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Rethinking Regulation: Integrating Large Language Models in International Arbitration[1]

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Abstract
The article is devoted to the relevant from theoretical and practical points of view issue of using so-called Large Language Models (LLMs) in international arbitration as a type of general-purpose artificial intelligence (AI) aimed at speech recognition and selection of answers with the highest probability, such as ChatGPT, Bildi, Gemini, etc. The purpose of the article is to analyse the challenges arising from the use of LLMs in international arbitration and to develop recommendations for their proper and bona fide application. The article uses the following research methods: the dialectical method (for studying the nature and content of LLMs and the specifics of their application in international arbitration), the method of analysis and synthesis (for analysing and systematising the main challenges of using LLMs in international arbitration), the systemic and structural method (for characterising the right to a fair trial and analysing the specifics of its application in international arbitration), comparative legal method (for examining the provisions of the legislation of certain countries regulating the functioning of international arbitration). Through the prism of the provisions of the United Nations Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958) and the UNCITRAL Model Law on International Commercial Arbitration (1985), the article examines the main challenges of using LLMs in arbitration, in particular, the need to comply with the requirements of due process and ensure guarantees of the right to a fair trial, the reasoning of arbitral awards, arbitrator impartiality and confidentiality, as well as the right to be heard in arbitration.

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The authors have analysed specific guidelines on the use of AI in international arbitration in certain institutions, in particular, the Silicon Valley Arbitration and Mediation Center (SVAMC) Guidelines on the Use of AI in Arbitration. This allowed the authors to propose a Checklist for the use of LLMs in international arbitration, which can be applied to the bona fide use of AI in international arbitration proceedings.

Keywords: Large Language Model (LLM); Artificial Intelligence (AI); international arbitration; right to a fair trial; due process.

Переосмислення регулювання: інтеграція великих мовних моделей у міжнародний арбітраж

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Анотація
Стаття присвячена актуальній з теоретичної та практичної точки зору проблематиці застосування у міжнародних арбітражах так званих великих мовних моделей (Large Language Models) як різновиду штучного інтелекту загального призначення, який направлений на розпізнавання мови та підбирання відповідей з найбільшою ймовірністю, на кшталт ChatGPT, Bildi, Gemini тощо. Метою статті є аналіз викликів, які постають у світлі використання великих мовних моделей в міжнародних арбітражах та розробка рекомендацій щодо належного та добросовісного їх застосування. У статті було використано такі методи дослідження, як діалектичний метод (для дослідження природи і змісту великих мовних моделей та особливостей їх застосування в міжнародному арбітражі), метод аналізу та синтезу (що дозволив проаналізувати та систематизувати основні виклики застосування великих мовних моделей в міжнародному арбітражі), системно-структурний метод (за допомогою якого надано характеристику праву на справедливий судовий розгляд та проаналізовано особливості його застосування в міжнародних арбітражах), порівняльно-правовий метод (при вивченні положень законодавства окремих країн, що регулює діяльність міжнародних арбітражів). У статті крізь призму положень Конвенції Організації Об'єднаних Націй про визнання та приведення до виконання іноземних арбітражних рішень 1958 р. та Типового закону ЮНСІТРАЛ про міжнародний комерційний арбітраж 1985 р. розглядаються основні виклики застосування великих мовних моделей в арбітражі, зокрема необхідність дотримання вимог належної судової

процедури та забезпечення гарантій права на справедливий судовий розгляд, вмотивованість арбітражних рішень, неупередженість арбітра та конфіденційність, а також реалізація права бути почутим в арбітражі. Авторами проаналізовані окремі настанови щодо використання штучного інтелекту в міжнародних арбітражах в окремих інституціях, зокрема Рекомендації щодо використання штучного інтелекту в арбітражі Центру арбітражу та медіації Кремнієвої долини (SVAMC). Зазначене дозволило авторам запропонувати Контрольний список для використання великих мовних моделей у міжнародному арбітражі, які можуть бути застосовні з метою добросовісного використання штучного інтелекту під час провадження в міжнародних арбітражах.

Ключові слова: велика мовна модель (ВММ); штучний інтелект (ШІ); міжнародний арбітраж; право на справедливий судовий розгляд; належна правова процедура.

Introduction

The rapid advancement of artificial intelligence (AI), particularly through Large Language Models (LLMs), is reshaping the landscape of international arbitration [1, p. 62]. LLMs are AI systems that generate responses by predicting and assembling text based on statistical patterns that emerged during their training. Notable examples include OpenAI's GPT-4 and Google's BERT (Bidirectional Encoder Representations from Transformers). GPT-4 excels in tasks that involve generating human-like responses to prompts. In contrast, BERT is designed primarily for understanding the context of text, which makes it highly effective in tasks such as question answering and sentiment analysis. These technologies provide notable benefits, including enhanced speed and cost-efficiency, making them increasingly attractive in legal proceedings [2, p. 122]. However, their integration raises critical questions about the integrity of the arbitral process.

Both the United Nations Convention on the Recognition and Enforcement of Foreign Arbitral Awards (New York Convention) (1958) [3] and the UNCITRAL Model Law on International Commercial Arbitration (UNCITRAL Model Law) (1985) [4] were formulated before the emergence of AI and, therefore, do not address the application of LLMs. This regulatory gap invites a critical examination of whether and under what circumstances these legal frameworks permit using LLMs. The features of the use of AI and LLMs in international arbitration have already been studied in the literature, in particular by such scholars as C. I. Florescu [1], E. Chan, K. N. Gore, and E. Jiang [5], G. H. Kasap [6], M. Scherer [7], G. Vannieuwenhuyse [2] and others. At the same time, the issue of using AI and specifically LLMs in international commercial arbitration is only gaining relevance due to the progress of large linguistic models.

Despite the absence of explicit provisions in the New York Convention and the UNCITRAL Model Law regarding LLMs, their silence indicates a permissive stance towards their use. The lack of prohibition means that parties can employ LLMs in arbitration, provided such use does not violate any other provisions of these legal frameworks. Central to international arbitration is the principle of party autonomy, which empowers parties to shape the procedural rules governing their arbitration [4, art. 19]. This autonomy also suggests that parties have the right to determine how LLMs can be integrated into their arbitration, provided their choices respect the rights of all participants and do not undermine the integrity of the process. In this article, the authors argue that while current legal frameworks offer sufficient flexibility to accommodate LLMs, specific international guidelines are necessary for their responsible use.

Literature Review

Florescu C.I. explores the integration of AI in international arbitration, focusing on its impact across several stages, including arbitrator selection, case management, document review, and predictive analytics [1, p. 60]. While AI has the potential to streamline arbitration processes and increase efficiency, Florescu C.I. emphasises the complexities involved, particularly concerning data privacy and cybersecurity [1, p. 64]. Additionally, ethical concerns arise with AI-driven innovations like online dispute resolution platforms and "robot" arbitrators. These developments prompt questions about the fairness and transparency of decision-making. Florescu C.I. concludes that, due to AI's current limitations, particularly its "black box" nature, it should not be relied upon for autonomous decision-making in IA at this stage. She argues for the establishment of strict oversight and an ethical framework to guide AI's involvement in arbitration [1, p. 72].

Chan E., Gore K.N., and Jiang E. investigate the rapid adoption of generative AI tools, such as ChatGPT-4, within legal practice, with a particular focus on their potential role in international arbitration [5, p. 267]. The authors note AI's ability to assist in tasks like document review, drafting, and predictive analysis, which could streamline arbitration proceedings [5, p. 268]. However, they also address the ethical concerns that accompany this shift, including the risk of over-reliance on AI and the possibility of compromising the human judgment integral to arbitration. Despite these challenges, they assert that with careful implementation and a balanced approach, AI could significantly add value to international arbitration in the future [5, p. 294]. They also stress the importance of regulatory frameworks and oversight to ensure that AI tools complement, rather than replace, human expertise [5, p. 282].

Kasap G.H. delves into the potential for AI to replace human arbitrators, acknowledging that while AI has made notable advancements in predicting dispute outcomes, it is still far from replicating the full range of human qualities essential in arbitration [6, p. 253]. The article discusses the limitations of AI, particularly its inability to understand emotional nuances and the complexities of human motivations, both of which are critical factors in resolving disputes. Kasap argues that while AI can assist human arbitrators in some aspects of their work, it cannot fully replace the need for human judgment [6, p. 235]. In a similar vein, Scherer M. critiques the over-reliance on AI for ex-ante predictions, warning that AI models often use conservative approaches and can perpetuate biases, making human oversight indispensable to achieving reasoned and unbiased arbitration outcomes [7, p. 561].

Vannieuwenhuyse G. explores the intersection of emerging technologies such as Big Data, blockchain, machine learning, and text-mining with arbitration [2, p. 119]. The article outlines how these technologies can enhance arbitration by broadening its applicability to new sectors while also creating novel types of disputes that arbitration is particularly well-suited to resolve. Vannieuwenhuyse G. discusses how smart contracts, in particular, will likely introduce new challenges in defining agreements, making arbitration a valuable mechanism due to its flexibility [2, p. 120]. Notably, all of the previously mentioned articles focus on the broader implications of AI in arbitration and do not specifically address LLMs. While they offer a useful foundation for discussing AI's broader challenges, they do not provide practical solutions for arbitration participants, which is a key feature of this study.

Materials and Methods

The article uses general philosophical, general scientific, and special research methods. The dialectical method is the methodological basis of the study, which was used to clarify the nature and content of LLMs and the specifics of their use in international arbitration. The method of analysis and synthesis allowed the authors to analyse and systematise the main approaches proposed in the literature and international documents to the application of LLMs in international arbitration, as well as the challenges of their supplication. The authors use the systemic-structural method to characterise the right to a fair trial and analyse the specifics of the application of its particular guarantees in international arbitration.

The logical and legal method is applied to explore how the provisions of the UNCITRAL Model Law are interpreted through the lens of due process and fair trial guarantees. This method enables the authors to identify how these

fundamental principles of justice are maintained or challenged in international arbitration, particularly concerning the integration of LLMs. Furthermore, the comparative legal method is employed to assess the regulatory frameworks of various jurisdictions, offering a comparative analysis of how different countries address the use of LLMs in arbitration. This method provides insights into the diversity of national approaches and the broader implications of integrating AI technologies into legal systems while also identifying best practices and potential obstacles to the widespread adoption of LLMs in international arbitration.

The article consists of an introduction, three parts and conclusions. In the first part of the article, the authors analyse the peculiarities of the application of the guarantees of the right to a fair trial and due process in arbitrations. In the second part, the challenges of integrating LLMs into arbitral proceedings will be discussed. In the third part, the authors examine existing AI regulatory mechanisms, highlighting the advantages of the guidelines provided by the Silicon Valley Arbitration and Mediation Center (SVAMC). Subsequently, we propose a practical checklist for using LLMs in arbitration, emphasising key aspects like risk management and bias mitigation. Finally, the authors advocate for a dynamic approach, recommending that the checklist evolve with AI developments to maintain party autonomy and due process.

Results and Discussions

The Right to a Fair Trial and International Arbitration

The European Convention on Human Rights (the ECHR) enshrined in Para 1 Article 6 the right to a fair trial, which states that 'in the determination of his civil rights and obligations or of any criminal charge against him, everyone is entitled to a fair and public hearing within a reasonable time by an independent and impartial tribunal established by law' [8]. This article provides for a system of guarantees of the right to a fair trial, including: 1) institutional guarantees (access to court, independence and impartiality of the court established by law) and 2) procedural guarantees (public hearing, reasonable time of a trial, fair hearing, which includes such components as proper notification of the time and place of the trial, the right to be heard, adversarial procedure and equality of arms, reasoned judgements, enforcement of court decisions, etc.) [9, p. 88-89].

In its case law, the European Court of Human Rights (ECtHR) has emphasised that it assumes an autonomous interpretation of the concept of 'tribunal', which allows extending the guarantees of Para 1 Article 6 of the ECHR not only to 'courts of the classical type', but also to other bodies that, although not part of the system of state courts, meet features of the concept of 'tribunal' [10]. These features are, in particular: 1) the authority of the body to decide cases in

accordance with the rule of law and clearly defined procedures; 2) the authority to make legally binding decisions [11]; 3) full jurisdiction over matters of law and fact, and over the amendment of decisions of other bodies [12], that is, the court is not bound by the conclusions of other bodies on legal and factual issues; 4) the impossibility of cancelling the decision of such a body by a non-judicial institution to the detriment of one of the parties [13]; 5) inadmissibility of considering a court as a body that provides only recommendations, even if there is a practice of following such recommendations [14; 15, p. 122-123]. Given the above features, the ECtHR has repeatedly concluded that the guarantees of Article 6(1) ECHR should also apply to arbitration proceedings [16].

However, the ECHR distinguishes between two types of arbitration in its practice – binding and voluntary. The former refers to cases where, in accordance with national law, a certain category of cases is removed from the jurisdiction of national courts and submitted to arbitration. In this situation, arbitration replaces the court, and therefore, all the guarantees of Para 1 Article 6 of the ECHR should apply to binding arbitrations [16]. At the same time, in the case of voluntary arbitration, a 'waiver of the right to a court' may be considered [15, p. 68-69], which indicates a conscious choice of the parties in favour of arbitration. At the same time, as the ECtHR notes, such a refusal should not be seen as a waiver of absolutely all guarantees of the right to a fair trial [17]. It follows that during arbitration proceedings, the guarantees of Para 1 of Article 6 of the ECHR, in particular the independence and impartiality of the arbitrator, the reasoned judgments, the fair hearing, the enforcement of arbitral awards, etc., must be guaranteed to the extent that they do not contradict the essence of the arbitration proceedings.

Challenges in Using LLMs in International Arbitration

The principle of impartiality is fundamental to maintaining the integrity of arbitration under Art. 12(1) of the UNCITRAL Model Law. Arbitrators are expected to remain neutral. Perceived biases can provide grounds for challenging an award under Article V(2)(b) of the New York Convention. LLMs in this environment can undermine impartiality, as these models are trained on vast datasets that may embed inherent social or jurisdictional biases [6, p. 225]. Traditional bias tests, such as the Porter or 'real possibility' standard [18] in English law and the 'evident partiality' principle [19, p. 852] in U.S. law, present challenges when addressing LLMs in arbitration. These tests are designed to evaluate the conduct of human arbitrators and assess whether a reasonable observer would perceive potential bias in their actions or relationships.

However, LLMs operate as opaque systems, making it difficult to trace their reasoning. As a result, these existing tests may not adequately capture the algorithmic bias, leaving arbitrators without a reliable framework to assess the influence of AI tools on their impartiality. The 'Reasonable Risk of Algorithmic Bias' (RRAB) test could be a possible solution to address this gap. This test could adapt the 'reasonable observer' standard to the AI context, specifically focusing on whether an informed observer would perceive a risk that the LLM's outputs could introduce bias that affects the arbitrator's decision-making process. The RRAB test could emphasise accountability by requiring arbitrators to evaluate the risk of biased outcomes from the data on which the LLM has been trained.

The potential for bias raises serious implications for the parties involved, particularly regarding their rights to due process. Articles V(1)(b) of the New York Convention and Articles 34 and 36 of the UNCITRAL Model Law guarantee that all parties are entitled to equitable treatment during proceedings. If an LLM-generated submission contains errors or fails to incorporate arguments, the affected party may assert that their right to due process has been violated. This assertion poses grounds for challenges against the award. Consequently, LLMs in arbitration necessitate an assessment of bias, impartiality, and due process risks. These elements are interconnected: bias in LLM outputs can compromise an arbitrator's impartiality, which, in turn, can violate due process by preventing parties from receiving a fair hearing.

The *intuitu personae* principle highlights the inherently personal nature of arbitration, emphasising that arbitrators are selected based on their unique expertise [20, p. 148]. This principle is vital in ensuring that the decision-making process reflects the individual capabilities of the arbitrators involved. In jurisdictions like France, Article 1450 of the French Code of Civil Procedure states that 'an arbitrator may only be a natural person enjoying the full exercise of his or her rights' [21]. This notion is also evident in Sweden's Arbitration Act, which maintains that 'any person who possesses full legal capacity in respect of his actions and his property may act as an arbitrator' [22]. As the debate shifts from the role of secretaries to AI technologies, the question arises: can LLMs truly fulfil the unique functions expected of human arbitrators?

While LLMs can offer assistance in research and drafting, their inability to comprehend cultural particularities and interpersonal dynamics poses challenges in arbitration proceedings. The subtleties of human judgement, crucial in resolving disputes, cannot be replicated by algorithmic tools. Arbitrators must manage the complexities of personal dynamics and contextual factors that inform

their decisions – elements that LLMs cannot grasp. Nevertheless, as the role of technology in arbitration continues to evolve, it becomes increasingly clear that reliance on LLMs may undermine the *intuitu personae* principle. This reliance risks reducing the arbitration process to a technical exercise, compromising the quality of the award and the richness of deliberation essential for fair resolutions.

Confidentiality is another cornerstone of arbitration in many jurisdictions, especially in commercial disputes, as it protects sensitive information [23]. While the UNCITRAL Model Law lacks an explicit presumption of confidentiality, institutional rules like those from the London Court of International Arbitration (LCIA) [24] and the Singapore International Arbitration Centre (SIAC) [25] contain default confidentiality provisions. LLMs raise concerns about how they can operate effectively while maintaining this confidentiality. AI algorithms require extensive datasets for training, and if they inadvertently access confidential documents during processing, it could expose sensitive information to unauthorised parties, undermining arbitration's private dispute resolution mechanism.

In England, although the Arbitration Act 1996 does not explicitly address confidentiality, courts have established an implied duty of confidentiality in arbitration proceedings. The case of *Dolling-Baker v. Merret* illustrates this principle, as the court identified an implied obligation arising from 'the nature of arbitration itself,' requiring parties to refrain from disclosing or using documents prepared for arbitration for any other purpose [26]. Additionally, the decision in *International Coal Pte Ltd v. Kristle Trading Ltd* emphasises that the scope of confidentiality should be evaluated in context, noting that each case presents unique circumstances that shape confidentiality obligations [27]. As LLMs are integrated into arbitration, it is vital to ensure confidentiality to preserve the trust essential to the arbitration process.

One of the foremost challenges by LLMs in international arbitration is the requirement for reasoned decisions, as articulated in Article 31(2) of the UNCITRAL Model Law. This article establishes the expectation that parties should have access to the rationale behind arbitral awards. While parties may agree to waive the necessity for reasoning in alignment with the principle of party autonomy, such decisions require careful consideration. Many jurisdictions necessitate reasoning for enforcement. A lack of reasoning could impede the winning party's ability to defend the award against potential set-aside proceedings, particularly under Article 34(2)(iii) of the UNCITRAL Model Law [28, p. 820]. In such scenarios, the absence of a transparent reasoning process could undermine the enforceability of the award.

The LLM's inherent 'black box' nature is another issue for reasoned decisions. LLMs typically process vast datasets to generate responses, often without providing insights into how they arrive at specific conclusions [5, p. 286]. This particularity can create significant challenges in arbitration, as parties may struggle to understand the basis for LLM decisions. In jurisdictions like Sweden, the Supreme Court has established that an award may only be set aside if it is completely devoid of reasoning, as demonstrated in *Soyak v. Hochtief* [29]. Nevertheless, even in such contexts, the lack of transparency in the LLM's reasoning could raise concerns regarding the award's enforceability in jurisdictions that emphasise the clarity of the awards' reasoning.

LLMs Checklist

The absence of explicit provisions concerning LLMs in the UNCITRAL Model Law and the New York Convention necessitates a reliance on emerging guidelines, such as those developed by the SVAMC. The SVAMC focuses on ensuring confidentiality, safeguarding due process, and addressing potential biases [30]. The guidelines assign clear responsibilities to all arbitration participants by transitioning from broad principles to specific rules. Furthermore, the 'four Vs' of Big Data – Volume, Variety, Velocity, and Veracity – provide a structured framework for addressing the challenges posed by LLMs. [31, p. 1; 7, p. 541]. These frameworks create an initial regulatory response, though enforceable international standards remain necessary to prevent inconsistencies in LLM's application across jurisdictions.

While these frameworks provide guidance, their practical application requires concrete tools to ensure real-world compliance. This is where the checklist becomes crucial, offering a practical method to apply the SVAMC guidelines. Imagine a scenario involving a Chinese technology company and an American software developer where LLMs are used to draft procedural orders. Problems arise when the LLM's outputs favour U.S. legal principles due to its training data. By using the checklist, the arbitrators ensure transparency and fairness. Under the SVAMC guidelines, they should cross-verify LLM outputs against the legal frameworks of both jurisdictions, preserving the integrity of the arbitration process and upholding the principle of party autonomy.

The checklist could incorporate a more detailed risk assessment tool to mitigate the inherent risks in the future. This would allow arbitrators, parties and party representatives to evaluate factors such as the LLM's geographic training data and its ability to incorporate diverse legal traditions. A 'bias risk score' could be developed to quantify these risks, ensuring that arbitrators remain aware of any imbalances. The checklist must also evolve as LLMs evolve to include more

predictive capabilities. Future iterations might include mechanisms for auditing LLM outputs, ensuring compliance with concrete disclosure requirements, and introducing algorithmic transparency standards to prevent over-reliance on AI tools without undermining the arbitrator's role in decision-making.

While LLMs represent a significant advancement in improving efficiency and access to international arbitration, their use must be carefully regulated. The SVAMC guidelines and the 'four Vs' offer a solid foundation for responsible AI integration. However, these measures remain voluntary and lack the enforceability required to ensure uniformity across different jurisdictions. The checklist proposed offers a practical mechanism for addressing current issues. As LLMs gain more sophisticated functionalities, the checklist will need to incorporate more stringent safeguards to ensure compliance with due process requirements. Establishing formal international regulations will be essential to achieving this balance.

Table 1. Checklist for the Use of LLMs in International Arbitration

Checklist for all Participants
1. Familiarise with the LLM's capabilities and limitations. ☐ Have I thoroughly researched and understood the intended use and risks of the LLM?
2. Ensure confidentiality of sensitive information. ☐ Have I taken steps to safeguard confidential, privileged, or protected data when interacting with the LLM?
3. Assess LLM disclosure needs. ☐ Have I carefully considered whether to disclose the use of the LLM based on case-specific factors like due process and privilege?
4. Verify the LLM's output. ☐ Have I reviewed the LLM-generated output to ensure it is factually and legally accurate?
5. Document the LLM's use. ☐ Have I documented the LLM's name, version, settings, and a brief description of ways of use?
6. Respect the integrity of the arbitration process and evidence. ☐ Have I ensured the LLM is not being used to falsify or compromise the authenticity of evidence?

7. Mitigate biases in the LLM.
☐ Am I taking steps to mitigate biases within the LLM to ensure fairness?

Additional Points for Arbitrators

8. Do not delegate decision-making responsibilities.
☐ Am I ensuring that no part of my decision-making process is delegated to the LLM?

9. Avoid reliance on unverifiable LLM-generated information.
☐ Have I avoided using LLM-generated outputs that cannot be independently verified within the record?

Conclusion

In conclusion, the ECtHR guarantees the right to a fair trial, which applies to arbitration when the tribunal has legal authority and decision-making power. In binding arbitration, all fair trial protections must be respected, while in voluntary arbitration, parties can waive some rights, but essential guarantees like impartiality and reasoned decisions must still be maintained. The absence of explicit provisions in the UNCITRAL Model Law and the New York Convention regarding LLMs implies that their application in arbitration is permissible. Since neither document includes a clear prohibition against LLM use, it is reasonable to conclude that parties and arbitral tribunals may incorporate these technologies, provided such use adheres to fundamental principles such as due process and the right to a fair hearing. Given the rapid advancement of technology, LLMs in international arbitration appear not only likely but also necessary. Therefore, it is essential to establish formal regulations through specific guidelines or amendments to existing frameworks.

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