

The Mode and Common Points of the Innovation of Industry University Research Cooperation in the Main Developed Countries

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Abstract

The main developed countries have accumulated a lot of successful experience and practice in the long-term cooperation of industry and industry, although there are some differences in the political and economic system, policy and culture. Summary and analysis of the experience of the developed countries, the innovation of industry, research and cooperation, we are building a technology innovation system, which is the main body, the market oriented and the industry university research cooperation, which is of great significance. In this paper, the United States, Germany, Japan and other major developed countries for the example, roughly summarized these countries to implement the mode of cooperation and innovation and common ground.

Key words: developed country; Research cooperation; Pattern; Experience

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INTRODUCTION

The choice of the mode of industry university research cooperation is influenced by two factors of macro

and micro factors. On the macro level, the research cooperation involves many departments or organizations of a country's national economy. It has formed a unique institutional environment, such as different social systems, cultural ideas, resources endowment, economic structure and scientific and technological level, which is influenced by the characteristics of each component.

1. THE MODE OF COOPERATION INNOVATION OF AMERICAN UNIVERSITY

The United States is one of the most successful countries, the United States of America's Silicon Valley model 'to prove that the United States of America's universities, federal laboratories and industry established a good partnership. The American government has played a very important role in the cooperation of industry university research. The support of multi-level science and technology program, the improvement of the legal protection, the effective management of the government is the important factor of the success in the United States.

1.1 Science and Technology Industrial Park Mode

In 1950s, with the rapid development of high-tech, the United States and government departments in order to take advantage of the University's research strength, began to engage in high-tech research and development laboratories located in the research universities around, they formed a new technology intensive areas, the 'science and Technology Industrial park. The characteristics of science and Technology Industrial Park are: first, the real cooperation between universities and other institutions of higher learning and scientific research institutions, second, usually with public or private research and development facilities, high-tech oriented enterprises, to support services for the purpose of the development of technology and business, and to support the development of the entire region, fourth, in order to support the growth of new

ventures and promote economic development. Now in addition to the Stanford Industrial Park and the “Silicon Valley” outside, Research Triangle Park, NC, Boston 128 Road High Tech Park, Tennessee Tech corridor are also the world-famous garden of science and technology, greatly accelerating the industrialization of scientific and technological achievements in the United States.

1.2 Business Incubator Model

Business incubator is a kind of organization model for the birth and development of new products and small businesses to provide help to help. The object is not the egg, but the commercial prospects of high-tech achievements, not hatched out of young birds, but new products and small business. “Enterprise incubator mode”, is a pioneering work American development cooperation in the process of research. The facts show that these business incubators are promoting the development of the industry, promoting the transformation of scientific research achievements, the development of high-tech industries, the cultivation of innovative ability of small enterprises, the creation of entrepreneurial team, the revitalization of regional economy and the national economy, etc.. Business Incubator in new enterprises to provide convenient and site at the same time, by providing various support services, for the new enterprise management, technical and financial assistance to matchmaking, and other experts and entrepreneurs the opportunity for interaction, so as to promote the growth and development of new enterprises.

1.3 Industry-University Cooperative Research Center and Engineering Research Center

Research university is the main base for the United States to engage in scientific research. The University’s scientific research institutions, in addition to the research laboratories and independent research units, the main role of enterprises in the research center, the research center of university cooperation, the establishment of the government in universities. The most successful example is the Massachusetts State University of polymer science and Engineering Research Center, and their cooperation with the company’s turnover was \$3,000,000,000, of which some companies have hundreds of scientists and engineers engaged in research. Funding for the ERC is mainly funded by the state, and the companies involved in the cooperation are also given considerable support. With the normal operation of the ERC, the national subsidy has decreased year by year, and the company has increased year by year. The final ERC depends on the cooperation between the two sides.

1.4 Development Model of High Tech Enterprise

High tech enterprise is the industry department of producing high tech products, which is usually separated from the University and Research Institute. The practice shows that the stripping is another important channel

for the flow of knowledge from the laboratory to the market. The establishment and development of high tech enterprises are summarized as follows: 4 ways: First, venture capital, which is the inventor of scientific research achievements, the use of venture capital to set up high-tech enterprises, production and development of high-tech products, which is the most important and typical way, the United States and the world’s most high-tech enterprises are developed in this way. Industry university cooperation is university scientific research institutions and enterprises cooperation, achievements in high technology provided by universities, research institutions and enterprises to provide production conditions, together constitute a risk sharing, benefit sharing of High Technology Consortium and its composition can enterprises, can universities and research institutions. Three are in the technology to implant type, is the university, scientific research institution will be the technical invention directly to the enterprise, the enterprise paid to introduce the high technical achievement. Four is external force grafting, which is through the introduction of high-tech and capital and the traditional production of enterprises, the use of grafting in the form of development of high-tech enterprises, so that the input of high technology and more advanced, more risk investment.

2. THE MODE OF COOPERATIVE INNOVATION IN GERMANY

The model of university industry university research cooperation model in Germany is the “dual system education” model of Vocational and technical education. The model focuses on the specialist level, its basic framework and operation mode: the preliminary work of the enterprise to carry out research cooperation program, the content involves cooperation methods, objectives, projects, deadlines, funding and security, the parties’ responsibility, and the final formation of the various parties can accept the implementation plan.

2.1 Pay Attention to the Cultivation and Education of Vocational and Technical Personnel

Pays attention to vocational and technical education is the characteristics of the German educational system, the German Vocational Education in various forms, the perfect structure, teaching process implementation of alternation, combination of engineering, students are not only students is business apprentice, both the theory of teacher and the teacher training, both textbook theory and practice teaching, training talents with high efficiency.

2.2 Cooperate With Market as the Center

According to the market demand, the enterprise puts forward cooperation projects, research and development, and along with the enterprise personnel to complete the trial of the entire project, and finally the two sides

together to market products. The whole cooperation fund is provided by the enterprise, and the school is under the full use of the enterprise's Association.

2.3 Unique "Consultant Cooperation System"

Many enterprises in Germany and colleges and universities have the cooperation system of the consultant " ". Many schools require teachers to act as consultants to the best of all walks of life, in particular the engineering teachers, to be a consultant, regardless of the size of the business. Enterprise general also to its advisory authority to the University of higher industry, Professor, Professor of special respect for advice, and at any time to the business information to the consultants to transmit and open. And once established, the relationship between the University and the University, which will be long-term, stable and close.

3. MODE OF JAPANESE UNIVERSITY RESEARCH COOPERATION INNOVATION

The Japanese government began to use a number of policies to encourage and guide universities, research institutions and industry to cooperate, to promote the development of industry, research and cooperation in 1960s. In the mid 1980s, the slogan of "science and technology" was put into practice. The Japanese government is actively promoting the process of industry, research and research. As a result, the Japanese government also paid much attention to improve the technological development. The Japanese government also paid much attention to improve the technology development.

(a) Led by the government to establish, research scientific research system of the Trinity, 1987 the Japanese Ministry of education set up three National University Cooperative Research Center. They are: Area of Toyama University Joint Research Center, Kobe University Joint Research and development center and University of Kumamoto area joint research center, the Japanese government also founded consists of the director, promote research agreement to strengthen the close ties between the provincial hall, to promote the smooth implementation of the cooperation of production, teaching and research.

(b) The establishment of scientific research achievements into productive forces, such as Japan in the University and scientific research institutions to establish a high tech market, the establishment of the government approved by the government technology transfer agencies, Japan has 18 universities have set up similar institutions, the organization form of the organization to take financial joint-stock company, consortium or university independent investment.

(c) Across the country to establish a variety of types of technology, to the end of 1999, Japan has built 27 science and Technology City, science and technology city to rely

on scientific research institutions and universities, and the upper and lower reaches of the industrial association and the formation of organic links, so that the University and research institutions based on the results and research results quickly realize industrialization.

4. THE COMMON GROUND OF THESE COUNTRIES, THE MODE OF PRODUCTION, RESEARCH AND RESEARCH

4.1 Strengthen the Management and Guidance Functions of the Government

To strengthen the cooperation between industry and University, we must emphasize the role of the government, establish the government as the leading innovation system, stimulate the enthusiasm of all parties to work together, and provide institutional guarantee for the independent innovation and development of high-tech enterprises. Attention to the role of the government in the construction of regional scientific and technological innovation system, in particular, to emphasize the government's management and guidance functions, local governments need to develop a series of preferential policies to promote regional innovation, to provide better environment and conditions for regional innovation, and to provide a new mechanism for the integration of complementary, mutually beneficial, pragmatic and efficient, open and flexible cooperation mechanism.

4.2 Industrial Innovation and Industrial Agglomeration Areas in the Construction of Industry

Innovation industry group refers to a certain region, a specific industry through the product supply and innovation services and mutual connection in a group of enterprises and research institutions, industrial agglomeration areas, including the innovative industrial zone, science and technology parks, technology incubators and other forms of organization or institution. At present, many countries take the form of innovative industry groups to carry out the research cooperation, on the one hand, can promote the sustainable development of specific industries; on the other hand, it can effectively promote the combination of research and industry, and can form the corresponding industrial chain, to solve technical problems.

4.3 Establish and Improve Intermediary Service Organization

Intermediary service organization is an indispensable support system in the cooperation of industry and research. Intermediary service organization on the one hand to provide help for the enterprise, so that it can find the conditions suitable, to cooperate to carry out the study of the University, while helping to understand the needs of

the enterprise, examine and revise the research direction. Universities and enterprises to carry out cooperative research, generally depends on the legal contract services agency, the university through the intermediary organizations to carry out cooperation with enterprises or to participate in the national research topics and make inventions. Therefore, we must establish and improve various intermediary service organizations to improve their service functions, so that not only has the function of advisory services, but also has the functions of security, in the process of research results in the transfer of the transfer agreement or contract.

4.4 Give Full Play to the Main Role of the Enterprise, in Particular, Should Support Small and Medium Enterprises to Participate in the Research Alliance

Industry university research alliance is an important part of technological innovation system, but in the construction of technological innovation system, we must deal with the relationship between the main body of the enterprise and the alliance. British government attaches great importance to small and medium enterprises, to support the development of small and medium enterprises as an important part of the national innovation strategy. In order to help small and medium enterprises to get more innovation, the British government not only set up the service agency of small and medium enterprises and other scientific and technological intermediary service organizations, but also to take a number of measures to promote small and medium enterprises and research institutions and universities in the financial and taxation.

4.5 Cultivation of Professional Talents

Technology transfer service personnel is one of the elements of the combination of production and research. In the United States, AUTM and a large number of technology transfer agencies are the cradle of technology transfer personnel training, and these two aspects are relatively lacking, we might as well learn from some of the experience of the United States in the early part of

OTL's experience: To absorb the University's professional personnel engaged in technology transfer, to its business and legal aspects of training, so that they can meet the work requirements; also can be recruited to understand the technology, understand the legal personnel team work together.

CONCLUSION

Combination of production and research is an effective way to accelerate the transformation of scientific and technological achievements, but also an important part of the construction of innovative cities. United States, Germany, Japan and other developed countries in the long-term cooperation in the process of the accumulation of a lot of successful experience and practice, learn from the developed countries, through policy guidance, mechanism innovation, platform to build a series of measures to accelerate the establishment of enterprises as the main, market oriented, political and industry research and innovation system, and promote the development of China's research and cooperation, accelerate the pace of China's economic and technological development.

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