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The digital reform of international commercial arbitration in China - based on an investigation of globally representative practices

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Abstract. The digital transformation of international commercial arbitration is a major development that has significantly enhanced efficiency, accessibility and fairness, while safeguarding the autonomy of the parties involved. Today, major regions around the world have adopted unique approaches to digitalisation. Their experiences show that effective digitalisation requires the simultaneous establishment of rule certainty, technical capability and procedural fairness. China has made substantial progress in the digitalisation of international commercial arbitration through institutional practice and legislative revision, but still faces challenges relating to detailed rules, the digital divide, and data security. Moving forward, China needs to, under the principles of subsidiarity, cooperation, synergy and security, build a prudent and inclusive regulatory system by improving legislation, strengthening security frameworks, enhancing digital literacy, and leveraging the role of arbitration associations. This will support the healthy and stable development of digital international commercial arbitration in China, thereby enhancing its competitiveness and influence in the field of international dispute resolution.

Keywords: international commercial arbitration, digitalisation, dispute resolution, legal reform

1. The legitimacy demands for digitalisation in international commercial arbitration

The legitimacy of digitalisation in international commercial arbitration stems from its alignment with the intrinsic core values and relevant legal principles of international commercial arbitration.

First, the extension of the principle of party autonomy. As the core principle of international commercial arbitration, party autonomy protects the parties' autonomy in legal choice and procedural design. In the digital economy, this principle acquires new dimensions: digital tools such as electronic submissions and online hearings allow parties to make more personalised and flexible procedural choices [1].

Second, the dual advancement of efficiency and fairness. International commercial arbitration is widely favoured due to its high efficiency and low cost. Digitalisation further reinforces this advantage, enabling the parties to complete the procedures without having to be present in person or submit paper materials [2]. Procedural fairness can also be improved through digitalisation. For instance, when one party is unable to participate offline due to visa restrictions or health reasons, digital mechanisms can effectively prevent procedural disruptions or imbalances, ensuring that all parties can exercise their arbitration rights equally [3]. As a result, digitalisation not only enhances the efficiency of international commercial arbitration, but also strengthens its inclusiveness, accessibility and fairness.

Third, the improvement of confidentiality and security. The traditional arbitration model relies heavily on paper documents, which are inefficient and carry risks of loss or damage. In contrast, modern digital arbitration platforms employ a variety of advanced technologies such as end-to-end encryption and secure cloud storage, significantly enhancing information confidentiality [2]. In addition, security can also be improved. In a digital environment, all user operations on files are automatically recorded by the system and generate unalterable timestamps and user identifiers, which is beneficial to building a more trustworthy arbitration environment.

2. Typical institutional designs and experience summary of digitalisation of international commercial arbitration

2.1. European regional practices represented by the European Union and the United Kingdom

The digital institutional design of European international commercial arbitration is deeply influenced by the General Data Protection Regulation, taking data privacy and data security as core considerations. The institutional design operates on two levels. On the one hand, legislation such as the eIDAS Regulation recognises the legal effect of electronic signatures and electronic transactions, removing fundamental legal obstacles to digitalisation. In England, while the Arbitration Act 1996 does not explicitly regulate digital technologies, its flexible interpretation of "written form" and the broad procedural discretion granted to tribunals allow considerable latitude for the application of electronic communication, electronic signatures, and remote hearings. The core of the European experience lies in its "hard law support" model. This framework establishes the legal status of digitalisation and digital procedures through unified legislation, greatly increasing transparency.

2.2. Practices in North America represented by the United States

The United States was an early explorer of digitalisation in commercial arbitration. For instance, the American Arbitration Association conducted online hearings as early as 1996. Moreover, the American Arbitration Association was one of the first arbitration institutions to launch its own AAA WebFile online service, achieving full-process digitalisation from filing complaints, making payments, managing cases, and selecting arbitrators, greatly enhancing user convenience. In addition to this online filing procedure via AAA WebFile, AAA-ICDR video conferencing technology was also introduced to the dispute resolution procedure. These developments show that North America has followed a "practice-led and technology-driven" path in the digitalisation of international commercial arbitration [1].

2.3. Practices in Asia represented by Hong Kong, China and Singapore

By capitalising on its common law tradition and the distinctive advantages afforded by the "one country, two systems" framework, Hong Kong, China has rapidly grown into a leader in the digitalisation of commercial arbitration. In addition to its Arbitration Rules, HKIAC has partnered with leading IT specialists to support its digital systems. Arbitration participants are provided with a range of different tools, such as simultaneous and asynchronous online translation and video conferencing [1].

Singapore has built an efficient digital arbitration framework through a combination of legislation and institutional collaboration. Legislative reforms explicitly recognise that electronic arbitration agreements and awards comply with the written form requirements of the New York Convention, removing legal obstacles to digitalisation. In addition, the Singapore International Arbitration Centre aligns closely with these reforms, continually updating its arbitration rules and integrating technologies such as artificial intelligence for case management and electronic evidence review.

2.4. Experience summary of digitalisation of international commercial arbitration

Firstly, without institutional adaptation, there can be no stable development of digitalisation. The institutional paths of various regions reflect distinct legal and governance traditions, embodied in Europe's regulatory systematisation, North America's market-centred experimentation, and Asia's dual-track emphasis on legislative and institutional innovation. The experiences of various regions show that there is no single standardised path; effective digital strategies must align with local legal culture, industrial demand, and technological conditions.

Secondly, the certainty of rules is the key to achieving full-process digitalisation. The EU's recognition of electronic signatures through the eIDAS Regulation and Singapore's clarification that electronic arbitration agreements meet the written requirements of the New York Convention both show that legal confirmation of rights at the legislative level is crucial for removing the obstacles of digitalisation. Without clear legal frameworks, uncertainties regarding the validity of arbitration agreements and the enforceability of electronic awards restrict deeper digitalisation.

Thirdly, technical capabilities and procedural fairness must be developed simultaneously. Digitalisation is not merely an innovation in tools, but also an upgrade in governance capabilities. European practice highlights data security and privacy protection, while North America's reliance on commercial platforms reveals that external technical risks may translate into a shortcoming in the confidentiality of programs. Therefore, building an independent, controllable, secure and trustworthy technical governance system is the core to ensuring the sustainable development of digital arbitration.

3. The current practice of digitalisation of international commercial arbitration in China

With the rapid development of China's Internet economy, arbitration institutions are actively promoting online arbitration, establishing case management information systems, implementing online and intelligent arbitration, and achieving coordinated online-offline development. In 2024, 93 arbitration institutions handled online arbitration cases, amounting to 300 billion yuan, highlighting how online court hearings have become a common practice [4]. Moreover, the arbitration rules and infrastructure of leading institutions like the China International Economic and Trade Arbitration Commission (CIETAC) are notably comprehensive. As a pioneer in the digitalisation of international commercial arbitration, CIETAC has institutionally expanded the application of digital technologies through its "Online Arbitration Rules". Most importantly, CIETAC has issued the platform "CIETAC Trail", which provides tools such as verification of arbitration participants' identity, submission and display of electronic evidence, simultaneous online recording, and affixing electronic signatures by scanning a QR code. In addition, by the presence of a network of sub-committees and cooperative institutions globally and the integration of headquarters and branches, CIETAC can adopt various hearing models such as online, offline and hybrid hearings, meeting the personalised needs of different case participants [1].

Other institutions, such as the Shanghai International Arbitration Center (SHIAC), have also updated their arbitration rules to recognise electronic submissions, electronic services, and remote video hearings. Technological applications now extend to the evidence stage. For instance, the SHIAC has collaborated with "Arbitration Chain" to utilise blockchain technology to provide evidence fixation and verification services for electronic evidence, effectively addressing the credibility challenges in digital procedures [5].

Driven by the evolution of arbitration practice, the "Arbitration Law of the People's Republic of China" has just undergone major revisions. One of the key revisions is to officially incorporate online arbitration into the general provisions of the Arbitration Law. Specifically, the newly revised Arbitration Law clearly adds the online arbitration system and explicitly stipulates that online arbitration has the same legal effect as traditional offline arbitration, eliminating doubts about the legal effect of online arbitration at the legislative level [4].

However, challenges remain. Firstly, the revision process of the Arbitration Law is slow and incomplete. It confirms the validity of online arbitration but fails to make clear provisions on issues such as the validity of electronic arbitration agreements and online service methods. This has resulted in insufficient support from higher-level laws for the practice of advanced arbitration institutions, posing risks to legal certainty. Secondly, the digital development of international commercial arbitration also shows an imbalance among regions and institutions. Although leading institutions such as CIETAC and SHIAC have carried out advanced practices in the digitalisation of international commercial arbitration, the majority of local arbitration institutions still suffer from severe deficiencies in funds and technology, which may lead to a "digital divide" in the quality of international commercial arbitration services. At the same time, this will also result in the majority of foreign-related cases being concentrated in leading institutions, thereby undermining the procedural efficiency of international commercial arbitration. Thirdly, international commercial arbitration involves parties from all over the world, making cross-border data flows inevitable. Ensuring the smooth conduct of arbitration proceedings without violating domestic regulations thus becomes a major compliance challenge for institutions. In addition, fundamental risks inherent in the digitalisation of international commercial arbitration, such as cybersecurity issues, data leakage and the abuse of digital technology, cannot be ignored [1]. Finally, the development of digital technology and the innovation of arbitration procedures have placed greater demands on technical proficiency. Addressing this skills gap is therefore a key challenge that must be addressed in the digitalisation process of international commercial arbitration in China.

4. The transformation of international commercial arbitration in China in the digital age

4.1. Establish regulatory principles for the digitalisation of international commercial arbitration

First, the principle of subsidiarity. As the trend of digitalisation in international commercial arbitration is irreversible, boundaries must be set to prevent over-reliance on digital technology. Digital tools and technologies such as artificial intelligence and blockchain are designed to facilitate the participants in arbitration and safeguard the autonomy of the parties, not replace the independent judgment and core discretionary power of arbitrators. The reasonable decision-making ability of human referees is crucial to the formation of fair and impartial awards [6]. Compared with digital technology, arbitrators have the ability to link legal norms with specific facts of cases and strike a balance between abstract legal provisions and substantive concepts of justice. Thus, due to the indispensability of human involvement in adjudication, the role of digital technologies must be auxiliary.

Second, the principle of cooperation. Due to the foreign-related nature of international commercial arbitration, confining the governance domain within each country is likely to fail to achieve the desired governance outcomes. Meanwhile, the application of digital technologies like artificial intelligence in international commercial arbitration raises special issues, such as the flow of arbitration data and the enforcement of awards, also demanding international coordination and resolution [6]. Therefore, China

should adhere to the principle of cooperation and actively participate in rule dialogues on international platforms such as the United Nations Commission on International Trade Law and the International Council for Commercial Arbitration; it should also promote the formation of international consensus and standards in areas such as the validity of electronic arbitration agreements, cross-border data flows, and the recognition and enforcement of online awards. Through international cooperation, legal conflicts can be reduced, and the digital achievements of China's international commercial arbitration can win broader international recognition and enforcement space.

Third, the principle of synergy. The digitalisation of international commercial arbitration intersects with multiple legal departments such as the Arbitration Law, the Data Security Law, and the Personal Information Protection Law. However, at present, these laws have different legislative purposes and focuses, and have not yet formed a synergy for collaborative governance, which may cause regulatory constraints. Consequently, there is an urgent need to enhance the coordinated interpretation and application of departmental laws. The Supreme People's Court, the Ministry of Justice, the Cyberspace Administration of China and other departments should jointly issue guiding opinions to clarify the scope, order of application, and boundaries of these laws, thus building an internally harmonious and strongly supported domestic legal environment for the digitalisation of international commercial arbitration.

Fourth, the principle of security. The basic logic of foreign artificial intelligence legislation is that the legislative approach mainly focuses on safety regulations [7]. This logic can also be applied to the application of other digital technologies. The unrestrained use of digital technology may bring about a devastating crisis to humanity. The ultimate value of the principle of security lies in preventing technological backlash. Without proper ethical and legal safeguards, digital tools may fail to enhance arbitration procedures and could also become sources of unfairness and confidentiality breaches. In addition, the principle of security should likewise govern cross-border data flows, ensuring that cross-border data flows comply with standards of national security and personal information protection.

4.2. Establish prudent and inclusive rules and institutional designs

First of all, at the legislative level, efforts should be made to actively promote the systematic revision of the Arbitration Law and laws related to digital technology. Specifically, first of all, it is necessary to improve legislation to clarify the validity of electronic arbitration agreements. The Arbitration Law can explicitly include data messages in the category of "written form". In addition, the legal status of online arbitration procedures should also be recognised. Key procedural steps, such as electronic service of documents and remote video hearings, need to confirm clear legal effect and unified business standards to ensure that procedural innovations do not infringe upon the legitimate rights of the parties. In addition, it is necessary to improve the rules for the recognition and enforcement of electronic arbitration awards. It should be clearly pointed out that an award with a reliable electronic signature has the same legal effect as a paper award, thereby providing convenience for judicial review and enforcement. Finally, laws and regulations related to digital technology should also be updated in a timely manner to clarify the role, status and scope of application of digital technology in international commercial arbitration.

Secondly, build a stable and effective information security system to avoid data security risks brought about by digitalisation. Specifically, at the institutional level, international commercial arbitration institutions should establish a permanent technical advisory committee or appoint a chief technology officer to deeply participate in the revision of arbitration rules and the design of digital procedures, ensuring that information security considerations are embedded in the procedural rules. Furthermore, at the level of individual proceedings, the arbitration tribunal should explicitly authorise in the procedure order or, when necessary, proactively appoint an independent cybersecurity expert on its own initiative to be responsible for assessing the security of the hearing platform, supervising the data transmission process, and providing professional expert opinions in the case of any security incident [1].

Thirdly, continuously enhance the digital literacy and skills of the participants in international commercial arbitration. The improvement of digital literacy should cover all roles in the international commercial arbitration ecosystem and be clearly targeted. For arbitrators, the focus of training lies in mastering the process management of online court trials, assessing the validity of electronic evidence, and understanding the technical principles behind it to reach a firm conviction. For lawyers and clients, it is important to focus on proficiently using various arbitration platforms for document submission and online cross-examination, and to understand the security level differences of different communication tools in order to fulfil the obligation of data confidentiality. For the staff of arbitration institutions, it is necessary to cultivate their emergency management capabilities in operating and maintaining digital platforms, preventing cyber-attacks and handling data leakage incidents. Through this hierarchical and regular training system, the objective of digital proficiency as a standard qualification for all individuals engaged in international commercial arbitration can be realised.

Finally, the China Arbitration Association should fully play its role as an industry self-regulatory organisation. It may formulate model arbitration rules for institutions to reference, detail procedures for online arbitration, promote the establishment of industry-wide data security and privacy protection standards, and require the arbitration platform to comply with the national cybersecurity level protection requirements. Moreover, the China Arbitration Association can organise experience exchanges between leading institutions and others, enabling more international arbitration institutions to acquire the ability to handle

complex international commercial cases and thereby enhance the efficiency of international commercial arbitration in China. In addition, the China Arbitration Association can systematically carry out professional training and provide structured instruction on new technologies and platforms relevant to the digitalisation of international commercial arbitration, thus improving the professional level of practitioners across the industry.

5. Conclusion

The global trend of the digitalization of international commercial arbitration is irreversible, driven by its demonstrable advantages and widespread adoption. During this process, different regions have developed their own distinctive models and have accumulated valuable local experience. Based on these experience summaries and the current practice of China in terms of the digitalisation of international commercial arbitration, China should improve the current rule system from both the perspective of principle and the perspective of rule and institutional design. While adhering to the guidance of principles such as the principles of cooperation, synergy, and security, it should also improve specific institutional designs and arrangements from perspectives such as improving legislation and fully playing the role of China Arbitration Association.

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