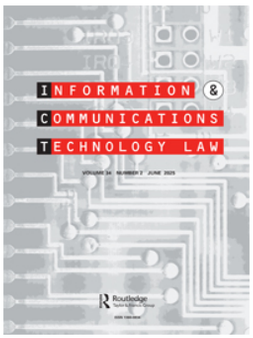

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Robots replacing human arbitrators: the legal dilemma

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ABSTRACT

Robots are slowly replacing humans in many areas of the economy. This paper compares the current-day arbitration laws of Australia, Cayman Islands, European Union, India, Indonesia, Japan, Singapore, Qatar, Philippines, the United Kingdom, and the United States, which are considered arbitration friendly. The paper confirms that the respective arbitration laws do not clearly and unequivocally provide for a robot to be used as an arbitrator. It is well understood that robots today do not have the emotional or social intelligence, such as bias, that a human naturally brings to the arbitration table. There are four streams of studies on this issue: AI-powered arbitrator, AI arbitration, AI-assisted arbitration, and a robot as arbitrator. However, none of these is clearly defined by arbitration law. This paper argues that the current day laws do not provide for robots to replace the human arbitrator, and must retain the status quo. Any law reform to allow a robot to replace the human arbitrator, would be a jump too far, and would significantly diminish the long-standing reputation that arbitration has as an effective legal mechanism for resolving international commercial and investor-state disputes.

KEYWORDS

Robots; arbitration; transnational arbitration

I. Introduction

Robots and their use are being considered in and across the legal profession. That is, they are being debated in terms of where the legal liability resides when a robot causes harm[1] to a human. The word 'robot' was introduced more than a century ago, and is a Czech word meaning 'worker'.[2] In the 1950s, the term *roboticist,*[3] emerged to describe the machine that would perform specific functions that a human would undertake. Significantly, the role of robots in the legal domain is also being widely debated as to whether they can replace lawyers, judges, arbitrators or perform any other function that a human performs within the legal profession? However, and although they have been deployed by industries in the manufacturing sector for more than a decade, robotics and robots do pose many challenges to and for the legal profession.

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[1]A Guerra, F Parisi, and D Pi, 'Liability for robots I: legal challenges' (2022) JIE 331–343.

[2]K Čapek, R.U.R. (Rossum's Universal Robots) (Paul Selver tr, Doubleday 1923) 10, https://www.gutenberg.org/files/59112/59112-h/59112-h.htm.

[3]I Asimov, 'Liar! in Astounding Science Fiction' (1941) (reprinted in Isaac Asimov, I, Robot (1950)).

In 2016, Ryan Calo, A. Michael Froomkin and Ian Kerr proposed the following working definition of a robot that it 'is a constructed system that displays both physical and mental agency but is not alive in the biological sense'.[4] The robot is a human construct that is developed and manufactured by humans. Robots have evolved from the industrial economy and are now becoming as an integral component of the new digital economy.

Industrial robots have been in operation for more than 70 years,[5] and are not new. Such is the growth and development of robotics and their underlying technology, that robots have evolved to become collaborative entities (cobots), which the market has 'valued at $649 million in 2018 and is projected to reach an annual growth rate of 44.5% by 2025'.[6] These cobots are designed to interact with humans and, thus, require a level of human input. The next phase of robotics could totally remove the human element. However, for this to be fully realised, there is a significant level of technology development required for a robot to fully replicate human thinking and behaviour.

One of the significant challenges is apportioning liability to a robot that is performing a human related function. Alice Guerra *et al.* make the point that in regard to liability, 'one of the challenges in the regulation of robots concerns accidents caused by "design limitations", such as, accidents that occur when the robot encounters a new unforeseen circumstance that causes it to behave in an undesired manner'.[7] Guerra goes on to say that

> the algorithm of a self-driving car could not "know" that a particular stretch of road is unusually slippery, or that a certain street is used by teenagers for drag racing. Under conventional product liability law, we could not hold a manufacturer liable for not having included that specific information in the software.[8]

Lemley and Casey state that a court 'might order a robot – or, more realistically, the designer or owner of the robot – to pay for the damages it causes'.[9] However, in practice,

> it turns out to be much harder for a judge to "order" a robot, rather than a human, to engage in or refrain from certain conduct. Robots cannot directly obey court orders not written in computer code. And bridging the translation gap between natural language and code is often harder than we might expect.[10]

Put another way, under this scenario, human intervention is required for the code to be updated so as the robot could comply with a court order.

Under the current legal framework of most nation states, this issue poses significant challenges. Specifically, there could be multiple applications and installations of algorithms, technology and software designs within a vehicle, the different parts of which have been manufactured by multiple organisations located in different nation states.

[4]R Calo, AM Froomkin, and I Kerr (eds), 'Robot Law', Edward Elgar (2016) 6.
[5]G McGrew, 'The Evolution of Robots' (2021) <https://www.amtonline.org/article/the-evolution-of-robotics> accessed 21 April 2024. The motor manufacturing industry deployed robots in the 1960s. See also, RP Paul, 'The Early Stages of Robotics', IFAC Proceedings Volumes, Vol 16, Iss 1 (1983) 19–21. Dario Floreano, Phil Husbands, and Stefanos Nolfi, 'Evolutionary Robotics' in B Siciliano and O Khatib (eds), *Springer Handbook of Robotics* (Springer, Berlin, Heidelberg, 2008) 1423–1451, <https://doi.org/10.1007/978-3-540-30301-5_62> accessed 21 April 2024.
[6]G McGrew, 'The Evolution of Robots' (2021), <https://www.amtonline.org/article/the-evolution-of-robotics> accessed 21 April 2024.
[7]A Guerra, F Parisi, and D Pi, 'Liability for robots I: legal challenges' (2022), JIE, 333–355.
[8]ibid.
[9]M Lemly and B Casey, 'Remedies for Robots', Stanford Law and Economics Olin Working Paper No. 523 (2019), 3–4.
[10]ibid.

Thus, the liability for a malfunction will require a complex tracing investigation, similar to that which takes place following an aircraft accident. Hence, the question or a possible first remedy is the installation of a black box in all autonomous vehicles to record all functions? This paper is not about resolving this issue. It is to determine whether todays' national laws allow a robot to replace a human in arbitration – as the sole or panel of arbitrators. In rephrasing this proposition, do the current day laws provide a pathway enabling humans to be replaced by a robot as the arbitrator? This paper will demonstrate how the current day legal framework does not allow for this to take place. It argues that the status quo must be retained.

On the other side, Guerra goes on to say that in relation to the application and use of robotics 'failing to account for every special circumstance cannot be regarded as a design flaw'.[11] To remedy this dilemma, the authors assert how rules can be designed to incentivise

> manufacturers to narrow the range of design limitations through greater investments in research and development and/or safety updates. For example, to ensure the technology can 'learn' from information and share their dynamic knowledge with other cars to reduce the risk of accidents in those locations.[12]

Guerra and others state that a significant challenge to the regulation of robots is:

> the double-edged capacity of robots to accomplish both useful and harmful tasks. As such, robots are increasingly perceived in society as social actors. Although legal scholars recognise that robots are mere physical instruments and not social actors, some have argued that from a pragmatic and theoretical perspective, granting them a legal personhood status – similar to corporations – might address some of the responsibility problems. Robots appear capable of intentional acts, and they seem to understand the consequences of their behaviour, with a choice of actions.[13]

Viewed this way however, demonstrates how the law has not caught up with the developments in robots. Hence, the ensuing question is: what is the current legal status of a robot as an arbitrator? In referring to the aircraft sector Guerra makes the important point that:

> Aircraft autopilot systems are among the oldest class of robot technologies. The earliest robot flight system – a gyroscopic wing leveler – was implemented as far back as 1909. After a century of development, autopilot technology has progressed to nearly full automation. Aircraft autopilot systems are presently capable of taking off, navigating to a destination, and landing with minimal human input. The longevity of the autopilot technology in aviation affords us a clear exemplar of how the law can respond to the emergence of robot technology. Early treatment of autopilot cases was mixed. The standard for liability was not negligence, but rather strict liability. However, the cases were not litigated as a species of products liability. Aircraft and autopilot systems' manufacturers were therefore rarely found liable.[14]

Notwithstanding the above, it must be clarified that these functions are just that – a function. They do not require a human element of behaviour or intuition to be considered. The autopilot does not have to interact with a humans' personality. Nonetheless, fast forward to 2023, robotics has been described as the evolution of swarm robots. Jonas Kackling posits that swarm robots 'are decentralised and highly redundant, however, there exists no single

[11]A Guerra, F Parisi, and D Pi, 'Liability for Robots I: Legal Challenges'.
[12]ibid.
[13]ibid.
[14]ibid 336.

central point of control (neither internal nor external to the swarm), as a centralised point of control would be a single point of failure'.[15] Kackling argues that they produce

> complex collective behaviours, such as task allocation that, cannot be planned and orchestrated by an operator. Instead, the swarm is required to be self-organising whereby the collective behaviour of the swarm must emerge from the interactions between the individual robots. However, they come with their own challenges.[16]

Again they are performing a function and do not require consideration of human intuition or behaviour. Therefore, a pertinent question is: could robots take the role of lawyers, judges or an arbitrator?

Dana Remus and Frank Levy,[17] writing in 2016, noted that there is:

> (i) an insufficient understanding of current and emerging legal technologies; (ii) an absence of data on how lawyers divide their time among tasks; and (iii) inadequate attention to whether computerised approaches to a task conform to the values, ideals and challenges of the legal profession.[18]

Remus and Levy concluded that lawyers were not being replaced by robots due to the relatively unsophisticated technology at that time. Even today, a similar position can be taken because since 2016, not much has changed and, although law firms and lawyers are conservative by nature, robots are far from fully replacing a lawyer.

In another study, Jack Balkin examined the key problems that robotics presents for law.[19] Balkin referred to Oliver Wendell Holmes Jr. and noted that in the latter's famous

> 1897 lecture, *The Path of the Law*, whereby it was argued that because law is produced by the cumulative forces of social life, we should view law from the standpoint of its social function and practical use. Holmes offered a proto-Realist manifesto against formalism and the belief in essential features of legal concepts.[20]

According to Balkin, technology is disrupting the law. I agree with this position. These disruptions today are requiring government and regulators, including society to react and respond at a pace not endured at any time in history. Balkin goes on to say that:

> technology disrupts the existing scene of regulation, leading various actors to scramble over how the technology will and should be used. As people scramble and contend with each other over the technology, they innovate—not only technologically, but also socially, economically, and legally—leading to new problems for law. Instead of saying that law is responding to essential features of new technology, it might be better to say that social struggles over the use of new technology are being inserted into existing features of law, disrupting expectations about how to categorise situations.[21]

Therefore, against the backdrop of the above, the normative values and behaviour of humans in today's society are based on a combination of law, values and societal

[15] J Kackling, 'Recent Trends in Robot Learning and Evolution for Swarm Robotics', Robotics and AI (2023) < https://www.frontiersin.org/journals/robotics-and-ai/articles/10.3389/frobt.2023.1134841/full > accessed 25 April 2024.
[16] ibid.
[17] D Remus and F Levy, 'Can Robots be Lawyers' (2016), CLTPL, 72, <https://ihej.org/wp-content/uploads/2017/03/Can-Robots-Be-Lawyers_Computers-Lawyers-and-the-Practice-of-Law-1.pdf> accessed 26 April 2024.
[18] ibid.
[19] J Balkin, 'The Path of Robotics Law', California Law Review Circuit (2016) CLRC 46.
[20] ibid.
[21] ibid 50.

norms. Ronald Leenes and Federica Lucivero reaffirm this position, stating that the gap between norms and robots is even narrower if we consider the fact that they function in highly regulated normative contexts.[22] Leenes and Lucivero argue that while

> robots are expected to create a moral landscape, by displaying, enacting and promoting some values while demoting others, they will also have to adhere to and respect the existing normative landscape. Robots operating in human environments have to observe social and legal norms.[23]

Specifically, the onus is on, and will be increasingly on, robot developers to ensure the technology complies with the law.

Leenes and Lucivero give the example of where a robot is operating in public spaces, such as roads and pavements, it 'should not cross the street whenever it suits them, but will have to comply with traffic regulation'.[24] More challenging for robots and the technology that supports their operation is the ability to replicate the social and legal norms that are inherent to human thinking. Leenes and Lucivero reinforce this point stating that 'life for humans is full of social and legal norms and it might be reasonable to require robots to comply with at least a minimal set of these as well'.[25] This begs the important question of how this can be measured, if at all. Moreover, while arbitration is heavily supported by laws, legal rules and procedure, there is arguably a strong element of social norms built into these frameworks.

Thus, the law, concepts, principles and rules offer 'a normative structure whose relevance in a specific situation has to be recognised by the robot, in order to adopt a compliant behaviour'.[26] It must be said that in applying this position to whether a robot can replace a human as an arbitrator, this issue cannot be determined without examining the national law, as this paper does. More research is required to investigate whether a robot would or ever could meet the normative social and moral values that inform human behaviours today. It must be further noted that these normative social and moral functions do vary from nation state to nation state, making it even more difficult for a robot to replicate them faithfully and entirely.

As an example of the differences in normative social and moral functions, we can consider the distinctive characteristics of democratic versus socialist/authoritarian[27] jurisdictions. Significantly too, 'where authoritarianism and democracy differ is how a belief in legitimacy is obtained'.[28] Thus, how can a robot replicate these complex nuances, beliefs and differences? This is far from understood, let alone settled.

More specifically, Simon Chesterman[29] proposes new rules, and argues that the theory of 'smart regulation' has shown that the functions of regulatory forces can be carried out not only by institutions of the state but also by professional associations, standard-setting

[22]R Leenes and F Lucivero, 'Laws on Robots, Laws by Robots, Laws in Robots: Regulating Robot Behaviour by Design', Law (2014) IT, 3.
[23]ibid.
[24]ibid 3.
[25]ibid 3.
[26]ibid.
[27]Ch Pursiainen and M Pei, 'Authoritarianism or Democracy?' in C Pursiainen (eds), *At the Crossroads of Post-Communist Modernisation* (Palgrave Macmillan 2012) 114–180.
[28]M Haugaard, 'Kleptocracy, Authoritarianism and Democracy as Ideal Types of Political Power' (2023) JPP 345–378.
[29]S Chesterman, 'We are the Robots? Regulating Artificial Intelligence and the Limitations of the Law' (2021) Cambridge University Press 186–187. Also see A Bertolini and F Episcopo, Robots and AI as Legal Subjects? Disentangling the Ontological and Functional Perspective (2022) 2–4.

bodies, and advocacy groups'.[30] For decades, this has been evident in many sectors such as those of primary and food production. In other words, government will set the minimum standards and expect the industry to implement a level of self-regulation. As Chesterman highlights, regulation not only has been designed to restrict or prohibit certain activities; arguably, it has been developed to facilitate, for example, trade and investment. This is where, for decades, arbitration has been a very successful tool for resolving highly complex transnational commercial and investment disputes.

From the perspective of social morality, Chesterman points out that robots could evolve into social machines, and as they 'become more prevalent – in industries from eldercare – it may be necessary to regulate what can be created and how those creations may be used'.[31] This would need to be replicated in international arbitration, when the arbitrator deals with the parties, talking, listening to and evaluating oral and documentary evidence. Chesterman, in referring to Isaac Asimov,[32] who made the case that the law was to give humanity as a whole, the highest priority to ensure the safety of humans at all levels. Nowadays, there would be little argument or debate about this important position. Furthermore, in regard to robots, the law, whether for arbitration or some other human activity, has to prioritise human safety. In taking this position a step further, robots should not in any way be able to undermine the normative frameworks that have adequately supported international arbitration since its inception. It is argued that robots should be used only to improve the arbitration process. Measures must be put in place to ensure that there is not an automatic default to impose regulation that restricts innovation. This is what Richard Susskind termed a 'hyperregulation' in response to the emerging technologies, which may lead to government responding with a level of regulatory complexity.[33] It can be argued that, whether by accident or design, technology will evoke a response from government that will result in complex regulation. As an example, the personal data laws around the world have evolved to become a complex area of private law that overlaps with commercial law, and are highly fragmented amongst nation states.

This paper expands on the work undertaken by David Horton, from the United States, in 2023. Horton cited the International Court of Arbitration which recently stated that robot arbitrators may be accepted.[34] On the one side, Horton argues that the current federal laws in the United States (US) do not provide for a robot to replace a human arbitrator. On the other side, and in agreement with Horton, the legal frameworks of the jurisdictions examined in this paper are not ready to allow for robots to replace human arbitrators. The operation of robots is underpinned by artificial intelligence[35] (AI) and algorithms, and it is becoming accepted that AI[36] will play a role in arbitration, albeit to an as-yet-unknown extent. For instance, predictive[37] tools and contracts that rely on

[30]S Chesterman, 'We are the Robots? Regulating Artificial Intelligence and the Limitations of the Law' (2021) Cambridge University Press 187.
[31]ibid 189.
[32]ibid 192, Isaac Asimov, *Foundation and Earth* (Doubleday 1986) Ch 21.
[33]R Susskind, 'Online Courts and the Future of Justice', Oxford: Oxford University Press (2019) 6.
[34]D Horton, 'Forced Robot Arbitration' (2023) CLR, 7.
[35]H Snijders, 'Arbitration and AI, from Arbitration to Robotration and from Human Arbitrator to Robot' (2021) TIJAMDM 223–239.
[36]PB Marro, M Karol, and S Kuyan, 'Artificial Intelligence and Arbitration: The Computer as an Arbitrator – Are we There Yet'? (2020) DRJ 35–37.
[37]OFC Colorado, 'The Future of International Arbitration in the Age of Artificial Intelligence' (2023) JIA 301–304. See also, M Scherer, 'Artificial Intelligence and Legal Decision-Making: The Wide Open'? (2019) JIA 539–544.

AI can all be used to improve the arbitrators' decision making under the current law and rules. In 2018, Kathleen Paisley and Edna Sussman wrote that the 'use of cognitive computing to allow AI not only to provide simple answers to questions and predictions about results, but also more complex reasoning, and to do so automatically without human intervention'.[38] Yet, this depends on the quality of the data that has been inputted to the robot or other computerised machines.

Dimitrios Ioannidis, on the other hand, who clearly explains the functions of an arbitrator that could be performed by AI, states that the federal arbitral laws do not prohibit this eventuality. In fact, Dimitrios Ioannidis further states that although the law at face value 'does not prohibit the use of artificially intelligent platforms serving as arbitrators, the freedom of the parties to contract will ultimately be the decisive factor in support of such use'.[39] It is important to note that Ioannidis favours the application of AI in arbitration, while other scholars such as Horton is making the case for robots themselves. They are two very different technology systems and have different functions. It is outside the scope of this paper to discuss these technologies separately, since AI is an essential component of robotics. What AI[40] has the potential of doing, in the short to medium term, is 'expedite the preparation of an arbitral awards. AI is not a substitute for human expertise and judgment, but rather a tool that promises to augment human abilities and allow legal teams and arbitrators to work more efficiently and effectively'.[41] More specifically, Jennifer Kirby has identified a single component of the arbitration process where AI can complement the human arbitrator. In other words, the arbitration award is the final step in the process of informing the parties who is in breach of the law, and who will pay whom. The award is binding on the parties.

On the other side, in one of the few papers opposing the use of AI in arbitrations, it has been argued that bias is a significant risk factor. That is, there is a need for human arbitrators, and delegating complete responsibility to AI is a bad idea. Although AI, itself offers the promise of providing solutions, it is not risk-free.[42] The technology requires human intervention to ensure there is no bias towards any single party. Despite this risk, the study again was focusing only on whether an 'AI-powered arbitrator, not a robot, can combat arbitral bias, and whether the Indian regulatory framework allows for the appointment of AI-powered arbitrators'.[43] This paper is broader and considers the Indian legal framework, amongst others to examine whether a robot, not an AI powered-arbitrator, can replace a human arbitrator. Thus, the application and use of terminology is and will be important. Also, as yet there is no legal definition of AI arbitration, AI-powered arbitration, AI-assisted arbitration, or a robot in arbitration.

In 2021, a study was conducted to determine whether AI itself could replace the human arbitrator. It must be noted that this study is narrow in that it focuses solely on AI and not the broader question of whether a robot can replace a human arbitrator.

[38]K Paisley and E Sussman, 'Artificial Intelligence Challenges and Opportunities for International Arbitration' (2018) NYDRL 35.
[39]D Ioannidis, 'Will Artificial Intelligence Replace Arbitrators Under the Federal Arbitration Act?' (2022) RJLT 505.
[40]JB Rajendra and AS Thuraisingam, 'The Deployment of Artificial Intelligence in Alternative Dispute Resolution: The AI Augmented Arbitrator' (2022) ICTL 176–193.
[41]J Kirby, 'International Arbitration and Artificial Intelligence: Ideas to Improve the Written Phase of Arbitral Proceedings' (2023) JIA 657–664.
[42]G Bhootra and I Puranik, 'Arbi (Traitor)?: A Case against AI Arbitrators', Indian Arbitration Law Review 28 (2022) IALR, 28.
[43]ibid.

Most noteworthy, the researcher asserted that AI 'has advanced to the point that machines can compare and contrast historical cases in order to predict the outcome of a dispute at hand, and AI is increasingly being deployed to do so'.[44] In the same year, Gizem Kasap argued that

> an AI arbitrator should not be downgraded to an AI application that is trained on historical cases to make accurate predictions ex-ante based on new dispute data. Even though the results of the most cited AI studies achieved over 70 percent accuracy in case prediction, these studies are heavily skewed toward appellate decisions.[45]

Kasap called for further research given the limited data available regarding arbitral awards, AI's technical limitations and its inability to embody emotions are obstacles that may prevent the widespread adoption and use of AI arbitrators. In taking this position, regardless of any law accepting AI/robots as arbitrators, the ability of such technology to detect and respond to human emotions is, arguably, connected to the normative social and moral functions of a society in a specific nation state. As already stated, this will vary, because the emotional response by a party will in part be influenced by the normative social and moral functions of the state in which they reside.

On that basis, in 2024, the accuracy and quality of the data input will, arguably, be two of the most important determinants of the way that a robot acts, interacts, understands, interprets and applies the laws and rules to arbitration. This section of the paper has focused on the evolution of the robot and the associated technology (i.e. AI). The next section will compare the current data arbitration laws of Australia, Cayman Islands, European Union (EU), India, Indonesia, Japan, Singapore, Qatar, Philippines, United Kingdom (UK), and United States (US) – to confirm or otherwise whether their provisions could allow robots to replace humans in the arbitration process. These jurisdictions have been identified as they are long-standing arbitration hubs.

II. Robots in arbitration

There is the potential for arbitration and the hearing proceedings to be significantly transformed by technology over the coming decades. In the digital economy, robotics are slowly being considered by and used within the legal profession. This section draws on earlier work undertaken by the author.[46] This section focuses on the constitutional recognition or otherwise of arbitration in each of the jurisdictions being compared.

David Horton, in referring to the International Court of Arbitration recently stated that robot arbitrators may be accepted.[47] More specifically, it was noted that, 'under the current US *Federal Arbitration Act*, adjudication is to be conducted by a "person" (human) and not a "machine" (robot)'.[48] In terms of functions, today's robots are unable to replicate the behavioural functions of a human, and therefore have the potential to significantly dilute the procedural fairness of arbitration. Horton goes on to

[44]GH Kasap, 'Can Artificial Intelligence ("AI") Replace Human Arbitrators? Technological Concerns and Legal Implications' (2021), JDR, 33.
[45]ibid.
[46]Robert Walters, Commercial & Arbitration Law of the Digital Economy: A Comparison of Asian, European and North American Jurisdictions, forthcoming 2024 Routledge.
[47]D Horton, 'Forced Robot Arbitration' (2023), CLR, 7.
[48]ibid.

say that 'AI systems suffer from the black box problem whereby they cannot explain the reasoning behind their conclusions, and deploying them in the judicial system might violate procedural due process principles'.[49] Horton goes further stating that:

> opacity is already the norm in arbitration, which is private, confidential, and often features awards that are un- written. Second, although AI legal prediction tools are still embryonic, they work well in the simple debt collection and employment misclassification disputes that businesses routinely funnel into arbitration. Third, AI programs require little overhead and operate at lightning speed. The ability to streamline the process has become especially important in the last few years, as plaintiffs' lawyers have begun filing mass arbitrations over loading the system with scores of individual claims in an effort to saddle defendants with mil- lions of dollars in fees. For these reasons, companies and arbitration providers have powerful financial incentives to experiment with automating decision-making in certain cases.[50]

AI courts would threaten the foundations of doctrinal principles. Horton, in referring to Eugene Volokh,[51] made the point that the **US Constitution** and some of its state counterparts require judges to swear oaths of office and receive salaries. This is because these scholars are considering human judges and, thus, the black box problem would impede the development of precedent, raise legitimacy concerns, and possibly violate procedural due process. For these reasons, even proponents of AI courts admit that establishing them would require a dramatic change in the legal system.[52] Viewed this way, under the current US legal framework, the law would need a radical change to incorporate and make way for non-human decision making. However, as Horton notes, this position does not apply to arbitration, because it is not formally recognised within state or federal constitution. Yet the **Australian** Constitution provides that arbitration is limited to industrial disputes.[53] Importantly, of the jurisdictions compared, the **European Union** has yet to be constitutionalised,[54] after a failed attempt to do so in 2004. The Lisbon Treaty 2007,[55] does not mention arbitration or the appointment of judges. On the other hand, this paper has not examined the member states' constitutions to confirm whether their provisions are similar to those of the US. India provides that arbitration can be used to resolve international disputes.[56] Indonesia's constitution[57] is similar to that of the US in that it makes no reference to arbitration. The **UK** has not codified a constitution and **Singapore's**[58] constitution does not mention arbitration. However, both Singapore[59] and India[60] require judges to swear an oath of office. Further under section 25 of the Indonesian constitution, the appointment of judges is to be regulated

[49]ibid 1.
[50]ibid 7.
[51]ibid, in reference to Eugene Volokh, 'Chief Justice Robots' (2019) DLJ.
[52]ibid 29.
[53]The Australian Constitution, 51, xxxv, <https://www.aph.gov.au/constitution> accessed 10 May 2024.
[54]European Parliament, Draft treaty establishing a constitution for Europe (not ratified), <https://www.europarl.europa.eu/about-parliament/en/in-the-past/the-parliament-and-the-treaties/draft-treaty-establishing-a-constitution-for-europe> accessed 20 May 2024.
[55]Treaty of Lisbon, Official Journal of the European Union, C 306/46. Convention, on the elimination of double taxation in connection with the adjustment of profits of associated enterprises, Official Journal of the European Communities, L 225/10.
[56]The Constitution of India, section 51.
[57]Indonesia's constitution.
[58]The Constitution of the Republic of Singapore, 1965.
[59]The Constitution of the Republic of Singapore, 1965, 95–98.
[60]The Constitution of India, sections 214–218.

by law. While in **Japan** sections 76–82[61] and in the Australian constitution section 72 regulate the appointment of judges, yet, there is no constitutional requirement for an oath to be taken. The constitution of **Qatar**[62] makes no specific reference to arbitration, although Articles 130 and 140 do refer to the resolution of disputes. Furthermore, the constitutions of the **Cayman Islands**[63] and the **Philippines**[64] make no mention of arbitration. This paper is not advocating for constitutional change in those jurisdictions that do not mention arbitration, although it highlights the fragmentation evident in the jurisdictions compared.

Importantly, and unlike the common law jurisdictions of Australia, Singapore, India, UK, US and, to a lesser extent (if non-existent) in the EU and Indonesian civil law, precedence has been a well-grounded doctrine. That is, the doctrine of *stare decisis* under common law compels lower courts to follow the decisions of higher courts; whereas, under civil law, the doctrine is relatively unknown because judges have the authority to reason. On the other hand, the doctrine of *jurisprudence constante*[65] applies when comparing rules established by the judiciary for civil law. Thus, the application and interpretation of future laws under the common and civil law are likely to diverge when applied to the technology used across the digital economy. However, as Horton rightly points out, in arbitration there is little to no formal adoption of the doctrine of precedence.[66] According to Horton, this is because of the confidential and private nature of the arbitration process, which has allowed only limited use of the doctrine. While this may be the case in the US, the other jurisdictions compared in this paper merit further examination.

Unlike the other jurisdictions being compared, the 'American legal system tolerates unconventional procedures in arbitration'.[67] That is, according to the procedural fairness rules and principles in the US, it has been found that judges, in many regards, make every attempt to enforce arbitration clauses and awards, and drafters can freely experiment. In referring to Judge Posner who stated that, short of authorising a trial by battle or ordeal, more doubtfully, by a panel of three monkeys, parties can stipulate whatever procedures they want to govern the arbitration of their disputes.[68] However, depending on the jurisdiction and the institutional framework adopted for a commercial arbitration, the process will differ. For instance, an arbitral institution may have established its own particular rules to govern the specifics of arbitrations across the digital economy**.**

Nonetheless, Horton in 2023 gave arbitrators some sobering news. He argued that AI is likely to be decades away from being able to take the reins from generalist judges. Even cutting-edge programmes cannot evaluate the credibility of a witness, rule on a hearsay objection, or make fact sensitive determinations about whether a party's conduct was unreasonable.[69] He believes that algorithms are not capable of adjudicating slip-and-fall torts, let alone convoluted antitrust matters in the foreseeable future. This is likely

[61]The Constitution of Japan, 1947.
[62]Constitution of Qatar, 2016.
[63]The Cayman Islands Constitution, 2009.
[64]The Constitution of the Republic of the Philippines, 1987.
[65]J Dennis, 'The John Tucker Lecture in Civil Law: Interpretation and Application of the Civil Code and the Evaluation of Judicial Precedent' (1993) LLR 54:1.
[66]D Horton, 'Forced Robot Arbitration' (2023) CLR 30.
[67]ibid 31.
[68]ibid.
[69]ibid 32.

to extend to complex cybersecurity and data breaches across all sectors of the digital economy. Moreover, for general contract, debt and lending disputes, AI may be able to take the place of the human arbitrator.

Furthermore, Horton pointed out that the statutory interpretation by the judiciary of legislation that dates back 100 years can be difficult when applying the provisions to current-day issues. The ensuing question is whether this position would apply to the other jurisdictions compared. The next section will compare the respective arbitration laws to confirm, or otherwise, this position.

III. Jurisdictional arbitration law

This section will examine the current day arbitration laws (at January 2024) to confirm or otherwise of how they refer to an arbitrator. It does not examine any arbitration institutions that are established within these jurisdictions.

Firstly Australia,[70] has a well-established arbitration legal framework that has been established by the 1974 International Arbitration Act (IAA), which incorporates the UNCITRAL Model Law [United National Commission on International Trade Law] in full. Arguably, it was drafted in a period when the intention was to refer to humans and not robots. This is reinforced in section 18A stipulating the appointment of a person as an arbitrator. Importantly, the reference to 'person' occurs no less than 40 times throughout the Act, even though the reference to a person is specific to the appointment of an arbitrator. The IAA does not define an arbitrator.

In addition to this, section 18 also clarifies the position and states that '18A Article 12 justifiable doubts as to the impartiality or independence of an arbitrator; (1) For the purposes of Article 12(1) of the Model Law, there are justifiable doubts as to the impartiality or independence of a person approached in connection with a possible appointment as arbitrator only if there is a real danger of bias on the part of that person in conducting the arbitration. This provides the clearest indication that an arbitrator must be a person. Also, section 23, which concerns an arbitrator's immunity, states that "an arbitrator is not liable for anything done or omitted to be done by the arbitrator in good faith in his or her capacity as arbitrator".'[71] Thus, the reference to 'his' or 'her' capacity implies a person, not a robot.

The **Cayman Islands** has recently established an arbitration institution. In 2012, the Arbitral Law[72] was enacted. Interestingly, section 2(1)(b) defines an arbitrator as a member of an arbitral tribunal. This implies that in order to be a member of an arbitral tribunal, the entity must be a person, not a machine or robot. Section 18(1) provides a level of clarity, stating that where 'a person is approached in connection with his possible appointment as an arbitrator'.[73] This reference to 'person' makes it clear that a robot cannot be appointed as an arbitrator. Further, under section 16 (5)(e) there is an implied reference to a person because, under the current framework, there is a specific mention of an arbitrator requiring qualifications. This section states 'any qualifications required of the arbitrator by the arbitration agreement or otherwise by the parties'.[74]

[70]International Arbitration Act 1974.
[71]International Arbitration Act 1974, section 23.
[72]Arbitration Law 2012.
[73]Arbitration Law 2012 section 18.
[74]ibid, section 16.

Currently, it is difficult to argue that a robot or other machine would have the necessary qualifications to be an arbitrator. Put another way, qualified arbitrators are considered to be minor judges who are required to undertake and successfully complete specialised training. Thus, under the current laws of the Cayman Islands, a robot cannot be appointed as an arbitrator.

The application and use of robotics in the **European Union [Slovenia]** by the European Court of Human Rights is well established. However, and while there is no specific arbitration regulation or directive, member states do have arbitration laws. For instance, **Slovenia**[75] refers to a person and the law contains terms 'his' or 'her' under the provisions for the appointment of an arbitrator. Thus, and without examining the equivalent laws of every member state, it is safe to say that they take a similar approach. The law does not define what or who constitutes an arbitrator. Article 14.5 provides a level of clarification in reference to a person or otherwise, stating:

> the Court, in appointing an arbitrator, shall have due regard to any qualifications required of the arbitrator by the agreement of the parties and to such considerations as are likely to secure the appointment of an independent and impartial arbitrator. The Court may appoint an arbitrator of a citizenship other than the citizenships of the parties, if this is necessary to ensure the independence and impartiality of the arbitral tribunal.[76]

Therefore, it can be argued that the reference to qualifications and citizenship make it connect the appointment of an arbitrator to be a person. Put another way, robots and machines do not have citizenship of Slovenia. Also, qualifications for an arbitrator are person specific. It requires a person to undertake complex training and be examined on that training. Andrés Larrea Savinovich reinforces this point stating that

> robot judges have already predicted most verdicts of the European Court of Human Rights. Those same machine judges have reviewed and processed the information of more than 500 cases making a decision, which lined up with those made by senior judges in Europe.[77]

While the history of arbitration is well documented, Savinovich stated that 'arbitral decisions involve other considerations such as empathy and respect of due process, which might be more familiar to humans than to cold machines.'[78] The point is, humans have over hundreds of years developed a high level of emotional intelligence when engaging with and responding to another human. It is far from settled whether a robot has this level of emotional intelligence. More research is required.

The same can be said for **India** under the Arbitration and Conciliation Act 1966[79] where the appointment of an arbitrator under section 11 clearly refers to a person. It does not refer to technology or to a robot. **Indonesia**[80] is somewhat more specific whereby, according to Article 1(7**),** 'arbitrator(s) (or arbitrator(s)) shall mean one or more persons designated by the parties in dispute or appointed by the District Court or by an arbitration institution to render an award regarding the particular dispute submitted for resolution

[75]Law of Arbitration Slovenia, Official Gazette 2008.
[76]ibid, Article 14.5.
[77]AL Savinovich, 'Arbitration in the Time of Artificial Intelligence', 2022, <https://www.terralex.org/publications/arbitration-in-the-time-of-artificial-intelligence> accessed 2 June 2024.
[78]ibid.
[79]The Arbitration and Conciliation Act 1966.
[80]Law No. 30 of 1999 Concerning Arbitration and Alternative Dispute Resolution.

by arbitration'.[81] Similarly, **Japan**[82] also makes regular references to 'person', and there is no mention of technology or robot.

Singapore can be considered as the dispute resolution hub of South East Asia. The island state has for many decades promoted itself as a leader in arbitration. Singapore's Arbitration Act 2001 refers to 'person' on more than 40 occasions, and does not mention technology.[83] More specifically, and according to section 13(1) that 'unless otherwise agreed by the parties, no person is precluded by reason of his or her nationality from acting as an arbitrator'.[84] Prima facie, the Singapore approach is consistent with those of the other jurisdictions, in that it makes it clear that a person is to be the arbitrator.

In Law No. (2) of 2017 Issuing the Law of Arbitration in Civil and Commercial Matters[85] in **Qatar**, Article 2 specifically refers to a person:

> Agreement to Arbitration in administrative contract disputes shall be subject to the approval of the Prime Minister, or the person to whom he delegates. Public juridical persons may not, in any case, refer to Arbitration to settle any disputes arising between them.[86]

Article 11 deals with the appointment of an arbitrator. It states that upon acceptance,

> the arbitrator's appointment shall be in writing, or by means stipulated in Article 7(3) of this Law. The arbitrator shall disclose in writing, when he is approached in connection with his appointment as arbitrator, any circumstances likely to give rise to doubts as to his impartiality or independence. Such obligation of the arbitrator shall continue even if such circumstances occur after his appointment.[87]

Of the most importance is Article 11.1 which clearly states that the arbitrator to be appointed is to be a person. It states,

> the arbitrator shall be appointed from the arbitrators who are approved and registered in the registry of arbitrators at the Ministry. Furthermore, any other person may be appointed as an arbitrator if he meets the following conditions has full capacity; has not been convicted in a final judgment of a felony or misdemeanour involving moral turpitude or breach of public trust, even if he has been rehabilitated; and is of good conduct and reputation.[88]

Hence, the law in Qatar is clear and specific in its reference to an arbitrator being a person.

In the **Philippines**, the Alternative Dispute Resolution Act came into force in 2004[89] and has defined an arbitrator according to Article 3(e) to mean the 'person appointed to render an award, alone or with others, in a dispute that is the subject of an arbitration agreement'.[90] Further Article 37, in relation to the appointment of a foreign arbitrator, makes specific reference to a person and not a machine or robot. Finally, Article 3 (b) is important because it defines ARDR [alternative dispute resolution] to mean an institution or persons accredited as mediator, conciliator, arbitrator, neutral evaluator, or any person

[81]Law No. 30 of 1999 Concerning Arbitration and Alternative Dispute Resolution Article 1(7).
[82]Arbitration Act 2003, Articles 17–19 for the appointment of an arbitrator.
[83]Arbitration Act 2001.
[84]Arbitration Act 2001, section 13.
[85]Law No. (2) of 2017 Issuing the Law of Arbitration in Civil and Commercial Matters.
[86]Law No. (2) of 2017 Issuing the Law of Arbitration in Civil and Commercial Matters Article 2.
[87]Law No. (2) of 2017 Issuing the Law of Arbitration in Civil and Commercial Matters Article 11.3.
[88]Law No. (2) of 2017 Issuing the Law of Arbitration in Civil and Commercial Matters Article 11.1.
[89]Alternative Dispute Resolution Act of 2004.
[90]Alternative Dispute Resolution Act of 2004, Article 3(e).

exercising similar functions in any Alternative Dispute Resolution system. Similar to the other jurisdictions compared, the law of the Philippines does not provide for the appointment of a machine or robot as an arbitrator.

The **United Kingdom's** Arbitration Act 1996[91] refers to a person on more than 25 occasions and, in particular, states under section 26 'death or an arbitrator or person appointing him'. This is a clear indication that the legislation is referring to a person conducting the arbitration, not technology. There is no mention of an arbitrator being appointed by a machine or a technology. While this does not rule out robots or machines, the default position is found in section 26 even though 'arbitrator' has not been defined under section 82, and sections 14–18 deal with the appointment of an arbitrator. However, there is no definition of an arbitrator, which, when comparing the laws of different states, is generally not required. A clear and specific definition of what constitutes an arbitrator would clarify the issue for parties to arbitration and the commercial world in general.

In the **United States**, under the Federal Arbitration Act, arbitration constitutes a dispute resolution with a human at the helm, and an agreement for automated procedures falls outside the scope of §2 of the FAA.[92] Horton states that in relation to the US FAA:

> Words that seem ambiguous in isolation [are] often clarified by the remainder of the statutory scheme. Two of the FAA's core components indicate that it only applies to determinations by humans. First, § 5 states that if the parties do not select an arbitrator or choose one who cannot serve, the court must appoint a substitute or substitutes who shall act under the . . . agreement with the same force and effect as if *he* or *they* had been specifically named therein. In 2022, the Federal Circuit relied on the italicised words to hold that an AI system cannot be an inventor. The FAAs sue of the words he and they suggests that arbitrators must be natural persons. Also, section 10 grounds for overturning and award envision human arbitrators.[93]

Given this, there would need to be a fundamental redrafting of the current-day laws, or a shift in the way they are interpreted. Arguably, this is only one of the most significant dilemmas facing the future of robots in arbitration and court decisions. The potential impact on the broader notion of statutory interpretation is far from being fully understood.

In reconciling the above, if it were to be undertaken, the current rule book on statutory interpretation would be all but thrown out. Any arbitrator or judge could be seen as being extremely courageous if s/he were to reinterpret or create an interpretation of the current-day legislation that allows for a human to be replaced by a robot. Thus, under the current framework, robot-facilitated arbitration is seen as having the potential to cause injustices. Even more problematic is that 'robots might embody the idiosyncrasies of their programmers'.[94] Additionally, 'because AI – robotic arbitration has a heightened probability to develop "extreme repeat players might capitalise on their familiarity with the process and expand their advantage".'[95] Thus, according to Horton, robotic procedures do not qualify as arbitration in accordance with §2 of the FAA. Therefore, further reform will be needed at the federal level in the US.

[91]Arbitration Act 1996.
[92]D Horton, 'Forced Robot Arbitration' (2023), CLR 41.
[93]ibid.
[94]ibid 47.
[95]ibid 48.

Andrés Savinovich makes the point that arbitral decisions involve other considerations such as justice, empathy and respect for due process, which might be more familiar to humans than to machines.[96] Procedural and natural justice are fundamental pillars of most jurisdictions, although the observance and application of these concepts do vary from nation state to nation state. Another consideration is generational variables, today, people over the age of 50 grew up in a different era, with no access to computers or mobiles phones. Whereas, most of those born after 2000 have grown up with a computer, and/or mobile phone in their hand. The access to the Internet and decision-making by apps could, over time, translate to people accepting legal determinations or decisions made by a robot. Andrés Savinovich further argues that:

> arbitrators should be impartial and neutral. An arbitrator is impartial when they do not have any direct or indirect link (economic interest, personal relationship) to the parties and their counsels. Hence, the arbitrator will decide the case based on its merits in an objective manner. An arbitrator is neutral when they do not have any prejudice or biases for or against the parties. In the international arbitral arena, it is common for arbitrators to be criticised for serving the interests of big law firms and multinational corporations. A machine arbitrator is programmed to be cold, analytical and impartial. Robots do not have feelings after all (as far as we know). AI arbitrators will analyze massive amounts of data, facts, answer questions of law or predict results eliminating the ever-fallible human element. By the end of the day, a party submitting their disputes to arbitration does not want to have the feeling that they lost their dispute because of an arbitrator's preference or prejudice against them, or–even worse– finding out that the arbitrator has an economic interest in the outcome of the dispute.[97]

Viewed this way, a clear distinction can be made between the robot and the technology that enables it to operate. Correctly identified by Savinovich, a robot, even one supported by the most advanced algorithms and AI cannot replicate human emotions and feelings. To extend this position, it appears that Savinovich is making a distinction between a robot from an AI driven machine that could be an arbitrator. Despite this possibility, in fact, when considering the robot in arbitration, it will be the algorithms and other technology including software, that will be used to make the final arbitral decision after analysing large quantities of data. It is this area alone that is not settled by either the law or the technology.

In further highlighting one of the largest challenges, Savinovich believes that:

> having robots as arbitrators might be related to the enforceability of arbitral awards. Although many countries are signatories to the New York Convention, it is worth noting that, under their internal legislation, local courts might refuse to recognise or enforce awards delivered by machines. Local laws regarding arbitration in most countries usually came into force at times where there was not even the possibility of having an IA arbitrator. But, given the technology development in recent years, it is important for countries to promote legal reforms in order to be more receptive to this reality and foster a more arbitration-friendly environment.[98]

Based on the above, the traditional statutory interpretation of current day arbitration laws will be paramount for the acceptance of arbitration being undertaken by a robot. In an interesting development, when comparing the national laws with those of the well-established,

[96]AL Savinovich, 'Arbitration in the Time of Artificial Intelligence', 2022, <https://www.terralex.org/publications/arbitration-in-the-time-of-artificial-intelligence> accessed 2 June 2024.
[97]ibid.
[98]ibid.

known and applied international rules for commercial arbitration, the UNCITRAL [United Nations Commission on International Trade Law] Model Law, there is a difference. According to Savinovich, the UNCITRAL Model Law does not require arbitrators to be humans. As long as the arbitration agreement is valid and capable of being performed, there is no law prohibiting parties from appointing robot arbitrators.[99] The jurisdictions compared in this paper have all generally adopted the international legal regime for transnational arbitration in their respective laws.

On the other side, the position taken by Savinovich could be questionable since Article 11 of the Model Law[100] states:

> *Appointment of arbitrators* 1) no person shall be precluded by reason of his nationality from acting as an arbitrator, unless otherwise agreed by the parties. 2) The parties are free to agree on a procedure of appointing the arbitrator or arbitrators, subject to the provisions of paragraphs (4) and (5) of this article.[101]

The reference to 'his' and 'no person' in this Article alone, without having to examine every provision, clearly implies a person. In addition to commercial arbitration, when considering investment state arbitration, under the The International Centre for Settlement of Investment Disputes (ISCD) Convention Rule (Article 37[2][b]) it is clear that if the Tribunal is to be constituted in accordance with Article 37(2)(b) of the Convention: (a) either party shall in a communication to the other party: (i) name two persons, identifying one of them, who shall not have the same nationality as nor be a national of either party, as the arbitrator appointed by it.[102] It is clear that at the international level, the rules for both commercial and investor state arbitration refer to a person and not a machine such as a robot. In fact, it can be argued that when these international legal instruments were established, the regulators arguably had a human arbitrator in mind, not a robot.

IV. Conclusion

The world is fast becoming digitalised, changing the way that everyone works, interacts and undertakes commercial and investment activities. Robots have been used for many decades, particularly in the industrial economy where they have been widely-adopted by the manufacturing sector. They are also being developed for and adopted by the service and digital industries.

Despite this, there have been a number of studies undertaken in relation to whether a human can be replaced by a robot or AI in arbitration. To date, studies have focused on four key elements, but arguably separate, areas of technology. However, previous studies have not provided a clear definition of a robot. On the other side, there is no clear definition of AI. Yet, it can be argued that they are intertwined because of the technology used. That is, this paper has highlighted that the studies have focused on AI-powered arbitrator, AI arbitration, AI-assisted arbitration, and a robot in arbitration.

In reconciling the above, there needs to be more clarification: are these referring to AI technology embedded in a machine such as a robot or other device? What is clear is that

[99]ibid.
[100]UNCITRAL Model Law on International Commercial Arbitration 2006.
[101]UNCITRAL Model Law on International Commercial Arbitration 2006, Article 11.
[102]The International Centre for Settlement of Investment Disputes (ICSID or the Centre) Rules <https://icsid.worldbank.org/sites/default/files/ICSID%20Convention%20English.pdf> accessed 5 June 2024.

the laws studied in this paper make it clear that they do not accommodate the use of a machine or, more specifically, a robot to replace the human arbitrator. However, AI could be used by an arbitrator to assist with the arbitration process.

More significantly, Horton's approach was applied to provide a wider study of the respective laws compared. The paper further confirmed that the national laws and those applying to a member state of the EU, state that a person, and not a robot or similar technology can be used as an arbitrator. Hence, this paper is not calling for law reform to allow robots to be used in arbitration.

Rather, it is highlighting that the legislation provides that persons will be conducting arbitral proceedings and making an award. The profession should retain for as long as is possible the use of a person as the arbitrator and resist any law reform to allow robots to take this role. Moreover, further research is needed not only to understand the level of proficiency this technology has regarding arbitration, but also to better understand whether those who use arbitration would be comfortable with having a robot conduct the arbitration and issue an award. Arbitration is not a function like autopilot is within an aeroplane that does not require the technology to understand and assess human behaviour or personality.

Leaving aside the national and supranational laws compared above, at the international level, the legal frameworks for transnational commercial and/or investor-state arbitration have, arguably, been developed with a human arbitrator in mind. What is becoming increasingly more settled and agreed is that the abovementioned technology can be used by an arbitrator to assist in the arbitration process.

Nonetheless, these are crucial but fascinating times for arbitration. It is naturally a conservative profession, and will undoubtedly be protected by the traditionalist. Arguably, it should be protected and the human arbitrator should not be replaced by a machine – a robot. While, AI and other technology are emerging to assist in the arbitration process, making it more efficient in areas such as document analysis, the final decision to agree to any reform rests with the nation state.

Although this paper has not discuss the implications for personal data and cybersecurity, the use of robots will pose significant challenges to the governance of personal and commercial data and to ensuring that it is secure over the Internet. Finally, this paper calls for more research into this area before any law reform is undertaken to replace the human arbitrator. The status quo has to be retained.

Disclosure statement

No potential conflict of interest was reported by the author(s).