

Implementation Dilemmas of the FRAND Principle in Standard Essential Patent Licensing and Reflections on China's Path

Yu Nanfen

Qualcomm Communication Technologies (Shenzhen) Co., Ltd., Shenzhen, Guangdong, China

Keywords: FRAND Principle; Standard Essential Patents (SEPs); Licensing Rates; Judicial Conflicts; China's Path

Abstract: Standard Essential Patents (SEPs) play a critical role in the formulation and application of global technical standards, while the FRAND (Fair, Reasonable, and Non-Discriminatory) principle serves as an essential mechanism to regulate SEP licensing practices and balance the interests of patent holders and implementers. However, the implementation of the FRAND principle in practice faces significant challenges. On the one hand, the “reasonableness” of licensing rates lacks a unified standard, leading to frequent disputes and litigation; on the other hand, transnational judicial conflicts, coupled with the interplay of injunctions and anti-suit injunctions, significantly increase compliance and operational risks for global enterprises. As a key participant in international standardization, China is both a major user of SEPs and an emerging exporter of patents, gradually developing unique approaches through judicial decisions, policy frameworks, and enterprise practices. Based on an analysis of the theoretical foundations and international practices of the FRAND principle, this paper examines the difficulties encountered in its implementation and reflects on China's responses through representative cases and institutional measures. Furthermore, it proposes optimization strategies for China's path, including improving rate determination mechanisms, balancing innovation incentives and market competition, and establishing diversified dispute resolution mechanisms, with the aim of providing references for China's institutional development and corporate strategies in global standard competition.

1. Introduction

Standard Essential Patents (SEPs) play a central role in technical standards within fields such as information and communications technology, and the FRAND (Fair, Reasonable, and Non-Discriminatory) principle has become a key mechanism to balance the interests of SEP holders and implementers. Its purpose is to ensure that innovators receive reasonable returns while preventing the abuse of patent rights that could hinder the widespread adoption of standards. Nevertheless, in practice, the implementation of the FRAND principle faces multiple challenges. The determination of reasonable licensing rates lacks a uniform standard, negotiations are often characterized by asymmetric information leading to unequal bargaining positions, and differences

across jurisdictions in the application of FRAND rules further intensify transnational disputes and judicial conflicts. For China, the FRAND issue carries a dual significance. On the one hand, Chinese companies, as major adopters of international standards, face high licensing fees and litigation risks. On the other hand, as Chinese enterprises strengthen their technological capabilities, they are increasingly becoming significant SEP exporters, necessitating the protection of their interests in international negotiations and judicial arenas. Against this backdrop, how to address the dilemmas of FRAND implementation at the judicial and policy levels and to explore an institutional path suited to national conditions has become a pressing issue. This paper aims to analyze the dilemmas of FRAND implementation through a review of its theoretical foundations and international practices, and to reflect on China's judicial cases and policy responses in order to propose feasible optimization strategies.

2. Theoretical Foundations and Practical Framework of the FRAND Principle

2.1 Origin and Connotation of the FRAND Principle

The FRAND principle—"Fair, Reasonable, and Non-Discriminatory"—originated from the practices of international standardization organizations such as the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). With the rapid development of information and communication technologies in the 20th century, SEPs became increasingly prominent in the standard-setting process. To prevent patent holders from abusing their market dominance once their patents were incorporated into standards, standard-setting organizations required them to commit to licensing under FRAND conditions[1]. This institutional arrangement sought to balance the protection of innovation incentives with the safeguarding of market competition. From the perspective of "fairness," the principle emphasizes that licensing terms should prevent patentees from exploiting their position by imposing unreasonable or excessive requirements on different implementers. "Reasonableness" is reflected in licensing rates that not only compensate patentees for their R&D investment but also avoid impeding technology diffusion and industrial application. "Non-discrimination" requires patentees not to impose differential conditions on licensees based on region, market position, or transaction size. Together, these three elements form the fundamental framework regulating SEP licensing practices. In theoretical terms, the FRAND principle represents a classic balancing mechanism. On the one hand, it acknowledges the exclusivity of patents as private rights, ensuring innovators can obtain fair returns through licensing[2]. On the other, it restricts potential monopoly abuse by emphasizing fairness and non-discrimination, thereby facilitating the development of the industrial chain as a whole. From a practical standpoint, a FRAND commitment has dual attributes: it constitutes a contractual obligation of the patentee toward the standard-setting organization, and it also serves as a legal basis that can be invoked in subsequent licensing negotiations and litigation. It is noteworthy that the interpretation of the FRAND principle varies across jurisdictions. The United States emphasizes market-based mechanisms, evaluating the "reasonableness" of licensing fees primarily on patent contribution and existing market transactions. The European Union, in contrast, places greater emphasis on maintaining competitive order, focusing on preventing SEP holders from abusing their market dominance within an antitrust framework. Thus, while the FRAND principle originated from international standardization practice, its interpretation and application exhibit significant institutional diversity, laying the groundwork for subsequent conflicts and dilemmas in practice[3].

2.2 International Practices and Legal Rules

The implementation of the FRAND principle at the international level demonstrates considerable diversity. While major jurisdictions generally recognize the importance of FRAND commitments, they differ significantly in the standards for rate determination, the conditions for injunctions, and the interplay with antitrust law[4]. Such institutional differences not only affect cross-border licensing negotiations and litigation strategies but also directly lead to global judicial conflicts. In the United States, the application of the FRAND principle reflects an intersection of contract law and antitrust law. U.S. courts emphasize that licensing fees should be evaluated based on the market value of the “Smallest Salable Patent-Practicing Unit” (SSPPU) in order to avoid unreasonable premiums derived from standardization. The landmark *Microsoft v. Motorola* case established the discretion of courts to determine reasonable rates in FRAND disputes. Overall, U.S. judicial practice encourages market negotiations and favors monetary damages over injunctive relief, seeking to prevent SEP holders from leveraging standard lock-in effects to exert undue pressure on implementers. In the European Union, the FRAND principle is closely tied to competition law. In the *Huawei v. ZTE* case, the Court of Justice of the European Union (CJEU) explicitly ruled that SEP holders must fulfill specific obligations before seeking injunctions, such as notifying alleged infringers, proposing concrete licensing terms, and allowing reasonable time for response. Failure to comply with these procedural requirements could result in a finding of abuse of market dominance. The EU thus emphasizes procedural safeguards and antitrust scrutiny to curb excessive behavior by SEP holders and to maintain fair competition. Japan takes a more pragmatic approach[5]. The Japan Fair Trade Commission (JFTC) has issued multiple policy guidelines clarifying that SEP licensing should adhere to FRAND conditions, and that discriminatory or unreasonable licensing arrangements may constitute “unfair trade practices” under antitrust law. In practice, Japanese courts often prefer mediation or arbitration as alternatives to litigation, focusing on industry realities in determining licensing terms. This flexibility helps reduce litigation risks for multinational enterprises in the Japanese market. In addition, international organizations such as the World Intellectual Property Organization (WIPO) and ISO have promoted several guiding documents in an attempt to harmonize the understanding of FRAND commitments worldwide. However, due to their lack of binding force, these documents serve more as policy recommendations rather than substantive rules. In sum, the United States emphasizes economic analysis and market value assessment, the EU underscores competitive order and procedural fairness, while Japan prioritizes industry practice and pragmatic flexibility. This differentiated landscape demonstrates that although the FRAND principle shares common ground, cross-border licensing and litigation inevitably give rise to conflicts, laying the foundation for the analysis of “implementation dilemmas” in subsequent sections[6].

3. Dilemmas in the Implementation of the FRAND Principle

3.1 Challenges in Determining Licensing Rates and Reasonableness

In the implementation of the FRAND principle, how to define a “reasonable” licensing rate has always been one of the most contentious issues. In theory, a reasonable rate should both ensure the legitimate return of the patentee and avoid obstructing the promotion and adoption of standards due to excessively high fees. However, given the complexity of technological contributions and the diversity of market environments, the determination of rates faces multiple practical challenges. First, differences between cost-based and market-based approaches lead to divergent methodologies. Some scholars and courts advocate calculating rates based on R&D investment and patent contribution, using cost-plus or proportional allocation models[7]. Yet, in the context of

cross-border transactions and global value chains, cost alone fails to reflect the true value of patents within a complete device or system. Another approach relies on market-based evidence, referencing existing licensing agreements or industry averages. However, such agreements often suffer from information asymmetries or special conditions, making them insufficient to fully reflect FRAND's fairness and reasonableness requirements. Second, portfolio licensing further complicates the determination process. SEPs are often concentrated in the hands of a few patentees, with significant disparities in the technical value of individual patents. In the context of patent pools or portfolio licensing, how to allocate weights among patents fairly and prevent certain patentees from inflating overall rates has become a pressing issue. In communications standards in particular, the "royalty stacking" effect may impose an excessive burden on implementers, raising serious antitrust concerns. Third, differences in judicial standards across jurisdictions exacerbate compliance uncertainty for global enterprises. U.S. courts tend to adopt the "Smallest Salable Patent-Practicing Unit" (SSPPU) as the valuation basis to prevent unreasonable premiums arising from standardization, while EU courts sometimes permit reference to the entire device value to ensure adequate returns for patentees. These divergent standards not only lead to inconsistent outcomes across markets but also encourage "forum shopping," further increasing transaction costs and legal risks. Finally, the accelerating pace of technological iteration adds further complexity. New generations of standards often incorporate large numbers of additional patents while older standards remain in widespread use, complicating the balance of value allocation across generations. In emerging areas such as 5G and the Internet of Things, where the number of patents is vast and the application scenarios diverse, the absence of a unified and transparent mechanism for dynamically adjusting licensing rates makes it difficult to accommodate the interests of patentees, implementers, and industry development as a whole. In sum, the determination of FRAND licensing rates is not merely a matter of economic analysis but also a focal point of legal and policy contestation. Its inherent uncertainty directly affects negotiation efficiency and industrial order, making it one of the most critical dilemmas in the practical implementation of the FRAND principle[8].

3.2 Asymmetry in Negotiations and Litigation

Table 1 Comparison of Asymmetries between SEP Holders and Implementers in Negotiations and Litigation

Dimension	SEP Holders	Implementers
Bargaining Power	Possess irreplaceable patent portfolios; leverage standard lock-in for advantage	Dependent on standards for market entry; refusal risks infringement liability
Information	Control knowledge of patent scope and licensing history; shape rate calculations	Lack information on contributions within pools; often disadvantaged by asymmetry
Negotiation	Use injunction threats or portfolio licensing demands to compel concessions	Forced to accept higher rates to avoid injunctions or market exclusion
Litigation	Choose favorable jurisdictions; employ injunctions, anti-suit injunctions, etc.	Defend across multiple jurisdictions; face high litigation costs and uncertainty
Risk Exposure	Typically liable for monetary damages if unsuccessful; may prolong suits to gain	Risk of product bans or market exclusion; more direct and severe consequences
External Oversight	May face antitrust scrutiny but often equipped with stronger legal resources	May appeal to regulators or courts, but remedies are less immediate or effective

In SEP licensing practice, patentees and implementers often exhibit significant asymmetry. This asymmetry manifests not only in bargaining power during negotiations but also in the remedies and legal risks faced during litigation. Leveraging standard lock-in effects and the scale of patent portfolios, SEP holders frequently occupy a dominant position in negotiations, while implementers, constrained by information asymmetries and market dependence, often find themselves

disadvantaged. At the negotiation stage, SEP holders typically control large patent pools and may use the threat of injunctions as leverage to demand higher rates. Implementers who fail to comply with these requirements may face product bans or exclusion from the market. In litigation, patentees often choose favorable jurisdictions and may combine injunctions with anti-suit injunctions to maximize pressure, whereas implementers must defend themselves across multiple jurisdictions, bearing heavy costs and uncertainty[9]. Table 1 illustrates the asymmetries between SEP holders and implementers in negotiations and litigation.

This asymmetry not only complicates the licensing process but also fuels international judicial conflicts. Designing mechanisms to reduce information asymmetries, limit the misuse of injunctions, and foster more balanced negotiation and remedy structures is central to improving FRAND implementation[10].

4. Judicial and Policy Practices of FRAND Implementation in China

With China's growing role in global technological innovation and standardization, issues concerning the implementation of the FRAND principle have acquired distinctive characteristics within its judicial and policy framework. On the one hand, Chinese enterprises in sectors such as mobile communications and smart devices heavily rely on foreign SEPs, facing high licensing costs and cross-border litigation risks. On the other, leading firms such as Huawei, ZTE, and Xiaomi are increasingly emerging as contributors to international standards and as SEP holders themselves, thereby requiring FRAND-based mechanisms to safeguard their rights in licensing negotiations and judicial proceedings. This dual role highlights the unique position of China in FRAND implementation. Judicially, Chinese courts have established their stance and methodology through a series of landmark cases. The Huawei v. ZTE case exemplified this by clarifying that FRAND commitments have both contractual and antitrust dimensions. The court limited the conditions for injunctions, requiring SEP holders to fulfill reasonable negotiation obligations before seeking such remedies. This decision not only echoed the European Union's judicial reasoning in Huawei v. ZTE but also strengthened China's influence in the global governance of SEPs. Subsequently, in the Xiaomi v. Ericsson case, Chinese courts further demonstrated judicial activism in cross-border licensing by setting global licensing rates. This move broke traditional territorial jurisdiction constraints and positioned China as an increasingly important venue for international SEP disputes. Collectively, these cases illustrate China's shift from passively responding to global litigation to proactively shaping international rules. On the policy and regulatory front, Chinese authorities have consistently strengthened their institutional responses to FRAND-related challenges. The State Administration for Market Regulation (SAMR) and its predecessors issued antitrust enforcement guidelines for SEP licensing, explicitly warning that refusals to license, discriminatory licensing, or excessive pricing may constitute abuse of market dominance. These guidelines resonate with the EU's competition law logic while providing Chinese enterprises with greater legal leverage in international negotiations. At the same time, the China National Intellectual Property Administration (CNIPA) has actively promoted research and international dialogue on FRAND-related issues, advocating for more transparent and predictable mechanisms for rate determination and licensing models. Such efforts not only reduce uncertainties for multinational firms operating in China but also enhance China's institutional voice in global intellectual property governance. Nevertheless, Chinese enterprises still face significant practical difficulties. As implementers, they remain disadvantaged in negotiations with foreign giants due to information asymmetries and heavy reliance on global standards, often compelled to accept high rates under the threat of injunctions. As patentees, although Chinese companies are rapidly expanding their SEP portfolios, the overall quality and global reach of these patents remain limited, constraining their

bargaining power in international disputes. To address this, Chinese firms have adopted dual strategies: investing heavily in core technologies and standardization to strengthen patent portfolios, and leveraging domestic judicial and regulatory practices to improve their positions in global disputes through litigation or counterclaims. Overall, China's judicial and policy practices in FRAND implementation reflect both the adoption of international experience and indigenous institutional innovation. This process not only signifies China's transformation from a major SEP user to an emerging SEP exporter but also contributes new models and pathways for the global governance of FRAND.

5. Reflections and Optimization of China's Path

5.1 Improving Licensing Rate Determination Mechanisms

In reflecting on and optimizing China's path, improving the mechanism for determining FRAND licensing rates is undoubtedly a priority. Existing determinations of FRAND rates often lack transparency and uniformity, with differences in standards, methods, and references across courts leading to insufficient predictability for both patentees and implementers. To address this, China should explore the establishment of a more systematic rate determination process that integrates technical value, market factors, and international benchmarks. Such a mechanism would both ensure that patentees receive fair returns and provide implementers with a fair and transparent basis for negotiations. Enhancing this mechanism would not only help reduce litigation arising from rate disputes but also strengthen the credibility and influence of Chinese judicial decisions internationally. Figure 1 illustrates an optimized framework for FRAND rate determination.

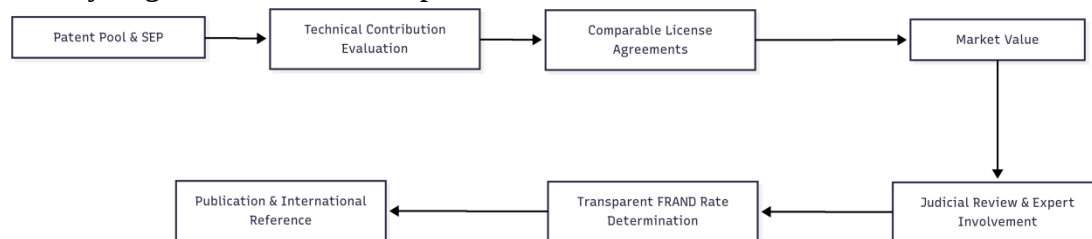


Figure 1: Optimized Framework for FRAND Rate Determination

As shown in the figure, the improved mechanism should be built on a well-developed SEP database and patent pools. Independent institutions or expert panels would conduct scientific evaluations of patent contributions, which would then be compared against existing license agreements to form an initial benchmark. On this basis, market value assessments should be incorporated to avoid distortions caused by relying solely on cost or contribution metrics. Subsequently, judicial review and expert participation would ensure the legality and professionalism of the process, ultimately producing a transparent FRAND rate determination. Importantly, the results should be made publicly available within a reasonable scope and serve as a reference in international negotiations and cross-border disputes, thereby enhancing China's institutional influence in global FRAND governance. Through such a process-oriented and transparent mechanism, China can not only reduce uncertainties in licensing negotiations for domestic and foreign enterprises but also provide internationally valuable experience, gradually promoting convergence in the global rules governing the FRAND principle.

5.2 Balancing Innovation Incentives and Market Competition

A central challenge in the implementation of the FRAND principle lies in striking a balance

between protecting patentees' innovation incentives and maintaining fair market competition. On the one hand, SEPs embody significant investments in R&D and technological breakthroughs, and adequate returns are essential to incentivize continued innovation. Excessively low licensing rates may weaken patentees' motivation to innovate and undermine China's prospects of gaining leadership in global standards competition. On the other hand, if patentees abuse their dominant market position by imposing excessively high fees or discriminatory licensing terms, this disrupts market competition, hampers the dissemination of technology, and may even trigger antitrust concerns. This inherent tension makes balancing innovation and competition a core issue in institutional design. In practice, China must absorb international experience while adapting to domestic market realities. On the one hand, establishing transparent standards for rate assessment and information disclosure can mitigate conflicts arising from uncertainty, enabling patentees to secure fair returns while allowing implementers to forecast costs and make informed business decisions. On the other hand, stronger antitrust enforcement is needed to prevent SEP holders from exploiting injunctions or information asymmetries to compel unfair concessions from implementers. Special attention should also be paid to small and medium-sized enterprises and emerging industries, which may require appropriate protection to ensure that excessive licensing burdens do not stifle innovation or competition. Notably, China's growing influence in international standardization provides an important opportunity to achieve this balance. By actively participating in and shaping the standardization process, Chinese enterprises can increase their share of patent contributions at the source and embed fair and reasonable principles into the rules of standards themselves. Moreover, industry associations and standard-setting organizations should be encouraged to adopt more binding internal governance mechanisms to ensure transparency and fairness in licensing, thereby preventing individual patentees from "capturing" entire industry chains. In sum, China must coordinate judicial, regulatory, and standardization efforts to achieve a dynamic balance between incentivizing innovation and ensuring market access. Only by safeguarding both patent protection and competitive order can the FRAND principle truly promote technology diffusion and industrial development, and only then can China's approach contribute valuable experience to global governance.

5.3 Building Diversified Dispute Resolution Mechanisms

Disputes are almost inevitable in FRAND implementation due to the complexity of SEP licensing, which often involves multinational enterprises, multiple legal systems, and vast patent portfolios. Reliance on traditional litigation alone tends to generate high costs, long cycles, and uncertain outcomes. In today's globalized environment, differences in judicial practice across jurisdictions also trigger cycles of counterclaims, injunctions, and anti-suit injunctions, exacerbating legal conflicts and operational risks for enterprises. Consequently, China must actively build diversified dispute resolution mechanisms to improve efficiency and predictability in resolving FRAND-related conflicts. Specifically, mediation, arbitration, and litigation should form a tiered and interconnected system. Mediation, preferably facilitated by industry associations or neutral institutions, should serve as the first step to address information asymmetries and negotiation deadlocks, thereby lowering transaction costs. Where mediation fails, arbitration provides a more professional and flexible alternative, with intellectual property and economics experts assessing both technical and market dimensions. Arbitral awards, which are generally more enforceable internationally, are particularly well-suited to cross-border disputes. Litigation, as the final recourse, should be reserved for cases involving public interests, major market implications, or where parties refuse to comply with arbitral awards, with courts delivering judgments under strict legal frameworks as the figure 2 shown.

This multi-tiered mechanism emphasizes a pathway of “mediation first, arbitration parallel, litigation as a last resort.” It not only alleviates legal and business pressures on enterprises but also enhances the influence of China’s judicial practices in global SEP dispute governance. More importantly, by investing in the development of credible and internationally recognized mediation and arbitration institutions, China can establish itself as a hub for FRAND-related dispute resolution, thereby protecting domestic enterprises while shaping rules in the global FRAND governance system.

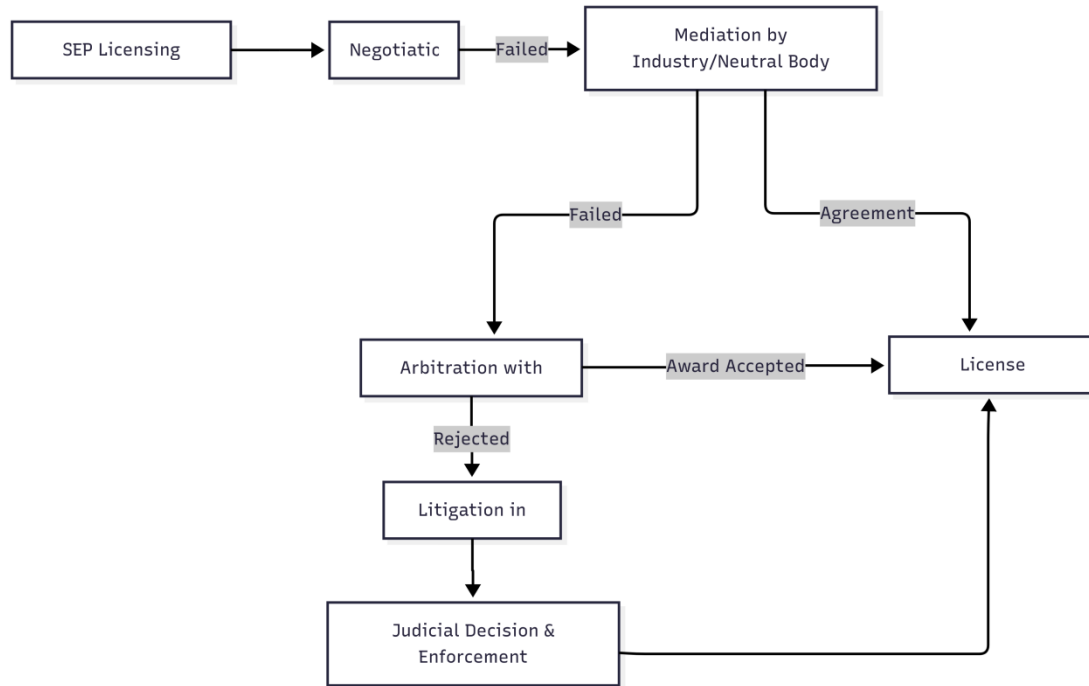


Figure 2: Diversified Mechanism for FRAND Dispute Resolution

6. Conclusion

As a mechanism to balance the interests of SEP holders and implementers, the FRAND principle faces persistent implementation challenges worldwide. The lack of a unified standard for rate determination, asymmetries in negotiation and litigation, and frequent transnational judicial conflicts continue to undermine its effectiveness. China has gradually accumulated judicial and policy experience in this area, shifting from a reactive posture to a more proactive role through landmark cases, regulatory measures, and enterprise strategies. Nevertheless, China’s approach still requires improvement in terms of transparency in rate determination, balancing innovation incentives with competition, and establishing diversified dispute resolution mechanisms. Looking forward, China should strengthen the international comparability and transparency of its institutional design, balance patent protection with competitive order in policy direction, and play a greater role in global governance. In doing so, China can contribute meaningfully to the effective implementation of the FRAND principle and the convergence of international rules.

References

- [1] Li, Xiaoming, Zi Cheng, and Meixin Du. "Standard-essential patent legal protection in China’s telecommunication industry: an international trade and economy perspective." *Asia Pacific Law Review* 32.2 (2024): 504-523.
- [2] Liu, Ying. "Royalty rate determination in standard essential patent litigation in China-from regional rate to global rate." *Computer Law & Security Review* 55 (2024): 106036.

- [3] Gaffney, Naoise, Pauline Grotz, and Thore Leidecker. "Say goodbye to my little FRAND: is the withdrawal of the European Commission's Regulation on standard essential patents a missed opportunity or a dodged bullet?." *Journal of Intellectual Property Law & Practice* 20.8 (2025): 523-538.
- [4] Besen, Stanley M. "Looking for FRAND: Patent Owners, Standard-Setting Organizations, and the Courts." *Tul. J. Tech. & Intell. Prop.* 25 (2023): 213.
- [5] Guan, Taorui. "Intellectual Property Legislation Holism in China." *U. Pa. Asian L. Rev.* 19 (2023): 81.
- [6] Yu, Ling, and You Zuo. "Coping with the standards wars: the practice of the Chinese courts." *Journal of Intellectual Property Law and Practice* 18.1 (2023): 18-29.
- [7] Zhong, Chun, and Bo Yuan. "Sword of Damocles? Assessing the anti-suit injunction of standard essential patents in China." *Queen Mary Journal of Intellectual Property* 15.1 (2025): 80-100.
- [8] Chen, Yang. "Under double shadows: how US-China trade relations and path dependence shape China's IP preliminary injunction system." *Asia Pacific Law Review* 33.1 (2025): 68-101.
- [9] Guan, Taorui. "Collaborative Protection of Intellectual Property: The Case of China." *U. Pa. J. Int'l L.* 46 (2024): 341.
- [10] Zeng, James Si. "Law and industrial policy: The East Asian experience." *Vand. J. Transnat'l L.* 58 (2025): 197.