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Research on Legal Issues of Artificial Intelligence Application in International Commercial Arbitration

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Abstract. With the widespread application of artificial intelligence technologies such as blockchain and big data technology, the field of international commercial arbitration is experiencing profound revolutions. The utilization of artificial intelligence in this field not only has acted as an important role in completing repetitive and mechanical basic tasks like drafting arbitration agreements and writing hearing transcripts. Instead, it is now playing a significant role in assisting with case adjudication. artificial intelligence offers positive impacts by enhancing arbitration efficiency, improving arbitration transparency, and reducing arbitration costs. However, it also has issues such as ethical risks, potential leakage of parties' personal information, weakening the "subjectivity" of arbitrators, and reducing arbitration accuracy. This paper proposes targeted measures to fully protect the personal information security of arbitration parties through legal regulations and technological measures, while consistently emphasizing the "subjectivity" of arbitrators. It uses artificial intelligence as an auxiliary tool in decision-making, enabling arbitrators to maximize arbitration efficiency while pursuing "substantive justice."

Keywords: artificial intelligence, international commercial arbitration, auxiliary ruling role

1. Introduction

Since the beginning of the 21st century, artificial intelligence achievements such as big data and blockchain technology have gradually integrated into all aspects and fields of human social life, profoundly impacting and revolutionizing human political, economic, and cultural life. The release of ChatGPT and Deepseek further demonstrates a qualitative advancement in the technological paradigm of generative artificial intelligence [1]. Based on this background, international commercial arbitration, one of the most important mechanisms for resolving cross-border disputes, has also been revitalized under the influence of science and technology. Artificial intelligence, with its characteristics of virtualization, digitization, and intelligence, has promoted the adjustment and development of the international commercial arbitration industry [2]. Specifically, the application of artificial intelligence in the field of international commercial arbitration has not only acted as an important role in completing basic, repetitive, and mechanical tasks such as drafting arbitration agreements, submitting arbitration applications, verifying factual evidence, writing trial records, and assisting in case filing, but also has begun to play a significant role in assisting in case adjudication.

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Chinese international arbitration institutions have already achieved certain results in this respect. For example, the Shenzhen International Arbitration Court launched the "Cloud Arbitration" service in 2016 and created China's first arbitration intelligent robot in 2017 [3]. Another example is the AI arbitration secretary "Zhong Xiaowen" developed by the Guangzhou Arbitration Commission, which completed its first international arbitration hearing without a human arbitration secretary in 2023. By the third quarter of 2024, the commission had accepted over 10,000 cases of digital economy disputes, with a total value exceeding 10 billion yuan, and the number of concluded cases using batch intelligent review had increased by 11%.

The application of artificial intelligence in the field of international commercial arbitration plays a positive role in improving arbitration efficiency, reducing arbitration costs, enhancing arbitration transparency, and promoting the fairness of arbitration results [4].Taking the advantage of improving dispute resolution efficiency as an example, artificial intelligence can efficiently complete repetitive and mechanical tasks, helping arbitrators clarify their thoughts and accurately identify case facts when they firstly encounter a brand-new case. This allows for a reasonable allocation of the arbitrators' focus and energy, saves time in making decisions, and significantly enhances arbitration efficiency. However, we must also clearly recognize that the application of artificial intelligence in international arbitration still faces many restrictive factors. For instance, there are ethical risks, such as weakening or even eliminating the "subjectivity" of arbitrators or exposing the personal information of arbitration parties. Additionally, due to limitations in the scale, diversity, timeliness, and reliability of big data technology , the accuracy of artificial intelligence decision-making may be compromised. Furthermore, the boundaries of artificial intelligence's assistance in decision-making have not been clearly defined, and the simple, rigid logical thinking of artificial intelligence may conflict with the "substantive justice" pursued in arbitration.

With the further development of scientific and technological achievements such as big data and blockchain technology, the innovative and intelligent achievements of artificial intelligence applications in international arbitration, such as online arbitration systems, will not be shelved. Instead, they will become an inevitable trend in the future development of the international commercial arbitration field [5]. To conclusion, this article aims to analyze and demonstrate the existing issues such as ethical risks and accuracy deficiencies that have emerged from the application of artificial intelligence in the field of international commercial arbitration. It will propose corresponding reasonable suggestions and improvement measures, clarify the role of artificial intelligence in the future of international arbitration, and strive to better leverage artificial intelligence's role in assisting with arbitration decisions in international commercial arbitration.

2. Existing issues in applying artificial intelligence to international commercial arbitration

2.1. The application of artificial intelligence raises ethical risks

To be honest, while the widespread use of artificial intelligence brings numerous convenience and positive impacts, arbitration, as one of the diversified dispute resolution mechanisms, essentially deals with disputes between natural persons, legal entities, and other social subjects. Therefore, the application of artificial intelligence in the field of international commercial arbitration may hinder the realization of ethical values and give rise to moral and ethical risks. In 2021, the National New Generation Artificial Intelligence Governance Committee released the "Ethical Norms for the New Generation of Artificial Intelligence", which proposed six basic ethical requirements for the application of AI, including protecting privacy security and ensuring and reliability. To be specific, in the field of international commercial arbitration, the application of artificial intelligence may lead

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to two main issues: the impairment of arbitrators' "subjectivity" and inadequate protection of personal information rights [6].

Firstly, in the era of big data technology, phenomena such as the "information cocoon" and "filter bubble" arise from recommendation algorithms and other AI technologies, which also shape individuals' unique cognitive structures based on their habits, inclinations, and interests, leading to a self-locking state of information while facilitating the rapid acquisition of desired information. In the context of international commercial arbitration, when arbitrators use artificial intelligence to assist in tasks such as determining case facts, reviewing the legality and validity of evidence, and retrieving applicable legal provisions, artificial intelligence captures the arbitrators' legal reasoning and argumentation methods, analyzes their thought processes, and in future case handling, regardless of whether the cases differ, prioritizes providing the same auxiliary services. This can lead to the solidification of the arbitrators' thinking patterns, preventing them from analyzing specific issues on a case-by-case basis. Moreover, if artificial intelligence's analysis results exert a guiding influence on the arbitrators' self-judgment, the harm is even greater. Frequent use of artificial intelligence for auxiliary adjudication can lead to dependency and addiction, as well as the gradual infiltration and influence of artificial intelligence on the arbitrators' thinking patterns, resulting in a "role reversal" between the arbitrators and artificial intelligence. This can severely impact, or even eliminate, the arbitrators' "subjectivity" in adjudicating cases. Subjectivity is essential in the adjudication process. The most reasonable and ethically acceptable international commercial arbitration awards require arbitrators to comprehensively consider legal, ethical, and international environmental factors [1]. Relying on artificial intelligence to make decisions would significantly undermine the achievement of legal principles, legal values, ethical requirements, and consideration of the international environment, not only impairing the arbitrators' "subjectivity" but also undermining the fairness and justice of the arbitration outcomes.

Secondly, international commercial arbitration combines foreign-related elements with arbitration characteristics. The former is reflected in the need to transmit the applicant's personal information and case-related evidence materials across borders, while the latter highlights the high degree of confidentiality inherent in arbitration [7]. Although the rapid development of information networks, coupled with the practical difficulties of not being able to conduct offline case hearings due to the COVID-19 pandemic, has led to an increasing number of international arbitration institutions creating online arbitration systems, such as the "Cloud Arbitration" service system launched by the Shenzhen International Arbitration Court. However, the widespread application of modern information technology and artificial intelligence, while bringing convenience and efficiency, also significantly increases the risk of personal information leakage for parties involved in international commercial arbitration, posing a serious threat to their personal information security. The amounts in dispute in international commercial arbitration are usually substantial, and the parties are often financially powerful enterprises, including some high-tech companies. Even under high levels of confidentiality, these companies' business information is at risk of theft, let alone the need to provide personal and business information during online evidence presentation. Once leaked, this information could not only cause significant economic losses to the enterprises but also damage the reputation and image of international arbitration institutions. Furthermore, many arbitration parties are skeptical about whether international arbitration institutions take necessary measures to protect their personal information, which is also harmful to the development of international commercial arbitration services [8].

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2.2. The limitations of big data affect the accuracy of arbitration outcomes

In the field of international commercial arbitration, artificial intelligence is capable of handling fundamental tasks such as retrieving relevant legal statutes and precedents. This capability primarily relies on the support of extensive databases. Firstly, the scalability of big data technology is limited. Due to the high confidentiality of international commercial arbitration, the number of publicly available arbitration documents is significantly less compared to domestic arbitration cases. However, the accurate application of data-driven artificial intelligence depends on a massive database; the larger the data volume, the higher the accuracy of artificial intelligence application in the current case. Unlike domestic arbitration cases, there is no unified data platform for collecting arbitration cases internationally, such as the China Judgments Online, resulting in relatively limited data available for international commercial arbitration cases. Secondly, the diversity of big data technology is overly complicated. The parties involved in international commercial arbitration cases, the place of contract performance, and the location of disputes may all have foreign elements. The basis for arbitrators to adjudicate cases often involves legal norms from different countries, making it operationally challenging to retrieve highly similar prior precedents. Thirdly, the timeliness of big data technology is relatively lagging. In complex international commercial arbitration cases, the existence of legal loopholes or the lack of relevant precedents is a common phenomenon and one of the inescapable limitations of the law. Professional arbitrators can fill legal loopholes by applying legal interpretation methods or citing fundamental legal principles, and most difficult and complex cases are often resolved in this manner. However, data-driven artificial intelligence serves as an auxiliary tool based on past data and cannot create legal rules. Fourthly, the reliability of big data technology is questionable. Given that international commercial arbitration cases often involve difficult and complex disputes, the authenticity and reliability of arbitration outcomes assisted by artificial intelligence are in doubt. Additionally, if artificial intelligence assists in arbitration based on algorithms, programmers inevitably add their subjective biases and preferences into programs during the coding process. Moreover, programmers often lack professional arbitration knowledge and fundamental legal knowledge, making it difficult to translate general abstract legal rules and precedents into computer language.

2.3. The conflict between the "objectivity" of AI arbitrators and arbitral justice

Some opinions argue that the advantage of AI-assisted arbitration lies in its "objectivity," which can reduce or even eliminate personal preferences and subjective biases exhibited by arbitrators during the decision-making process. This viewpoint seems reasonable, with supporters arguing that justice is an inherent part of arbitration, and impartiality is a fundamental requirement for equality before the law. However, it is inevitable that decisions reflect the subjective inclinations of those making them; one cannot equate value orientations with discrimination or bias. Moreover, artificial intelligence is not immune to subjective bias: from a static perspective, when artificial intelligence makes rulings based on case data, it reflects the subjective tendencies of arbitrators behind each case. Additionally, programmers inject their own subjective ideas into how artificial intelligence selects and analyzes data. Therefore, so-called "objective" rulings made by artificial intelligence are rooted in various subjective value orientations.From a dynamic perspective, the development and improvement of artificial intelligence are not spontaneous processes; no form of artificial intelligence can spontaneously absorb cases to improve its database but must be influenced by continuously inputted instructions and data. In some extreme failure cases where arbitrators make unjust rulings, if artificial intelligence absorbs these experiences without discernment, it will not

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only fail to eliminate existing discrimination and bias but will also repeatedly fall into similar mistakes, leading to a vicious cycle.

The mechanical logical reasoning approach used by artificial intelligence struggles to achieve substantive justice in arbitration; cold symbolic codes cannot produce rulings that align with natural justice or human sentiment. Taking formal reasoning and substantive reasoning as examples of legal reasoning methods: if we compare AI-assisted decision-making to deductive reasoning, it generally functions well under normal circumstances due to reliance on vast databases and strict logical thinking patterns, enabling fair judgments in similar cases. However, when faced with complex cases requiring nuanced judgment beyond strict logic structures—no matter how rigorous—substantive justice remains elusive. But professional arbitrators' decisions resemble substantive reasoning approaches that consider underlying legal principles and values while employing scientific legal interpretation methods through legal argumentation to explain laws reasonably before reaching fair conclusions.

3. Rational suggestions for the application of artificial intelligence in the field of international commercial arbitration

3.1. Role of artificial intelligence in international commercial arbitration

As previously mentioned, the application of artificial intelligence may not only introduce ethical risks, thereby weakening the subjectivity of arbitrators and threatening personal information security, but also its simple logical reasoning may deviate from the "substantive justice" that arbitration aims to achieve. Therefore, artificial intelligence cannot truly replace human arbitrators in the field of international commercial arbitration. Its application should be confined to a supplementary and auxiliary role.

3.2. Specific rules for the application of artificial intelligence in international commercial arbitration

3.2.1. Ensuring arbitrator autonomy

Due to the limitations of legal provisions, such as their lag, ambiguity, and gaps, legal loopholes and outdated regulations are inevitable. Each case is also specific and complex, which necessitates that arbitrators should and must possess a certain degree of discretion. However, the purely rigid logical thinking of artificial intelligence is insufficient to meet this requirement. Only professional legal practitioners can analyze specific cases individually, finding a reasonable balance between abstract and vague legal norms and the specific, complex, and ever-changing individual cases, thereby making decisions that are relatively more conducive to achieving "substantive justice." In other words, human involvement in the adjudication process is not optional but irreplaceable, forming the foundation of a reasonable arbitration decision [1].

China's "Ethical Norms for the New Generation of Artificial Intelligence," promulgated in 2021, proposed the basic ethical requirement of "ensuring trustworthiness." Additionally, the "Opinions of the Supreme People's Court on Regulating and Strengthening the Judicial Application of Artificial Intelligence" emphasize the principle of "auxiliary adjudication," stating that artificial intelligence should be positioned as a supplementary tool for specific cases, with arbitrators retaining autonomous decision-making rights. This ensures that "no matter how advanced the technology becomes, artificial intelligence cannot replace judges in rendering judgments." Specifically in the

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field of international commercial arbitration, this means: Even if artificial intelligence has the technical capability to independently render decisions, its role should be confined to a supplementary function, ensuring that arbitrators retain full autonomous decision-making rights. Arbitration institutions and their arbitrators should have the authority to decide whether to apply artificial intelligence to a particular case, to choose whether to use artificial intelligence for supplementary decision-making, to decide whether to accept the results of AI-assisted decisions, and to terminate artificial intelligence application and exit interaction at any time. Strict scrutiny of artificial intelligence application by arbitrators should be strengthened to ensure that arbitration outcomes are always made by arbitrators, keeping artificial intelligence within the control of arbitrators.

However, it is undeniable that artificial intelligence has unique advantages. At the procedural law level, basic, repetitive, and mechanical tasks such as generating arbitration documents, drafting trial records, and archiving case files can be delegated to artificial intelligence to enhance arbitration efficiency, optimize the execution of arbitration procedures, and promote the realization of procedural justice. At the substantive law level, leveraging artificial intelligence's superior search, storage, and analysis capabilities can more accurately and comprehensively retrieve case decision bases and past precedents with reference value, enabling rational allocation of arbitrators' time and energy, improving quality and efficiency of dealing with cases,completely realizing artificial intelligence's auxiliary decision-making role.

3.2.2. Information security protection

Protecting privacy and security is also a fundamental requirement for the application of artificial intelligence in international commercial arbitration in the new era, specifically to fully respect and safeguard the personal information rights of arbitration parties. For one thing, establishing a more comprehensive personal information protection system for international commercial arbitration [9].Although international commercial arbitration is highly confidential, a unified and robust personal information protection system should be established to enhance the level of information security protection for arbitration parties. At the legislative level, the "Personal Information Protection Law of the People's Republic of China" should include provisions on protecting the personal information security of parties during arbitration, clarifying the methods of using personal information and the entities responsible for information leakage. The "Arbitration Law of the People's Republic of China" should adapt to the trend of artificial intelligence playing a significant role in arbitration by specifying, in a dedicated chapter, the scope of authority and legal procedures for arbitration institutions to collect personal information from parties, as well as their obligation to ensure information security. At the judicial level, arbitration institutions should ensure information security for arbitration parties throughout the entire process, including submitting arbitration applications and defenses, providing evidence materials, conducting trial hearings, and executing decision results.

What’s more, introducing more advanced information security protection technologies. Enhancing personal information security protection requires not only legal provisions but also technological advancements. Introducing high-quality information protection technologies can help mitigate the disadvantages of China's relatively short practice and limited experience in applying artificial intelligence to international commercial arbitration. Specific measures include:Firstly, Establishing a dedicated information security protection department within international arbitration institutions to oversee the overall security operations. Secondly, Establishing an information security protection system by collaborating with high-tech enterprises to create information encryption

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systems and online arbitration platforms. Thirdly, Enhancing the information protection awareness of arbitration personnel, conducting information security education, and improving their ability to use information security technologies [10].

4. Conclusion

Undoubtedly, artificial intelligence can greatly benefit the development of international commercial arbitration. [11] It not only enhances the efficiency of dispute resolution, reduces arbitration costs, and improves transparency, but also contributes to the cultivation of interdisciplinary legal professionals who possess both arbitration expertise and proficiency in using AI as a supplementary tool. However, it is undeniable that the application of AI in international commercial arbitration encounters challenges such as ethical risks, potential leakage of parties' personal information, loss of arbitrators' "subjectivity," and deficiencies in arbitration accuracy. Nevertheless, artificial intelligence is merely an emerging product of technological advancement and cannot inherently be defined as good or evil function. The key lies in how international arbitration institutions utilize it to better achieve their objectives. The consensus among parties in international commercial arbitration is to maximize the advantages of artificial intelligence based on the fairness and efficiency of arbitration. In the future, the role of artificial intelligence in international commercial arbitration should be clearly defined as supplementary rather than decisive. Arbitrators need rational analysis and cautious application. Instead of endlessly debating its drawbacks, it is more effective to address them through legal and technical measures, fully acting as auxiliary role in decision-making. By improving legal frameworks and upgrading technology, ethical risks can be reduced and even resolved. On one hand, the "subjectivity" of arbitrators should always be emphasized, with AI acting as a supplementary tool to enhance arbitration efficiency in the pursuit of "substantive justice." [12] On the other hand, robust personal information security systems should be established, complemented by advanced personal information protection technologies, to safeguard the privacy of arbitration parties. Whether viewed positively or negatively, the era of artificial intelligence has arrived and gradually spread every aspect of international commercial arbitration. The international arbitration field will inevitably need to adapt to the new changes brought about by artificial intelligence. The application of AI in international commercial arbitration not only fully embodies the synergy of technology and law but also represents a transformation and revolution to traditional arbitration paradigms. Legal systems must not stagnate, and legal practice must keep pace with technological progress. Within the overall framework where arbitrators play a leading role and artificial intelligence serves a supplementary function, a positive interaction between artificial intelligence and international commercial arbitration can be achieved.

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