

Analysis on the Countermeasures of Patent Transformation and Promotion of Universities in Yunnan Province

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ABSTRACT

Based on the current situation of university patent transformation in Yunnan Province, it was found that the invalid patents accounted for 16.29% of the patents transformed by universities in Yunnan Province. Patent conversion was mainly distributed in Kunming, but not in most other cities. This study analyzed the factors that restricted the patent transformation of universities in Yunnan Province, and put forward that the government should establish an assessment system for patent transformation and build relevant platforms; universities should start with the internal assessment system, the management system of relevant departments and incentive measures for scientific research personnel to formulate a reward and punishment system to promote patent achievements.

Keywords: Yunnan University, Patent, Transformation, Countermeasures

1. INTRODUCTION

1.1. Value of Topic Selection

Improving the ability of innovation and building an innovative country has been promoted to the height of national strategy, which means that the main theme of social and economic development is innovation. Scientific and technological innovation is one of the important criteria to measure the social status of a country, while universities are the source of knowledge and technological innovation, and the main force of basic research in our country. Intellectual property rights represented by patents are an important part of scientific and technological work in universities. If an authorized patent cannot be converted, it cannot create social and economic benefits, just like a piece of waste paper. Generally speaking, the patent is just like a commodity. Only when patent technology is successfully transformed, can universities benefit from it. According to Alexander Arrow of the United States, patents and other forms of intellectual property are very similar to the financial assets in the 19th century and have two distinct characteristics: the risk of ownership and the difficulty of handling. The risk refers to the high exclusive cost of patent, which makes the obligee face economic risk. The difficulty of handling means that it is very difficult for the obligee to transform the patent into the market due to the reasons for capital, technology, and management [1]. According to the statistical data of "China University

Intellectual Property Report (2010)" published by the Ministry of education, from 1985 to 2010, the total number of patent applications in Chinese universities was 319595, with an average annual growth rate of 19.8%; the total number of patents granted was 150029, with an average annual growth rate of 26.0%. In 2010, a total of 79332 patent applications were submitted by Chinese universities, which was 52 times higher than that in 1985, and the number of patents granted was 43153, which was 113 times of the total number of patents granted from 1985 to 1986. Although the number of patent applications and authorizations in universities has increased by tens or even hundreds of times, the quality of patents has not improved, but has declined. The average life span is only more than three years, and the patent conversion rate is generally lower than 5% [2]. The patent conversion rate of most developed countries is more than 50%, and the patent technology conversion rate of the United States and Japan is as high as 70% [3]. From the above statistical data, it can be seen that at present, there is a phenomenon of "more authorization, less conversion, low efficiency and short life span" of university patents in China.

1.2. Research Significance

As a gathering place for high-level talents and a high-density area of scientific research resources, universities create hundreds of patents every year. It can be said that universities are an extremely key link in the scientific and technological innovation system. It not only dominates China's basic scientific research and high-tech

research, but also contributes to the economic growth of some areas. The state invests a large number of funds every year to provide an economic basis for scientific research in universities. The main purpose is to produce more results and contribute to the promotion of social development. According to the relevant data, although the number of patents granted by universities increases greatly every year, there are also a large number of "useless patents" gushing out, and the authorized patents cannot be transformed successfully. Patent transformation is a complicated system, which is not only determined by unilateral factors, but also affected by universities, governments, enterprises, as well as capital, environment, policy, market, etc.

1.3. Research Purpose

By consulting and learning from the research results and practical experience of domestic and foreign scholars, combined with the path and influencing factors of patent transformation in domestic universities, and connecting with the characteristics of Yunnan Province, this study systematically analyzed the current situation, existing problems and obstacles encountered in the process of patent transformation of universities in Yunnan Province, to explore the effective ways of patent transformation in universities in Yunnan Province and put forward some targeted suggestions and countermeasures to improve the conversion rate.

1.4. Development Status at Home and Abroad

1.4.1. Foreign Research Status

Foreign scholars' research on the transformation of patent achievements in universities is relatively early, and there are a large number of research results. Foreign studies mostly focus on government policy, transformation mode, transformation system and influencing factors, etc. For example, Canadian scholar Nice and American scholar Yong S. Lee (1996) pointed out that entrusted research was the main cooperative research way for universities to transfer to enterprises. J. Lee and H. N. Win of Korea Science and Technology Policy Research Institute analyzed the main factors affecting university science and technology [4]. It can be seen that there is little research on the status of patent transformation in universities, and there is a lack of in-depth research. However, they also laid a foundation for follow-up research. When studying the current situation of patent transformation, we can comprehensively consider from these dimensions.

1.4.2. Domestic Research Status

As the main base of scientific and technological innovation, universities promote social development. In the past few years, domestic scholars have chosen the transformation of university patents as an important factor

in the study of the transformation of scientific and technological achievements in universities. The relevant literature show that the research of domestic scholars mainly focus on the current situation, transformation mode, existing problems and countermeasures of patent transformation in universities (i.e., Huang Jisheng's "Research on the Problems and Countermeasures of Patent Transformation in Universities in China" [5], Zhang Jingwei's "Research on the Problems and Countermeasures of Patent Achievement Transformation in Universities in China" [6], Zheng Yanmei and Yu Bing's "Problems and Countermeasures of Patent Management in Universities" [7-8], etc.). All these indicate that scholars have been studying the patent issues of universities in China. Through reading the literature, it is found that the scope of scholars' research is extensive, but only stay on the surface, and do not carry out in-depth research.

2. BASIC THEORY OF PATENT TRANSFORMATION IN UNIVERSITIES

2.1. Patent Technology

Patent technology refers to the invention of technological achievements that have been patented. The content of patent technology has been required to be fully disclosed to the society through patent documents in the process of application; during the period of patent validity, the patentee has the right to use and license others to use the patent technology, which is protected by the patent law; the protection of patent technology is subject to geographical restrictions.

2.2. Patent Technology Transformation

Patent technology transformation is a kind of act of law that patent applicant and patentee transfer patent application right and patent right to others. Patent technology transformation should pay attention to correctly evaluate its own patent value. Patent transfer can make universities obtain considerable transfer fees by transferring their patent technology, and at the same time save the cost of patent maintenance. The transferee can obtain key technology through the transfer of patent technology, reduce the cost of research and development, and accelerate the research and development cycle.

2.3. Mode and Path of Patent Transformation

There are mainly the following modes of university patent achievements transformation in China: 1. Self-management entity mode. It refers to that universities, relying on the existing policies and environment, set up their own enterprises and transform patent technology into real productivity. 2. Joint entity mode. It refers to that the

enterprise puts the patent technology achievements into the production of an entity, and the enterprise calculates the economic benefits of the patent separately, and finally pays the university or inventor who provides the patented technology with a certain proportion of income according to the contract signed by both parties. 3. Incubator mode. This is a kind of social and economic organization to improve the survival rate of technological enterprises' patents. This mode can provide research and development base, infrastructure, and staff training for the transformation of scientific and technological achievements. From the overall situation, the incubator mode has functioned obviously in promoting China's economic development. 4. Through the transformation mode of technology market. There are two kinds of transmission modes of patent technology through the market: 1) the sale of patent refers to the direct transfer of patent technology to the transferee at a certain price. 2) Patent transfers technology through the intermediary agency, which is a bridge between universities and enterprises.

3. ANALYSIS OF THE PROBLEMS RESTRICTING THE PATENT TRANSFORMATION OF UNIVERSITIES IN YUNNAN PROVINCE

3.1. The Insufficient and Low Intensity of Attention

In general, the phenomenon of "attaching importance to authorization and neglecting transformation" has not been improved. The research direction of scientific research projects is often far away from the needs of enterprises and market development. A large number of patents have low market level, and even some useless waste patents are produced. Although the number of patent applications in universities increases rapidly every year, many of them are unable to enter the market because of the poor practicability of patent technology. In terms of system, the number of patents is the main index in the evaluation of professional titles, performance appraisal and appointment of teachers, and the achievements of patent transformation are not included in the category of evaluation and reward. By logging on the Patent Website of the State Intellectual Property Office, the patents of 32 undergraduate universities in Yunnan Province identified by the Ministry of education were searched, and the specific situation of patent output of Yunnan universities in recent 10 years was analyzed. Combined with the existing research [9], it was found that there was no correlation between the scientific research strength of universities and the transformation performance. Some universities with general scientific research strength have expanded the path and mode of patent transfer from the aspects of policy, scientific research institutions, market demand, etc.

Although some universities have a high level of patent authorization and technological innovation, the number of patent transformation is zero. The main reason is that the university does not pay enough attention to the transformation work, and the inventors are lack of motivation and enthusiasm, which restricts the smooth transformation of patent achievements.

3.2. Lack of Effective Management in Patent Maintenance

Several universities only pay attention to authorization and ignore patent protection. Inventors and universities may lose their patent due to lack of funds or unable to bear the annual fee after losing government funding. Invalid patents account for 16.29% of the patents converted by universities in Yunnan Province. Most of them are due to the failure to pay the annual fee before the expiration of the patent protection period. There are two main reasons for the invalidation of patent: 1) The technology is out of date or replaced by new technology. Invalid patents are not protected by law and can be used free of charge. In a short period of time, a large number of patents will be put into production, and the level of marketization will be higher. However, with the rapid development of technology, the old technology will be gradually replaced by new technology. 2) The investment of risk is insufficient. Patent transformation itself is a complex process, which requires a lot of manpower, material resources and financial resources. No matter which link is missing, it may lead to the failure of patent transformation. For patent with unclear prospects, even if the legal procedures for transfer (license) are completed, market entities (transferees and licensees) are not willing to make small-scale or medium-term investment, and finally give up to maintain the patent to remain valid due to insufficient risk investment [10].

3.3. Lack of Communication Channels Between Universities and Enterprises

The main reason why university patent cannot be favored by enterprises is that they fail to communicate effectively with enterprises in the process of topic selection and technology research and development, resulting in the derailment of patent technology and market, unable to put into production, or unable to find cooperative enterprises and transformation platform. From the perspective of universities, most universities in Yunnan Province have not set up departments and persons in charge of communication with enterprises. Even though some universities have set up, the personnel structure is too simple and the quality is relatively low, which fails to play its due role. Researchers themselves do not have the corresponding ability to transform technological achievements, and they fail to communicate effectively with enterprises during research and development, and

there are no conditions for cooperation with enterprises after the completion of technical achievements, which seriously restricts the transformation of scientific and technological achievements in universities.

3.4. Uneven Distribution of Patent Transformation Fields

There are differences between regions and industries in patent transformation of universities in Yunnan Province. First, the conversion rate is not balanced. There are differences in the number of patents and scientific research strength between universities. The patent conversion rate is not only related to the level of scientific research and disciplines, but also provides effective support for the dissemination of patent information, the establishment of connections between patentees and patent users, and patent transaction, to reduce the cost of patent search and matching, and accelerate the implementation of patent technology and the transformation and application of achievements. Patent technology is mainly distributed in Kunming, and a small part of it appears in Dali, while the other eight cities do not appear, which shows a serious uneven distribution of technology.

4. COUNTERMEASURES AND SUGGESTIONS FOR PROTECTING PATENT TRANSFORMATION OF UNIVERSITIES IN YUNNAN PROVINCE

4.1. Implement Scientific Evaluation System

In the evaluation of universities, the Ministry of Education usually takes the number of patents as an important basis for determining the level of scientific research, and does not care about the quality and realizability of patent. When choosing scientific research subjects, universities will not consider the practicability of patent, and there will be a large number of "bubble patents" gushing out. It is this assessment method that causes the low enthusiasm for patent transformation. Therefore, the Ministry of Education is expected to establish a scientific evaluation system of universities to assess universities from the perspective of all-round and comprehensive development.

4.2. Building a Platform for University Transformation

The patent is ultimately rooted in the market. However, according to the current situation, the patents of universities cannot meet the market, and some enterprises complain that patents cannot be applied to practice. Therefore, if the scientific research projects of universities can be directly related to enterprises, there will be a very

clear research purpose and direction, and these patents will have good application prospects. Universities can strengthen cooperation with enterprises to improve the purpose of patent research and application.

If universities and enterprises can fully and effectively communicate and innovate cooperatively, it is more conducive to the transformation of university patent achievements. Universities are supposed to reasonably allocate staff, and enterprises should also set up relevant departments. Only with specialized departments and high-quality staff, an effective communication between the two is realized.

The top managers of universities are expected to lead effectively. It is necessary to actively advocate that researchers should be guided by the patent market, pay close attention to the market situation and devote them to the implementation of patent technology. The development of patent technology is not only the task of researchers and managers, but also requires the joint efforts of all departments and colleges.

4.3. Improving the Management Mechanism of Patent Work

"No rules, no square". To carry out the work well, it is crucial to establish a sound work management system. First of all, it is essential to set up relevant patent management departments and clarify the management system and functions. Teachers are the main inventors of patents. If the teachers think that the patents have no value, they generally do not have good market value, and it is difficult to get the favor of the market. In the application, the inventors should be required to strengthen the examination and approval. Universities can also, according to the actual situation, require teachers to pay a small part of the fee to enhance the sense of responsibility of teachers.

Secondly, it is crucial to improve the talent reward and punishment system. In terms of the management system, it is necessary to emphasize that the inventor's scientific and technological achievements are related to the reward amount, and the reward standard of universities is mainly based on the benefits after the transformation of scientific and technological achievements. At the same time, universities should also formulate a punishment system and transformation responsibility system. If the inventor's patent cannot be transformed on time within the prescribed time limit, the university will be responsible for the transformation, and the income obtained by the inventor will be reduced, and the corresponding proportion of the income of the University will be increased.

It is essential to strengthen the construction of patent management team. The work of patent management needs talents who are proficient in the field of disciplines. Therefore, universities can strengthen the professional training of relevant personnel to improve their work quality, update their knowledge and change their concepts. At the same time, it is crucial to introduce technical talents,

strengthen the personnel team and improve the management system.

4.4. Improving the Compatibility of Patent Technology and Market

In order to reduce the generation of the waste patent, change the current situation of mismatch between patent technology and market demand, and enhance the practicability of the patent, it is crucial to start from the market demand. The importance of patent transformation should be fully considered in the selection of scientific research projects. Additionally, more attention is supposed to be paid to the practical operability of patent technology achievements guided by market-oriented theory. Only when the patent research of universities is highly consistent with the market, the patent produced can meet the market demand. Besides, only by solving the issues from the source can the performance of patent market be improved, and then provide more financial support for the development of universities. If the above measures are taken and actively cooperate with relevant enterprises, the patent achievements will be put into production effectively.

5. CONCLUSION

To sum up, there is no quality without the number of authorized patents, but we cannot blindly pursue high authorization. When the quantity reaches a certain amount, the focus must be shifted to patent quality and transformation. In order to solve the obstacles encountered in the process of patent transformation in Yunnan universities, the government should establish a scientific university assessment system, build a relevant platform, and provide a scientific system and effective transformation channels for university patent transformation. Universities are expected to start with the assessment system, the relevant department management system and scientific research personnel, formulate and implement the reward and punishment system to promote patent achievements and strive to stimulate the motivation and enthusiasm of scientific research personnel. At the same time, universities should also strengthen communication and cooperation with enterprises, take a proactive attitude, and perfectly combine patent research and development orientation with enterprise demand and market prospects. Universities can also work out suitable management methods and measures according to their characteristics.

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