



The Impact of Intellectual Property Quality on Economic Development: Insights from Jiangsu Province

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Authors' contributions

This work was carried out in collaboration among both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Aims: This paper gets rid of the limitation of patent quantity of intellectual property, strengthens people's protection on the quality of intellectual property, and makes people realize that intellectual property will eventually be transformed into productivity and have an impact on economic development.

Study Design: The quality of intellectual property is measured through three dimensions: patent market (economic) quality, patent technology quality and patent law quality

Methodology: Based on the essence of patent quality, this paper defines and divides the concept, evaluation system and research index of intellectual property quality, and analyzes the internal relationship and influence mechanism between intellectual property quality and economic development.

Results: The quality of intellectual property is positively correlated with economic development.

Conclusion: The research conclusion puts forward new requirements for the transformation efficiency of intellectual property in the technology market of Jiangsu Province. The ultimate destination of patent invention is to serve the society and promote productivity. It is not only necessary to pay attention to the protection of the "source" of intellectual property, but also to

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enhance the agglomeration effect of intellectual property in the "economic estuary". It is of great practical significance to realize both "quality" and "quantity" of intellectual property for strengthening the construction of intellectual property, perfecting intellectual property system and promoting economic development.

Keywords: Intellectual property quality; patent quality; patent quality system; economic development.

1. INTRODUCTION

The development strategy of intellectual property rights is an important way to realize the high quality development of our country's economy, and patent, as an important part of intellectual property rights, plays an increasingly important role in the road of innovation-driven development and the construction of intellectual property power in our country. The data show that from 2014 to 2017, the number of invention patent applications in China has increased explosively, with a growth rate of 71%, and has occupied the first place in the world for many years. However, there is a wide disparity in the possession of effective invention patents per 10,000 people between China and developed countries. For example, in 2016, compared with Japan, South Korea, and the United States, in 2016, the number of valid invention patents per 10,000 people only accounted for 27.6 percent, 17.5 percent and 18.4 percent, respectively. Although our country outpaces America and other innovative countries in the number of patent applications, our patent quality and patent transformation efficiency are slightly backward in various aspects, which reflects that it is not objective to measure the value and innovation power of patent by the number of patent applications alone. Now, China is still in the early stage of patent, strengthen patent quality management, continue to deepen innovation reform, promote the follow-up of intellectual property supporting policies, starting from the whole chain of intellectual property, make the public realize that now in the stage of innovation-driven development, blindly pursuing the extensive growth of patent number can no longer adapt to the current regional competition with scientific and technological innovation as the core. We should realize the transformation of intellectual property from quantity accumulation to quality, and change the way of scientific research evaluation. It is more innovative value to evaluate economic growth through the quality of intellectual property. At present, the construction of intellectual property in Jiangsu ranks among the best in China, and the experience in the creation, protection and

application of intellectual property is of great reference significance to most provinces. The number of National intellectual property Protection centers in Jiangsu ranks first in China, the comprehensive development index of intellectual property ranks second in China, and the high-quality development of intellectual property has achieved remarkable results. Therefore, what is the relationship between the quality of intellectual property protection degree and regional economic development in Jiangsu Province? Clarifying this problem not only provides theoretical support for sorting out the key influencing factors of intellectual property quality and the action path of each influencing factor. This paper studies the correlation between intellectual property quality and economic development. However, it only takes Jiangsu Province as an example, which has limitations and lacks data. In the future, it is necessary to further collect data and enter into empirical research.

2. LITERATURE REVIEW

2.1 Research on Quality Evaluation System and Index of Intellectual Property

In the construction of the quality index system of intellectual property, although there is no strict fixed standard, most of them focus on patent technology, law, application and other aspects, and build a comprehensive and multi-dimensional evaluation system. In the initial stage of patent quality research, the construction of patent quality system is mostly based on some patent quantity indicators, such as the number of patent grants and the proportion of invention patents.

2.1.1 From the perspective of patented technology

From the technical point of view, it is based on the creativity, novelty and practicality of patented technology, and the patent quality is measured by patents with certain technical content. For

example, Zhou Lu and Zhu Xuezhong believe that patent quality refers to the level of creativity of the authorized patent itself based on the technical perspective [1]. Meng et al believe that patent is an important innovation output, and patent quality can represent innovation quality to some extent [2]. Ding Huan feng, He Xiao fang [3] and Tang Heng [4] all characterized patent quality as its influence on the competitiveness of patent users. The more advanced and complex the technology, the higher its market prospect and economic value, and the higher the patent quality.

2.1.2 From the point of view of patent law

This perspective is based on the examination process of the patent, the degree to which the patent meets the licensing criteria set out in the law [5]. Yan Zhe defined the legal quality of patent as the scope of legal protection and the stability of legal effect contained in the patent [6]. Deng Heng and Wang Han believe that high-quality patent has three legal elements: novelty, creativity and practicability, as well as high legal quality and technical quality [7].

2.1.3 From the perspective of the patent market

This perspective takes into account the influence of external environment on patent quality. Based on patent value, market transformation of patent refers to the economic quality of patent. Zhang Xiaojing believes that patent quality is positively correlated with patent market value [8].

2.2 Research on Patent Quality Evaluation System

In the initial stage of patent quality research, the construction of patent quality system is mostly based on some patent quantity indicators, such as the number of patent grants and the proportion of invention patents. With the deepening of scholars' research, although there is no strict fixed standard for the construction of intellectual property quality index system, most of them focus on patent technology, law, application and other aspects, and build a comprehensive and multi-dimensional evaluation system. For example, Cheng Wenyin et al. proposed a three-dimensional evaluation method for patent quality, and evaluated the quality of Chinese patents from the perspectives of patent length (reflecting the exclusivity time), patent width (reflecting the scope of patent), and patent depth (reflecting the

exclusivity strength) [5]. Deng Heng and Wang Han divided the high quality patent influencing factor system into three levels, which are the influencing factors of patent technology quality, the factors contained in patent legal quality, and the objective environment of scientific and technological innovation, on the basis of the above [7], Ding Huanfeng added the level of patent structure [3]. Tang Heng believes that the quality of patented technology and the composition of economic quality [4], but Mao Hao believes that patent quality includes technical quality and economic quality, and the legal quality of patent has formed a three-dimensional cognitive system of patented technology, law and economy. From the perspective of patent invention process [9], Sun Yutao: the economic quality and technical quality measurement model of patent is constructed from three aspects: technical invention, application review and authorization protection [10,11].

2.3 Research on Intellectual Property Quality and Economic Development Mechanism

Now that the economy has entered a stage of high-quality development, improving the quality of intellectual property has become an important driving force to promote economic development. Therefore, the correlation between the quality of intellectual property and economic growth has become an increasingly concerned issue. Based on the reading and understanding of the previous literature, the current research of Chinese scholars mainly focuses on the correlation between the quantity of intellectual property and economic growth, and the research on the correlation between the quality of intellectual property and economic growth is in the initial stage. For example, by demonstrating the relationship between intellectual property protection, patent quality, and high economic quality development, Meng Mengmeng showed that the degree of intellectual property protection and patent quality has a certain correlation. Patent quality plays a certain intermediary role between intellectual property protection and high-quality economic development [2]. Therefore, intellectual property protection can promote the economy through the improvement of patent quality. Zhou Kexuan and Yu Linhui found through empirical research that improving the quality of intellectual property in demonstration cities through technological innovation, improving supporting services and other ways can promote the development of urban economy [12].

Meanwhile, the development of intellectual property quality has a more obvious role in promoting the economic development of cities with financial height and high financial strength. Tang Heng empirically found that patent quality plays an intermediary role between patent funding and corporate performance, and the growth of corporate performance is conducive to promoting economic development [4]. Obviously the intellectual property quality improves economic development by promoting some intermediary factors. Patent quality has a certain correlation with economy, but the internal mechanism of patent quality and economic growth needs to be further studied and discussed.

3. THE ANALYZE OF INFLUENCE MECHANISM

Based on the above theoretical basis and literature research, and considering the availability of collected data, this paper measures the quality of intellectual property from the perspectives of patent technology quality, patent economic (market) quality and patent legal quality, forming a trinity evaluation system, analyzes the relationship mechanism between each and the economy [9]. This paper mainly uses literature analysis, theoretical analysis and qualitative analysis to elaborate the internal mechanism of the correlation between intellectual property quality and economy.

3.1 Patent Technology Quality and Economic Development

Based on Schumpeter's theory of technological innovation, we can see the core role of technology in economic growth. Patent technology quality is the core of patent quality composition. Patent is the result of examination by the State Intellectual Property Office from the aspects of innovation, novelty, practicality, etc. As one of the most important forms of intellectual property, patent is the material embodiment bearing knowledge invention and creation. At the same time, compared with design patent and utility model patent, invention patent can better reflect the degree of innovation and invention quality, and play a more obvious role in improving enterprise performance and economic development. Therefore, this paper starts from the patent structure such as the proportion of invention patents as a three-level index to represent the quality of patent technology. Patent structure starts from the Angle of patent quantity

and proportion, which is the direct embodiment of enterprise innovation. The school of national Innovation System believes that technological innovation and government functions are combined to promote economic growth. The state has issued a series of policies to promote the development of intellectual property strategy, which has increased financial support and R&D investment of enterprises and other institutions to a certain extent. On the other hand, the development, application and maintenance of high-quality patents generally need to increase scientific research investment and financial support. In 2020, Jiangsu invested 300.59 billion yuan in research and development, and the intensity and intensity of scientific research investment has been further increased. The government has stimulated and protected innovation in terms of funds and policies. The rapid transformation of invention patents with a high degree of innovation has improved the production efficiency and scientific and technological level, thus promoting the economic development through innovation. In terms of high-quality patent cultivation, Jiangsu achieves precise matching between enterprise demand and patent resources. It not only exports high-value patent cultivation mode to enterprises and scientific research institutions related to the industrial chain, but also exports patent achievements to the production line and technology market, so as to boost the industrial development by double output.

3.2 Patent Economic Quality and Economic Development

As for the economic quality of patent, this paper understands it as the market transformation of patent technology, namely the commercialization of patent and the economic efficiency of patent application. In this paper, the contract transaction volume of patent in the technology market is used as a three-level index to measure the economic (market) quality of patent. In Romer's endogenous economic growth model, knowledge, as an endogenous factor, can increase the income of itself and other factors such as capital and labor, so as to achieve long-term economic growth. Therefore, we can see that intellectual property rights and technological progress play an important role in economic development. As an important part of intellectual property rights, the market quality of patents is reflected in the indicators of patents lasting more than five years and the ability to transform

patented technology. These indicators are conducive to measuring the value of patents, and exclude some low-quality patents applied for reasons such as promotion, evaluation and professional title. The improvement of patent economic quality is on the one hand the support of the national macro policy and on the other hand the enhancement of social groups' awareness of patent protection. The improvement of patent economic quality can optimize the industrial structure: First, improve the matching rate between enterprises and required talents, effectively improve the technical level and production efficiency of the whole industry; Secondly, it forces some low-end industries to upgrade and reform. Patent protection increases the exclusivity of products, enhances the competition among enterprises, and stimulates some enterprises with low added value and rely on technology imitation to upgrade technology, thus promoting the industrial structure. Third, the protection of patent market quality enhances the reverse technology spillover effect of FDI, promotes the quality of imported foreign capital, and optimizes the structure of investment stock [13]. The technology spillover effect can improve the regional technology content and product quality. By integrating resources and improving the utilization rate of factors, various departments gradually drive the optimization and upgrading of industrial structure. The improvement of patent economic quality plays a role in promoting economic development at the level of technology and industrial structure. The application of scientific and technological achievements in Jiangsu is good, and the number of industrial application projects is 585; A total of 512 registered applied technological achievements have generated economic benefits, with self-conversion benefit income of 226.253 billion yuan. The transformation of innovation output into Jiangsu Province has brought considerable economic benefits, contributing to the economic development of Jiangsu Province.

3.3 Patent Legal Quality and Economic Development

Based on Schumpeter's innovative development theory and Romer's endogenous economic theory: Intellectual property is transformed into productive forces through innovation and technology to promote economic development. As the product of law, the examination process of

patent must conform to the norms stipulated by law, and its application and implementation process must also be protected by law. The quality of patent law reflects the protection and attention of a country or local government to the innovation results. The quality of patent law is mainly reflected in the government's introduction and improvement of intellectual property protection policies, the rise of intellectual property agencies and the provision of a full range of intellectual property services. The government constantly improves the protection mechanism, enhances the judicial protection ability and strengthens the punishment of infringement, plagiarism and other behaviors. When the cost of plagiarism and infringement is too high, it will form a certain threshold effect and screen out the patents with a certain real innovation value. Therefore, the government revised and improved the regulations on intellectual property, which is conducive to cracking down on bad behaviors, on the other hand, it also stimulated the innovation of invention patents [9]. The Jiangsu provincial government has improved the efficiency of the whole process of dealing with intellectual property examination and rights protection, promoted the facilitation of the later period of patents, focused on improving the business environment in the whole society, constantly expanded the social influence of judicial protection, increased the demand for scientific and technological talents, and the demand for innovative talents will attract more enterprise investment and more talents. It accelerates the accumulation of human capital and improves the production efficiency of the whole society to a certain extent. Jiangsu Province has made remarkable achievements in standardizing enterprise intellectual property management, cultivating high-value patents, and constructing administrative adjudication of patent infringement disputes. The improvement of patent legal quality in Jiangsu Province has better protected the legitimate rights and interests of inventors, which can better stimulate enterprises and individuals to make active innovations and play a positive role in improving labor productivity [14].

4. CONCLUSION

According to the above research, the internal influence mechanism of intellectual property quality and economy in this paper (Fig. 1).

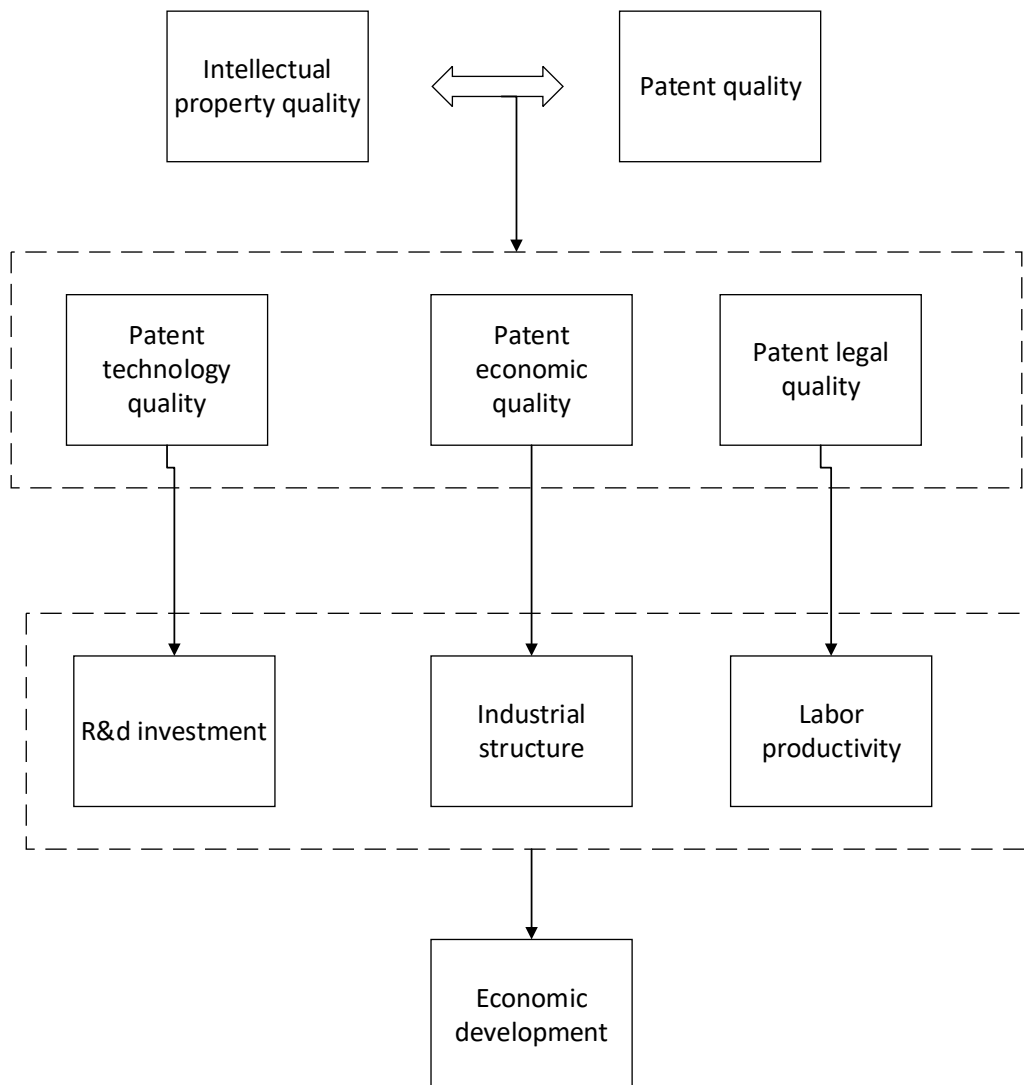


Fig. 1. The quality of intellectual property affects the economic development mechanism

We should realize that the more patents are not the better, but to achieve the quality of victory, the realization of patent benefits is the ultimate goal. In order to make intellectual property more comprehensive escort to the economy, we need to start from the comprehensive protection of intellectual property.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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