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# *Research on the Causes and Countermeasures of Low Patent Conversion Rate in China*

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***Abstract:*** While the number of patent applications in China is surging, the transformation of patents has become a hot topic of concern across various sectors. Focusing on the existing issues with China's patent conversion rate, this paper starts by elucidating the concept of patent transformation, delving into the normative interpretation behind its definition. It then conducts an in-depth analysis to identify the influencing factors of patent transformation. Considering the distinct characteristics of these factors, the paper explores targeted approaches to address patent transformation. Two strategic paths are proposed - one before patent authorization and the other during patent application - to enhance China's patent conversion rate and promote the country's innovative capabilities.

## 1. Concept of Patent Transformation

According to the Law of the People's Republic of China on Promoting the transformation of Scientific and Technological achievements, the term "transformation of scientific and technological achievements" as used in this Law refers to the subsequent testing, development, application and popularization of scientific and technological achievements to the formation of new technologies, new processes, new materials and new products, and the development of new industries in order to raise the level of productive forces[1]. Thus, the transformation of patent outcomes into practical applications should ideally enhance societal and economic gains and propel the development of a nation driven by innovation [2]. The utilization of patents, also referred to as patent transfer and transformation, akin to other intellectual properties, can be broadly categorized into three types: industrialization, commercialization, and capitalization [3]. Industrialization refers to the practical application and transformation process of patent technologies, encompassing the development and production of products based on patent technologies, as well as enabling others to implement these technologies through means such as licensing, trading, or transferring. This process contributes to enhancing societal productivity and directly generates economic benefits. For instance, by applying

patented technologies for new materials or processes, innovative products can be created or the performance of existing products can be improved. Commercialization refers to the treatment of intellectual property rights, including patent applications and patents, as commodities that can be bought, sold, and traded in the market. Forms of commodification include patent licensing, trading, and assignment, which can improve the efficiency of resource allocation and generate economic returns. For example, through patent licensing, other enterprises can utilize the patented technology for product manufacturing, or through the trading and transfer of patents, the rights to use the patents can be transferred to other enterprises, thus expanding the market application scope of the patented technology. Capitalization: Involves leveraging patents as intangible assets for investment, financing, and risk management. Capitalization takes various forms, such as patent mortgage financing, patent insurance, and patent securitization. These practices fully exploit the role of patents as financing instruments, providing financial support for corporate upgrades and transformations. For example, enterprises can secure loans by mortgaging patents or invest patents into other enterprises as a form of capital contribution, converting the potential value of patents into tangible economic benefits.

The quality of patents affects the effectiveness of patent transformation, and studying the factors that influence patent conversion rates helps in understanding the relevant patterns of patent transformation, thereby enhancing the applicative value of the patent system [3]. This enables the selection of truly valuable patents, thereby genuinely achieving the initial purpose of patent policy formulation: to promote economic and social development and scientific progress. Through such means, we can accurately identify and utilize patents with genuine value, thus fulfilling the original intent of patent policies—to drive the prosperity of the socio-economy and innovation in the scientific domain.

## 2. Current Status of Patent Conversion and Influencing Factors

### 2.1. Current Status of Patent Conversion

As of the end of 2022, there were 3.351 million valid invention patents in Chinese mainland (excluding Hong Kong China, Macao China, and Taiwan China), marking a year-on-year growth of 20.9%; 10.781 million utility model patents, with a year-on-year increase of 17.3%; and 2.708 million design patents, showing a year-on-year rise of 10.4%. Among the valid invention patents in Chinese mainland (excluding Hong Kong China, Macao China, and Taiwan China), enterprises owned 2.367 million, with a year-on-year growth rate of 24.0% [4]. In 2023, the authorization volume of invention patents in our country reached 921,000 pieces, that of utility model patents reached 2,090,000 pieces, and that of design patents reached 638,000 pieces [5]. By the end of December 2023, the aggregate valid quantity of invention patents in our nation was 4,991,000. Among these, the valid quantity of invention patents domestically (excluding Hong Kong China, Macao China, and Taiwan China) amounted to 4,015,000. The cumulative valid quantity of utility model patents was 12,129,000, while the valid quantity of design patents reached 3,234,000 [5]. These figures reflect that while China has achieved a "quantitative change" in terms of patent volume, there is an urgent need for a "qualitative change." Structural issues in patent conversion reveal that quantity does not proportionately reflect quality, hence it is necessary to investigate the underlying influencing factors.

## 2.2. Factors Influencing Patent Conversion

### 2.2.1. The leniency in patent granting conditions has contributed to a disparity in patent quality

The caliber of patent applications for technological innovations necessitates enhancement, particularly in terms of patent share within pivotal technologies and core domains, where the number of core patents is restricted. Concurrently, some guiding policies and assessment frameworks tend to disproportionately favor patent quantity over quality, thereby engendering patent application practices that deviate from the primary objectives of safeguarding innovative achievements and fortifying market competitiveness. Tian Lipu, the former Head of the National Intellectual Property Administration, remarked, "In juxtaposition to the pinnacle of high-tech innovations from advanced nations, our portfolio comprises a greater proportion of improvement-oriented patents, alongside a prevalence of more rudimentary utility model patents and design patents. [6]".

### 2.2.2. Patent transformation platforms exhibit a paucity of innovative conversion methodologies

For individuals, smaller enterprises, or research entities, bereft of the requisite resources to materialize the advantages of their patents independently, licensing and transfer represent the chief avenues to actualize patent benefits [7]. Currently, while platforms have satisfied these prerequisites, persistent concerns remain, notably the homogeneity in the conversion tactics employed by patent transformation platforms. At present, platforms conventionally enact science and technology transformation strategies via a triad of online project achievements exhibition, offline conversion coordination, and the dispensation of technological services. The precise operational procedure encompasses the compilation of project achievements data, the presentation of project supply and demand, and project-to-party matching. This conversion modality primarily fixates on the demonstration of project information and the alignment of transformation agents, with the patent operations platform predominantly assuming a facilitative role, bereft of the impetus conferred by innovative platform services.

### 2.2.3. The patent value assessment system is ambiguous

Patent valuation is a simulation of market pricing rather than a replacement for it. Valuation is not an appraiser's subjective and arbitrary pricing, but rather a simulation of the thinking and actions of the majority of market participants [8]. Therefore, the essence of appraisal lies in recognizing that the value of the subject being appraised pre-exists. The appraiser, utilizing their knowledge of appraisal theories and a wealth of practical experience, aims to "reveal" or "discover" this intrinsic value, rather than to "invent" or "create" value. However, due to the non-proportionality and uncertainty of costs and values in the formation of patent right values, the assessment of patent right values becomes intricate and challenging to ascertain. The non-proportionality of value and cost manifests in the fact that the market value of patent rights is not directly determined by their costs, with no clear proportional relationship existing between the two. The creation of patent rights is closely tied to research and development costs, marketing costs, and other investments, yet the quantification of these costs is considerably challenging. Therefore, assessing the value of intellectual property solely based on costs is unreasonable. The uncertainty of value implies that the value of patent rights is influenced by multiple factors such as market potential, transfer methods, and frequency, causing its value to remain in a state of constant fluctuation. The value of some intellectual properties may even experience significant swings

within a single year. Taking IBM as an example, its brand value was not prominent in 1994, yet by 1995, it surged to $17.1 billion, highlighting the volatility of intellectual property values. In other words, the lack of a direct correlation between the value of patent rights and costs, coupled with the fluctuation of values due to influences such as technology, market, and transfers, complicates the valuation of patent rights. The formation of patent right values is not only dependent on costs but is also significantly influenced by factors such as the maturity of technology, market prospects, transfer methods, and more, making their value assessment complex and challenging.

## 3. Measures and Recommendations for Patent Transformation and Utilization

### 3.1. Prior to Patent Application: Administrative Departments Must Elevate Patent Granting Thresholds

The aggregate volume of patents constitutes the bedrock of scientific innovation, with the quality of patents embodying the essence of research endeavors. There exists a dialectical relationship of unity amidst opposition between quantity and quality. Absence of a critical mass of patents would obscure the superiority of quality, while quality's absence would render a plethora of patents merely a frivolous depletion of resources. Presently, China boasts a considerable patent accumulation, and thus, the paramount objective for the current phase lies in enhancing and refining patent quality. As the principal executor of policies pertaining to patent transformation, the government is obligated to fortify its policy guidance on patent quality, propel quality enhancement, and dedicate itself to nurturing high-value patents that can translate into tangible productive forces. Within the framework of project management, the patent administration should integrate patent quality, licensing status, and commercialization outcomes into its evaluation criteria, continuously monitoring the quality of patent applications and rigorously controlling non-meritorious patent applications to elevate the patent granting threshold.

### 3.2. Amidst Patent Transformation: Establishing Diversified Patent Transformation Platforms

Considering the lack of improvement in the early stages of patent transformation by patent operation platforms, and the fact that transformation targets are often single patents. Firstly, shift the focus upstream. This means that right from the onset of the patent development phase, the patent transformation platform should delve into market demands, swiftly identify new market trends, and grasp the technical service needs of businesses. With these demands in mind, the platform should proactively seek out matching research institutions and technical development teams to foster in-depth collaboration between the two parties. This approach not only aligns the ultimate patent outcomes more closely with market demands but also provides research teams with a clear directive for development. For instance, UTEK's U2B business model initially identifies the technological needs of companies, then searches for technologies from universities or laboratories that possess market potential. Through negotiations, the customer secures the technology, the university or laboratory receives licensing fees, and UTEK acquires a stake in the customer's company. Second, we should build a platform for multi-party participation and shared governance in the transformation process. The platform can invigorate itself through methods such as setting up innovation funds, establishing working groups, and expanding multi-channel cooperation. More specifically, it can select technology departments, financial sectors, research institutions, and enterprises from diverse regions as cooperative partners to jointly advance the implementation of patent transformation, facilitating the communication and sharing of patent operation information across regions. Patent operation platforms can orchestrate a variety of events, such as

entrepreneurial competitions, patent exchange conferences, and academic forums, to augment the utilization efficacy of information resources, expedite the circulation of patent industry information, and fully leverage their role as a bridge, which constitutes an excellent means for patent operation platforms to function as a facilitative bridge.

### 3.3. During Patent Commercialization: Scientific Patent Valuation

Patent valuation involves, based on a thorough understanding of the mechanisms and processes that form market prices, as well as in-depth investigation and understanding of market conditions, the scientific activities of analysis, calculation, and judgment to reveal the objectively existing value [9]. Given the diverse nature of patent assets and the constraints imposed by available data, the valuation of patent rights necessitates a multifaceted approach. Predominant valuation methodologies encompass: the cost method, which evaluates the cost required to recreate or substitute the patent asset with a functionally equivalent alternative, thereby ascertaining the uppermost value of the appraised patent. The income method, which takes into consideration the anticipated profits from investing in the patent right, utilizing the "profit-to-capital" approach to ascertain the asset's price; and the market method, which entails conducting research on market conditions within public asset or technology trading platforms, comparing the transaction prices of analogous assets, to ascertain the market value or investment cost of the appraised asset. In the valuation of patent rights, it is imperative to holistically consider these three valuation avenues to achieve a more precise assessment outcome.

## 4. Conclusions

As the number of patent applications in China has skyrocketed, the transformation of patents has become a hot topic in the scientific community. This paper, targeting the low conversion rate of patents in China, starts with the concept of patent transformation, delves into the factors influencing it, and proposes targeted strategies to address the issue. These strategies include raising the threshold for patent authorization by administrative departments before patent applications and building diversified platforms for patent transformation during the transformation process. The paper also outlines the conceptual framework for the construction of patent transformation platforms. Finally, it emphasizes the importance of scientific and efficient valuation of patents according to their different characteristics to improve the conversion rate of patents in China and enhance the country's innovation capabilities.

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