Frontiers in Economics and Management Volume 6 Issue 8, 2025
ISSN: 2692-7608 DOI: 10.6981/FEM.202508_6(8).0010

Conflict of Interest and Equilibrium Mechanism in Patent Transformation of National Key Laboratories

Jiaxin Li, Xiangzhi Zhang*, Jingying Wang, Siyu Du, Xinyi Liu, Ting Song

East China Jiaotong University, Nanchang, China

*Corresponding author: Xiangzhi Zhang

Abstract

Patent conversion in national key laboratories is a crucial link in realizing the value of scientific and technological achievements, but it faces the challenge of multiple conflicts of interest. This paper focuses on four types of entities: laboratories, research teams, enterprises and the government, and analyzes their differentiated demands: laboratories pursue academic reputation and resource accumulation, research teams focus on the benefits of achievements and autonomy, enterprises emphasize the commercial value of technology, and the government emphasizes macro-strategic coordination. The study found that conflicts of interest stem from imbalance in revenue distribution, misalignment of risk assumption, ambiguity in ownership definition and disorder in quality control. Typical cases reveal real predicaments such as patent ownership disputes, disconnection between supply and demand of technology and the proliferation of "bubble patents". In response to this, the paper proposes a "dynamic equilibrium mechanism", which promotes the sharing of benefits and risks through legislation to clarify the legal proportion of benefits for research teams, the establishment of a quality-oriented patent evaluation system, and the introduction of market-oriented value assessment standards, thereby stimulating collaborative innovation vitality. In terms of institutional guarantees, it is suggested to strengthen legal constraints and classified governance, improve the quality traceability and accountability mechanism, and build a virtuous ecosystem of "innovation-transformation-feedback" to provide theoretical and practical support for resolving conflicts of interest and optimizing the scientific and technological innovation system.

Keywords

National Key Laboratories; Patent Transformation; Conflict of Interest; Equilibrium Mechanism; Institutional Innovation.

1. Analysis of Stakeholders

National key laboratories, as an important part of the country's strategic scientific and technological forces, play an irreplaceable role in basic research and breakthroughs in key core technologies. Patent transformation is a key link in realizing the value of scientific research achievements and promoting industrial upgrading. However, in this process, the demands of multiple stakeholders such as laboratories (legal entities), research teams, enterprises and the government are different, and the resulting conflicts of interest restrict the efficiency and quality of patent transformation. A thorough analysis of the demands and conflicts of interest of various stakeholders is a prerequisite for establishing a scientific and reasonable interest balance mechanism and improving the efficiency of patent conversion in national key laboratories.

ISSN: 2692-7608 DOI: 10.6981/FEM.202508_6(8).0010

1.1. Analysis of the Demands of National Key Laboratories

National key laboratories are usually established based on universities, research institutes or large enterprises. As legal entities, their core interests revolve around research reputation, access to resources and sustainable development. According to the 2023 National Report on the Transformation of Scientific and Technological Achievements, 68% of key laboratories listed "enhancing academic influence and industry voice" as their top priority for patent transformation, which is closely related to the need for laboratories to obtain support from national scientific research projects and talent programs through high-level patent achievements. For instance, a national key laboratory of materials science, after successfully converting three patents on the preparation of nanomaterials, received support from the National Key Research and Development Program's "Frontier Science Center" project and increased its research funding by 40%, further consolidating its leading position in this field.

In addition, the national key laboratories have to rely on financial support from the government to increase their scale. The government invests a large amount of funds each year for the research projects of the national key laboratories and provides financial support for their research. Most national key laboratories keep applying for science fund projects in order to obtain government investment. Their research is only for the conclusion of the fund, not for market application. As a result, they ignore market demand. The scientific and technological achievements they create are patented in a timely manner, and they seldom explore their industrial value.

The management system of state-owned assets in colleges and universities is relatively rigid compared to the trading order of the free market. Although the key laboratory is the owner of the invention made in the course of employment, because the intellectual property rights generated from the projects funded by the government belong to state-owned assets, due to the limitations of China's state-owned asset management system, the laboratory cannot freely dispose of these intellectual property rights either. According to Article 9 of the Interim Measures for the Management of the Disposal of State-owned Assets of Central-level Public Institutions issued by the Ministry of Finance (CAI [20081495]), the intellectual property rights of the laboratory, as a kind of intangible asset, are also incorporated into the scope of state-owned asset management and, like other state-owned assets, must follow the corresponding procedures and steps when used. The approval process is complicated and time-consuming. This also leads to the fact that intangible state-owned assets, including patents, need to go through a complex approval process when they are transformed into the market, especially when they are transferred. The transfer of a certain amount of patents requires a complex approval process, which makes it difficult and obstructive for the transformation of patents and the full realization of the transformation value[1].

1.2. Analysis of the Demands of the Research Team

Most of the patent achievements of national key laboratories are classified as inventions made in the course of employment. Although national key laboratories have invested a large amount of funds, equipment and information resources in the process of developing patent technologies, the intellectual resources invested by research teams are also indispensable and often the most important part of the research and development process. In addition, since it is often the research team that is most familiar with the content and application value of the patent technology in the national key laboratory, the amount of investment made by the research team in patent transformation has a significant impact on the level of patent transformation work in the national key laboratory. In China, the rights to inventions made in the course of employment belong to the units, which are responsible for the movement of patent rights. Inventions produced by national key laboratories undertaking national scientific research projects are owned by the laboratories, while the members of the scientific research

ISSN: 2692-7608 DOI: 10.6981/FEM.202508_6(8).0010

team undertaking the specific scientific research tasks, as inventors, only have the right of authorship and the right to obtain rewards and remuneration, and have no right to dispose of the patent,2 which greatly reduces the enthusiasm for patent conversion and the innovation enthusiasm of the scientific research team members.

According to the current provisions of the Patent Law of our country, inventors of inventions made in the course of employment have the right of authorship, the right to receive rewards, and the right to receive remuneration in the process of patent transformation and implementation. However, the patent law does not specify the exact amount and proportion of rewards and remuneration for inventions made in the course of employment, resulting in frequent disputes in practice between national key laboratories and inventors of inventions made in the course of employment over the amount of rewards and remuneration[2]. These issues have dampened the enthusiasm of national key laboratory researchers for patent conversion work.

According to the provisions of the Patent Law regarding inventions made in the course of employment, most of the patent achievements of national key laboratories should indeed be classified as inventions made in the course of employment. However, most national key laboratories lack a unified patent conversion management mechanism, resulting in the actual patent managers still being the original R&D personnel or research groups. This leads to a disconnection between the laboratory and the patent conversion work, and the inventors who actually manage the patent conversion do not have legal rights. This is a rather chaotic situation. Under such circumstances, inventors' dedication to patent conversion must be proportional to their own profits. At present, most national key laboratories fail to reasonably incorporate inventors' claims in the implementation of the patent reward system, especially in the distribution of rewards and remuneration for the implementation of patent transformation, there are still some "bureaucratic" practices, and advanced property rights distribution models such as patent rights sharing and shareholding distribution cannot be introduced into the patent rights distribution system of national key laboratories. These problems have led to a low enthusiasm of inventors for patent conversion work in national key laboratories, and have directly affected the output and quality of patent conversion in national key laboratories.

1.3. Analysis of Enterprise Demands

After a laboratory develops a patent, the transformation role of enterprises is indispensable for large-scale promotion and application in society, and the rising research and development costs also prompt enterprises to actively engage in cooperative research and development. But the strategic goals of the two are quite different. For enterprises, the largest amount of capital is invested, taking on the huge risk of technology being transferred to the market, and achieving the greatest economic benefit is the top priority. As for the laboratory, it has invested some of its human and technical resources, and its main pursuit is the stability of the rights of the patent results and the public interest of society, in order to obtain funds and rewards for scientific research achievements. Therefore, different entry points have led to conflicts in the distribution of benefits between the two sides[3].

Enterprises, as the demanders and application subjects of patent transformation, pursue the economic benefits and market competitiveness brought by technology transformation. According to a 2024 survey by the China Enterprise Confederation, 83% of enterprises, when introducing patented technologies, prioritize "the market application prospects and commercial value of the technology", and have extremely high requirements for the maturity and stability of the patent. However, China's current Law on Promoting the Transformation of Scientific and Technological Achievements does not emphasize the market-oriented and enterprise-centered patent transformation principle, nor does it provide specific regulations on the patent transformation mechanism that combines industry, academia and research. The

ISSN: 2692-7608 DOI: 10.6981/FEM.202508_6(8).0010

cooperation among industry, academia and research institutions is the future development trend of the patent transformation model of national key laboratories, which leaves no definite standards for the cooperation between national key laboratories and enterprises in China. If legislation does not improve the regulations on the mechanism of industry-university-research cooperation as soon as possible and fails to emphasize the guiding role of the market and the dominant position of enterprises, then the patent transformation work of national key laboratories will still be in a stage where it is not targeted and it will be difficult to implement industry-university-research cooperation smoothly.

In terms of benefit distribution, enterprises are more inclined to adopt the model of "installment payment + revenue sharing" to control the initial investment cost. But this model conflicts with the "one-time high transfer fee" that laboratories and research teams expect. In addition, there is a phenomenon of "more introduction than digestion" in the process of patent conversion by enterprises. After introducing patent technologies, some enterprises lack subsequent R&D investment, resulting in the technology not being able to fully realize its value and affecting the long-term interests of laboratories and research teams.

1.4. Analysis of Government Demands

The government plays multiple roles as a policy maker, coordinator and supervisor in the patent conversion of national key laboratories. The core interests of the government are to promote scientific and technological innovation and industrial upgrading to achieve national strategic goals. According to the National Science and Technology Innovation Plan for the 14th Five-Year Plan, the government has identified "improving the efficiency of technology transfer and promoting in-depth integration of industry, academia and research" as a key task and has introduced a series of policies and measures, such as tax incentives and financial subsidies, for this purpose. For example, corporate income tax is exempted for the portion of income from technology transfer not exceeding 5 million yuan; For the portion exceeding 5 million yuan, corporate income tax is halved.

However, there are deviations in the implementation of the policy. Some local governments, in pursuit of political achievements, blindly push the number of patent conversions while neglecting the quality of conversions. In addition, when coordinating the interests of multiple parties, the government lacks effective communication mechanisms and means of balancing interests, making it difficult to resolve conflicts among all parties.

1.5. The Underlying Causes of Conflicts of Interest among the Four Parties

The conflicts of interest among laboratories, research teams, enterprises and the government are mainly reflected in the distribution of benefits, risk-taking and goal orientation. In terms of revenue distribution, there are significant differences among all parties regarding the proportion of revenue from patent conversion, and there is a lack of uniform standards; In terms of risk sharing, laboratories and research teams expect enterprises to take the main risks, while enterprises demand to reduce their own risks; In terms of goal orientation, laboratories pursue academic reputation and research resources, enterprises pursue economic benefits, and the government pursues macro strategic goals, and it is difficult to reconcile the three.

The underlying cause of these conflicts of interest lies in imperfect systems and mechanisms, information asymmetry and the lack of effective interest coordination mechanisms. In the current patent conversion management system, the regulations on the ownership of intellectual property rights and the distribution of benefits are ambiguous, resulting in unclear definition of interests among all parties; The asymmetry of technical and market information between the laboratory and the enterprise increases the difficulty of cooperation; At the same time, the lack of professional intermediary agencies and arbitration mechanisms makes it impossible to resolve conflicts of interest in a timely manner.

ISSN: 2692-7608 DOI: 10.6981/FEM.202508_6(8).0010

2. Analysis of Typical Cases of Conflict

After the analysis, we found that the conflicts of interest mainly revolved around three aspects: unclear patent ownership, mismatch between supply and demand, and imperfect revenue system.

First of all, the patent rights are not clear. These conflicts are mostly patent ownership disputes that arise when research teams collaborate with enterprises. For example, in the case of a patent rights transfer contract dispute between Shanghai XX Company and Liu XX Company, Shanghai XX Company signed an agreement with Liu XX, stipulating: Liu promised to transfer to the company free of charge all invention, utility model, design patent, proprietary technology, derivative technology and related drawings, process flow and other technical materials related to the Jianshijia, Noah's Ark brand or similar products and future new products. During the trial, Shanghai XX Company submitted 11 original copies of the patent register to the court. It claimed that according to the agreement in suit, it requested the court to order Liu to fulfill the agreement in question and transfer the patent in suit and other related technologies to the company. However, the court held that since the agreement did not stipulate the transfer of the patent in question, nor did it complete the registration and filing procedures for the transfer of the patent in suit, the agreement did not have the effect of the transfer of the patent right in question. Secondly, the patent involved in the "Jianshijia utility model invention patent right" as stipulated in the agreement is not clear, and it cannot be automatically recognized as the patent in question. Therefore, the appeal of Shanghai XX Company is dismissed[4].

In this case, when the agreement was drafted, the provisions regarding the transfer of the relevant patent rights were not clear, and the relevant procedures were also lacking, resulting in a dispute over the ownership of the patent. This also indicates that when researchers work with enterprises, there may be loopholes of handling procedures and drafting agreements, resulting in unclear patent ownership. This could lead to situations where enterprises or research teams unilaterally grant exclusive licenses to third parties, causing damage to the interests of both parties.

The second is the mismatch between supply and demand. This conflict mainly includes two aspects. One is that the patents produced by the laboratory do not match the market demand well. The main reasons for this phenomenon are that the academic standards for evaluating the value of patents are different from those in practice, and the existing patent conversion intermediary platform is not perfect enough, which makes it difficult for research teams and enterprises to communicate smoothly and connect well: The academic community places more emphasis on the technological innovation of patents. In practice, more emphasis is placed on the practicality of the patent and the costs behind it. Second, there is a big difference between the laboratory environment and the actual production environment. A certain patent may be directly usable in the laboratory environment, but if it is to be applied in production practice, it may cost a lot and bring little benefit to the enterprise. For example, to increase the speed of a maglev train, Skate Key Laboratory of Rail Transit Vehicle System has adopted the method of conducting experiments in a vacuum environment to achieve operation conditions such as no wheel-rail resistance and low noise[5]; It is difficult to achieve vacuum conditions in practice, so China Aerospace Science and Industry Corporation chose to use low vacuum to achieve the effect of accelerating the maglev train[6].

The last problem is the imperfect revenue system. This conflict includes problems with the management of state-owned assets and the shift in the purpose of research and development by researchers. However, the state is actively exploring ways to resolve the conflict and trying to break through the bottleneck.

Regarding the issue of state-owned asset management, due to the immateriality of knowledge products, it is difficult to judge their value in the same way as the value of tangible property.

ISSN: 2692-7608 DOI: 10.6981/FEM.202508_6(8).0010

Moreover, there is no relatively complete value evaluation system in China at present. This leads to the difficulty in determining the value of scientific research achievements and may cause the problem of difficult pricing in the actual transformation process, which may result in the loss of state-owned assets. In the existing relevant laws, it is clearly stipulated that a due diligence exemption system should be established for laboratory staff. For example, the "Notice of the State Council on Issuing and Implementing Several Provisions for the Enforcement of the Law of the People's Republic of China on Promoting the Transformation of Scientific and Technological Achievements" stipulates: In the process of the transformation of scientific and technological achievements, if the price is determined through listing and trading, auction, etc. in the technology trading market, Or if the price is determined through an agreement and the proposed transaction price is publicized in the unit and the technology trading market, the unit leader shall be exempted from decision-making responsibility arising from the subsequent value changes of the transformation of scientific and technological achievements in the pricing of scientific and technological achievements, provided that they fulfill their duty of diligence and responsibility and do not seek illegal benefits[7]. In addition, many universities and laboratories have made active explorations to address this issue. For example, Shanghai Jiao Tong University, through the "completer implementation" model, has granted Xu Kai himself full ownership of the core patent technology as the inventor. Xu then established Beijing Shurui Robot Co., LTD. (hereinafter referred to as Shurui Robot Company) in the form of patent investment, using the enterprise as an extension of marketization to accelerate the research and development of core technologies and the industrialization of achievements. The research and application of this innovative achievement was selected as one of the top ten typical cases of patent industrialization released by the National Intellectual Property Administration. The underlying logic of this system is to give researchers full autonomy over their achievements and relieve them of their responsibilities[8]. The advantage lies in giving researchers sufficient autonomy, allowing them to independently transform their research results and giving them a high enough share in the distribution of benefits to boost their enthusiasm for patent transformation.

As for the problem of the shift in the purpose of research and development by researchers, the main reason is that the original award evaluation did not attach enough importance to patent transformation. Some improvements have been made by the state regarding this phenomenon. For example, in the evaluation criteria for invention patents and utility model patents in the China Patent Award, the weight of patent application and protection measures, economic benefits and market share is the highest, accounting for 35% of the total evaluation[9].

3. Design of the Balance Mechanism

National key laboratories, as the core carriers of national scientific and technological innovation, carry the important mission of breaking through key technologies and serving national strategic needs. Patent transformation is the core link for the achievements of national key laboratories to move from "laboratory bookshelves" to "market shelves", but in this process, frequent conflicts of interest arise among stakeholders such as laboratories, research institutions, enterprises and the government due to differences in goals and uneven allocation of resources. Therefore, establishing a scientific and reasonable balancing mechanism is the key to resolving conflicts of interest and promoting high-quality development of patent transformation. Starting from the root causes of conflicts of interest and combining typical cases, systematically explore the design framework and implementation path of the balanced mechanism, with the aim of providing references for policy-making and practical operation.

The core concepts of the balanced mechanism design include the balance of fairness and efficiency, dynamic adaptability, multi-party collaborative participation, and long-term interest

ISSN: 2692-7608 DOI: 10.6981/FEM.202508_6(8).0010

orientation. Patent conversion should safeguard the basic rights and interests of all parties while avoiding a decline in efficiency due to excessive rigidity. For example, the distribution of benefits should take into account the short-term incentives for research teams and the long-term accumulation of national key laboratories, while also meeting the reasonable return demands of enterprises. Mechanism design should take into account changes in the technology field, market environment and policies. For example, the patent conversion cycle is long and the risks are high, so a more flexible Joint Risk Undertaking mechanism needs to be designed; In the field of information technology, where updates are fast, emphasis should be placed on rapid iteration and dynamic revenue sharing. Build open and transparent communication platforms to promote trust and cooperation among stakeholders. Avoid one-off deals and promote the formation of a sustainable innovation ecosystem.

To facilitate the smooth transformation of the patent achievements of the national key laboratory in rail transit, we have designed a more scientific and reasonable balancing mechanism from two aspects. We will discuss from two aspects that establishing a quality-oriented evaluation and control system for scientific research patents and establishing precise standards for assessing the economic value of patents.To establish a quality-oriented patent evaluation and control system for scientific research, first of all, it is necessary to comprehensively correct the bad tendencies in the evaluation of scientific and technological achievements, such as emphasizing quantity indicators over quality contributions, and increase the weight of patent transformation value. The breakthrough point is to break the "paper only" and "SCI first", and not to take the number of papers, representative works, and impact factors as the only quantitative assessment and evaluation indicators. For high-quality achievements that have significant academic influence, have achieved remarkable application effects, and have made outstanding contributions to economic and social development and national security, the weight of their assessment and evaluation will be increased, as determined by the relevant scientific and technological evaluation organization and management units (institutions) based on the actual situation. When patent applicants obtain additional benefits by claiming rewards and subsidies, they will use the incentive of claiming rewards and subsidies as the motivation for patent applications, applying for patents just for the sake of applying for patents, and at this time, a large number of poorly made patent applications with no technological innovation content will emerge[10]. The title, educational background, title, awards, administrative position, and the number of research projects undertaken by the person who completed the achievement shall not be used as a reference for the evaluation of scientific and technological achievements, the performance evaluation of research projects, and the review of talent programs. Secondly, focus on market demand and technological development trends, carry out patent application and patent layout planning in a targeted manner, implement the pre-patent application disclosure system, and establish a scientific research evaluation system oriented towards quality and transformation and application, and incorporate the situation of patent open licensing into the performance assessment indicators and professional title evaluation conditions of patent completers. Form a high-quality patent application system aimed at market application value from the root to improve the quality of patents in colleges and universities[11].

Establish a preliminary technical evaluation system for the technical value of patent applications, and those that fail the assessment shall not be allowed to apply with fiscal funds. With the continuous advancement of the domestic intellectual property strategy, the demand of inventors for patents has gradually shifted from low-quality patents aimed at authorization to high-quality and high-value patents aimed at transformation. Therefore, how to conduct a rapid and effective assessment of technical solutions before patent applications has become a hot research issue in the academic and practical fields[12]. Strengthen research on theories and methods for evaluating scientific and technological achievements and patents, utilize

ISSN: 2692-7608 DOI: 10.6981/FEM.202508_6(8).0010

technologies such as big data and artificial intelligence, develop information-based evaluation tools, and promote standardized evaluation by comprehensively applying methods such as proof-of-concept, technology prediction, innovation competitions, intellectual property assessment, and pro-excellence review. Make full use of all kinds of information resources to build databases of scientific and technological achievements, demands, cases and evaluation tools and methods across industries, departments and regions. Avoid laboratories and universities applying for patents and conducting scientific research only for the conclusion of the National Natural Science Foundation.

At present, most research teams tend to apply for a large number of low-quality patents to meet the "patent quantity indicator" in the project conclusion assessment, which leads to a large number of "bubble patents". 10By requiring research teams to bear part of the patent maintenance costs, the interest chain of "patent quantity - project conclusion - funding acquisition" is cut off, forcing research teams to shift from "pursuing quantity" to "focusing on quality", linking patent maintenance costs to team interests, forcing teams to actively screen high-quality patents, allowing good technologies to be continuously invested, and giving up the "invalid holding" of inefficient patents.

To build an accurate standard for assessing the economic value of patents, it is necessary to conduct in-depth research and analysis from three aspects: technical indicators, legal indicators, and market indicators, and to design a multi-faceted and multi-level balancing mechanism, so as to be more in line with the patent transformation between national key laboratories and enterprises.

Technical indicators measure the value of patents from the perspective of technological innovation and importance. The IPC classification number reflects the technical field involved in the patent. The more classifications there are, the broader the application field of the patent[13]. The number of inventors reflects the size of the research team. The more people there are, the higher the complexity of the patent technology. The number of citations reflects the level of technological innovation. The more cited patents there are, the stronger the content of technological innovation and the higher the value of the patent. The number of family citations reflects the technical foundation of the patent. The more citations there are, the higher the value of the patent.

Legal indicators measure the value of a patent from the perspective of its scope of protection and legal stability. The number of claims reflects a university's technological innovation ability. The more claims there are, the greater the scope of protection of the patent and the higher the value of the patent. The number of pages of literature reflects the quality of patent writing. The more pages of literature there are, the more sufficient the disclosure of technology, the more reliable the quality of the patent, the better the stability, and the higher the value. The number of independent claims reflects the intensity of defining the essential technical features of the patent. The more words there are, the greater the scope of protection.

Market indicators measure the value of a patent from the perspective of the applicant's economic investment in protecting the patented technology. Patent lifespan reflects the use value of the patent. The longer the patent lifespan, the higher the maintenance cost required, and the higher the patent value; The number of patent families reflects the comprehensive protection of the patent technology. The more patent families there are, the more important the patent is and the higher its value. Expanding the number of patents in the same family reflects the layout of the patent. The more the number, the more certain the patentee is of the technical status. The number of citations reflects the technical influence of a patent; the more citations it receives, the higher the quality of the patent[14].

The design of the equilibrium mechanism is the core path for the transformation of national key laboratory patents from "contradictory game" to "synergistic symbiosis". The conflict of

ISSN: 2692-7608 DOI: 10.6981/FEM.202508_6(8).0010

interest in the patent transformation of national key laboratories is essentially a game between short-term interests and long-term values, individual demands and common goals. By establishing a balanced mechanism of shared benefits, shared risks and compatible incentives, not only can short-term conflicts be resolved, but also the innovation vitality of all entities can be stimulated, impetus can be injected into the sustainable development of the scientific and technological innovation ecosystem, and the efficient operation of the value chain of "national key laboratories - industry - society" can be promoted.

4. Institutional Guarantees

The situation of patent conversion and application in national key laboratories still falls short of expectations, and there are very few high-value patents that are truly needed by society. The reason for this is the irrationality of the patent conversion benefit distribution mechanism and the lack of relevant laws and regulations for reference, resulting in uneven distribution ratios in the market. So it is necessary to seek to establish a dynamic balance mechanism and a stable rule to achieve a fair and reliable guarantee of value, so that the interests of individuals and the public can be distributed fairly[15]. This problem can be solved by reconstructing the rights and responsibilities of the subjects and the patent quality control mechanism at the legal level.

In the field of rights and responsibilities allocation, the current laws have ambiguous definitions of the rights and obligations among laboratories, research teams and enterprises, resulting in a large number of high-value patents falling into a "transformation deadlock" due to ownership disputes. For instance, a patent for a composite material at a national materials laboratory was put on hold for five years without industrialization due to a disagreement over ownership between the laboratory and the research team. To address this, legislation should be enacted to clarify the review responsibilities of the laboratory as the operating entity of state-owned assets, compelling it to establish a transformation decision committee led by technical experts to conduct compliance assessments on major patent conversions, and to publish transformation lists regularly for special audits. At the same time, substantive disposal rights should be granted to researchers. Referring to the spirit of the draft Regulations on Inventions Made in the course of Employment, legislation should be passed to stipulate that research teams should hold a legal proportion of no less than 40% of the patent revenue rights without an agreement, allowing them to independently choose to value as equity or license the transformation. And establish a "transformation responsibility push mechanism" - when the laboratory fails to initiate the transformation within a reasonable period of time, the research team may, in accordance with the Law on Promoting the Transformation of Scientific and Technological Achievements, request the unit to publicly explain the reasons and apply for third-party assessment intervention. For enterprises, a lower limit of industrialization investment ratio should be set in the technology transfer contract, along with restrictive clauses and tax incentives, to form a transformation drive where responsibility and benefit are equal.

At the patent quality control level, the current "quantity over value" review mechanism has given rise to a large number of "zombie patents". According to the data, about 60 percent of the patents applied for by key laboratories are only to meet the assessment targets, and more than 300 patents applied for by a certain provincial laboratory have earned less than a million from conversion. To address this chaos, we need to implement a classified governance system: a filing system for basic research patents, with a focus on reviewing theoretical innovation; For applied patents, "industrial feasibility hearings" will be added, and upstream and downstream enterprises will be involved in the review to screen out low-value applications from the source. At the same time, a quality traceability mechanism should be established, requiring applicants to submit a "quality commitment letter" indicating the industrialization path. Those who fabricate application scenarios will be blacklisted for scientific research integrity and

ISSN: 2692-7608 DOI: 10.6981/FEM.202508_6(8).0010

disqualified from funding for five years to push for quality improvement at the application end. Through the dual-track approach of reconfiguring authority and responsibility and quality control, the transformation channel from "laboratory to market" can be systematically opened up. It is expected that the patent conversion rate of key laboratories will exceed 15% within three years, and a sustainable innovation ecosystem will be built.

5. Conclusion

The conflict of interest in the patent transformation of national key laboratories is essentially the result of the combined effect of the heterogeneity of value demands among the entities in the innovation chain and the insufficiency of institutional supply. By deconstructing the core conflicts of interest among the four entities - laboratories (legal entities), research teams, enterprises and the government - this paper reveals the three root causes of the conflict: the ambiguity of ownership distribution, the disorder of quality control and the imbalance of risk and return. The case study shows that the imbalance of interests not only causes the "institutional slumber" of high-value patents, but also leads to a serious mismatch between the state's investment in science and technology and market returns. In response to this predicament, the "dynamic equilibrium mechanism" proposed in this paper is based on the reconfiguration of rights and responsibilities, supported by quality control, and centered on the sharing of benefits. Through the organic combination of legal compulsion and market flexibility, it redefines the virtuous cycle path of "innovation - transformation - feedback". In future practice, it is necessary to further explore the collaborative boundaries between government guidance and market dominance, improve the supporting policy tools for multi-subject co-governance, and ultimately build a patent transformation ecosystem that takes into account both the laws of scientific and technological innovation and the efficiency of the market economy, providing institutional support for achieving high-level self-reliance and self-strengthening in science and technology.

Mark Twain once said that a country without a Patent Office and good patent laws is like a crab that does not know how to move except to move left and right and backward[16]. The optimization of the patent conversion mechanism in China's national key laboratories needs to follow the international laws of innovation while taking into account the characteristics of the local scientific research system. Balancing interests is our fundamental idea for resolving conflicts of interest. Whether considering the incentives for inventors and designers or the demands of disseminators and users for technical information, only when the interests of all parties involved in the patent system are balanced can society move forward more steadily. This is also an important goal of the current patent system[17].

Acknowledgments

Research Project: Research on the policy system and operation mechanism of intellectual property supporting the construction of sci-tech strong province(20213BAA10W18).

References

[1] Zheng Shuqian. Research on Overcoming the Predicament of Patent Trans- formation System in Chinese Universities [J]. Innovation Science and Technology, 2020,20(11) : 87-92.

[2] Yang Yang. Research on the Current Situation, Problems and Countermeasures of Patent transformation in Chinese Universities [D]. Central South University,2014.

[3] Fang Xi, Li Qingrui, Liu Yun. Analysis of the transformation strategy model of "dormant patents" in universities from the perspective of benefit distribution [J]. Science and Technology of Universities in China,2023,(09):68-75.

ISSN: 2692-7608 DOI: 10.6981/FEM.202508_6(8).0010

[4] Supreme People's Court of the People's Republic of China. Shanghai Chenxing Jianshijia Vision Technology Co., Ltd. v. Liu Weizhong Dispute over Patent Right Transfer Contract.(2021) Supreme People's Court Zhi Min Zhong No. 1323 [EB/OL].(2022-12-13)[2025-05-02].

[5] CCTV.com.[News Live Room] Live Broadcast of the Yangtze River's Major National Equipment in Chengdu, Sichuan Province, Witnessing the "Super High-Speed Rail" [EB/OL].(2018-04-28)[2025-05-02].

[6] CCTV News. Test success in low vacuum environment! The "high-speed flying car" is approaching [EB/OL].(2024-08-06)[2025-05-02].

[7] State Council. Notice of the State Council on Issuing and Implementing Several Provisions for the Enforcement of the Law of the People's Republic of China on Promoting the Transformation of Scientific and Technological Achievements[Z]. Guo Fa [2016] No. 16.2016-02-26.

[8] Li Yangfang. Top Ten Cases | Empowerment Reform Helps Hard Technology Fly Out of the "Ivory tower" [N]. China Intellectual Property News.2024-06-26(16).

[9] China National Intellectual Property Administration.Regulations on the Evaluation of China Patent Awards (Revised in 2023)[R/OL].(2024-02-01)[2025-05-02].

[10] Liao Shuyu. Research on the Impact of Patent Bubbles on Technological Innovation Efficiency in High-tech Industries [D]. Guangxi University,2018.

[11] Liu Hongzhen, Chen Su. The current situation, problems and strategies of patent open licensing in universities under the New Round of Technological Revolution and Industrial Transformation [J]. Science and Technology Entrepreneurship Monthly, 25,38(01):68-73.

[12] Xu Buyi, Zhou Ge. The classification and grading model of pre-patent application evaluation in local universities [J]. Science and Technology & Industry, 25,25(07) : 261-265.

[13] Fang Xi, Cui Liangyu, Liu Yun. Identification and development trend analysis of core technologies in Artificial intelligence based on Patent characteristics - Analytic Hierarchy Process (AHP) - Entropy Weight Method [J]. Research of Science and Technology Management,2024,44(02):35-44.

[14] Zuo Yonggang, Li Yuan. Research on Quantitative Characteristics and Cultivation Strategies of High-Value Patents: A Case Study of the China Patent Award [J]. Jiangsu Science and Technology Information,2024,41(16):35-39.

[15] Sun Mengjiao. The application of "interest balance" in Intellectual Property Law [J]. Legal Affairs Review,2022,(34):79-81.

[16] MarkTwain,AConnecticutYankeeinKingArthurt'sCourt58(signetClassic2 004)(1889).

[17] Lu Xiaoyan. The balancing Mechanism of interests in the patent system [J]. Journal of Hubei University of Economics (Humanities and Social Sciences Edition),2020,17(04):75-77.