

Market Mechanism of Promoting the Transformation of High-tech Achievements in Scientific Research Institutions of Universities

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Abstract. This paper expounds the market elements of the transformation of scientific research institutions' technological achievements, the development trend of the transformation market of scientific research achievements and the connotation of the market mechanism of scientific research institutions' achievements, analyses the reasons for the failure of the market mechanism of the transformation of scientific research institutions' achievements, and puts forward some measures to promote the smooth operation of the market mechanism of the transformation of scientific and technological achievements.

1. Introduction

Scientific research institutes in Colleges and universities are engaged in scientific and technological innovation, providing public goods for the society, and their role is the main body of public welfare. Under the market economy, scientific research institutions should not only engage in scientific and technological innovation, but also transform high-tech achievements and participate in market transactions. At this time, scientific research institutions are not only public welfare subjects, but also market subjects. Under the condition of market economy, the market mechanism of scientific research institutions' achievements transformation is the basic and core issue in the transformation of scientific research institutions' achievements.

2. Market elements of technological achievements conversion in scientific research institutions

2.1 Supply and demand parties of market for transforming scientific and technological achievements

Scientific and technological achievements have commodity attributes, but because of their particularity, they are difficult to sell directly in the market as general commodities. Scientific and technological achievements need to be improved by experiments or processed according to social needs before they are traded in the market. Finally, it is provided to the demander through licensing and transferring. The supplier of the market for the transformation of scientific and technological achievements generally refers to scientific research institutions, including enterprises and individuals, and the above parties can also become the demanders of the market. The interaction between multi-supplier and multi-demander in different time and space, together with the participation of government and market intermediaries, forms a multi-directional and complex market for the transformation of scientific and technological achievements, which is closely integrated with other markets in a country or region. At the same time, it is influenced by the political system, the stage of economic development, the level of market development, social structure, history and culture, regional characteristics and national traditions.

2.2 Market intermediary for transformation of scientific and technological achievements

Because of the particularity of the commodity attribute of scientific and technological achievements, the market for transformation of scientific and technological achievements needs the existence of market intermediaries such as legal services, patent applications, intellectual property operation, investment and financing, insurance, etc. Market intermediaries become bridges between supply and demand by providing information and services. Market intermediaries partly defuse the risks of scientific research institutions in the process of transformation of achievements. On the one hand, market intermediaries understand market demand, which can help scientific research institutions to improve their research results, and help them to find demand enterprises as soon as possible. On the other hand, market intermediaries help enterprises to select research results and facilitate market transactions.

2.3 Marketing of transforming scientific and technological achievements

In the process of transformation, scientific research institutions carry out two aspects of marketing: one is to sell the existing achievements of scientific research institutions to enterprises, and the other is to develop the results according to the needs of enterprises. Because scientific research institutions are limited by their positioning, professional fields and accumulation of achievements, marketing is mainly based on the results created by scientific research institutions to find market demand.

The marketing of scientific and technological achievements is not a simple trade in scientific and technological achievements. It needs not only to understand the industrial development and market situation, but also to master the relevant patents, technological layout and status quo. This requires marketers to have not only scientific and technological expertise, but also knowledge of economics and other related fields. At the same time, scientific research institutions need to transform their achievements from administrative departments to marketing departments.

3. Development trend of market for transforming scientific and technological achievements

3.1 Networking

In recent years, the market of transformation of scientific and technological achievements has shown a trend of networking, which is manifested in the establishment of transformation networks among scientific research institutions and between scientific research institutions and enterprises. These networks strengthen the linkage between scientific research institutions in the transformation of achievements, promote the docking of scientific research achievements and enterprise needs, and play a positive role in the development and promotion of the market of transformation of achievements.

3.2 Incubator

Concentrate the relevant elements of the transformation of technological achievements such as scientific and technological achievements, talents, services and capital, cultivate the entrepreneurship of scientific and technological personnel, and develop market application technology research and development. Since 2014, Harbin has carried out annual activities for the construction of scientific and technological business incubators, established an assessment mechanism for scientific and technological business incubators, opened an information management system and launched an "APP for foreign exchange earning". Provinces and municipalities jointly invested 64.95 million yuan to support the development of science and technology business incubators toward professional and market-oriented services. A number of new innovative business incubator platforms, such as Wanzhong Pioneering Valley, Leye Pioneering Space and Kazakhstan-Israel Incubator, emerged rapidly, which provided a favorable atmosphere and environment for the entrepreneurship of scientists and technicians. The agglomeration effect of entrepreneurship of scientific and technological personnel has been formed. The transformation market of scientific and technological

achievements has developed from the original emphasis on transaction to the function of multi-integration of transaction, incubation, service and investment.

3.3 Patent concentration

With the rapid development of the market for transformation of scientific and technological achievements, there is also a trend of patent concentration. The so-called patent concentration means that the patent concentrator concentrates the patent licenses of scientific research institutions or other organizations or individuals, packages or further develops the related technology licenses in a certain field, and then licenses them to other enterprises and organizations. Patent concentration increases the patent value of scientific research institutions, which can also be called Patent Value Added Model.

4. The connotation of market mechanism of scientific research institutions' achievements

4.1 Supply and demand mechanism

Usually, in the transformation of scientific research institutions, scientific research institutions are the suppliers and enterprises are the demanders. The supply-demand relationship and price, competition and other factors restrict and interact with each other, forming a supply-demand mechanism to promote the transformation of scientific research institutions.

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The supply and demand mechanism has the following characteristics. First of all, from the supplier side, the achievements of scientific research institutions are often far from market application, and there is still a long research and development process from the results to products. This determines that the supplier should continuously optimize and improve the scientific and technological achievements provided, and try to be close to the market application. Sometimes, such improvement needs close cooperation with the demander, including providing funds and testing facilities by the demander side.

Secondly, from the point of view of the demand side, enterprises are required to have the corresponding foundation in terms of funds, talents and R&D capabilities, be able to understand the potential market demand for science and technology, dare to bear the risk of R&D failure, and fully trust scientific research institutions and their scientific and technological personnel. The above characteristics of supply and demand determine that the supply and demand mechanism of scientific research institutions is not a one-time transaction, but a reciprocating and long-term interactive process, which requires close cooperation between supply and demand sides. This is obviously different from the general supply and demand mechanism, and determines that scientific research institutions must have both scientific research and market professionalism.

4.2 Competition mechanism

In the market of transformation of scientific research institutions' achievements, the first is the competition between enterprises for scientific and technological achievements, and the second is the competition between scientific research institutions for the demand side of enterprises. For the transformation of scientific and technological achievements, the above competition activates the motive force of market transactions and increases the supply and demand of scientific and technological achievements. In promoting the industrialization of scientific and technological achievements, China emphasizes linking the interests of both suppliers and demanders through a competitive mechanism, that is, the achievements of scientific research institutions are rapidly applied to enterprise production, and the scientific and technological needs in enterprise production are linked to the research and development of scientific research institutions. Because the scientific and technological achievements of scientific research institutions are often more advanced and far away from the market, the actual demand side is sometimes not many, or even none, so the competition mechanism often fails to play a role.

4.3 Price mechanism

In the market competition, the price of transformation of scientific and technological achievements interacts with the supply. In terms of price formation, both suppliers and demanders play and cooperate on the value of transformation of scientific and technological achievements and market revenue expectations, and finally reach a price acceptable to both sides. In terms of price composition, the price of transformation of scientific and technological achievements generally includes pre-contract fee, royalties based on sales products, minimum annual fees for maintaining permission, and sometimes installment payment or milestone payment. The above price composition reflects the dynamic and interactive characteristics of the realization of transformation price of scientific and technological achievements, that is to say, the price of transformation of scientific and technological achievements is formed by undertaking science and technology with enterprises. As a result, further R&D is closely related to the final product sales of the enterprise and the close cooperation between the supplier and the demander after the transaction. In terms of price regulation, benign price mechanism of transformation of scientific and technological achievements drives scientific research institutions to increase supply around market demand, thus promoting more scientific and technological achievements to be transformed into enterprises, while enterprises generate more demand for scientific and technological achievements due to the increase of benefits from transformation of scientific and technological achievements.

In the price mechanism of transformation of scientific research achievements, the price and value are generally the same, and the value here should be understood as the market value actually created by the transformation of scientific and technological achievements into social application products, rather than the value demonstrated or evaluated from the scientific and technological achievements themselves. If we start from the latter to determine the price and then insist on the market transaction at that price, it obviously does not conform to the price mechanism of scientific research institutions, nor does it conform to the general market mechanism. Scientific research institutions generally adopt the licensing method for the transformation of achievements, and the realization of the licensing price is linked to the sale of enterprise products, thus ensuring the basic consistency of the price and value of the transformation of scientific and technological achievements.

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