

Analysis on the Present Situation of Patent Transfer in Hubei University

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Keywords: Hubei University, Patent application, Patent transfer.

Abstract. In order to speed up the construction of innovative country, we must promote the ability of scientific and technological innovation, and accelerate the transformation of scientific and technological achievements, colleges and universities are the main body of technological innovation and transformation of achievements. Facing the dilemma of low patent conversion rate in colleges and universities, this paper first analyzes the patent application and transfer in Hubei province from 2010 to 2016, and then makes a comparative study of the top 8 provinces and cities in the comprehensive strength of colleges and universities. To find out the gap between Hubei and other province. On the basis of all the above, through some aspects of patent application management, talent incentive and cooperation between the supply and demand side of patent technology to put forward the countermeasures and suggestions to improve the transfer of patent technology in Hubei Province.

Foreword

General secretary Xi Jinping stressed: "Innovation is the first driving force for leading development and a strategic support for building a modern economic system" in his report by 19th CPC National Congress of the Party, to accelerate the construction of an innovative country, we must focus on enhancing the ability of scientific and technological innovation. With a number of world-class scientific research institutions, research universities, innovative enterprises, can emerge a number of important original scientific achievements ^[1]. Colleges and universities are one of the important sources of technological innovation, and an inseparable force in the close integration of science and technology. The outline of the National Intellectual Property Strategy points out that "it is necessary to guide the support of innovation elements to enterprises and promote higher education, and to promote the application and industrialization of intellectual property shifting to enterprises from School and transfer innovation research institutes, shorten the industrialization cycle." In the face of the comprehensive development of the economic globalization and information technology, China support to the development of technology patent more and more, not only required to develop strategic emerging industries, but also requires the creation of technology innovation platform to speed up the transformation and application of science and technology, gradually deepening the reform of science and Technology University. As an important part of the innovation of scientific research development in our country, colleges and universities play an important role on promoting the process of patent technology market. Patent technology and the market have become an important problem to be solved at present. There are many scientific research institutes in colleges and universities in Hubei province, how to transform the patent achievements into productive forces has become one of the problems that need to be solved.

Analysis on the Present Situation of Patent Application and Transfer in Hubei Province in Recent Years

Number of Patent Applications

As shown in figure 1, the number of patent applications filed by colleges and universities in Hubei Province, it was from 3198 rising to 14261 in 2010 to 2016, an overall increase is 346.35%, an annual increase is 23.83%; although the total number of patent applications increased year by year from 2009 to 2012, the growth rate fluctuated, with the largest increase of more than 40% in 2013

and 2016. Invention patents accounted for more than 40% of the patent applications, of which almost all patent applications came from invention patents in 2013, and the remaining few years accounted for the number of invention patents. In 2010, the number of applications for invention patents was 1880, increasing to 8068 in 2016, an increase is 329.15%, an average annual increase is 23.13%.

Valid Invention Patent

The valid patent refers to the patent that is still valid after the patent application has been authorized. The patent situation of the effective invention in Hubei Province from 2010 to 2016 is as shown in figure 2: it shows an upward trend that the total effective invention patent in Hubei Province during 2010-2016. From 2010 to 2016, the total increase was 78.88%. The average annual increase was 8.66%. The number of valid invention patents in 2012 decreased by 21.93% than that in 2011, while the increase of effective invention patents in 2011 was the most obvious, reaching 28.93%.

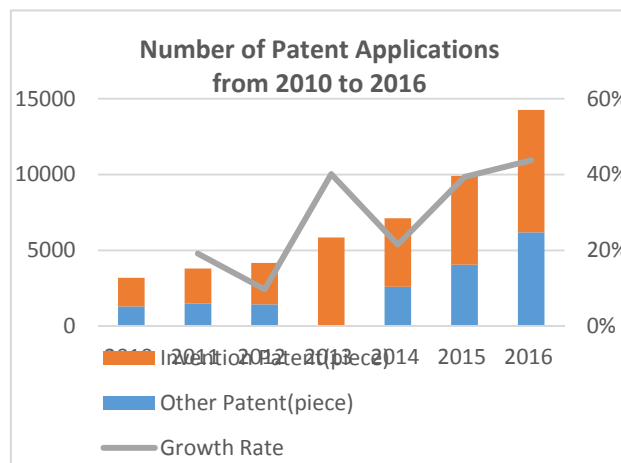


Figure 1. Number of patent applications in Hubei Province in 2010 to 2016

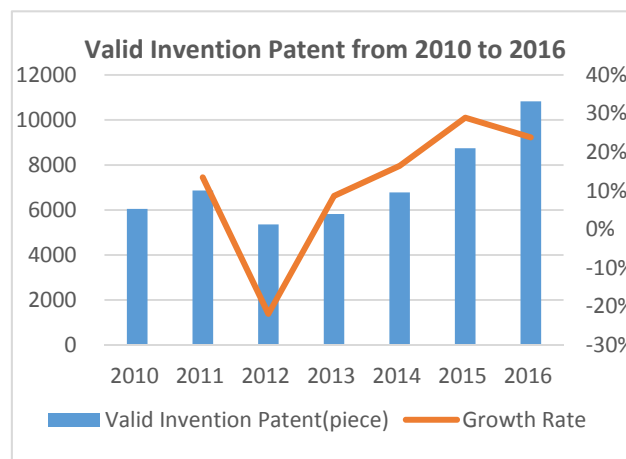


Figure 2. Patent status of valid invention patent in colleges and universities from 2010 to 2016.

Data Source: China Science and Technology Statistics Yearbook 2011-2017.

Transfer of Patent Ownership and Number of Licenses

In Hubei Province, the transfer of patent's ownership and the number of licenses from 2010 to 2016 in colleges and universities is as shown in figure 3, it's showed a general downward trend, from 177 in 2010 to 153 in 2016. As can be seen from figure 2-3, the number of patent transfers and licenses rose steadily from 2010 to 2012. In 2013, the number of patents transferred and licensed rose by 188 from the previous year, falling below 100. Although there were rebounds in 2014 and 2016, the number is still not as good as 2010.

Transfer of Patent Ownership and Income from Licensing

In Hubei Province, the transfer of patent ownership and the income from licensing in 2010-2016 are in a fluctuating trend as shown in figure 4, which shows that the transfer of patent ownership and the income from licensing in 2010-2016 have fluctuated, from 13.68 million yuan in 2010 to 31.39 million yuan in 2016. The overall growth rate was 129.47%, with an average annual increase of 12.6%. In 2012, from 16.44 million yuan in 2011 rising to 46.45 million yuan, the increase was the highest in recent years, with an increase of 182.55%, but there's a sharp decline of more than 50% in 2013 and 2014. In 2015 and 2016, it picked up again.

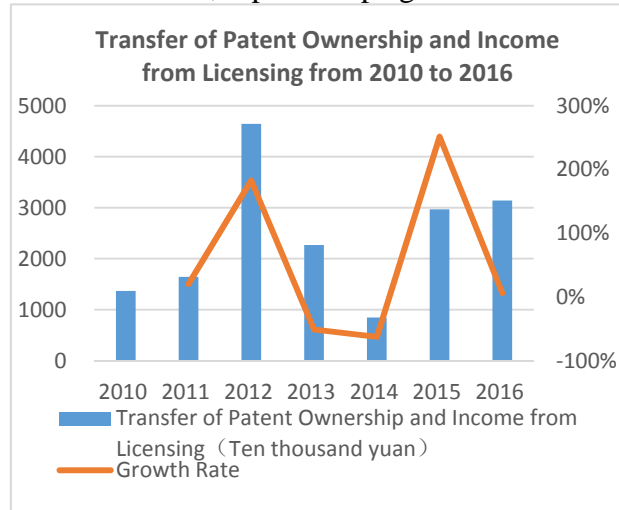


Figure 3. Transfer of patent ownership and number of licenses in Hubei Province from 2010 to 2016

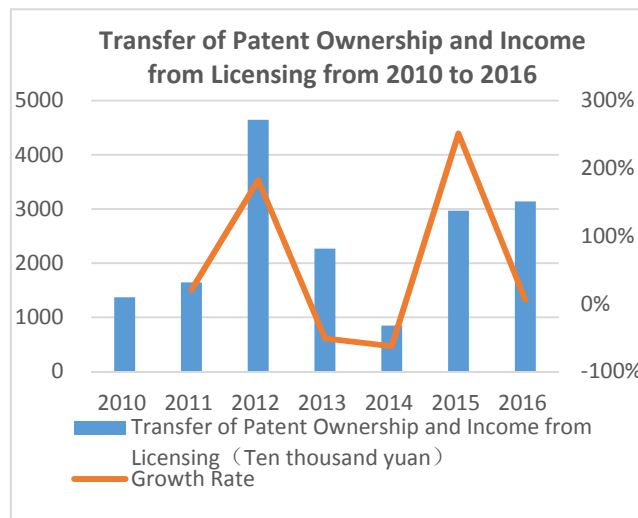


Figure 4. Transfer of patent ownership and income from licensing

Data Source: China Science and Technology Statistics Yearbook 2011-2017.

It can be seen from the above analysis that although the number of patent applications is steadily increasing year by year, the related data of patent transformation fluctuate greatly, and will fall sharply in a certain year. It shows that the rate of patent transfer in colleges and universities in Hubei Province is not ideal.

Comparative Analysis of Patent Application and Transfer in Colleges and Universities between Hubei Province and Other Regions

From the above part of the analysis, we can see the situation of patent application and transfer in Hubei Province colleges and universities in 2010-2016. Now, we need carry on the horizontal comparative analysis of the colleges and universities in Hubei Province and that in other 7 regions¹

with comprehensive strength in China (Jiangsu Province, Beijing City, Shanghai City, Shaanxi Province, Guangdong Province, Tianjin City), Sichuan Province).

From Table 1, we can see that the number of patent applications in eight provinces and cities in 2010-2016 is increasing year by year. Among them, Jiangsu Province has the largest number of patent applications, which is far higher than the other seven provinces. In 2016, the number of university patent applications in Hubei Province was only 40% of that in Jiangsu Province. The number of Hubei Province was in the middle reaches in 8 regions, but in terms of average annual growth rate, Hubei Province, Guangdong Province and Sichuan Province all maintained high annual growth rate.

Table1. Number of university patent applications in 8 regions from 2010 to 2016(piece)

<i>Province</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2016</i>	<i>Annual Growth Rate</i>
<i>Jiangsu</i>	12694	19413	24340	22721	26291	35507	15.83%
<i>Beijing</i>	8425	9413	10327	26178	11503	14960	8.55%
<i>Shanghai</i>	6828	8003	8770	12900	9503	10848	6.84%
<i>Shanxi</i>	4034	5121	5605	8089	6848	13825	19.24%
<i>Guangdong</i>	3427	3930	4682	6895	6819	15680	24.26%
<i>Hubei</i>	3195	3807	4179	5857	7117	14261	23.83%
<i>Tianjin</i>	2234	3105	3743	4442	5281	6044	15.28%
<i>Sichuan</i>	1891	2775	3650	3981	5077	10043	26.94%

Data Source: China Science and Technology Statistics Yearbook 2011-2017.

Table 2. Number of university patents transferred and licensed in 8 regions from 2010 to 2016(piece)

<i>Province</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>Annual Growth Rate</i>
<i>Jiangsu</i>	244	256	507	431	479	691	1493	29.53%
<i>Beijing</i>	109	166	147	193	198	302	745	31.60%
<i>Shanghai</i>	179	194	199	253	139	243	312	8.26%
<i>Shanxi</i>	77	97	97	101	149	122	203	14.85%
<i>Guangdong</i>	73	81	52	80	73	107	227	17.59%
<i>Hubei</i>	177	227	279	91	56	125	153	-2.06%
<i>Tianjin</i>	66	79	83	83	90	40	47	-4.73%
<i>Sichuan</i>	53	71	94	109	158	106	249	24.74%

Data Source: China Science and Technology Statistics Yearbook 2011-2017.

As can be seen from Table 3-2, except Hubei province and Tianjin, the number of patent transfers and licenses of colleges and universities in other regions has been increasing year by year from 2010 to 2016. Jiangsu Province has the largest number and still maintains a relatively high growth rate, while Beijing has the highest average annual growth rate. The number of university patents transferred and licensed in Hubei Province also ranks second among the eight regions. After keeping the growth for two years, there has been a sharp decline in the number of patents transferred and licenses in Hubei Province. This is a situation not appeared in other provinces and cities. We should find out the reasons and make adjustments in time to catch up with the pace of other regions.

Suggestions on the Development of Patent Technology Transfer in Colleges and Universities in Hubei Province

Although the number of patent applications in Hubei colleges and universities has been increasing in recent years, the number of patent transfers and licenses, the transfer of patent ownership and the income of licenses have fluctuated greatly. Hubei Province has no advantages

compared with other regions, especially there is still a big gap with Jiangsu Province. Hubei Province has many colleges and universities, how to turn the scientific research achievements of universities into productive forces, Narrowing the gap with other regions? In response to the above, the following observations are made:

Strict Administration of Patent Application Authorization and Reduction of Patent Unused

First of all, while encouraging patent applications, we must strictly standardize the patent examination process and ensure that there are scientific and feasible patents to be authorized. Secondly, universities, scientific research institutions and related enterprises should establish a model of industry-university-research cooperation. The patent transfer object should be found in advance, and the cost of the transfer process should be reduced. For the valuable patent, it is necessary to appropriately extend the duration of use, continuously innovate and reform, and realize the effectiveness of patent transformation. Maintain and other links to make efforts to improve patent utilization.

Strengthening Patent Support and Perfecting the Policy of Encouraging Talents

To increase the support for scientific research projects in colleges and universities, to ensure the timeliness of scientific research funds, to fully mobilize the enthusiasm of scientific research personnel. Therefore, it is necessary to absorb all kinds of social idle funds, increase government input and actively introduce private capital, and improve the cooperation mechanism between enterprises and universities, it is convenient for enterprises to understand the attributes and characteristics of relevant patent technology in time, and to realize patent conversion into practical application as soon as possible.

To Realize the Close Cooperation between the Supply and Demand Parties of Patent Technology

In order to promote the process of patent transformation in universities in Hubei Province, the supply and demand parties of patent and technology need to trust each other and cooperate with each other. As the demand side of patent technology, enterprises should set up all-round cooperation ideas, strengthen the trust between the two sides, and strengthen the exchange of information in all aspects of patent technology through all-round cooperation. The demand side timely feedback its demand for science and technology patents, and the supply and demand side constantly improves innovation according to the demand, and increases the success rate of patent transformation.

Acknowledgement

This research was financially supported by the Institute of Wuhan Studies (IWHS20172018).

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