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National Security Risks and International Arbitration Methods during the Transnational Circulation of Key Technological Intellectual Property

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Abstract. In the context of the intensification of global technological competition, the rise of technological nationalism and the reconstruction of the industrial chain and supply chain, the cross-border flow of key technology intellectual property rights has become a strategic issue related to National Science and technology security, industrial security and economic security. This paper analyzes the types of national security risks in the cross-border transfer of key technology intellectual property rights, the institutional advantages of international arbitration, and the applicable scenarios and practical limitations. This paper concludes that international arbitration, with its neutrality, efficiency, confidentiality, professionalism and cross-border enforceability, it can effectively adapt to controversial scenarios such as cross-border technology licensing transfer, cross-border Mergers and Acquisitions investment (M & A investment), standard essential patents, compliance with trade secret data, and countering unilateral sanctions, it is an important rule of law path to prevent and control related national security risks; however, there are still shortcomings in the aspects of jurisdiction delimitation, rule adaptation, cost control, ruling implementation and error correction mechanism. Based on the overall national security concept, it is necessary to improve the arbitration rules to incorporate security considerations, improve the coordination mechanism of security review and arbitration, build a whole chain risk prevention and control system, and ensure the independence and control of core technologies, safeguard national strategic security interests.

Keywords: Key Technology Intellectual Property Rights, National Security Risks, International Arbitration, Cross-Border Transfer

1. Introduction

The unprecedented great changes in the world in a century have accelerated the evolution, and scientific and technological innovation has become the core battlefield of the international strategic game. The key core technologies include artificial intelligence, quantum information, integrated circuits, biomedicine, aerospace, new materials, new energy, and deep-sea space exploration, which directly determine the status and discourse power of the country in the future global pattern. As a legal and market-oriented right form of technological achievements, intellectual property is the core

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carrier to realize the value of technology, promote technology transfer and transformation, and carry out technology competition. Under the development pattern of economic globalization and innovation globalization, the transnational flow of key technology intellectual property rights is an inevitable choice for multinational enterprises to optimize the allocation of innovation resources and expand the global market. It is also an important link for countries to carry out scientific and technological cooperation and promote the coordinated development of industrial chains.

At present, the academic circles have formed a certain research accumulation around the cross-border transfer of key technological intellectual property rights and national security governance. Zhu Xuezhong and Dai Zhizai explain the theoretical logic of intellectual property security governance from the perspective of overall national security, and sort out the various security risks and governance frameworks hidden in the cross-border flow of intellectual property rights. Huang Yuye and Liu Yunkai focus on the security review mechanism of foreign transfer of intellectual property rights, pointing out that the existing review system is still in the stage of exploration and improvement in terms of program design, division of Rights and responsibilities, and rule adaptation from the dimensions of international economic and trade rules and competition law. Zuo Haicong analyzes the impact and institutional dilemma of unilateral regulation and high-standard intellectual property rules on the cross-border transfer of key technologies in the country.

The existing research focuses on the construction of security review system, the macro-security governance of intellectual property rights and the single dimension of cross-border technology transfer regulation, there are still research shortcomings: first, there is less systematic review of the types and formation mechanism of multiple national security risks in the cross-border transfer of key technology intellectual property rights; Second, there is a lack of specialized in-depth argumentation on the institutional value, applicable scenarios and inherent limitations of international arbitration in the field of dispute resolution and risk prevention and control.

This paper systematically analyzes the types of national security risks faced by the cross-border transfer of key technological intellectual property rights, the institutional advantages and application scenarios of international arbitration in such cross-border disputes, and clarifies the realistic limitations of international arbitration itself. Based on the overall national security concept, this paper puts forward the improvement path of legalization and systematization.

2. The main national security risks in the cross-border flow of key technological intellectual property

The cross-border flow of key technology intellectual property is an important part of global scientific and technological cooperation and industrial synergy, but its disorderly and unbalanced flow will lead to multiple systemic security risks, it is necessary to construct a standardized cross-border flow control mechanism. Combined with the logic of risk transmission and the dimension of influence, the core risks are concentrated in the following three aspects:

2.1. Core technology and risk of industrial safety out of control

The key core technology is the core element to support the national science and technology self-reliance and ensure the independence and control of the industry. Its cross-border disorderly flow will directly impact the foundation of National Industrial Security. Key core technologies constitute the bedrock of national scientific and technological self-reliance and underpin the independence and controllability of industrial systems. Unregulated cross-border flows of such technologies directly erode the foundational security of national industries and undermine long-term innovation

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sovereignty [1]. From the perspective of the risk transmission path, in the conventional cooperation links such as transnational technology licensing, joint research and development, cross-border mergers and acquisitions, and transnational flow of high-end talents, the core algorithm, process parameters, test data, underlying source code and other sensitive technology intellectual property rights may be illegally obtained by foreign entities in a disguised form. On the national security risk of the cross-border flow of key technological intellectual property rights: the cross-border flow of key technological intellectual property rights has become a core variable affecting national science and technology security, the risks of core technology spillover, data leakage and supply chain vulnerability pose a systematic challenge to China's industrial security and economic security [2]. Some overseas entities have gradually penetrated the technology system in the world's strategic emerging industries and high-end manufacturing fields through joint venture cooperation, technology shareholding, and commissioned development, and then the technology path lock-in and technology dependence are formed.

From the perspective of practical impact, if high-end manufacturing, defense and military industry, critical infrastructure, and other fields rely on overseas core technology intellectual property rights for a long time, they will face the core link "Choke Point", the industry chain supply chain broken chain, industry low-end lock-in, and other risks. According to the global industrial chain security monitoring data, countries with insufficient core technology autonomy will have a longer average recovery period of pillar industries and will lose the dominance of the industrial chain when facing transnational technical sanctions, which directly threaten national economic security and long-term industrial competitiveness. Regulating the cross-border flow of core technology intellectual property rights is an inevitable requirement to prevent industrial security risks.

2.2. Data sovereignty and the risk of state secrets disclosure

The cross-border flow of key technology intellectual property rights is always deeply bound with the sensitive data generated by the whole process of Research and Development and application (R & D and application), and the synchronous cross-border flow of the two is prone to data security and state secret leakage risks, endangering national data sovereignty. In the process of technology research and development, testing and industrial application, many kinds of sensitive information such as test data, geographic information data, national defense engineering secret data and core business operation data will be derived. Such data and technical intellectual property form an integral whole, and security control needs to be implemented simultaneously in the process of cross-border transfer.

2.3. Game of international rules and security risk of supply chain

In the context of global technology competition, the dominance of intellectual property rules and the stability of the technology supply chain have become the core areas of the game between countries, and the unbalanced cross-border flow of technological intellectual property rights will aggravate the double security risks of a country in the international rules and supply chain levels. On the one hand, some developed countries have generalized the concept of national security, abused measures such as technology export controls, unilateral sanctions and entity lists, and artificially separated the global innovation chain from the industrial chain, through the monopoly of technical standards and the barriers of standard essential patents, the technological upgrading of enterprises in developing countries is suppressed, which leads to the problems of rising cross-border compliance costs,

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restricted overseas markets, and increased difficulty in safeguarding rights for the enterprises, gradually losing the right to speak on international technology rules.

On the other hand, key technical intellectual property rights are deeply embedded in the underlying infrastructure of national critical infrastructures such as communications, energy, finance and transportation. The termination of overseas intellectual property authorization, technical disconnection, sanctions and other emergencies will directly lead to the risk of critical infrastructure operation failure, service interruption, remote control and so on. Therefore, it is necessary to regulate the cross-border flow of key technology intellectual property rights, break the rule monopoly and ensure the security of the supply chain to maintain the stability of national science and Technology and economy.

3. Institutional advantages of international arbitration in dealing with key technology intellectual property risks

3.1. Outstanding neutrality and avoidance of regional bias

International arbitration allows the parties to choose their own arbitration institution, place, arbitrator and rules of procedure, which can avoid the bias and discrimination of a single national judicial system. For cross-border disputes over key technology intellectual property, neutral third-party platforms provide a basis for fair adjudication, reducing the risk of political interference and local protection, and reducing the risk of cross-border disputes over key technology intellectual property. It is especially applicable to the settlement of high-tech disputes involving multi-national subjects, sensitive technologies and complex interests [3].

3.2. Flexible and efficient program

Due to the fast iteration of technology updates, strong commercial timeliness and a limited market window period, the efficiency of intellectual property dispute resolution is highly required. The parties can simplify the process, online hearing, emergency arbitrator procedure and interim measures through an international arbitration agreement, and the hearing period is much shorter than traditional litigation. Against the backdrop of rapid technological iteration and time-sensitive commercial competition, intellectual property disputes entail stringent procedural efficiency requirements, as delayed resolution may entirely exhaust the limited market window of innovative products. International arbitration addresses such practical demands by empowering contracting parties to adopt streamlined proceedings, online hearings, emergency arbitrator mechanisms, and provisional relief measures, rendering it significantly more time-efficient than conventional domestic litigation [4]. Efficient arbitration procedures can curb torts in time, preserve evidence, stabilize trading relationships, and minimize technical and market risks.

3.3. Strong confidentiality, guarding the core technical secrets

Disputes over key technical intellectual property rights usually involve a large number of trade secrets, technical know-how and sensitive information. International arbitration is based on the principle of closed hearing, and the trial materials, evidence, information and award results are strictly confidential, which can effectively avoid the secondary proliferation of sensitive technical information. The characteristic of confidentiality makes arbitration an ideal way to deal with

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confidential technology, CORE algorithms, undisclosed data and other issues, which meets the dual needs of national security and corporate interest protection.

3.4. Professional outstanding, adapts to the technical complex case

Key technology intellectual property cases involve a large number of professional and technical facts, and it is difficult for ordinary judicial personnel to accurately determine. International arbitration allows parties to select experts with a science and engineering background, expertise in intellectual property and experience in cross-border dispute resolution to serve as arbitrators. It can make more scientific and practical judgments on professional issues such as patent validity, infringement comparison, identity of technical secrets, license fee calculation, standard essential patents, and so on.

3.5. Strong cross-border enforceability to ensure the implementation of rights

Based on the Convention on the recognition and enforcement of foreign arbitral awards (the New York Convention), Arbitral Awards can be recognized and enforced in more than 170 countries and regions, which has fundamentally solved the dilemma of "Difficulty in enforcing judgments" in cross-border remedies. For enterprises, the choice of international arbitration means that the winning result can be truly transformed into actual rights, and the preservation of overseas assets, the enforcement of injunctions and the landing of damages can be realized, although there are a total of 126 jurisdictions worldwide that apply the model law on international commercial arbitration (hereinafter referred to as "Model law jurisdictions"), among the most popular places of arbitration in the world, only the Hong Kong Special Administrative Region of China and Singapore are model law jurisdictions (and Singapore only applies in international arbitration). France, Switzerland and the United Kingdom are not model law jurisdictions; it is still arbitrary to take the model law of international commercial arbitration as the ideal standard for the internationalization of China's arbitration system. In the process of law revision, some researchers have proposed drawing lessons from the model of France and Singapore to formulate laws or design corresponding rules, but there is no academic consensus on this issue. It provides a solid guarantee for the protection of key technology intellectual property rights [5].

4. Analysis of the deficiencies of international arbitration in the prevention and control of key technology intellectual property risks

4.1. Natural limitations

The key technology intellectual property has strict territoriality. The judicial organs of various countries generally retain the exclusive jurisdiction to determine the validity and ownership of intellectual property rights, such as patents and technical secrets; international arbitration institutions do not have the power to make final rulings on the legality and validity of intellectual property rights related to national strategic technologies. Due to this defect, arbitration can only resolve superficial disputes, such as subsequent infringement compensation and contract breach; it is impossible to prevent the core risks of cross-border technology loss and industrial security caused by vague technology ownership and illegal technology rights confirmation from the source.

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4.2. The lack of adaptability of the rule system

The current international arbitration rules are mostly formulated by Western countries, which focus on the private rights relief of commercial subjects and ignore the public interests, such as national security and industrial strategy carried by key technical intellectual property rights. It is difficult to fit in with the mandatory requirements of core technology control, data security, and cross-border flow of sensitive technologies in the country. Some arbitration procedures and evidence rules will even break through the red line of domestic technical safety supervision, which can not meet the rigid needs of the state for the whole process safety prevention and control of key technologies.

4.3. The cost of risk prevention and control

International arbitration needs to bear high fees for professional arbitrators, cross-border lawyers' fees, and procedure promotion fees. For technology enterprises, especially small and medium-sized science and technology entrepreneurs, the costs of Rights Protection and risk prevention and control far exceed the benefits At the same time, the arbitration procedure lacks unified and standardized standards for the preservation and review of confidential technical evidence, and there are loopholes in the confidentiality control of sensitive technical information such as CORE algorithms, test data, and process parameters, it is difficult to realize the pre-prevention and rapid disposal of technical risks.

4.4. Limited risk resolution

International arbitral awards are inherently constrained by the public policy exceptions stipulated in national legal systems. Awards ruling on matters concerning pivotal technologies and core industrial interests frequently face refusal of recognition and enforcement, which renders it hard to fundamentally resolve disputes stemming from technology infringement and unauthorized cross-border technology transfer. Furthermore, international arbitration follows the principle of finality of awards with relatively immature appellate and rectification mechanisms. Any erroneous ruling made during arbitral proceedings will bring persistent adverse impacts that are difficult to remedy subsequently [6]. On the one hand, international arbitral awards are subject to the public policy reservation clauses of various countries. If the awards involve the key technologies and core industrial interests of other countries, they are easily refused recognition and enforced by relevant countries; as a result, risks such as technology infringement and illegal technology transfer can not be substantively solved. On the other hand, international arbitration adopts the final award system and lacks perfect appeal and error correction procedures. Once there are errors in the identification of technical facts and the application of laws, it will directly lead to the failure of the prevention and control of key technical intellectual property rights, and further amplify the security risks.

5. Systematic ways to improve international arbitration and prevent national security risks

5.1. Improve the rules of intellectual property arbitration and embed the consideration of national security bottom line

Urging domestic arbitration institutions to revise arbitration rules on foreign-related intellectual property rights, define national security exception clauses, public policy reservation mechanisms, confidential evidence processing procedures, technical investigator participation systems, emergency interim measures, and cross-border assistance mechanisms, legal requirements such as

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technology export control, foreign transfer security review, and data exit assessment should be included in the premise of arbitration application to ensure that the arbitration process and award do not harm the core interests of the state.

5.2. Strengthening the coordination between security review and arbitration procedure

Optimizing mechanisms for security review of outward transfer of intellectual property rights, technology export controls, and Security Review of foreign investment, and using arbitration clauses as an important tool for risk allocation, compliance commitments, and remedies for breach of contract, information Sharing, case notification and collaborative assessment mechanisms between arbitration institutions and national security review departments will be set up to implement penetrating supervision of sensitive technology transactions and prevent the use of arbitration to circumvent statutory review. Strengthening and streamlining security review mechanisms for outward IPR transfers, technology exports, and foreign investment is vital to safeguard national industrial security. Arbitration clauses function as key contractual instruments for risk apportionment, compliance assurance, and breach compensation. Establishing formalized information sharing, case notification, and joint assessment channels between arbitral tribunals and security review agencies ensures effective penetrating oversight of sensitive technology transactions and blocks attempts to bypass statutory review through arbitration [7].

5.3. Constructing the whole chain system of prevention in advance, response in the event and relief afterwards

To guide enterprises to set up compliance clauses, control retention clauses, improved ownership clauses, confidentiality obligations and dispute resolution clauses in cross-border contracts to reduce risks from the source; Build a cross-border risk early warning platform for key technology intellectual property rights, provide compliance guidance, case training and emergency rights protection assistance, and improve enterprise risk response capabilities. In the new era, intellectual property rights have been upgraded from traditional private law rights to the core tool of safeguarding national strategic interests. It is necessary to promote the protection of intellectual property rights and risk prevention and control with the concept of overall national security [8].

5.4. Enhancing the professional and internationalization ability of arbitration institutions

On September 12, 2025, the 17th session of the Standing Committee of the 14th National People's Congress voted to adopt the newly revised arbitration law of the People's Republic of China (hereinafter referred to as the Arbitration Law). This revision is the first comprehensive and systematic adjustment of the arbitration law since its implementation 30 years ago. The newly revised arbitration law shall further improve and perfect the arbitration legal system with Chinese characteristics, which is compatible with the commonly used international rules. It is of great significance to strengthen the construction of foreign-related rule of law, improve the credibility and international competitiveness of the country's arbitration, and better serve high-quality development and high-level opening-up [9]. China International Economic and Trade Arbitration Commission, Beijing Arbitration Commission and Shanghai Arbitration Commission should set up key technology intellectual property arbitration centers, establish a pool of professional arbitrators consisting of technical experts, patent attorneys, judges, scholars and senior lawyers, and optimize mechanisms such as fast-track, merger, emergency and online arbitration, enhance the ability to

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solve complex technical cases and enhance international credibility. Based on the overall situation of the construction of the rule of law concerning foreign affairs, the newly revised arbitration law of 2025 has achieved a number of institutional innovations in the field of foreign-related arbitration, and has formed a precise docking with the international development needs of arbitration institutions such as Beihang arbitration. It will build a coordinated link between institutional guarantee and practical development [10].

5.5. Strengthen the judicial support and supervision, guarantee the effective execution of the ruling

The People's courts shall, in accordance with the law, support the property, evidence and act preservation for arbitration and the assistance in extraterritorial collection of evidence, and shall standardize the enforcement procedures in accordance with the New York convention, clear boundaries and standards for refusal to enforce based on national security and public policy, balance the enforcement of awards and sovereign security, and create a stable and predictable judicial environment for international arbitration.

6. Conclusion

The cross-border flow of key technological intellectual property rights is an important part of high-level opening-up in the new era, and it is also a key area of national security risk prevention and control. The risks of core technology spillover, data leakage, rule monopoly, fragile supply chain and unilateral sanctions continue to pose challenges to national science and Technology, economy and industrial security. With its advantages of neutrality, efficiency, confidentiality, professionalism and enforceability, international arbitration has become one of the best ways to balance open innovation and national security and resolve cross-border intellectual property disputes. The country must adhere to the overall national security concept, promote risk prevention and control and dispute resolution in a rule-of-law way of thinking, it will continue to improve the supply of arbitration systems, strengthen the connection between security reviews, enhance the professional capacity of institutions, improve the judicial guarantee system, and deepen the participation in the building of the global governance system, by building a systematic, multi-level, rule of law mechanism for intellectual property protection and risk prevention and control of key technologies, it can effectively guarantee the independent control of key core technologies and safeguard national strategic interests and long-term security, in the fierce international scientific and technological competition to achieve a high level of security and high-quality development of the benign interaction.

References

[1] Hu, X. B., & Yuan, C. H. (2024) Complementary assets linking capacity, absorption speed and core technology breakthroughs. Science Research Management, 45(9), 1-8.
[2] Liu, X. H. (2026) The local practice and path improvement of internationalization of arbitration in China. Journal of International Law, (1), 83-91+156.
[3] China International Economic and Trade Arbitration Commission (2025) Annual Report on China International Intellectual Property Arbitration (2024). Retrieved from CIETAC official website: https: //www.cietac.org/articles/32508
[4] Li, S. Q. (2025) Intellectual Property Law and International Arbitration. Seton Hall Journal of International and Comparative Law, 18(2), 45-62.

DOI: 10.54254/2753-7048/2026.34462

[5] Luo, F. Z., & Zhao, Y. (2026) Reflection on the Meaning and Implementation Path of "Internationalization" of China's Arbitration System. Nanjing University of Law, (2), 42-61.
[6] Brown, T., & Davis, R. (2024) Public Policy Defences and Procedural Deficiencies in Cross-border Technology-related Arbitration. Journal of World Investment & Trade, 25(4), 512-536.
[7] Liu, S. (2025) Arbitration as a Double-Edged Sword: Balancing Party Autonomy and National Security in Cross-Border IP Transactions. Asian Journal of International Law, 15(2), 245-270.
[8] Guyuan Daily (2025) In the context of the new era, intellectual property has been upgraded from traditional private law rights to a core tool for safeguarding national strategic interests, and it is necessary to promote intellectual property protection and risk prevention and control in a coordinated manner with the overall national security concept. Guyuan Daily.
[9] Xiao, Y. D., & Wang, S. S. (2024) Research on the Reform Ideas of the Security Review Mechanism for the Transfer of Intellectual Property Rights to Foreign Countries in China. Journal of the Chinese Academy of Sciences, 39(3), 509-518.
[10] Jiang, L. L. (2026) The coordinated evolution of the revision of the Arbitration Law and the internationalization development of Beijing International Arbitration Commission from the perspective of foreign-related rule of law. International Law Journal, (1), 92-101+157.