

Can Artificial Intelligence be used to appoint arbitrators?

Practical and legal implications of the use of Artificial Intelligence in the appointment of arbitrators in International Commercial Arbitration

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Abstract: Artificial Intelligence (AI) is rapidly disrupting the traditional way of conducting arbitrations. In International Commercial Arbitration (ICA) some innovative AI applications are improving the efficiency and quality of arbitration proceedings. This article's goal is to analyze the possibility of replacing the old-fashioned method for appointing arbitrators by implementing an AI-model capable of selecting an arbitral tribunal without the existing weaknesses of the traditional selection process. However, although an AI-model is presented as an attractive alternative for the appointment of arbitrators, it has to overcome significant challenges, such as the insufficiency of information of the potential decision-makers, issues of arbitration confidentiality, potential AI biases, and finally, it must earn enough confidence from the arbitration community.

Keywords: Artificial Intelligence, Arbitrator appointment process, International Commercial Arbitration.

¿Se puede utilizar la Inteligencia Artificial para nombrar Árbitros? Implicaciones prácticas y legales del uso de inteligencia artificial en el nombramiento de árbitros en arbitraje comercial internacional

Resumen: *La Inteligencia Artificial (IA) está rápidamente disruptiendo la forma tradicional de conducir arbitrajes. Algunas fascinantes aplicaciones están mejorando la calidad y eficiencia de los procedimientos arbitrales en el contexto del Arbitraje Comercial Internacional (ACI). El objetivo del artículo es analizar la posibilidad de utilizar IA como mecanismo para la selección de los árbitros y así suprimir los defectos del actual y anticuado proceso de nombramiento. Sin embargo, a pesar de que la IA es presentada como una atractiva alternativa para la designación del tribunal arbitral, la misma debe superar importantes dificultades relacionadas con la falta de información de los potenciales árbitros, la confidencialidad en el arbitraje, prejuicios de la IA y finalmente, obtener suficiente confianza por parte de la comunidad arbitral.*

Palabras claves: *Inteligencia Artificial, Proceso de nombramiento de los árbitros, Arbitraje Comercial Internacional.*

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SUMMARY:

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INTRODUCTION

Much speculation and skepticism have arisen around the idea of using Artificial Intelligence (AI) in International Commercial Arbitration (ICA).¹ The most optimistic proponents of AI aim to have a robot arbitrator to replace human arbitrators, while others are just adapting their practice to these novel shifts by using AI as a helpful tool to simplify repetitive stages of the process.

The revolutionary idea of the potential use of AI in arbitration aims at enhancing the quality of the proceeding. In particular, to improve the arbitration proceeding in terms of efficiency, time, and cost. Clearly, to achieve an arbitration proceeding without any human intervention requires a tremendous technological effort and a global consensus in the ICA community.

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¹ The focus of this work will be from the International Commercial Arbitration perspective, however, given that it will be published by the Venezuelan Arbitration Association (AVA), the ultimate goal is to implement, in the future, some of these ideas into the Venezuelan arbitration practice.

The article's objective is to explore the practical and legal implications of the use of AI in ICA, but solely as a tool for appointing² arbitrators. As will be examined, choosing the decision-maker is a stage of the proceeding where AI might have more room for triumph.

In recent years, some remarkable AI projects have emerged in the legal practice and the ICA community, ranging from tools for smart meeting scheduling (X.ai)³ to models that can predict accurate outcomes of a case (Ravel Law).⁴ Nevertheless, an AI model able to appoint one or three arbitrators does not exist or at least not until the time of writing this article.

The selection of the arbitrators is perhaps, for parties, the most important decision in an arbitration case. The arbitrators are the ones that will have a direct impact on the final outcome and the quality of the process. Therefore, searching the available candidates is a key stage for a successful arbitration dispute.⁵

The open question is whether this essential step of the process can be performed by an independent AI model without any human involvement.

In order to answer this complex question, the article will be divided in the following three sections.

The first section will describe the legal and procedural considerations that surround the process of appointing arbitrators, including methods of appointment for a sole or a three members tribunal, as well as the principles that compose the criteria for appointment. The segment culminates with an overview of the current challenges faced in the appointment process, which will be crucial for scrutinizing the feasibility of the implementation of the "AI-arbitrator appointer".

Subsequently, the ensuing section follows a comprehensive approach to the other side of the issue and outlines the current landscape of AI. This is done through both a general analysis of contemporary AI models, as well as a specific assessment of models already implemented in the context of arbitration.

Logically, the third section is the byproduct of the combination of the preceding ones: in this last section, the complexities of the arbitration appointment process are subject to the framework dealt with in the analysis of AI models, allowing us to extract

² The article will use, indistinctly, the words "appointment", "selection" or "choose" with the same meaning, which is the parties' right to nominate and confirm arbitrators.

³ "Instant Meeting Scheduling," x.ai, accessed August 30, 2020, <https://x.ai/>.

⁴ "Ravel Law", Products and Technology, data-driven research and analytical tools, accessed August 30, 2020, <https://home.ravellaw.com/products>.

⁵ Margaret Moses, *The Principles and Practice of International Commercial Arbitration* (Cambridge: Cambridge University Press, 2008), 116.

various considerations in relation to a vast array of topics, ranging from data (un)availability to neutrality and transparency of the machine. Finally, the thorough dissection of such limitations should allow us to a final conclusion regarding the feasibility or not of the potential AI-arbitrator appointer.

1. Appointment Arbitrators Process

1.1 Legal Framework

One of the remarkable advantages of arbitration over traditional courts is that parties have the right to appoint the decision-maker for a specific dispute.⁶ The appointment of the arbitrator(s) is also one of the most crucial decision for parties given that it will affect the quality of the proceeding and the award.

The freedom to select and appoint an arbitrator is an “inherent and indispensable” part of the principle⁷ of party autonomy.⁸

The appointment of arbitrators must be based on their skills, knowledge, and experience⁹ and also, taking into consideration their independence and impartiality with both, the case and the parties.

The parties’ autonomy to appoint the arbitrators represents a fundamental arbitration feature¹⁰ that is recognized in the New York Convention¹¹ and most of the national arbitration legislations.

Article V (1) (d) of the New York Convention establishes that the recognition of an award may be refused if “the composition of the arbitral authority was (...) not in accordance with the agreement of the parties”.¹²

Meanwhile, the UNCITRAL Model Law,¹³ adopted as the arbitration law of many countries, provides similar protection to the parties’ autonomy appointment right. Article 11 (2) provides that “the parties are free to agree on a procedure of appointing the arbitrator or arbitrators”.¹⁴

⁶ Emilia Onyema, “Selection of Arbitrators in International Commercial Arbitration”, *International Arbitration Law Review* (2005): 1.

⁷ This principle entails the parties to decide on all aspects of the arbitration procedure that is not limited by mandatory laws.

⁸ Ilias Bantekas, *An Introduction to International Arbitration* (New York: Cambridge University Press, 2015), 114.

⁹ Moses, *The Principles...*, 116.

¹⁰ Gary B. Born, *International Arbitration: Law and Practice*, 2nd ed, (The Hague: Kluwer Law International, 2016), 129.

¹¹ United Nations Convention on the Recognition and Enforcement of Foreign Arbitral Awards (New York, June 10, 1958) [New York Convention]

¹² Article V (1) (d), New York Convention

¹³ UNCITRAL Model Law on International Commercial Arbitration, United Nations Commission on International Trade Law (June 21, 1985) [UNCITRAL Model Law]

¹⁴ Article 11 (2) UNCITRAL Model Law

This freedom of choice is also reflected in almost every arbitral institution's rules. For instance, articles 7 to 10 of the UNCITRAL Rules¹⁵ and articles 12 to 14 of the International Chamber of Commerce (ICC) rules¹⁶ refer to the freedom of parties to agree on the decision to have a sole or three arbitrators.

Thus, the principle of autonomy of the parties to nominate and confirm their arbitrators is supported by the New York Convention, the UNCITRAL Model Law, and most ICA rules.

As a consequence, the present legal framework in ICA, based on the principle of parties' autonomy, allows them to agree, without any restrictions, on the best mechanism for selection of the arbitration panel, including a potential AI-arbitrator appointer.

1.2. Methods of Appointment

The method of appointment varies depending on the parties' agreement, applicable law, and arbitral institution rules. Therefore, there is not a standard method of appointment, other than, in every case, the parties have to select the arbitral tribunal.

According to the principle of parties' autonomy, the parties can select the procedure for appointing the arbitrators, including the number of arbitrators. In ICA the arbitral tribunal normally consists of one or three arbitrators.¹⁷

Normally if parties do not establish how they want to appoint the arbitral tribunal, the selection will take place according to the rules that will govern the process. Both the national laws and institutional rules state principles for the appointment mechanism.

It is important to remark that when parties entrust the nomination of the arbitrators to a third party, they exercise their principle of parties' autonomy indirectly. So, the third-party acts on behalf of the parties.¹⁸

In the following lines, a brief review of the arbitration appointment process for both a sole arbitrator and three arbitrators.

¹⁵ UNCITRAL Arbitration Rules (Last amendment December 16, 2013) [UNCITRAL Rules]

¹⁶ International Chamber of Commerce (ICC), Arbitration Rules (March 1, 2017)

¹⁷ Institute for the Promotion of Arbitration and Mediation in the Mediterranean, *Report on The Criteria for Selection of Arbitrators* (2012), 4.

Exceptionally, some status, such as section 15(2) of the English Arbitration Act are content with an even number.

¹⁸ Onyema, "Selection of Arbitrators in International Commercial Arbitration", 6.

1.2.1. Sole Arbitrator

When parties decide, for cost-related reasons or given the nature of the dispute, to have a sole arbitrator, habitually the arbitration agreement provides the method or mean of appointment.¹⁹

The common method in the case of the sole arbitrator is that the parties agree on some general qualifications of the potential decision-maker in the arbitration agreement. Then, once a dispute arises, the parties exchange a list of names of potential arbitrators who possess the desired arbitrator characteristics.²⁰

When non-method is addressed in the arbitration agreement, parties usually follow the provisions stated in national law or international arbitration rules. Some examples of the latter are Article 8(1) of the UNCITRAL Rules states that if parties “have not reached agreement thereon, a sole arbitrator shall, at the request of a party, be appointed by the appointing authority”.²¹ In this case, the authority could be the Secretary-General of the Permanent Court of Arbitration at The Hague.²²

A similar approach is given by the ICC Rules in case of non-agreement,²³ with the difference that the authority will be the International Court of Arbitration of the International Chamber of Commerce (the “ICC Court”).

It is also possible to select a particular arbitrator, before the dispute, in the arbitration agreement, but it might cause future problems since the arbitrator may be unavailable at the moment of the conflict or their particular case might require a different qualification and approach from the arbitrator.²⁴

1.2.2. Three Arbitrators

When parties agree to a panel of three members, the most used method of appointment is that every party selects one arbitrator and the two co-arbitrators reach an agreement of the third arbitrator, who will be the tribunal’s chair.²⁵

In other cases, the parties agree in appointing the chair of the arbitral tribunal themselves or throughout different arbitral rules.²⁶ For instance, in the ICC Rules, the ICC Court is who appoints the chair of the panel.²⁷

¹⁹ Onyema, “Selection of Arbitrators in International Commercial Arbitration”, 5.

²⁰ Moses, *The Principles...*, 127.

²¹ Article 8(i), UNCITRAL Rules.

²² Article 6, UNCITRAL Rules.

²³ Article 12, ICC Rules.

²⁴ Moses, *The Principles...*, 127.

²⁵ Moses, *The Principles...*, 121.

²⁶ Also, most national arbitration laws allow the appointment of arbitrators by a national court.

²⁷ Article 12 (5), ICC Rules.

Likewise, some arbitration clauses state, that if a party fails to select an arbitrator within the time-period the other party might make the choice itself.²⁸ In this case, one party would have a potential advantage since the beginning.

Another common method for appointing the panel of arbitrators is the list-method that uses the American Arbitration Association Rules (AAA Rules),²⁹ where is provided to the parties a list of ten persons from their National Roster³⁰ and then they have to reach an agreement from the submitted list.

In summary, the majority of the arbitral tribunal entails one or three members. There is not a uniform method of choosing them, to a large degree, it depends on the arbitration agreement or the applicable law.

1.3 Appointment Criteria

For assessing the objective of the present article of replacing the current method of appointment of arbitrators for an AI-model, it is important to review some of the current selecting criteria in ICA. These selecting criteria will set the rules on the machine to appoint the arbitrator that better suits a case based on those minimum and necessary standards.

Two main categories of the appointment criteria can be distinguished. The first one is the independence and impartiality inherent to every arbitrator. The second one is those necessary qualifications to have a tailored arbitrator for a particular case.

1.3.1. Independence and Impartially

To guarantee the neutrality of the arbitration proceeding, arbitrators must be independent and impartial in their functions. This obligation is widely accepted as a general principle of arbitration and is included in various arbitration rules and laws.

The Guidelines on Conflicts of Interest in International Arbitration of the International Bar Association (IBA) establishes that "every arbitrator shall be impartial and independent of the parties at the time of accepting an appointment to serve and shall remain so until the final award has been rendered or the proceedings have otherwise finally terminated".³¹

²⁸ Born, *International...*, 135.

²⁹ Commercial Rules and Mediation Procedures of the American Arbitration Association (October 1, 2013). [AAA Rules]

³⁰ R-12 (a) of the AAA Rules.

This also apply for the selection of a unique arbitrator.

³¹ IBA Guidelines on Conflicts of Interest in International Arbitration, Part I (London: October 23, 2014)

In addition, article 12 of the UNCITRAL Model Law states that arbitrators must disclose any information that may affect their impartiality or independence in a case.

Independence generally means that the arbitrator should not have any relationship (direct, indirect, past or present) with the parties, from the professional or personal perspective.³² It also means that the arbitrator has no financial interest in the case and does not expect any benefit from the parties.³³

Impartiality implies an unbiased position of the arbitrator in the case and the absence of any preconceived notion about the matter of the dispute or the parties.³⁴ This obligation is a more subjective aspect that involves the state of mind of the arbitrator in a specific matter.³⁵

As a result, in an effort to avoid real or perceived lack of independence and impartiality, any conflict of interest that may affect the impartiality or independence of the arbitrator should be disclosed to the parties in order for them to decide whether to appoint or maintain a particular arbitrator in the dispute.

1.3.2. General Qualifications

The most challenging part of the process is to appoint an arbitrator who possesses the proper qualifications for a particular dispute. Knowledge and experience have been analyzed as the main characteristic considered by the parties at the moment to choose an ideal decision-maker.

Knowledge is based on the expertise of the prospective arbitrators in the industry or sector matter of the dispute, while the experience is referred to as the familiarity of the candidates regarding the applicable law and procedure.

For both, the candidates should be able to demonstrate that they possess the described elements on the matter subject to a dispute and the applicable law based on academic, professional, or previous arbitrations.³⁶

However, there are many other qualifications contemplated by parties in this initial stage of the arbitration proceeding. For example, other substantial considerations include the personality or social skills of the potential arbitrators. In this respect, the parties analyze the capacity of candidates to be emphatic with them and the issue.

³² James Ng, "When the Arbitrator Creates the Conflict: Understanding Arbitrator Ethics through the IBA Guidelines on Conflict of Interest and Published Challenges", *McGill Journal of Dispute Resolution*, Vol. 2 (2016): 25, <https://srm.com/abstract=2811192>

³³ Moses, *The Principles...*, 130.

³⁴ Moses, *The Principles...*, 130.

³⁵ Michael McIlwrath and John Savage, *International Arbitration and Mediation: a Practical Guide* (Austin: Wolters Kluwer, 2010), 127.

³⁶ Moses, *The Principles...*, 117-118.

Additionally, parties take into consideration the reputation of the prospective arbitrators. This aspect aims to generate confidence in the parties.³⁷

Another relevant aspect is the arbitrator's language and his/her fluency. This is because "an arbitrator lacking of fluency in the language of the arbitration may not understand some issues necessary to the resolution of the dispute".³⁸

Availability is also a concern for the parties, they have to confirm the possibility and commitment of the candidate to attend the arbitration process.

Finally, some cases demand specific requirements requested by parties or by the arbitration agreement. For instance, parties may agree to have a non-lawyer arbitrator or a person with knowledge in maritime and space law at the same time. This specificness might represent a risk in finding a candidate given the detailed of the qualifications.

These are the most essential qualifications aimed by the parties when choosing an arbitrator. Clearly, depending on the dispute at hand there might exist more requirements.

As will be discussed, an AI-arbitrator appointer might have more or fewer difficulties to comply with the previous criteria, especially with those having a subjective perspective.

1.4. Challenges of the arbitrator's appointment process

Paradoxically, the freedom to select the decision-maker not only represents one of the most important benefits for resolving a dispute through arbitration, but is also one of the biggest challenges of the arbitration proceeding.

As will be seen in this next section, some issues like favorable predisposition of party-appointed arbitrators, repetitive selection of arbitrators, or lack of information; could jeopardize the principles of impartiality and independence of the arbitrator appointment process.

A deeper explanation of some of the challenges that the arbitration appointment process faces nowadays in ICA as follow:

³⁷ Latham & Watkins, *Guide to International Arbitration* (2017), 11.

³⁸ Moses, *The Principles...*, 119.

1.4.1. Party-appointed arbitrators

In a three-member tribunal, the frequent method of appointment is that every party nominates one arbitrator, and then the co-arbitrators or the parties select the tribunal's chair. This method is supported by many since it gives the parties superior control over the process and more credibility to the award since each party-appointed arbitrator is "willing" to endorse their particular position.³⁹

Nonetheless, several criticisms of this appointment process are explained by the selection and affiliation effects. The former represents the trend to select a person likely to be favorable for a previous relationship⁴⁰ while the latter, despite the intention to stand unbiased, might be deciding in favor of a party simply by knowing that it was designated by a specific party.⁴¹

Both, the selection and affiliation effects might disturb the arbitration independence and impartially. In other words, it might be argued that both effects are a sort of biases that are intimately related to the unilateral appointment system given the "relationship" between the arbitrator and the appointed-party.

In parallel, the party-appointed arbitrators' method carries some other negative aspects to the arbitration proceeding, especially at the moment to deliberate the reasonings of the award. Professor Jan Paulsson has identified at least two drawbacks.

First, unanimity of the tribunal regarding the award is not always achieved in honorable ways. According to the professor, the party-appointed effect (affiliation) is the reason for that, where the "compromise" with the appointed-party may be an "obstacle to coherently and sincerely motivated awards".⁴²

Second, the professor identifies some problems of the tribunal when deliberating the motivation of their decisions. For instance, the professor quotes an example where arbitrators offer a sort of indirect "bargains" between them, for instance, "I will see it your way when I preside and you as co-arbitrator want a particular outcome; and I will then count on you when our roles are reversed."⁴³

³⁹ Sergio Puig and Anton Strezhnev, "Affiliation Bias in Arbitration: An Experimental Approach", *SSRN Electronic Journal*, (2016): 5, <https://doi.org/10.2139/ssrn.2830241>.

⁴⁰ Favorable in the sense of expecting a positive decision because of a previous relationship. Not favorable referred in the event case that an arbitrator has publicly expressed an opinion (award or article) likely to a party's position, which represent a logical litigation strategy to appoint that particular arbitrator.

Puig and Strezhnev, "Affiliation Bias in Arbitration: An Experimental Approach", 4.

⁴¹ Puig and Strezhnev, "Affiliation Bias in Arbitration: An Experimental Approach", 7.

⁴² Jan Paulsson, "Must we live with Unilaterals?", *ABA Section of International Law* (2013): 6.

⁴³ Paulsson, "Must we live with Unilaterals?", 6.

To mitigate these potential problems, Professor Paulsson proposed that all the members of the tribunal should be appointed by a neutral appointing authority.⁴⁴ Perhaps, as will be discussed in the next section, AI might be used by the neutral authorities to mitigate the problems pointed out by Professor Paulsson.

1.4.2. Repetitive Selection

“How nice to see you again?”⁴⁵ is the ingenious title of the paper conducted by Drew J. Hushka to explain the phenomenon of the risk and potential partiality in the use of repetitive arbitrators.

The author explains another way of potential biases when a person is constantly appointed by a party. This might generate a vicious circle between a particular party and an arbitrator.

This vicious circle consists of a repetitive pattern where the largest law firms nominate the same persons as arbitrators given that in the past, they decide in their favor. And from the arbitrator perspective, there might exist an incentive for a particular party to ensure future work as a decision-maker.⁴⁶

This “pre-existing working relationship” conduct is gaining importance in ICA and at the same time putting at risk the independence and impartiality of the arbitrators. Especially, large-scale law firms who have dozens of arbitration cases per year and can develop this kind of relationship with prominent arbitrators.

This problem can be diminished if an independent system like an AI-model designates the arbitral tribunal members.

1.4.3. Lack of Information

Parties spent significant time, energy, and even professional fees in finding information about the possible arbitrators. This might be explained by the fact that the arbitration information market is relatively opaque and is auspicious to promote the “*How nice to see you again?*” effect.⁴⁷

The available information about arbitrators is usually limited, only some basic biographical information is public to the community. Having insight into how a specific person decides a case is uphill. This can be a consequence of the confidential character of the arbitration process or it might be encouraged by the big players in the arbitration

⁴⁴ Paulsson, “Must we live with Unilaterals?”, 5.

⁴⁵ Drew J. Hushka, “How Nice to See You Again: The Repetitive Use of Arbitrators and the Risk of Evident”, *Arbitration Law Review* (2013)

⁴⁶ Hushka, “How Nice to See You Again: The Repetitive Use of Arbitrators and the Risk of Evident”, 326.

⁴⁷ Catherine Rogers, “Transparency in Arbitration Selection”, *Austrian Yearbook on International Arbitration* (2015), 5.

community, but either way, the lack of information sparks arbitrator biases and inequality between parties.

The first aspect that influences the lack of information is confidentiality. This element is one of the foremost attractive features in arbitration. It is, without a doubt, a distinction from traditional courts. But it brings the collateral damage of interference with any information of the prospective arbitrators and moreover, how they motivated their decision.⁴⁸

The second aspect is a subjective one and consists of an arbitration community effort to maintain and promote the same players in-game.

According to the 2018 International Arbitration Survey conducted by White & Case, 77% of the respondents (parties or in-house counsels) find information about their arbitrators by “word of mouth” followed by “from internal college” information (68%).⁴⁹

This survey evidenced that the process to collect arbitrator’s information in ICA is far away from being transparent. This lack of transparency is highlighted by the fact that any insight of a candidate depends on who issues the message. And the repeated players are more likely to receive positive feedback given the “pre-existing working relationship”.

In addition, this might create inequality between law firms with a solid networking community and small law firms, or also, with parties without a strong budget that cannot have access to a global networking community.

Overall, regardless if it is caused by a lack of information, repetitive player, selection, or affiliation effect, the actual arbitration appointment process suffers from several limitations that affect the quality of the proceeding and the award. This article aims to propose an alternative method of appointing arbitrators using AI as a channel to address the challenges explained in the previous lines. The following sections explore the practical and technical feasibility of implementing an AI-arbitrator appointer to accomplish the aforementioned objective.

2. Artificial Intelligence and Machine Learning

2.1. AI models

Machines doing cognitive tasks are now having more impact on our lives than machines performing physical duties. Digital machines now can do more human abilities

⁴⁸ Even if the case became available to the public, the arbitrator’s names could be removed.

⁴⁹ White & Case, *International Arbitration Survey: The Evolution of International Arbitration* (2018), 21.

than in the past.⁵⁰ Some examples ranging from spam filters or facial recognition to more complex ones like self-driving cars or pet-robots can illustrate the value of AI in the upcoming years.

This digital impact is also influencing law practice. In arbitration, as it will be explained later, AI is having some fascinating developments. Existing AI models for contract and document analysis, smart meeting scheduling, or for predicting judicial decisions are an indication that the AI appointer of the arbitrator it might be feasible.

There is not a general consensus about the definition of AI but, in non-technical words, it can be understood as a "set of techniques aimed at approximating some aspect of human or animal cognition using machines".⁵¹ Also, in the Oxford Dictionaries is defined as "the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages".⁵²

Summing up, AI implies the use of a machine that is able to complete tasks requiring human or near-human intelligence.

The most important development driving the force of AI is the machine learning.⁵³ AI is the big picture of this field and machine learning is an essential requirement for AI.⁵⁴ For the purpose of this paper, AI or machine learning will be understood as "AI model".

Machine learning works similarly to how our brain learns from experience. For instance, we learned how to walk and talk through practice. Machine learning uses a similar neural process but instead of a human programming system, they build their own set of rules based on the data received.⁵⁵

The most important attribute of machine learning is the capacity to detect useful patterns in a large amount of data. Thus, the more data the machine receives the more room to improve its performance over time.⁵⁶

As a way to illustrate how these machine learning techniques can produce accurate results, it is proper to explain the email spam filter example.

⁵⁰ Erik Brynjolfsson and Andrew McAfee, *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies* (Vancouver, B.C.: Langara College, 2018), 91

⁵¹ Ryan Calo, "Artificial Intelligence Policy: A Primer and Roadmap" (2017): 4, <https://ssrn.com/abstract=3015350>

⁵² Oxford Living Dictionaries, accessed August 20, 2020, <https://en.oxforddictionaries.com/>

⁵³ Ethem Alpaydin, *Machine Learning: The New AI* (Cambridge, MA: MIT Press, 2016), Preface XIII
See also: Horst G. M. Eidenmueller and Faidon Varesis, "What Is an Arbitration? Artificial Intelligence and the Vanishing Human Arbitrator", *SSRN Electronic Journal* (2020): 6, <https://doi.org/10.2139/ssrn.3629145>.

⁵⁴ Alpaydin, *Machine...*, 17

⁵⁵ Bernard Marr and Matt Ward, *Artificial Intelligence in Practice: How 50 Successful Companies Used Artificial Intelligence to Solve Problems* (Chichester, West Sussex: Wiley, 2019), 4.

⁵⁶ Harry Surden, "Artificial Intelligence and Law: An Overview", *Georgia State University Law Review*, Vol. 35 (2019); *University of Colorado Law Legal Studies*, 1312, <https://ssrn.com/abstract=3411869>

Imagine receiving an email with the word “drug”. The first reaction is to relate them with a virus and dropping it into the spam folder. The next time you receive an email with the same word the software using machine learning will drop it automatically in the unwanted folder. But how does this imperceptible process work?

Basically, every time users mark an email as unwanted; they are “training” the system for future opportunities. Then the system will automatically distinguish a spam email from the rest.

Therefore, machine learning systems are able to make reasonable and automated decisions over time.⁵⁷

With the email filter example, two main conclusions can be made, these machines can learn without having a human program setting rules (knowns as unsupervised learning)⁵⁸ and are capable to improve their performance when receiving more and more data.⁵⁹

Besides, focusing on the topic of the present research, it is necessary to highlight that the most relevant machines in the legal sector are the one using “supervised learning”. This type of model refers to a process that is “labeled by humans according to the dimension of interest”.⁶⁰ In the end, this set of rules determines the best way to predict a relevant outcome.

Whether is supervised or unsupervised machine learning, this technology is prepared to improve its performance while it receives a vast amount of data, being able to make automated and accurate outcomes.

As a consequence, it might be predicted that an AI-model is capable to set its rules based on the appointment criteria for arbitrators discussed above. For instance, it can set the number of arbitrators, language, specific experience, arbitrator knowledge, the field of matter, availability, or even the independence and impartiality with the parties.

The idea of the AI-arbitrator appointer is its versatility to produce an outcome (selecting the best arbitrator for a particular case) founded in the necessity of parties according to the dispute. Yet, to have a reliable and precise outcome the AI-model has to be nourished by abundant data, and under the existing conditions, it might face some practical obstacles.

⁵⁷ Surden, “Artificial Intelligence and Law: An Overview”, 1313.

⁵⁸ This is known as unsupervised machine learning. Also exist another type of “supervised” machine learning where a human can intervene in the rule of set of the program. For a deeper understanding of the machine learning systems, I recommend the book “*Machine Learning: The New AI*”: Ethem Alpaydin.

⁵⁹ Surden, “Artificial Intelligence and Law: An Overview”, 1312.

⁶⁰ Eidenmueller and Varesis, “What Is an Arbitration? Artificial Intelligence and the Vanishing Human Arbitrator”, 7.

2.2. Existing AI-Model in arbitration

As it was mentioned beforehand, there does not exist any AI-model able to act as an “arbitrator appointer”. However, there do exist some interesting AI-models capable to develop some assistants’ tools during the arbitration proceeding.

Some of these assistants’ tools organize the management of the arbitration process, gather and analyze facts, or predict the outcome of a case.

The following examples illustrate that is technically possible to have an AI model supporting parties in their aim to select the right arbitrator, of course, as long as it obtains the necessary data.

- Instant Meeting Scheduling (X.AI)⁶¹ is an AI-application to assist parties and arbitrators in scheduling and planning of their workload. With this application, parties can arrange all the meetings and hearings at the same time. It can connect parties’ agendas and identify key components like time, people, location with minimal human intervention.
- Ross⁶² is a legal AI app that allows parties or arbitrators to navigate through documents, submissions, exhibits, and case law.⁶³ For parties it might be useful because they can compare their arguments with similar cases.
- DISCO⁶⁴ is also an AI alternative model to organize evidence, review of witness videos and transcripts, or find documents.
- Kira is an AI app that “identifies, extracts, and analyzes text”⁶⁵ like contracts and other documents in minutes. For arbitrators and parties, it can be useful at the moment of reviewing relevant information on contracts for a particular case.
- Arbilex is an AI app created for international arbitration for predictive analytics “to enhance decision-making by law firms and litigation funds”.⁶⁶ The application can “quantify uncertainties” and “maximize desirable outcomes”⁶⁷ using predicting data.

Besides, some investigators using AI (machine learning models) conducted a study to predict the US Supreme Court decisions from 1816 to 2015. The researchers

⁶¹ See “Instant Meeting Scheduling,” x.ai, accessed August 30, 2020, <https://x.ai/>.

⁶² See “ROSS Intelligence,” ROSS Intelligence, accessed August 30, 2020, .

⁶³ Eidenmueller and Varesis, “What Is an Arbitration? Artificial Intelligence and the Vanishing Human Arbitrator”, 10.

⁶⁴ See “Your Ediscovery Upgrade,” DISCO, accessed August 30, 2020, <https://www.csdisco.com/>.

⁶⁵ See “Contract Analysis,” Contract Analysis, Kira Systems, August 28, 2020, <https://kirasystems.com/how-it-works/contract-analysis/>.

⁶⁶ See “Predictive Analytics for International Law,” ArbiLex, accessed August 30, 2020, <https://www.arbilex.co/welcome>.

⁶⁷ “Predictive Analytics for International Law,” ArbiLex.

analyzed more than 28,000 outcomes. Surprisingly, the AI-model was able to predict the outcome of all the decisions with 70.2 percentage of accuracy.⁶⁸

Although these previous AI models are an accurate sample of how rapidly AI is irrupting the arbitration process, it also illustrates that technically an AI arbitrator appointer is achievable.

Also, some of the features of these AI projects can be used in the future for the proposed AI-arbitrator appointer. For instance, the X.AI model can be useful to determine the availability of the potential arbitrator or Arbilex it can be used to predict which are the most suitable arbitrators' candidates for a case.

These new technologies support the idea of the AI arbitrator appointer, however as it will be explored in the following and final part of the article some limitations might hinder its implementation.

3. Feasible implementation?

At this stage of the article, it seems that the present arbitration legal framework based on the party's autonomy principle will allow the parties to have an AI model that decides their arbitral tribunal members. Likewise, the nature of the AI-models and some existing AI projects in the arbitration context seem to serve as evidence to have confidence in an AI-arbitrator appointer.

Nevertheless, this last part of the article will explore two important aspects to conclude whether or not an AI-arbitrator appointer is feasible.

The first aspect refers to the analysis of the idea of an AI model being capable of gathering the necessary data/information to comply with the appointment criteria of arbitrators.⁶⁹ The second one is a review of other potential challenges that AI-models might have at the moment to serve as an independent appointer arbitrator program.

3.1. Is the data enough?

As it was mentioned⁷⁰ an AI model improves its performance over time as long as it receives enough and precise data.

Some scholars have identified two fundamental reasons why AI models are having so much contemporary success in all the industries.

⁶⁸ Maxi Scherer, "Artificial Intelligence and Legal Decision-Making: The Wide Open? Study on the Example of International Arbitration", *Queen Mary School of Law Legal Studies* (2019): 13, <https://ssrn.com/abstract=3392669>

⁶⁹ See also section 1.3.

⁷⁰ See also section 2.1.

The first reason is the data. This component is the raw material that fulfills any AI-model. The global digitalization of every industry is increasing the volume of data that an AI-model can collect.⁷¹ This data is necessary for the machine to program a proper set of rules for a particular purpose.

The second motive is computing power. Today's machine technology has the capacity to store a vast amount of data for any AI project.

The latter reason does not need much explanation. A simple example of the technology evolution is that nowadays a cheap smartphone is millions of times more powerful than the Apollo 11 guidance computers back in 1969.⁷²

However, the former reason requires careful analysis. The central concern is if the existing data regarding the potential arbitrators is enough.

The objective of implementing an AI-model for choosing arbitrators is to diminish the potential challenges of the initial stage of the arbitration proceeding. Without a doubt, proper implementation of this technology will enhance the arbitration quality in general.

The main concern regarding the current appointment process is the arbitrator's biases. As it was discussed,⁷³ these biases can be reflected within the party-appointed arbitrators' effect, repetitive arbitrators, or insufficient information. The first two challenges will be automatically surpassed by applying an AI-model given that a third independent system will decide the arbitrators' panel. However, the insufficient information in the arbitrator selection process is closely linked to the data required by an AI-arbitrator appointer.

The information gap is caused by different reasons such as confidentiality, monopoly of the information from the biggest players (law firms or even arbitrators), or promoted by the *how nice to see you again* effect. Regardless of the reason, it might signify an important obstacle for the implementation of this technology.

An AI-arbitrator appointer with an incomplete set of rules will have an undesired outcome. Therefore, gathering all the information about potential candidates is essential to replace the present appointment process using AI.

However, is it feasible to fight against the current context of the lack of information on arbitrators?

⁷¹ Marr and Ward, *Artificial...*, 5.

⁷² Mihai Andrei, "Your Smartphone Is Millions of Times More Powerful Than All of NASA's Combined Computing in 1969", *ZME Science*, February 11, 2020, accessed January 19, 2021, <https://www.zmescience.com/science/news-science/smartphone-power-compared-to-apollo-432/>.

⁷³ See also section 1.4.

Regarding confidentiality, it has to be analyzed case by case, but there is no doubt that this principle is hierarchically more relevant for the parties than revealing an arbitrator profile or some motivations in a specific award. Thus, a potential AI-model will have the same limitations about confidentiality when choosing the arbitration panel.

Nevertheless, what occurs when the information could be publicly accessible but it is not? This may happen because of the mentioned monopoly of the information or for the convenience to maintain the same arbitrators in orbit. Still, this information has to be disclosed to ensure an accurate AI-arbitrator appointer.

A potential success approach to beat these challenges and therefore implement an AI-arbitrator appointer model can be found in the Arbitrator Intelligence project.

The Arbitrator Intelligence project is a “global information aggregator that collects and analyzes critical information about decision making by international arbitrators”.⁷⁴ The interesting issue of this project is that, through a global questionnaire that asks parties several factual and interpretive questions about the procedural and substantive decision making by the arbitral tribunal in a case, it can build a truthful arbitrator’s database.⁷⁵

The insights provided by parties regarding the performance of arbitrators in previous arbitration cases will replace the “word mouth” or “internal college” source and moreover, it will provide the arbitration community a more accurate information background about a person than the outdated existing arbitrator researchers tools.⁷⁶

It is important to notice that the Arbitrator Intelligence project does not use AI technology but a data collector system. However, it is easy to anticipate that the information gathered (database) by this novel project will make an AI-arbitrator appointer completely feasible.⁷⁷

In conclusion, some of the present challenges in the implementation of an AI-arbitrator appointer regarding the lack of data/information can be overcome with the use of other technologies focused on data collection like Arbitrator Intelligence. Evidently, these might require an effort and a will on the part of these types of entrepreneurs to collaborate with an AI-arbitrator appointer initiative.

⁷⁴ See “State-of-the-Art Analytics on International Arbitrators,” Arbitrator Intelligence, accessed August 30, 2020, <https://arbitratorintelligence.com/>.

⁷⁵ See “State-of-the-Art Analytics on International Arbitrators,” Arbitrator Intelligence.

⁷⁶ See, for example, two international arbitrators researchers tools: <http://www.iaiparis.com/index.asp> or <https://arbitrationlaw.com/arbitrators>. Both contain only some general information of the potential candidates instead of deeper contextualization of every arbitrator.

⁷⁷ Another reasonable idea is that the arbitral institutes share insights information about the cases and decision-makers in order to collaborate with an AI project. This also will be subject to the same confidentiality obstacles explained.

Within addition to the possible inconvenience in gathering the necessary and error-free data to ensure a reliable AI-Model, there are some other challenges inherent with the AI technology such as transparency, AI biases, or lack of empathy with subjective criteria that will be fleetingly described as follow.

3.2. Other Limitations regarding AI

Besides the absence of information as a latent obstacle for the implementation of an AI-arbitrator appointer model, there also exist some other AI technical implications to take into consideration.

When thinking of the application of AI models, rationality, neutrality, and fairness are the main advantages that arise over any human selection process. Still, these systems can also lead to opacity, biases, and discriminatory outcomes.

One of the greatest challenges of AI is the opacity and complexity of its technology. The reason behind the opacity of this model is that most people lack the technical expertise to understand the reason behind a decision of an AI-model and, in many cases, those systems are protected by trade secrecy.⁷⁸

Transparency in AI models suggests the availability to obtain information about the outcome of the system. AI models are opaque and rarely “have any concrete sense of how or why a particular classification has been arrived at from inputs”.⁷⁹

The use of algorithms or AI models to select arbitrators might represent a challenge when it comes to the explanation of such selection.

This may have two disadvantages (i) the idea to encourage this type of technology is to promote transparency, and not having a clear clue of how the outcomes are obtained might be contradictory with the intention of this initiative and; (ii) in the eventual of a party’s challenging⁸⁰ an arbitrator appointed by an AI-model it will be tough for them to explain the “justifiable doubts” or the “not possession of the qualifications”, without the AI technical knowledge of the result and, even more, if that technology is protected by trade secrecy.

Along with the opacity of AI models, they also could be based on biased data. The outcomes of these systems could result from training datasets, which means that the

⁷⁸ Frederik Zuiderveen Borgesius, “Strengthening Legal Protection against Discrimination by Algorithms and Artificial Intelligence” (2020), 8.

⁷⁹ Jenna Burrell, “How the Machine ‘Thinks’: Understanding Opacity in Machine Learning Algorithms”, *Big Data & Society* 3, no. 1 (2016): 1.

⁸⁰ Article 12 of UNCITRAL Model Law prescribed: “An arbitrator may be challenged only if circumstances exist that give rise to justifiable doubts as to his impartiality or independence, or if he does not possess qualifications agreed to by the parties. A party may challenge an arbitrator appointed by him, or in whose appointment he has participated, only for reasons of which he becomes aware after the appointment has been made.”

algorithm could be trained in biased data reflecting a human bias in the interpretation of the data.⁸¹

To give an illustration of AI biases. In 2014 Amazon implements an AI program to filter resumes and select candidates. This system was trained with data (previously selected candidates and employees) for 10 years. Surprisingly, the company realized that the system was discriminating against women because the systems were trained to vet applicants by patterns, "a reflection of male dominance across the tech industry".⁸²

In the case of the eventual use of the arbitrator's information provided by an Arbitrator Intelligence project or an arbitral institutional, the data that feeds the AI-arbitrator appointer will have to be strongly impartial and independence, otherwise these systems will fall in the same vicious circle as the current arbitrator appointment process.

Finally, another aspect to take into consideration is the specific qualifications analyzed by the parties to select an arbitrator. Many developments have been made in AI to read and interpret humans' emotions.⁸³ Yet, recent technologies are far from accurate models that can determine a person's social skills or reputation.

AI models should appropriate for managing objective selection criteria such as knowledge, experience, language, number of arbitrators, or availability because they are trained mainly with objective data. However, when it comes to reputation, social skills, and other specific subjective qualifications it might be difficult to generate the required affinity that parties usually aim in an arbitrator.

CONCLUSION

In present times technologies are indispensable in human life and they are becoming crucial in our development. In today's world, we can do things with technology that in the past we believed to be impossible.⁸⁴

Law does not escape from this reality; however, hesitation has been part of this journey. Undoubtedly, AI can enhance legal practice and contribute to faster, less costly, and accessible procedures.

⁸¹ Anja Lambrecht and Catherine Tucker, "Algorithmic Bias? An Empirical Study of Apparent Gender-Based Discrimination in the Display of STEM Career Ads", *Management Science* 65, no. 7 (2019): 3-5.

⁸² Jeffrey Dastin, "Amazon Scraps Secret AI Recruiting Tool That Showed Bias against Women", *Reuters*, October 10, 2018, accessed January 19, 2021, <https://www.reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G>.

⁸³ See examples of these on: Thomas Brewster, "DARPA Pays \$1 Million For An AI App That Can Predict An Enemy's Emotions", *Forbes Magazine*, July 22, 2020, accessed January 19, 2021, <https://www.forbes.com/sites/thomasbrewster/2020/07/15/the-pentagons-1-million-question-can-ai-predict-an-enemys-emotions/>; and, Vijaysree Venkatraman, "I Saw a Future Where You Could Frown at Your Digital Device: Rana El Kaliouby", *The Hindu*, July 17, 2020, accessed January 19, 2021, <https://www.thehindu.com/sci-tech/i-saw-a-future-where-you-could-frown-at-your-digital-device-rana-el-kaliouby/article32112380.ece>.

⁸⁴ Laura Cox, "5 Artificial Intelligence Developments To Watch", *Disruption Hub*, April 14, 2019, accessed January 19, 2021 <https://disruptionhub.com/the-5-most-interesting-ai-developments-of-the-past-year/>.

In arbitration, if there exists a stage that can be improved through the use of AI is the appointment of the arbitrators.

In 2020, parties still select the decision-maker as they did in the 20th century,⁸⁵ which means calling colleagues, word of mouth, or trusting a precarious public biographical information of the candidates.

With this old-fashioned method to select the arbitral panel, the process faces some other perils, threatening the legitimacy of the arbitration proceeding. For instance, the selection and affiliation or the “How nice to see you again” effect might be translated into arbitrator biases affecting negatively the proceeding and award.

In this context, AI is presented as an attractive alternative to being the aimed method that diminishes any potential biases during the appointment of the arbitrators.

First, there does not exist any restriction in the current ICA legal framework that prohibits parties rely upon their right to appoint arbitrators into an AI-Model. Second, an AI-model has the quality to build a system (set of rules) able to improve its performance over time as much as it receives a robust amount of data. In the instant case, these sets of rules can be, effortlessly, programmed for particular or general arbitrators’ qualifications such as independence, impartially, availability, language, experience with a matter, or the number of arbitrators. Finally, some illustrations of existing successful AI-models in arbitration like Ross, Disco, or Arbilex are also a light in the path for the desire AI-arbitrator appointer.

Nevertheless, the wanted AI-model might have some practical and technical challenges. Essentially it can be categorized in a particular and general limitation.

The particular one is intertwined with the lack of arbitrator information problems that parties face nowadays. If an AI-model is not capable to set its rules based on sufficiency and detailed information (data) the outcome of the potential arbitrators is condemned to fail. Some initiatives like Arbitrator Intelligence might have the solution to this gap of information since is creating a reliable database of the arbitrators in ICA. The central doubt is if this database will be enough for AI-models to work properly? Just the time will tell.

The general challenge is related to a common concern in AI. These limitations are denoted in the opacity of the legal community in understanding how AI reaches the outcomes, latent biases of the model giving a predisposition in the data received or lack of empathy of the AI-model in identify social-skills in an arbitrator.

⁸⁵ “Why the Use of Technology in Arbitrators’ Selection Process – Although Fostered – Must Still Be Handled Carefully,” Blog do CBAr, accessed August 30, 2020, <http://www.cbar.org.br/blog/artigos/why-the-use-of-technology-in-arbitrators-selection-process-although-fostered-must-still-be-handled-carefully>.

In conclusion, given the present circumstances in ICA and AI, the answer to whether an AI-arbitrator appointer is feasible might be “yes”, but not yet. It will be as soon as (i) the arbitration community blindly trusts these programs to appoint the arbitral tribunal and, (ii) when having the opportunity to fulfill AI models with variability, sufficiency, and veracity of the information about potential arbitrators.

BIBLIOGRAPHY

- Alpaydin, Ethem. *Machine Learning: The New AI*. Cambridge, MA: MIT Press, 2016.
- Andrei, Mihai. “Your Smartphone Is Millions of Times More Powerful Than All of NASA’s Combined Computing in 1969.” ZME Science, February 11, 2020. Accessed January 19, 2021. <https://www.zmescience.com/science/news-science/smartphone-power-compared-to-apollo-432/>.
- ArbiLex. “Predictive Analytics for International Law”. Accessed August 30, 2020. <https://www.arbilex.co/welcome>.
- Arbitrator Intelligence. “State-of-the-Art Analytics on International Arbitrators”. Accessed August 30, 2020, <https://arbitratorintelligence.com/>
- Bantekas, Ilias. *An Introduction to International Arbitration*. New York: Cambridge University Press, 2015.
- Borgesius, Frederik Zuiderveen. “Strengthening Legal Protection against Discrimination by Algorithms and Artificial Intelligence”, 2020.
- Born, Gary B. *International Arbitration. Law and Practice*. 2nd, Rev. Ed. The Hague: Kluwer Law International, 2016.
- Brynjolfsson, Erik, and Andrew McAfee. *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. Vancouver, B.C.: Langara College, 2018.
- Burrell, Jenna. “How the Machine ‘Thinks’: Understanding Opacity in Machine Learning Algorithms”. *Big Data & Society* 3, no. 1, 2016.
- Calo, Ryan. “Artificial Intelligence Policy: A Primer and Roadmap” (2017): 4 <https://ssrn.com/abstract=3015350>
- Contract Analysis | Kira Systems. “Contract Analysis.”, Accessed August 28, 2020. <https://kirasystems.com/how-it-works/contract-analysis/>.
- Dastin, Jeffrey. “Amazon Scraps Secret AI Recruiting Tool That Showed Bias against Women”. *Reuters*, October 10, 2018. Accessed January 19, 2021, <https://www.reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G>.
- DISCO. “Your Ediscovery Upgrade”. Accessed August 30, 2020. <https://www.csdisco.com/>.
- Eidenmueller, Horst G. M., and Faidon Varesis. “What Is an Arbitration? Artificial Intelligence and the Vanishing Human Arbitrator”. *SSRN Electronic Journal* (2020): 6. <https://doi.org/10.2139/ssrn.3629145>.
- Fagbemi, Sunday A. “The Doctrine of Party Autonomy in International Commercial Arbitration: Myth or Reality?”. *Journal of Sustainable Development Law and Policy (The)* 6, no. 1 (2016): 202. <https://doi.org/10.4314/jsdlp.v6i1.10>.
- Hushka, Drew. “How Nice to See You Again: The Repetitive Use of Arbitrators and the Risk of Evident”. *Arbitration Law Review* (2013)

- Institute for the Promotion of Arbitration and Mediation in the Mediterranean. *Report on The Criteria for Selection of Arbitrators*, 2012.
- Lambrecht, Anja, and Catherine Tucker. "Algorithmic Bias? An Empirical Study of Apparent Gender-Based Discrimination in the Display of STEM Career Ads". *Management Science* 65, no. 7 (2019): 2966–81.
- Latham & Watkins. *Guide to International Arbitration*, 2017.
- Marr, Bernard, and Matt Ward. *Artificial Intelligence in Practice: How 50 Successful Companies Used Artificial Intelligence to Solve Problems*. Chichester, West Sussex: Wiley, 2019.
- McIlwraith, Michael, and John Savage. *International Arbitration and Mediation: a Practical Guide*. Austin: Wolters Kluwer, 2010.
- Moses, Margaret L. *The Principles and Practice of International Commercial Arbitration*. Cambridge: Cambridge University Press, 2017.
- Ng, James, "When the Arbitrator Creates the Conflict: Understanding Arbitrator Ethics through the IBA Guidelines on Conflict of Interest and Published Challenges". *McGill Journal of Dispute Resolution*, Vol. 2, (2016): 25. <https://ssrn.com/abstract=2811192>
- Onyema, Emilia. "Selection of Arbitrators in International Commercial Arbitration". *International Arbitration Law Review* (2005).
- Paulsson, Jan. "Must we live with Unilaterals?". *ABA Section of International Law* (2013).
- Puig, Sergio, and Anton Strezhnev. "Affiliation Bias in Arbitration: An Experimental Approach". *SSRN Electronic Journal* (2016). <https://doi.org/10.2139/ssrn.2830241>.
- Ravel Law. "What We Create". Accessed August 30, 2020. <https://home.ravellaw.com/>.
- Rogers, Catherine. "Transparency in Arbitration Selection". *Austrian Yearbook on International Arbitration* (2015).
- ROSS Intelligence. "ROSS Intelligence" Accessed August 30, 2020. <https://www.rossintelligence.com/>.
- Scherer, Maxi. "Artificial Intelligence and Legal Decision-Making: The Wide Open? Study on the Example of International Arbitration". *Queen Mary School of Law Legal Studies* (2019): 13, <https://ssrn.com/abstract=3392669>
- Surden, Harry. "Artificial Intelligence and Law: An Overview". *Georgia State University Law Review* Vol. 35 (2019); *University of Colorado Law Legal Studies*, 1312. <https://ssrn.com/abstract=3411869>
- White & Case *International Arbitration Survey: The Evolution of International Arbitration*, 2018
- x.ai. "Instant Meeting Scheduling". Accessed August 30, 2020. <https://x.ai/>.

Legal and Public Documents

- Commercial Rules and Mediation Procedures of the American Arbitration Association (October 1, 2013).
- IBA Guidelines on Conflicts of Interest in International Arbitration, Part I (October 23, 2014)
- International Chamber of Commerce (ICC), Arbitration Rules (March 1, 2017)
- United Nations Convention on the Recognition and Enforcement of Foreign Arbitral Awards (New York, June 10, 1958)
- UNCITRAL Model Law on International Commercial Arbitration, United Nations Commission on International Trade Law (June 21, 1985)
- UNCITRAL Arbitration Rules (Last amendment December 16, 2013)