

NEW TECHNOLOGIES AND ARBITRATION

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Abstract

The tech revolution has been underway for some time now. The progress of technology has allowed it to make its way into the legal industry, and with it, the alternative dispute resolution industry. In light of this, the purpose of the article is threefold. First, it addresses the arbitral framework which does not categorically bar the use of new technologies in the course of arbitral proceedings. Second, it considers the synergistic relationship between arbitration and new technologies – such as cryptocurrencies, blockchain, smart contracts, big data and artificial intelligence – and suggests that while new technologies enrich and streamline dispute resolution, arbitration provides insurance to these emerging technologies and the tech industry. Finally, it contemplates the challenges that may follow the posited mainstream application of these emerging practices which include confidentiality, decision-making, the form and content of awards and smart contracts, the role of arbitrators and the coherence of crowd sourced decisions. It will be interesting to see how this mutually beneficial relationship flourishes, and how the inevitable challenges will be overcome.

I. Introduction

The use of technologies such as cryptocurrencies, blockchain, smart contracts, big data and artificial intelligence in the legal industry is not a new phenomenon. For better or worse, it is no longer a question of *if*, but *when* these technologies will have mainstream applications and impact arbitral proceedings.

New technologies are touted to increase efficiency, reduce costs and permit the expansion of arbitration into new market segments.¹ Efficiency and cost management have been codified across many jurisdictions as the objectives or duties for the conduct of arbitration.² However, the dissemination of these technologies will inevitably result in new classes of complex disputes rooted in either the underlying novel features of the technology or the lagging regulatory

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¹ Gauthier Vannieuwenhuysse, *Arbitration and New Technologies: Mutual Benefits*, 35 J. INTL. ARB. (2018) at 119.

² The Civil Procedure Rules 1998, c. 1, Rule 1.1(2)(d) (Eng. & Wales) (The overriding objective of the rules is dealing with a case justly and at a proportionate cost, which includes ensuring that it is dealt with expeditiously and fairly); The Arbitration Act 1996, c. 23, § 33(1)(b) (Eng. & Wales) (“The tribunal shall adopt procedures suitable to the circumstances of the particular case, avoiding unnecessary delay or expense [...]”), CODE CIVIL [C. CIV.][CIVIL CODE] art. 1464 (Fr.) (“parties and the arbitrators shall act expeditiously and fairly in the conduct of proceedings”).

framework to which they are subjected to.³ Having said that, the fact that arbitration boasts of a decentralised regime, flexibility and a facilitated enforcement mechanism, it is rendered the most suitable to deal with said disputes.⁴ Therefore, on the horizon lies a synergic relationship whose reciprocal benefits are ripe for exploitation. While the emerging technologies will enhance arbitral proceedings, arbitration will provide certainty, in a rather uncertain field, that there exists an adequate forum for the resolution of any resultant disputes.

This article will begin by addressing the ways in which the arbitral framework permits the use of new technologies and revisiting the roles of arbitrators as we know them. It will then move on to consider the aforementioned synergy between arbitration and new technologies before turning to the inherent obstacles and challenges that stem from the fact that the digital world transforms considerably faster than the analogue world.

A. Terminology

What does any of it mean? The advent of legal technology comes with jargon that can prove perplexing to those unversed in the subject matter. It is therefore of utmost importance that we address the terminology before diving into a subsequent analysis.

Cryptocurrency is a virtual/digital currency, categorised by its decentralised nature. It operates outside the realms of central banks and the ownership of the currency is authenticated on the blockchain. The value of cryptocurrencies is rarely pegged to traditional, fiat currencies.⁵

In turn, blockchain is essentially a register or a distributed ledger. It is an open ended decentralised software platform that enables smart contracts (see below) and decentralised applications. Each transaction conducted on the blockchain, or block, is validated by a network of computers before being added to the chain – hence creating the blockchain. The blockchain is said to be permanent, inviolable and immutable and uses both encryption and a combination of public and private keys for security.⁶ Essentially, it has been suggested that blockchain technology encompasses two novel characteristics; namely, a decentralised way of tracking ownership of property free from any intermediary, and the ability to directly transfer property from peer to peer.⁷

Moreover, smart contracts, which typically rely on the blockchain, are legal agreements embedded in a line of code. In other words, they are e-instructions drafted in a line of code and programmed to self-execute upon fulfilment of a specified set of conditions.⁸ The parties to the

³ Vannieuwenhuyse, *supra* note 1.

⁴ *Id.*

⁵ Riikka Koulu, *Blockchains and Online Dispute Resolution: Smart Contracts as an Alternative to Enforcement*, 13 SCRIPTED 40, 49 (2016) available at [https://script-ed.org/article/blockchains-and-online-dispute-resolution-smart-contracts-as-an-alternative-to-enforcement/\(how blockchains and cryptocurrencies work\)](https://script-ed.org/article/blockchains-and-online-dispute-resolution-smart-contracts-as-an-alternative-to-enforcement/(how%20blockchains%20and%20cryptocurrencies%20work)).

⁶ Reggie O'Shields, *Smart Contracts: Legal Agreements for the Blockchain*, 21 N.C. BANKING INST. 177, 180 (2017) (smart contracts and blockchain), available at <http://scholarship.law.unc.edu/ncbi/vol21/iss1/11>.

⁷ Joshua A.T. Fairfield, *Smart Contracts, Bitcoin Bots, and Consumer Protection*, 71 WASH. & LEE L. REV. 35, 40-41 (2014) (radical disintermediation).

⁸ Samuel Bourque & Sara Fung Ling Tsui, *A Lawyer's Introduction to Smart Contracts*, in SCIENTIANOBILITAT: REVIEWED LEGAL STUDIES, 4 (2014).

agreement sign the smart contract using cryptographic security and it is then deployed to the blockchain.⁹

Artificial Intelligence [“AI”] “is a field of computer science that includes machine learning, natural language processing, speech processing, expert systems, robotics, and machine vision”.¹⁰ In turn, machine learning is a subset of AI, programmed to automate the decision-making process by following pre-set ‘if-then’ decision trees.¹¹ Decision trees are intuitive and interpretable algorithms which create a predictive model that predicts the value of a target variable by learning simple decision rules inferred from data features; [they] learn from data to predict [outcomes] with a set of ‘if-then-else’ decision rules.¹² In a tree structure, a node represents a feature (attribute), each branch [conjunction of features] represents a decision and each leaf represents an outcome.¹³ Most importantly, machine learning self-adapts its programming on the basis of the training program and feedback. Natural language processing is a functionality of AI that derives meaning, context, and sentiment in textual data or through conversations with humans.¹⁴

II. Arbitral Framework

Does the underlying arbitral framework even permit the use of new technologies by all players and parties to arbitral proceedings? This is a burning question that is undoubtedly in the mind of all arbitration practitioners. Even more so, is the question of the usurpation of the role of arbitrators: will they be out of a job in the near future?

A. The Use of New Technologies in Arbitration under the Current Arbitral Framework

In short, the current regulatory framework does not categorically rule out the use of new technology in arbitral proceedings. Both the decision to arbitrate and the manner in which the arbitration is conducted are contractually based, which confers on the parties and the arbitrator significant operational freedom.

Article 19(1) of the UNCITRAL Model Law on International Commercial Arbitration [“**Model Law**”] states that “*subject to the provisions of this Law, the parties are free to agree on the procedure to be followed by the arbitral tribunal in conducting proceedings*”.¹⁵ Furthermore, Article 19(2) of the Model Law states that “*failing such agreement, the arbitral tribunal may, subject to the provisions of this Law, conduct the arbitration in such a manner as it considers appropriate*”, and also has “*the power to determine the admissibility, relevance, materiality and weight of any evidence*”.¹⁶ Moreover, Article 19.1 of the Singapore International Arbitration Centre [“**SIAC**”] Rules provides that “*the tribunal shall conduct the*

⁹ Kristen Silverberg et. al, *Getting Smart: Contracts on the Blockchain*, INSTITUTE OF INTERNATIONAL FINANCE, (May 2016), available at https://www.iif.com/system/files/32370132_smartcontracts_report_may_2016_vf.pdf, at 2.

¹⁰ Paul Stothard et al, *Jargon Buster: Legal Technology*, 9 INT’L ARB. REP., 19-21 (2017).

¹¹ *Id.*

¹² Kok Leong Seow, *Breaking Down Machine Learning*, KSEOW DECISION TREE, available at <http://kseow.com/decisiontree/>.

¹³ Madhu Sanjeevi, *Chapter 4: Decision Trees Algorithms*, MEDIUM (Oct. 6, 2017), available at <https://medium.com/deep-math-machine-learning-ai/chapter-4-decision-trees-algorithms-b93975f7a1f>.

¹⁴ Paul Stothard et al., *supra* note 10.

¹⁵ United Nations Commission on International Trade Law (UNCITRAL), Model Law on International Commercial Arbitration, 1985, with amendments as adopted in 2006, art. 19(1), G.A. Res. 61/33, U.N. Doc. A/RES/61/33 (Dec. 4, 2006) [hereinafter “UNCITRAL Model Law”].

¹⁶ *Id.*

arbitration in such manner as it considers appropriate, after consulting with the parties, to ensure the fair, expeditious, economical and final resolution of the dispute".¹⁷ Article 19.2 SIAC Rules goes on to state that "the Tribunal shall determine the relevance, materiality and admissibility of all evidence [and] is not required to apply the rules of evidence of any applicable law in making such determination".¹⁸ Similar provisions can also be found under the London Court of International Arbitration Rules, the Hong Kong International Arbitration Centre Rules and the International Chamber of Commerce ["ICC"] Rules.¹⁹ Therefore, it can be gathered that there is a significant degree of freedom awarded to arbitrators in establishing the facts of the case – and there is no specific mention or restriction on the means by which they may do so. Lastly, the International Bar Association ["IBA"] Rules on the Taking of Evidence in International Arbitration state that a 'document' is a "*writing, communication, picture, drawing, program or data of any kind, whether recorded or maintained on paper or by electronic, audio, visual or any other means*".²⁰ As such, the broad definition of document encompasses, amongst a myriad of things, both contracts written entirely in code and purported decisions rendered in a codified manner.

Ergo, as evidenced by the above examples of rules underpinning the conduct of arbitral proceedings, there are no restrictions regarding, the procedure to be followed by the arbitral tribunal, the obtaining of factual evidence, or on the definition of document. This substantiates that the use and proliferation of new technologies should not be hindered, merely by the idea that arbitral institutions will forbid them.

III. Synergy Between Arbitration and New Technologies

This section will deal with the synergistic relationship that exists between arbitration and new technologies. While much has been documented or postulated with regard to the imminent disruptions that new technologies will cause to arbitral proceedings, it is also important to consider the added value that the possibility to arbitrate will bring to the emergence and potential mainstream adoption of new technologies (i.e. a dispute resolution mechanism that corresponds to the technical intricacies and necessities of the underlying technology).

It is worth making a quick reference to the results of a survey conducted by the Silicon Valley Arbitration and Mediation Centre ["SVAMC"] which aimed to elucidate, among other things, the major benefits of arbitration, as perceived by the tech industry. According to the study, the benefits were ranked as follows: expert decision making (80%), time (54%), confidentiality (41%), streamlined process (38%), flexibility (35%), facilitated enforcement (27%) and cost (20%).²¹

¹⁷ Arbitration Rules of the Singapore International Arbitration Centre, 2016, r. 19.1.

¹⁸ *Id.* r. 19.2.

¹⁹ London Court of International Arbitration Rules, 2014, arts. 14(4)(ii) and 22(1)(vi); Rules of Arbitration of the Hong Kong International Arbitration Centre, 2013, art. 22.2; Rules of Arbitration of the International Chamber of Commerce Rules, 2012, art. 25(1) [*hereinafter* "ICC Rules"].

²⁰ International Bar Association Rules on the Taking of Evidence in International Arbitration, *Definitions* (May 29, 2010).

²¹ Gary Benton, Chris Compton & Les Schiefelbein, *Cost is the Top Tech Litigation Problem, Survey Shows*, ARBITRATION STRONGLY PREFERRED FOR SPECIALISED EXPERTISE, (2017), available at <https://svamc.org/wp-content/uploads/SVAMC-2017-Survey-Report.pdf>.

A. Cryptocurrencies

There is seldom any discussion regarding the seemingly obvious interrelation between cryptocurrencies and arbitration. It is, however, worth touching upon, due to the digital currency's growing use, and with it, the inherent necessity for an effectively tailored dispute resolution mechanism. International arbitration, on or off the blockchain, matches the characteristic borderless feature of virtual currencies.

Three pillars make international arbitration the most suitable dispute resolution mechanism to deal with the inevitable novel disputes that will emerge from the increased use of decentralised digital assets: neutrality, cross border enforceability and the flexibility to tailor specific arbitration rules.²² International arbitration offers a decentralised substitute to domestic tribunals, and results in a widely enforceable award under the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards [**"New York Convention"**].²³ Further, it presents parties with an opportunity to appoint a tribunal composed of specialists who are duly equipped to address the complexities of even the most technical of disputes and choose an arbitral seat where the local legislation and judiciary are supportive of technological innovation and can cater to complex disputes.²⁴

Despite the seemingly perfect match, arbitration has not yet gained the expected traction from the tech industry. In spite of the favourable attributes highlighted by practitioners in the aforementioned survey conducted by SVAMC, a similar survey conducted by it showed that among lawyers in the tech industry, a mere 35% turned to arbitration while 44% and 37% appealed to litigation and mediation, respectively.²⁵ From the unquestionable benefits and lack of adherence stems both a necessity and scope for the promotion of the advantages of arbitration to those active in the tech industry. The development of template arbitration clauses tailored to cryptocurrencies would indeed be a start, as well as, think tanks tasked with addressing a potential reform to institutional rules.²⁶ In addition, arbitral institutions could envisage attending tech roadshows and being increasingly present in conferences and workshops organised by the tech industry. Moreover, I believe there are numerous benefits to be reaped from organising roundtables featuring arbitral institutions, tech companies, lawyers and academicians to discuss how to proceed with a seamless integration of arbitration into the tech industry. Furthermore, arbitral institutions should strive to establish contact with leading tech companies, by issuing questionnaires that address both the perceived benefits and practical drawbacks of the aforementioned integration. Lastly, on the basis of interaction and questionnaire responses, arbitral institutions should envisage issuing practical guidelines for the utilisation of their services by the tech industry.

²² Simon Maynard & Elizabeth Chan, *Decrypting Cryptocurrencies: Why Borderless Currencies May Benefit from Borderless Dispute Resolution*, KLUWER ARB. BLOG (Nov. 2, 2017), available at <http://www.arbitrationblog.kluwerarbitration.com/2017/11/02/decrypting-cryptocurrencies-borderless-currencies-may-benefit-borderless-dispute-resolution/> [*hereinafter* "Maynard & Chan"].

²³ *Id.*

²⁴ UNCITRAL Model Law, *supra* note 15.

²⁵ Maynard & Chan, *supra* note 22.

²⁶ *Id.*

B. Blockchain and Smart Contracts

As referred to above, among the underlying principles of blockchain technology and smart contracts are decentralisation, lack of intermediaries and automation which, in turn, ensure security, perpetuity, immutability and availability of a peer to peer network.²⁷

Correspondingly, according to a survey conducted by Queen Mary University of London (2015), three of the most notable attributes of international arbitration are decentralisation (64%), flexibility (38%) and ease of enforceability of awards (65%).²⁸ One can therefore not ignore the resultant benefits of arbitration in disputes arising out of smart contracts which are, themselves, decentralised. From this decentralisation, stems both, the inherent flexibility and the facilitated enforcement which are characteristic of international arbitration. This flexibility is rooted in the fact that it does not carry the procedural restrictions of litigation. Consequently, parties are able to appoint a tribunal with the expertise necessary to address the complex technicalities that arise in a dispute involving cutting edge technologies such as blockchain.²⁹ It is important to reiterate that the New York Convention provides that arbitral awards are enforceable across 157 jurisdictions, which matches the cross-border nature of this technology, and the need for certainty that any decision rendered will be enforceable.³⁰

It has been suggested, from a radical standpoint, that arbitration ‘on the blockchain’ is the only future for dispute resolution in the tech industry.³¹ The argument is made on the basis of the volatility of new technologies, which often sees them obsolete before legislation is passed or a judicial body is sufficiently equipped to deal with a dispute for which there is no statutory guidance.³² Indeed, blockchain affords arbitral proceedings opportunity for further decentralisation and match digital technologies to a corresponding digital dispute resolution forum. Therefore, the elaboration of platform-specific arbitration rules will be beneficial as the digital world does, in fact, transforms faster than the analogue one. Notwithstanding the previous, while I perceive the fickle nature of emerging technologies, I consider the underlying distributed ledger technology (blockchain) to be the true innovation, and one that is here to stay. Arbitral institutions should, therefore, strive to gradually institutionalise the punctual utilisation of the distributed ledger technology, wherever practical. Nevertheless, the ideology of ‘institution’ should not stand in the way of progress. As the rapid emergence of other new technologies becomes the convention or the norm, the legislative process might pick up a corresponding pace and the arbitral institutions, an ability to adapt more rapidly, thereby refuting the radical notion that arbitration on the blockchain is the only future for dispute resolution in the tech industry (emphasis added). As such, I am sceptical of any outright statement that categorically excludes tech disputes from the ambit of services that arbitral institutions are, or

²⁷ Vannieuwenhuysse, *supra* note 1, at 121.

²⁸ *2015 International Arbitration Survey: Improvements and Innovations in International Arbitration*, QUEEN MARY UNIVERSITY OF LONDON (2015), available at <http://www.arbitration.qmul.ac.uk/research/2015/index.html>.

²⁹ Vannieuwenhuysse, *supra* note 1.

³⁰ *Status: The New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards*, UNICITRAL, available at http://www.uncitral.org/uncitral/en/uncitral_texts/arbitration/NYConvention_status.html.

³¹ *Why is Blockchain-Based Arbitration the Only Future for Dispute Resolution?*, MEDIUM (Oct. 5, 2017) available at <http://medium.com/@confideal/why-is-blockchain-based-arbitration-the-only-future-for-dispute-resolution-93e34d99ec83>.

³² *Id.*

may be, capable of providing. The idea being that while arbitration on the blockchain is likely to flourish and so should punctual institutional blockchain arbitration, one should not rule out a beneficial desire of arbitral institutions to adapt and hence keep up with the times.

i. Smart agreements

Despite the fact that self-executing smart contracts deployed on the blockchain are envisaged to potentiate the efficiency of dispute resolution mechanism, it will not eradicate disputes entirely.³³ In fact, it is likely to lead to a new class of disputes for which safeguards must be implemented.

A rather inspired solution was proposed by Morgan C. in an article written in March 2018. He emphasised the importance of tethering smart contracts to a traditional legal framework and of parties unequivocally designating the forum and mechanism for the resolution of disputes.³⁴ The inspired solution was to reinforce the notion of smart contracts by entering into traditional enforceable contracts and include the necessary clauses to be self-executed through smart contracts on the blockchain.³⁵ The traditional contract would, for the avoidance of doubt, contain all the clauses that do not require self-execution on the blockchain, and still make reference to those ancillary operative clauses and provisions that will be deployed on the blockchain for self-execution upon the fulfilment of previously defined conditions precedent. Morgan C. opines that the former ensures that the decentralised and efficient nature of smart contracts is punctually harnessed, albeit retaining the ability to resolve resultant disputes at a single, predetermined dispute resolution forum. In addition, the otherwise coined ‘smart agreements’ will ensure that the parties’ rights and obligations are located in a single document. If these safeguards are not implemented and the smart contract lacks a sound mechanism of enforcement, however smart the contract is touted to be, parties to a contractual relationship will struggle to determine the applicable governing law and decision-maker to address the dispute to.³⁶

ii. Master agreements

Another issue which must be addressed and safeguarded against is the possibility of discrepancies in dispute resolution clauses or agreements throughout the contractual chain. It is important to determine from the outset what the dispute resolution method will be and how it will trickle down the aforementioned contractual chain. It has therefore been suggested that an umbrella agreement should be entered into to ensure uniformity throughout the chain with respect to governing law, dispute resolution mechanism and the ability to join or consolidate disputes, where possible.³⁷ This would have a pervasive effect of cutting time and costs of engaging in disputes in various jurisdictions and legal systems, which may, in turn, result in

³³ Charlie Morgan, *Will the Commercialisation of Blockchain Technologies Change the Face of Arbitration?* KLUWER ARB. BLOG (Mar. 5, 2018), available at <http://arbitrationblog.kluwerarbitration.com/2018/03/05/topic-to-be-confirmed/>.

³⁴ *Id.*

³⁵ *Id.*

³⁶ *Id.*

³⁷ Lee Bacon, *Dispute Resolution in Blockchain: Do You Need an Umbrella?*, CLYDE & CO. (Feb. 24, 2018), available at <http://www.clydeco.com/insight/article/dispute-resolution-in-blockchain-do-you-need-an-umbrella>.

incompatible awards.³⁸ The doctrine of privity of contract means that the rights and obligations under an arbitration agreement are only conferred to those that are party to it. Nevertheless, most institutional arbitration rules provide that a party may be joined to the agreement, with the consent of all the parties.³⁹ This is, however, not straightforward. For example, Article 7(1) of the ICC Rules states that “*a party wishing to join an additional party to the arbitration shall submit its request for arbitration against the additional party (the ‘Request for Joinder’) to the Secretariat*”.⁴⁰ In addition to having to file a further request, akin to the initial “*Request for Arbitration*” provided for in Article 4 of the ICC Rules, there are compounding issues pertaining to filing, timing and supporting documentation. Article 7(1) goes on to state that “*no additional party may be joined after the confirmation or appointment of any arbitrator, unless all parties, including the additional party, otherwise agree*”.⁴¹ Furthermore, the request, which can only be filed in “*Paris, Hong Kong, New York, Sao Paulo, Singapore and Abu Dhabi*”,⁴² must contain an abundance of details specified under Articles 7(2), 4(3) and 4(4) of the ICC Rules.⁴³ It is, therefore, an arduous process. An umbrella or master agreement is one way to circumvent this restriction. A master/umbrella agreement is an agreement setting out the standard terms that would apply to all the transactions entered into between the parties, as well as subsequent subcontractors. Accordingly, the parties can enter into a master agreement to arbitrate any dispute flowing from their transactions. In this agreement, a clause may be included regarding the parties’ consent to joining of a third-party, such as the aforementioned subcontractors, to the agreement and resultant dispute resolution mechanism. The clause would act as a ‘catch-all’ provision and ensure conformity in terms of governing law, mechanism and ability to join or consolidate disputes throughout the contractual chain.

iii. Examples of dispute resolution platforms on the blockchain

CrowdJury, CodeLegit and Kleros are examples of platforms that have been created for the purpose of dispute resolution on the blockchain.

CrowdJury:

CrowdJury, “*a justice system for the internet age*”, “*is an online platform that crowdsources judicial proceedings: filing complaints, evaluation of evidence, trial and jury decision*”.⁴⁴ It is a “*framework for court processes of adjudication adapted for the blockchain era. It combines the advantages of crowdsourcing and blockchain to create a system of justice which is both, transparent and self-sustained*”.⁴⁵ But how does it work, really?

Two recent articles made an inspired correlation between the CrowdJury platform and the process of law reform in the ancient world. Importantly, they drew an analogy between the literal Athenian agora and the virtual or digital agora. In short, before delving into the intricacies of the Greek adjudicative system, the procedure of law reform was widely open to the public at large,

³⁸ *Id.*

³⁹ *Id.*

⁴⁰ See ICC Rules, *supra* note 19, art. 7(1).

⁴¹ *Id.*

⁴² *Filing a Request*, INTERNATIONAL CHAMBER OF COMMERCE, available at <https://iccwbo.org/dispute-resolution-services/arbitration/filing-a-request/>.

⁴³ See ICC Rules, *supra* note 19, arts. 7(2) and 7(3).

⁴⁴ *Crowdjury: A Justice System for the Internet Age*, CROWDJURY, available at www.crowdjury.org.

⁴⁵ *Id.*

i.e., to anyone who wished to speak at the Agora.⁴⁶ However, the drawback was that a rope was tied around the purported law reformer and extended through the crowd. The way in which the reform was met by the crowd, determined the fate of both, the reform and the reformer.⁴⁷ Taking a step back, Jeremy Bentham believed that a public forum for resolving disputes has three main attributes: (i) it assists in uncovering the truth; (ii) it helps education; and (iii) being subject to public scrutiny, it potentiates the discipline of judges.⁴⁸ Bentham was an advocate of placing judges in the public eye and expanding the audience by ensuring the information was attained by even those that were not present.⁴⁹ Studies into collective intelligence repeatedly ascertain how the aggregation of individual judgments within a group of individuals leads to collective judgments.⁵⁰ The Athenians mastered both the aggregation procedure and the resultant collective judgements⁵¹ by combining the attributes for an effective epistemic system. Both, their democracy and trials were “*fuelled by incentives, oiled by low communication costs and efficient means of information transfers, and regulated by formal and informal sanctions*”.⁵² Tens or hundreds of people formed the jury, created right before the trial, to deter bribery and intimidation. After individuals inserted their ID cards into a stone block, they were randomly selected. Thus, the Greeks essentially crowdsourced their judicial system through widespread participation and information dissemination.

The above imagery can be extrapolated to modern times, and it is increasingly interesting to observe the shift from the ancient Athenian agora to the present virtual agora. It will be interesting to see the paradigm shift and resultant impact on decision-making of the collective judgement of dispersed crowds as opposed to gathered crowds. On the CrowdJury platform, the process begins when the parties submit their dispute to the website. A panel subsequently carries out fact-checking.⁵³ This panel is composed of 9-12 volunteers chosen on the basis of their expertise. They put their expertise to work by transforming raw data into a knowledge bank, differentiating information and ascertaining what is relevant.⁵⁴ Should there be a need for it, a trial is then conducted and a decision is rendered.⁵⁵ The trial is entirely held online, and a seat on the jury is open to anyone wishing to take part. Said would-be participants only need to apply and the selection is then performed by a randomization device, much like in the Athenian agora. All evidence and exhibits are broadcasted to the public, in alignment with Bentham's vision of an

⁴⁶ Ian Macduff, *Crowd-Hidden, Whereabouts Unknown.*, KLUWER ARB. BLOG (Apr. 27, 2016), available at <http://mediationblog.kluwerarbitration.com/2016/04/27/crowd-hidden-whereabouts-unknown/> [hereinafter “Macduff”].

⁴⁷ *Id.*

⁴⁸ Federico Ast & Alejandro Sewrugin, *The Crowdjury, A Crowdsourced Judicial System for the Collaboration Era*, MEDIUM (Nov. 10, 2015), available at <http://medium.com/the-crowdjury/the-crowdjury-a-crowdsources-court-system-for-the-collaboration-era-66da002750d8>.

⁴⁹ *Id.*

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *Id.*

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ *Id.*

open court. While everyone can attend and ask questions to the defendant, only the jury can cast a vote – again, entirely online.⁵⁶

CrowdJury will therefore draw on “*collective intelligence, open government, social epistemology and the blockchain technology which enable a radically different way of structuring courts, a way that is both epistemically efficient and financially sustainable*”.⁵⁷ The ideology is predicated on the fact that any adjudicative system is an epistemic engine. In other words, it is a system founded and resting on two pillars: (i) collecting information and (ii) applying experience or expertise to an issue in view of elucidating the truth to make a decision and render a judgment.⁵⁸

The specific applications of blockchain technology to this dispute resolution platform are two-fold: (i) the incentives to take part in the process are payments made to the jurors in bitcoins and (ii) increasing adherence will result in a repertoire, or bank of decisions and precedents readily available for consultation on the inviolable and immutable blockchain.⁵⁹

CodeLegit:

CodeLegit, on the other hand, states that “*its mission is to bridge the gap between technology and law by auditing the compliance of software code*”.⁶⁰ It assists software developers in creating “*legal-by-design smart contracts*” and boasts a “*certified blockchain arbitration library [with] ready-made smart contracts [...] fitted with the CodeLegit Arbitration Certificate*.” Moreover, the services provided include a “*complete technical software audit by CodeLegit and their auditing partner, a leading international law firm*.”⁶¹ CodeLegit conducted the first blockchain-based smart contract arbitration proceeding in July 2017.⁶² Finally, CodeLegit also has Blockchain Arbitration Rules and envisages an Appointing Authority charged with appointing arbitrators with either a legal background or the required technical know-how for the dispute at hand.⁶³ On a more practical note, communication occurs via email and if need be, an oral hearing via videoconference is conducted.⁶⁴

Kleros:

The final example is of Kleros, which purports to “*solve the problem of the rise in disputes of the global, digital and decentralised economy in areas that cannot be solved by state courts and existing alternative dispute resolution methods [...] by using blockchain and crowdsourced specialists to adjudicate disputes in a fast, secure and affordable way. [...]. Crowdsourcing taps into a global pool of jurors. Blockchain technology guarantees*

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ Macduff, *supra* note 46.

⁶⁰ Home: Codelegit, CODELEGIT, available at www.codelegit.com.

⁶¹ *Id.*

⁶² Michael Reuter, *CodeLegit Conducts First Blockchain-based Smart Contract Arbitration Proceeding*, CODELEGIT BLOG (July 16, 2017), available at <http://codelegit.com/2017/07/16/codelegit-conducts-first-blockchain-based-blockchain-arbitration-proceeding/>.

⁶³ Derric Yeoh, *Is Online Dispute Resolution the Future of Alternative Dispute Resolution?*, KLUWER ARB. BLOG (Mar. 29, 2018), available at <http://arbitrationblog.kluwerarbitration.com/2018/03/29/online-dispute-resolution-future-alternative-dispute-resolution/> [hereinafter “Yeoh”].

⁶⁴ *Id.*

evidence integrity, transparency in jury selection and incentives for honest rulings".⁶⁵ Kleros, as opposed to the two previous examples, is developing a quasi-judicial system, with a general court and two levels of sub-courts.⁶⁶ However, much like the others, the would-be jurors who wish to participate, are randomly selected. Another distinguishing feature of Kleros is that it has developed and put in place both, an appeal and an anti-bribery system.⁶⁷

No such radical change presents itself without certain reservations. The first question, or scepticism, I believe, stems from the fact that we are faced with realistic initiatives which are entirely reliant on the wisdom of the crowd and the coherence of crowdsourced decisions. Moreover, uncertainty regarding the civic and normative identity of this postulated crowd also is inherent in the system.

C. Big Data

Advances in technology have allowed for aggregation and processing of large volumes of data with little or no margin of error and in a fraction of the time. This naturally opens new avenues for automated factual analysis and resultant decision-making. Big data is defined by the 'four Vs: volume (scale of data), variety (different forms of data), velocity (analysis of streaming data) and veracity (uncertainty of data)'.⁶⁸

One very concrete example with respect to the application of big data to arbitral proceedings is Dispute Resolution Data. Dispute Resolution Data, a recently founded United States ["US"] company, purports to aggregate case data from arbitral institutions and "*present [it] in aggregate by case type and geographic region*". It is a "*robust database for data collection and reporting*" that is updated on a rolling basis, as cases are decided.⁶⁹ "*Examples of the types of cases from which data is collected include contract disputes, construction disputes, severance packages for executives, oil and gas, pharmaceutical-biotech, healthcare payer/provider disputes, franchise and licensing agreement*".⁷⁰ In short, it collects and reports on any type of business dispute submitted to either arbitration or mediation. The information specifically covers industry, amount, geographic location, cost, duration and macro outcomes. Most importantly, it provides a platform for businesses to judge and decide where, when and how to conduct their arbitration more favourably.⁷¹

However, it is very difficult to ignore the ways in which this database-driven factual aggregation, sorting and analysis will disrupt arbitral proceedings. By way of an example, a system that details the way in which potential arbitrators have decided certain matters or the content of public statements might help predict or ascertain certain tendencies towards more favourable positions.⁷² This disruption, of course, lies in arbitrator's selection. However, this disruption is

⁶⁵ Kleros – *The Blockchain Dispute Resolution Layer* (2017), available at <https://kleros.io/assets/one-pager.pdf>.

⁶⁶ Yeoh, *supra* note 63.

⁶⁷ *Id.*

⁶⁸ *The four V's of Big Data*, IBM BIG DATA & ANALYTICS HUB, available at <http://www.ibmbigdatahub.com/infographic/four-vs-big-data>.

⁶⁹ See *Dispute Resolution Data*, available at http://www.disputeresolutiondata.com/about_drd.

⁷⁰ *Id.*

⁷¹ James Rogers & Matthew Buckle, *The future of arbitration in the world of Big Data*, 9 INT'L ARB. REP. at 12-14 (2017).

⁷² *Id.*

not inherently radical, especially because arbitrator's due diligence is already a reality, most notably in investment arbitration where awards are public and readily available.⁷³

AI also has the potential to impact and disrupt arbitral proceedings in a myriad of ways, especially in the context of international arbitration. Similar to the disruptive effect of investment arbitration which 'promotes freedom from the judiciary', AI promotes 'freedom from cognitive limitations'.⁷⁴

Efficiency and accuracy, through subsets of AI such as natural language processing ["NLP"], are often used to describe the global impact that AI has on the legal industry and consequently, arbitration. AI potentiates legal representatives and adjudicative services, and helps to provides more comprehensive information to, academics and third-party funders.⁷⁵ Further, it promotes cognitive functions and has the potential to render time-consuming tasks obsolete with no decrease in the quality of output while decreasing the potential for human error. It is already assisting legal practitioners when analysing documents, agreements and submissions.⁷⁶ Most importantly, not only does it reduce costs for the client, but also estimates costs of the proceedings and predict their outcome, thereby reinforcing the conviction of clients who are otherwise unsure of their future course of actions.⁷⁷ LegalTechs are already providing case management and predictive services.⁷⁸ What is understood by predictive services is the deployment of AI technology to analyse precedents in order to statistically predict the probability of any desired outcome in proceedings.⁷⁹ In case management services, AI is used for pinpointing inefficiencies and systematising certain tasks. Furthermore, AI could propose drafting formulations and identify potential weaker points of exposure.⁸⁰ Finally, in the ambit of efficient representation, clients could also assess a lawyer's or firm's suitability for a particular matter, much in the same way they would carry out arbitrator's selection. It is important to note that parties have the freedom to agree to the aspects of the dispute and areas of the legal services contracted that they wish to delegate to AI-powered tools.⁸¹

Moreover, AI could propose settlement ranges based on similar disputes, generate more comprehensive data about precedents and trends for academics and more incisive and conclusive insights for third party funders to assist them in deciding what disputes they are willing to fund.⁸²

⁷³ *Id.*

⁷⁴ Lucas Bento, *International Arbitration and Artificial Intelligence: Time to Tango?*, KLUWER ARB. BLOG (Feb. 23, 2018), available at <http://arbitrationblog.kluwerarbitration.com/2018/02/23/international-arbitration-artificial-intelligence-time-tango/> [*hereinafter* "Bento"].

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ *Id.*

⁷⁸ *Id.*

⁷⁹ Winston Maxwell et al., *The Future of Arbitration: New Technologies are Making a Big Impact – and AI Robots May Take "Human" Roles*, HOGAN LOVELL PUBLICATIONS (Feb. 21, 2018) available at <https://www.hoganlovells.com/en/publications/the-future-of-arbitration-ai-robots-may-take-on-human-roles> [*hereinafter* "Maxwell"].

⁸⁰ Bento, *supra* note 74.

⁸¹ *Id.*

⁸² *Id.*

Furthermore, the NLP subset of AI allows for analysis and extraction of meaning from an unlimited number of documents that may be relevant to the cases at hand.⁸³ This is a significant advance from the existing technology that parses through documentation looking for inputted key words. The NLP technology can now extract meaning from both written and oral materials which is set to significantly reduce time and costs, particularly in discovery.⁸⁴

IV. Challenges

Despite the numerous advantages conferred by new technologies to arbitral proceedings, seldom do these come without challenges or drawbacks. The more pronounced challenges encountered have to do with confidentiality, a constitutional challenge of due process, the eligibility of the form and content of a decision rendered, the coherence of crowdsourced decisions, a risk of reductionism and the usurpation of the junior lawyers' role.

A. Confidentiality

The confidential nature of arbitration is often referred to as one of its major advantages. Enabling access to precedents and the external assistance required to operate new technologies during the conduct of arbitration create confidentiality concerns. External assistance comprises anyone from court reporters and translators, to those charged with operating technologies or IT equipment such as computers and other videoconferencing equipment.

Unlike investment arbitration, commercial arbitration awards and procedural orders are, as a general rule, confidential.⁸⁵ This renders the aggregation of decisions and generation of a precedent bank, indeed, very tricky. A potential way to overcome this, however, is that access to previously decided cases is closely and exclusively regulated by arbitral institutions which are best equipped to safeguard this important attribute of arbitration.⁸⁶ Moreover, the individuals with specific technical knowledge who are necessary for operating tech-powered tools should be required to sign confidentiality agreements.⁸⁷

While the close management of purported precedent banks is tricky and resource consuming, it may be practical and feasible when weighed against its pervasive benefits for clients, counsel, academicians and third-party funders. Further, the imposition of confidentiality undertakings on individuals operating the necessary machinery for the proliferation of the synergistic relationship between new technologies and arbitration should not be daunting. Indeed, external assistance from court reporters and translators, among others, is already subject to the simple and practical solution of entering into confidentiality agreements.

B. Decision-making

Presently, digital and predictive service tools attribute the same weight to statutory law, fact pattern, and underlying *ratio decidendi*. In addition, they often produce conservative output since

⁸³ Maxwell, *supra* note 79.

⁸⁴ *Id.*

⁸⁵ Vannieuwenhuyse, *supra* note 1, at 126.

⁸⁶ *Id.*

⁸⁷ *Id.*

they are heavily reliant on previously resolved disputes. There is, therefore, a lack of original thinking, which is required to produce new and innovative solutions.⁸⁸

While these tools confer irrefutable advantages to arbitral proceedings, they raise the question of optimal degree of reliance on their ‘services’. While digital technologies reduce the cost and time required to comb through precedents and ascertain the discrepancies between case laws and their underlying factual patterns, unrestricted reliance on their output may halt the “*use of an intuitive sense of justice*”.⁸⁹ Notwithstanding the former, if arbitration practitioners manage to strike the appropriate balance between machine and human input, the application of new technologies to arbitral proceedings can undeniably, enhance the quality of decisions and awards rendered.⁹⁰

The incorporation of new technologies should not overhaul or dismantle arbitral proceedings. If relied on in excess, they can be counterproductive and complete dependence would see efficiency and expeditiousness take precedent over intuition and quality of output. As such, we are at a crossroad – innovate or educate. On the one hand, we may further innovate and tailor digital and predictive service tools to distinguish between the aforementioned statutory law, fact pattern and *ratio decidendi* in hopes of mimicking, to a further extent, the decisions otherwise rendered by current arbitrators. On the other hand, we may educate arbitrators on: (i) the advantages of new technologies for arbitral proceedings; (ii) the drawbacks that over-reliance on technology entails; and (iii) the optimal manner in which to potentiate the role of the arbitrator. I am an advocate of the latter. Striking the appropriate balance between machine and human input is not obvious, and the nascent characteristic of these new technologies encompasses a steep learning curve which is why arbitrators should not be expected to be immediately well-versed with the same. *Loomis*, a criminal case in the US that was appealed all the way to the Supreme Court of Wisconsin, addressed the issue of reliance on digital technologies to render a decision.⁹¹ The court utilised an AI powered tool to compare its decision with the software generated probability of the individual being a repeat offender. The tool, COMPAS, evaluates said risk on the basis of an interview conducted with the defendant and his criminal record.⁹² In the past, the assessment of recidivism risk relied on “*intuition, instinct and a sense of justice which could result in a more severe sentence based on an unspoken clinical prediction*”.⁹³ The lack of objective bearings has often been grieved by the judicial community. Judges’ reliance on objective bearings promotes transparency and rationality when determining a sentencing decision.⁹⁴

The decision was very controversial, as it was alleged that it “*violated the defendant's due process rights [as it took gender into account]*”, as well as “*the right to an individualised sentence and the right to be sentenced on accurate information*”.⁹⁵ On appeal, the Supreme Court gave legitimacy to the lower court's reliance on the technology because it did not form the basis of its decision. The tool was merely

⁸⁸ *Id.*

⁸⁹ *Id.*

⁹⁰ *Id.*

⁹¹ Maxwell, *supra* note 79.

⁹² *State v Loomis – Wisconsin Supreme Court Requires Warnings Before Use of Algorithmic Risk Assessments in Sentencing*, 130 HARV. L. REV 1530, available at <https://harvardlawreview.org/2017/03/state-v-loomis/> [hereinafter “*State v Loomis*”].

⁹³ *Id.*

⁹⁴ *Id.*

⁹⁵ *Id.*

utilised for informative purposes, and did not usurp the decision of the presiding judges.⁹⁶ Moreover, the due process argument brought forth by the defence was rejected by Justice Bradley who found that “gender as a factor in the risk assessment served the non-discriminatory purpose of promoting accuracy and [...] as COMPAS uses only publicly available data and data provided by the defendant, the court concluded that Loomis could have denied or explained any information that went into making the report and therefore could have verified the accuracy of the information”.⁹⁷ Importantly, and touching upon the right to an individualised sentence, the appeal was rejected because the risk assessment was not the sole basis for the decision.

C. Form and Content of Decisions and Smart Contracts

There is very little material which deals with the legitimacy of decisions which would be rendered in code by ‘machine arbitrators’ and the validity of such arbitral award. It will be interesting to see how different jurisdictions will address the issue of codified awards and decisions that will inevitably flow from the unlikely lawfulness and adoption of machine arbitrators. One country, at least, has pronounced itself on the matter by analogy. In France, a codified decision will not be considered as valid due to the fact that it lacks the prerequisite inclusion of the *ratio decidendi* to be expressed in words.⁹⁸ By expressly stating that the *ratio* must be expressed in words, France has effectively ruled out the legitimacy of decisions rendered in code. In addition, I believe ‘expressed in words’ pertains to the expression of will, in this case, the will of the tribunal via an individual.

The validity of smart contracts is far more documented – perhaps due to the more realistic imminence of their mainstream applications. The two challenges facing the validity of smart contracts as traditional contracts are; (i) the fact that they are entirely written in code and (ii) the presence of arbitral clause itself.⁹⁹

Article II(1) of the New York Convention states that “each Contracting State shall recognize an agreement *in writing* [...]” (emphasis added).¹⁰⁰ Furthermore, Article 2(2) states that “the term ‘*agreement in writing*’ shall include an arbitral clause in a contract or an arbitration agreement [...]” (emphasis added).¹⁰¹ It is unclear herein, whether or not a smart contract and an arbitration clause therein will fulfil the ‘in writing’ prerequisite put forth by the New York Convention.

However, a solution may be found upon a closer interpretation of the introductory provisions and Part II of the New York Convention, paragraph 16 of the UNCITRAL Model Law on Electronic Commerce, 1996 and the UNCITRAL Recommendation regarding the interpretation of Article II(2) of the New York Convention.

Paragraph 16 of the UNCITRAL Model Law on Electronic Commerce 1996 states that it “relies on a new approach, sometimes referred to as the ‘functional equivalent approach’, which is based on an analysis of the purpose and functions of the traditional paper based requirement with a view to determining how those

⁹⁶ State v. Loomis, 881 N.W.2d 749 (2016).

⁹⁷ State v Loomis, *supra* note 92.

⁹⁸ Maxwell, *supra* note 79.

⁹⁹ Yeoh, *supra* note 63.

¹⁰⁰ Convention on the Recognition and Enforcement of Foreign Arbitral Awards of 1958 (June 10, 1958), 330 U.N.T.S. 38, art. II(1).

¹⁰¹ *Id.* art. II(2).

purposes or functions could be fulfilled through electronic-commerce techniques".¹⁰² In addition, "the Recommendation [regarding the interpretation of Article II, para. 2 of the New York Convention] encourages States to apply article II (2) of the New York Convention recognising that the circumstances described therein are not exhaustive".¹⁰³ This recommendation adopted by the UN Commission on International Trade Law in 2006 at its 39th session is included in Part II of the New York Convention and has the effect of permitting a more lenient, non-exhaustive, approach to the interpretation of 'in writing'.

As mentioned above, there are a number of reasons which support the tethering of smart contracts to valid traditional agreements. In addition to clauses regarding seat and governing law, the arbitration clause may be included in this adjacent agreement, for the avoidance of doubt.¹⁰⁴

In order to fully explore the restrictions in recognition and enforcement posed by the New York Convention, the last point to make in this subsection is specific to the blockchain arbitration platform imagined by Kleros. Since the randomly selected panel of jurors must base their decision solely on evidence stored on the blockchain— in lieu of hearing arguments presented by the parties— Article V(1)(b) of the New York Convention may act as an impediment to the recognition and enforcement of an award on the grounds that recognition and enforcement of the award may be refused by the party against whom it was sought to be invoked if such party was *unable to present its case*.¹⁰⁵ It is not a matter of the evidence that may be stored on the blockchain, but rather the fact that it is a documentary evidence in lieu of an opportunity for the parties to present their case in person.

D. Role of Arbitrators

Rare is the commentator that envisages an impending upheaval to the arbitration so great that machine arbitrators would completely replace humans. Rarer are those hoping for such a disruption.

Most of the legislations provide that arbitrators must be an individual. However, this is not pervasive. While some legislation explicitly provides that an arbitrator must be a physical person, others are silent on the matter.¹⁰⁶

More specifically, by way of example, Article 20 of the Peruvian Arbitration Act states that "*natural persons in full capacity to exercise their civil rights may act as arbitrators*".¹⁰⁷ Moreover, Article 19 of the Ecuadorian Arbitration Act states that "*persons that are not in the capacity to stand trial for themselves may not act as arbitrators*".¹⁰⁸ Furthermore, Article 1450 of the French Code of Civil Procedure provides that "*only a natural person having full capacity to exercise his or her rights may act as an*

¹⁰² UNCITRAL Model Law on Electronic Commerce with Guide to Enactment, G.A. Res. 51/162, ¶16 (Dec. 16, 1996).

¹⁰³ EXPLANATORY NOTE BY THE UNCITRAL SECRETARIAT ON THE 1985 MODEL LAW ON INTERNATIONAL COMMERCIAL ARBITRATION AS AMENDED IN 2006, available at <http://www.uncitral.org/pdf/english/texts/arbitration/ml-arb/MLARB-explanatoryNote20-9-07.pdf>, ¶ 20.

¹⁰⁴ Yeoh, *supra* note 63.

¹⁰⁵ *Id.*

¹⁰⁶ Vannieuwenhuyse, *supra* note 1.

¹⁰⁷ Law No. 1071, Sept. 1, 2008, Arbitration Act Legislative Decree No. 1071, art. 20 (Peru).

¹⁰⁸ Ley No. 000. RO/ 145, de 4 de Septiembre de 1997, Ley de Arbitraje y Mediación (Law on Arbitration and Mediation), art. 19 (Ecuador).

arbitrator".¹⁰⁹ Furthermore, Article 24(1)(c) of the UK Arbitration Act states that "*a party to arbitral proceedings may apply to the court to remove an arbitrator on the grounds that he is physically or mentally incapable of conducting the proceedings [...]*".¹¹⁰ All the abovementioned legislations directly or indirectly imply that an arbitrator must be human. The same grounds for requesting the removal of an arbitrator feature in Article 16(1)(a) of the Singaporean Arbitration Act.¹¹¹ Thus, it appears that the first challenge for the replacement of humans by machines as arbitrators is that the law may itself prohibit it.

On the other hand, neither Chile's nor Mexico's Arbitration Acts make explicit reference to arbitrators as persons.¹¹² In addition, the Model Law does not provide for a definition of 'arbitrator' either. Consequently, it may be possible to appoint a machine arbitrator.

However, it remains unlikely that machines will replace humans as arbitrators for a myriad of reasons. The first is a machine's lack of emotional sensitivity or perception.¹¹³ The best way to illustrate the impact of this on the role of an arbitrator is to explore what occurred to Elliot, one of Antonio Damasio's patients.¹¹⁴ Elliot had an "*orange-sized brain tumour that was pushing into his frontal lobes*".¹¹⁵ Although the tumour was successfully removed, during his recovery his entourage remarked that "*Elliot was no longer Elliot*".¹¹⁶ He was easily distracted, could not manage a schedule and would deliberate endlessly on how to approach any organisational problem. He would perform the task too well, at the expense of the larger goal. He could no longer make decisions, particularly, personal and social ones.¹¹⁷ While follow-up tests showed that his IQ, memory, learning, language and other cognitive capabilities were fine, the problem rested in his emotional responses. Nothing seemed to evoke an emotional response. Researchers have since found that injuries to parts of the limbic system responsible for generating emotions, cause individuals to struggle when making decisions.¹¹⁸ In other words, there is a prominent link in the brain between emotion and reason that is crucial to the process of decision making – "*the primitive, emotional parts of our brains have a powerful influence on the choices we make*".¹¹⁹ It seems to flow from this phenomenon that machines, which lack the abovementioned emotional capabilities, may not effectively perform the role of an arbitrator.

In their paper on Transnational Dispute Management (2010), Nappert and Flader go further in saying that "*an important distinction should be made between one's emotional reactions and the process of understanding the emotions of others. Whilst arbitrators must control their own emotional reactions to a case, failure to give proper recognition to the parties' emotional reactions arguably hampers the arbitrators'*

¹⁰⁹ CODE CIVIL [C. CIV.][CIVIL CODE] art. 1450 (Fr.)

¹¹⁰ The Arbitration Act 1996, art. 24(1)(c) (Eng. & Wales).

¹¹¹ Arbitration Act 2001, art. 16(1)(a) (Singapore).

¹¹² José Maria de la Jara et al., *Machine Arbitrator: Are We Ready?*, KLUWER ARB. BLOG (May. 4, 2017), available at <http://arbitrationblog.kluwerarbitration.com/2017/05/04/machine-arbitrator-are-we-ready/> [hereinafter "De la Jara et al."].

¹¹³ *Id.*

¹¹⁴ Antonio Damasio is a Portuguese-American neuroscientist.

¹¹⁵ Gardiner Morse, *Decision Making: Decisions and Desire*, HARV. BUS. REV., 44-45 (2006).

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ *Id.*

*understanding of the case as it discount the part played by the parties' emotions in the circumstances leading up to the dispute".*¹²⁰

On a similar note, in her paper entitled "*Angry Judges*", Terry Maroney observes that "*anger [of the judges] keeps one engaged*".¹²¹ In addition, "*anger motivates responsive action. It is associated not only with judgments of injustice, but also with a motivation to restore justice*".¹²² Terry Maroney, therefore, does not set out a necessity for judges [and hence arbitrators] to extract their own emotions when seeking to right a wrong. Her thesis focuses on anger rather than emotions in the global sense. While she states that some emotions carry a "*strong tendency for withdrawal*", anger is "*a signal that something of import is taking place*", "*keeps one engaged*", "*motivates responsive action*" and "*generates the energy to enact change*".¹²³ Terry Maroney concludes that anger is of "*obvious utility to judges – indeed, one is tempted to say [it is] necessary to judging*".¹²⁴

Emotional sensitivity, from a neurobiological standpoint, appears to be a prerequisite for the efficient conduct of one's duties as an arbitrator. Emotions are inextricably linked to information, motivation, processing, memory and judgment.¹²⁵ Without emotions, just like Elliot was not Elliott, humans are not humans.

Machine arbitrators also lack empathy and the underlying metacognition. Moreover, they are unable to provide reasons for their decisions which, in turn, are incompatible with the regulatory framework of some jurisdictions.¹²⁶ Lastly, with the recent introduction of the EU-GDPR (European Union General Data Protection Regulation) – which has extraterritorial application – automated decisions which may not later be explained, are not permitted.¹²⁷

E. Wisdom of the Crowd and Coherence of Crowdsourced Decisions

This particular subsection is food for thought. Issues that arise and stir curiosity when delving into the applications and synergistic relationship between arbitration and new technologies are subsequently debated.

"With most things, the average is mediocrity. With decision making, it's often excellence. You can say it's as if we've been programmed to be collectively smart".¹²⁸ How accurate is this statement in light of the crowd sourced decision making envisaged by the aforementioned blockchain dispute resolution platforms? Must there be a significant shared identity or ideology? From Professor George Rudé and his work on the role of the crowd in the French revolution to popular protest in 18th century England, much has been written about the "*often problematic and disruptive nature of crowds, their composition, their collective motivation and their malleability*".¹²⁹ The nascent nature of the digital

¹²⁰ Dieter Flader & Sophie Nappert, *The Psychology of Persuasion in International Arbitration*, 7 TRANSNAT'L DISP. MGMT., 23 (2010) (understanding the importance of controlling emotional reactions).

¹²¹ Terry Maroney, *Angry Judges*, 65 VAND. L. REV. 1207, 1262 (2012) (the behavioural benefits of judicial anger).

¹²² *Id.*

¹²³ *Id.*

¹²⁴ *Id.*

¹²⁵ De la Jara et al., *supra* note 112.

¹²⁶ *Id.*

¹²⁷ *Id.*

¹²⁸ JAMES SUROWIECKI, *THE WISDOM OF CROWDS* 11 (2005).

¹²⁹ Macduff, *supra* note 46.

blockchain crowd means that there is no sufficient data to critically evaluate them. What is clear, however, is that these virtual crowds are “*ephemeral, dispersed, of short-term instrumental value and low on shared identity and ideology*”.¹³⁰ With the proliferation in use of these new technologies, it will be interesting to uncover the ethical and normative foundations that unite these ‘crowds’.

V. Conclusion

In conclusion, new technologies have, in fact, made their way into the legal industry. The question that remains is when these technologies will have mainstream applications and the reverberations that will be produced and felt throughout the dispute resolution industry. New technologies have the potential to impact and disrupt arbitral proceedings in a myriad of ways. The impact is most interesting in the context of international arbitration, which also represents an alternative to the status quo of dispute resolution. They have the potential to significantly aid in legal representation and adjudicative services, and provide more comprehensive information to academicians and third-party funders. Moreover, these applications may be possible within the current regulatory framework, at least when robotised arbitration is excluded.

While it is true that most of the legislations provide that arbitrators must be a physical person, this condition is not pervasive. A potential concern that may arise is that machines lack emotional sensitivity or perception which appears, from a neurobiological standpoint, to be a prerequisite for the efficient conduct of one's duties as an arbitrator. Emotions are inextricably linked to information, motivation, processing, memory and judgment. To that end, machines also lack empathy and the underlying metacognition. Lastly, some jurisdictions may not enforce codified decisions rendered by a machine arbitrator due to the lack of reasoning attached to such decisions. Whether or not the challenges presented by lack of a machine's emotional sensitivity and perception could be overcome is debatable. I am an adamant advocate for embracing these challenges and the exploitation of the added value conferred by new technologies. To that end, I believe that think-tanks and roundtables should be imminently implemented to address a necessary reform of certain institutional rules and national legislations that effectively prohibit the usurpation of the arbitrator's role. Notwithstanding the previous, the same approach should be taken towards a consensus on the optimal manner of on-boarding technology to potentiate a decision which can only be rendered by a human arbitrator.

With regards to cryptocurrencies, their proliferation in use results in an inherent necessity for an effectively tailored dispute resolution mechanism. International arbitration, on or off the blockchain, matches the characteristic borderless feature of virtual currencies. Moreover, amongst the underlying principles of these technologies is decentralisation, lack of intermediaries and automation. It is important to note that decentralisation is also a major characteristic of international arbitration. Consequently, in what seems like a synergistic relationship, disputes arising from the use of these technologies can benefit from flexibility and the facilitated enforcement mechanism that arbitration provides.

In what concerns the disruption of arbitral proceedings by the so-called big data revolution, advances in technology have allowed for aggregation and processing of large volumes of data

¹³⁰ *Id.*

with little or no margin of error, and in a fraction of the time. The adoption of a tech-savvy approach to dispute resolution aims to potentiate both the proper administration of justice and client representation. The correct harnessing of the benefits of the envisaged database-driven factual aggregation, sorting and analysis is undoubtedly a step in the right direction; it decreases or eradicates handling errors and ensures that both client matters and proceedings are dealt with expeditiously and without unnecessary delays.

Lastly, the confidential aspect of arbitration renders the aggregation of decisions and generation of a precedent bank very tricky indeed, and access to previously decided cases should be closely and exclusively regulated by arbitral institutions. Another challenge is presented by the parity in weight attributed to statutory law and the underlying *ratio decidendi* which often leads to conservative outputs and consequently, lack of original thinking. This may halt the use of an intuitive sense of justice. There is no clear-cut solution to this challenge that does not involve the reprogramming of the underlying code to unlock this parity. A more practical solution may be the cautious interpretation of the conservative output, limiting it to a mere factor in the otherwise independently judged scenario. The latter is, in my opinion, far more beneficial for the dispute resolution industry. With respect to the validity of contracts written entirely in code and which depart from the fundamental principles of traditional contract formation, the situation is not as black and white. Upon close and non-exhaustive interpretation of the 'in writing' requirement in the UNCITRAL Model law and by adopting the functional equivalent approach, contracts, and clauses therein, written in code can be considered valid. .

It will be very interesting to see exactly how these new technologies attain mainstream applications and most importantly how we adapt and evolve as a consequence.