The Role of International Rules in Blockchain-Based Cross-Border Commercial Disputes

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Recommended Citation

ROLE OF INTERNATIONAL RULES IN BLOCKCHAIN-BASED CROSS-BORDER COMMERCIAL DISPUTES

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I. INTRODUCTION

The concept of online dispute resolution (ODR) is not new.[1] But, with the advent of Web 3.0, the distributed web that facilitates pseudonymous and cross-border transactions via blockchain's distributed ledger technology,[2] the idea of, and pressing need for, appropriate

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1. In the Web 2.0 iteration of the Internet, the term online "refer[red] to the use of the Internet or related communications technologies (such as email, videoconferencing, or interaction via a website or chatroom) as the primary method of communication during a transaction or related dispute resolution proceeding." Of course, the term applies with equal force in the Web 3.0 environment that uses existing technologies—some decades old (i.e., peer-to-peer technology, public/private key cryptography and digital signatures—in a novel fashion via the Internet. *Recommended Best Practices for Online Dispute Resolution*, ABA TASK FORCE ON ECOMMERCE AND ADR, https://www.americanbar.org/content/dam/aba/migrated/dispute/documents/BestPractices Final102802.pdf (last visited June 28, 2019) (recommending best practices for online dispute resolution service providers).

2. This paper presumes some baseline knowledge of blockchain and distributed ledger technology. Essentially, blockchain is a novel database structure invented in 2008

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dispute resolution models for blockchain-based disputes to support this novel system of distributed consensus and trust of which blockchain proponents boast, is a primary concern in rapid development.[3]

The common goal of each project is to utilize smart contracts to facilitate "superior, quicker[,] and less expensive proceedings by eliminating so many of the tedious and protracted trappings of traditional arbitral proceedings, such as the sending and receiving of documents via courier."[4] Despite myriad approaches, all emerging blockchain-based dispute resolution services (BDR solutions) generally seek to bridge the divide between automated performance mechanisms, like smart contracts, and the human judgment traditionally required to settle legal disputes.[5]

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and launched in 2009 by a pseudonymous person, group, or entity Satoshi Nakamoto. *What is Blockchain Technology? A Step-by-Step Guide for Beginners*, BLOCKGEEKS (Mar. 1, 2019), https://blockgeeks.com/guides/what-is-blockchain-technology/. Blockchains—there is not just one—function much like an excel spreadsheet and without any centralized server or entity to maintain a single master version of the current state of the ledger at any single point in time. *Id.* Rather than a centralized server or trusted intermediary, the ledger is maintained and validated by a peer-to-peer network of computers. *Id.* Cryptocurrency—specifically Bitcoin—was the first use case for Satoshi's blockchain, much in the same way electronic mail (e-mail) was the first application for Internet technology. *See id.* However, there are many actual and proposed uses for this nascent technology. *See id.* And at the time of publication, hundreds of blockchains and at least 1,800 different cryptocurrencies exist. *See* COINMARKETCAP, https://coinmarketcap.com/ (last visited May 6, 2019). For more substantive coverage, see Tonya M. Evans, *Cryptokitties, Cryptography and Copyright*, AIPLA Q.J. (forthcoming 2019).

3. An ever-growing list of ODR projects includes: Kleros (kleros.io), JUR (jur.io), Juris (jurisproject.io), Aragon (aragon.org/network), Delphi (delphi.systems), Rhubarb (rhucoin.com), SAMBA (http://www.miamiblockchaingroup.com/), Jury Online (jury.online), and OpenCourt (https://media.consensys.net/opencourt-legally-enforceable-blockchain-based-arbitration-3d7147dbb56f).

4. Caroline Simson, *Arbitration Uniquely Situated to Benefit from Blockchain*, LAW360 (Mar. 29, 2018), https://advance.lexis.com/document/?pdmfid=1000516&crid=55914f03-151f-40af-b318-eb208123dcf5&pddocfullpath=%2Fshared%2Fdocument%2Flegalnews%2Furn%3AcontentItem%3A5S0B-HF81-K0BB-S3K3-00000-00&pddocid=urn%3AcontentItem%3A5S0B-HF81-K0BB-S3K3-00000-00&pdcontentcomponentid=122080&pdteaserkey=sr0&pditab=allpods&ecomp=3y9Lk&earg=sr0&prid=93337ef5-eb26-48ba-9e64-bbaecf784051&cbc=0#.

5. *See, e.g.*, Adam J. Kerpelman, *Introducing the Juris Protocol: Human-Powered Dispute Resolution for Blockchain Smart Contracts*, MEDIUM (Feb. 16, 2018), https://medium.com/jurisproject/introducing-the-juris-protocol-human-powered-dispute-resolution-for-blockchain-smart-contracts-bc574b50d8e1.

How our existing legal frameworks must develop to ensure that smart contracts[6] facilitate, rather than frustrate, the parties' intent is a critically important question to ask as the blockchain stack's infrastructure and application layers are being built and, ultimately, scaled. Indeed, interest is high in the race to create alternative dispute resolution mechanisms to resolve disputes arising from blockchain-based commercial transactions that, due to the transnational, borderless, pseudonymous, and distributed nature of blockchain, clearly necessitate international solutions.[7]

II. ANALYSIS

A. Contracts

A contract is a legal relationship defined as an agreement that creates mutually enforceable obligations.[8] Every contract is an agreement, but not every agreement is a contract, as a matter of law.[9] To be legally enforceable, a contract requires mutual assent of the parties as expressed by: an offer and an acceptance of the offer, adequate consideration, legal capacity to enter into the contract, and legal subject matter.[10]

A "smart contract," conceived by Nick Szabo,[11] is best understood as programmable code that exists within a blockchain protocol.[12] The term smart contract is a misnomer given that these pieces of code are neither "smart" nor a "contract" in the common understanding of both words.[13] The term vexes both lawyer and technologist alike as a term that sparks unnecessary controversy and causes far more confusion than is justified given the acutal mundane and routinized functions at issue.[14] In fact, in a 2019 tweet, Ethereum Founder Vitalik Buterin responded to a Twitter conversation about the proprietary of the term and role of "crypto law" in

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6. *See* Nick Szabo, *Smart Contracts Glossary*, SATOSHI NAKAMOTO INSTITUTE (1995), https://nakamotoinstitute.org/smart-contracts-glossary/
[https://archive.fo/0aJk0] (providing the original authoritative glossary of smart contract terms).

7. *See* Simson, *supra* note 4.

8. *Contract*, WEX, https://www.law.cornell.edu/wex/contract (last visited May 6, 2019).

9. *See id.*

10. *Id.*

11. *See generally* Stefan Stankovic, *Who is Nick Szabo, The Mysterious Blockchain Titan*, UNBLOCK (July 13, 2018), https://unblock.net/nick-szabo/.

12. *See* Szabo, *supra* note 6.

13. Judah A. Druck, *"Smart Contracts" Are Neither Smart nor Contracts. Discuss.*, 37 No. 10 BANKING & FIN. SERVS. POL'Y REP. 5 (2018).

14. *Id.* at 7.

the blockchain ecosystem: "To be clear, at this point I quite regret adopting the term 'smart contracts.' I should have called them something more boring and technical, perhaps something like 'persistent scripts.'"[15]

The pushback against, and even the disdain for, traditional notions of law and legal intermediaries and the role of law and legalese in an ecosystem born out of the decidedly Libertarian cypherpunk movement should not be underestimated.[16] But as the ecosystem at large comes to terms with the reality that blockchains exist within an existing and enduring labyrinth of local, national, and international legal systems, an increasing number of blockchain originalists and other stakeholders are embracing the reality that blockchain does not exist in a cypherpunk vacuum.[17]

The Ethereum Network was the first blockchain built specifically to accommodate programmable code—in the same way a computer's operating system runs various applications.[18] Szabo describes it more specifically as, "[a] set of promises including protocols, within which the parties perform on the other promises."[19] The protocols, explains Szabo, are usually implemented via software programs on a decentralized network of computers or "other forms of digital electronics."[20] Because promises, once triggered by some action on-chain, are performed without human interaction or trusted third party intermediaries, Szabo deemed smart contracts to be "smarter" than their paper-based antecedents.[21]

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15. Vitalik Buterin (@VitalikButerin), TWITTER (Oct. 13, 2018, 10:21 AM), https://twitter.com/VitalikButerin/status/1051160932699770882.

16. *See generally* Eric Hughes, *A Cypherpunk's Manifesto*, ACTIVISM.NET (Mar. 9, 1993), https://www.activism.net/cypherpunk/manifesto.html.

17. *See* Simon Chandler, *Smart Contracts Are No Problem for the World's Legal Systems, So Long as They Behave Like Legal Contracts*, COINTELEGRAPH (Feb. 8, 2019), https://cointelegraph.com/news/smart-contracts-are-no-problem-for-the-worlds-legal-systems-so-long-as-they-behave-like-legal-contracts.

18. *See generally* Vitalik Buterin, *A Next Generation Smart Contract & Decentralized Application Platform*, GITHUB (2013), https://github.com/ethereum/wiki/wiki/White-Paper; Taylor Gerring, *Cut and Try; Building a Dream*, ETHEREUM BLOG (Feb. 9, 2016), https://blog.ethereum.org/2016/02/09/cut-and-try-building-a-dream/; *History of Ethereum*, ETHEREUM HOMESTEAD (2016), http://ethdocs.org/en/latest/introduction/history-of-ethereum.html; Gavin Wood, *Ethereum: A Secure Decentralised Generalised Transaction Ledger (EIP-150 Revision)*, GAVWOOD.COM, https://gavwood.com/paper.pdf (last visited May 6, 2019).

19. Szabo, *supra* note 6.

20. *Id.*

21. *Id.*

Szabo's goal for smart contracts focused primarily on increased security within society.[22] He posited that formalizing and securing relationships, especially through contract, "provide[s] the blueprint for ideal security."[23] Further, he asserted that "contractual clauses (such as collateral, bonding, delineation of property rights, etc.) can be embedded in . . . hardware and software . . . to make breach of contract expensive (if desired, sometimes prohibitively so) for the breacher."[24] Szabo intended for smart contracts to be most commonly utilized in the performance of "financial contracts, liens, and other kinds of security, transfer of ownership, performance of online services, and supply chain workflow."[25] He also sought to replace traditional contracts with self-executable agreements based on "code as law," also referred to as *lex cryptographica*.[26] I argue that coding these agreements to precisely reflect and perform the parties' intent is essential to create an enforceable legal agreement.

Innovation and societal progress historically outpace the laws that are eventually crafted to protect users, consumers, and society from such technological advances.[27] And those advances seem to be occurring at an increasingly rapid clip.[28] For example, little more than a decade ago,

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22. *Id.*; *see also* Nick Szabo, *Formalizing and Securing Relationships on Public Networks*, FIRST MONDAY
(Sept. 1, 1997), https://firstmonday.org/ojs/index.php/fm/article/view/548/469.

23. Szabo, *supra* note 6.

24. *Id.* This goal makes sense for rule of law application, but it does not fare as well with equitable considerations.

25. Nick Szabo, *A Formal Language for Analyzing Contracts*, SATOSHI NAKAMOTO INSTITUTE (2002),
https://nakamotoinstitute.org/contract-language/ [https://archive.fo/QfvwL].

26. *See id.* at 193–204 (discussing the potential applications—and limitations— of code as law); PRIMAVERA DE FILIPPI & AARON WRIGHT, BLOCKCHAIN AND THE LAW 73–74 (2018).

27. *See* Vivek Wadhwa, *Laws and Ethics Can't Keep Pace with Technology*, MIT TECH. REV. (Apr. 15, 2014), https://www.technologyreview.com/s/526401/laws-and-ethics-cant-keep-pace-with-technology/; John Shinal, *When Technology and Society Outpace the Law*, USA TODAY (Mar. 1, 2016, 4:41 PM), https://www.usatoday.com/story/tech/columnist/shinal/2016/03/01/when-technology-and-society-outpace-law/81167076/.

28. Paul Scharre, *Making Sense of Rapid Technological Change*, CTR. FOR A NEW AM. SEC. (July 19, 2017), https://www.cnas.org/publications/commentary/making-sense-of-rapid-technological-change ("In the span of a few short years, the internet, mobile devices, and social media have transformed how we communicate and get information about the world."); *see also* John O. McGinnis, *Laws for Learning in an Age of Acceleration*, 53 WM. & MARY L. REV. 305, 310–16 (2011).

smart phones (these powerful, handheld mini-computers) did not exist.[29] As of 2015, nearly two-thirds of Americans owned a smartphone.[30] The overwhelming majority of smartphone owners use these devices as a key entry point to the online world.[31] The first personal computer arrived just forty years before the digital native, smartphone-dependent American society that exists today.[32] Early in the 1990s, the commercial Internet— a means of connecting users (other than the government or academics) to words and images—was just taking root.[33] If the development of the world wide web, Internet, and digital technology moved from the late 1950s through the early twenty-first century at "the speed of sound," development of blockchain and distributed ledger technology is on pace to move at the speed of light.[34] In addition to the pace of blockchain infrastructure development, the transnational reach and impact of the technology on the global economy across varied and various industries— finance, healthcare, supply chains, entertainment, and other IP-intensive industries—is astounding.[35]

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29. *See* Owen Andrew, *The History and Evolution of the Smartphone: 1992–2018*, TEXT REQUEST (Aug. 28, 2018), https://www.textrequest.com/blog/history-evolution-smartphone/.

30. Aaron Smith, *U.S. Smartphone Use in 2015*, PEW RES. CTR. (Apr. 1, 2015), https://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/. This number has doubled since 2011, when just 34% of Americans owned a smartphone. *Id.*

31. *Id.*

32. Scharre, *supra* note 28. Mark Prensky coined the term "digital native" to describe the generation of children, born around 1980, who grew up in the digital age. Will Kenton, *Digital Native*, INVESTOPEDIA
(May 24, 2018), https://www.investopedia.com/terms/d/digital-native.asp. As Kenton further explains:
> The idea of "digital native" came from an article explaining why today's teachers are having trouble teaching students. Prensky argues that young people today are speaking a digital language whereas teachers are speaking an old accented language (their accent being their reluctance to adopt new technology). He calls for a change in the way children are taught so that they may learn in a "language" they understand.

Id.

33. *See generally* DANIEL B. GARRIE, PLUGGED IN: GUIDEBOOK TO SOFTWARE AND THE LAW § 3.2 (2018 ed. 2018); Tristan Fitzpatrick, *A Brief History of the Internet*, SCI. NODE (Feb. 9, 2017), https://sciencenode.org/feature/a-brief-history-of-the-internet-.php; History.com Editors, *The Invention of the Internet*, HIST. (Aug. 21, 2018), https://www.history.com/topics/inventions/invention-of-the-internet.

34. *See* DON TAPSCOTT, BLOCKCHAIN RES. INST., 2018 BLOCKCHAIN REGULATION ROUNDTABLE 5 (2018),
https://s3.us-east-
2.amazonaws.com/briwebinars/2018+Blockchain+Regulation+Roundtable_Blockchain+
Research+Institute.pdf.

35. *Id.*

Core and application layer developers, technologists, and dogged entrepreneurs continue to build the blockchain infrastructure; the technological stack, regulators, lawmakers, and law enforcement across the globe attempt to make sense of it all—both within the confines of existing rules and regulations and also potential *sui generis* ones.[36] In this light, we see that although regulatory challenges in the midst of technological disruption is not new, this time it somehow feels different—more challenging and more important than ever.[37]

A fundamental question the ecosystem must ask at every step, and an essential issue to resolve, is who (or what entity) creates the rules and regulations that govern the development, impact, and effects of this transnational, disruptive technology?[38] Further, what rules apply when a regulated industry is disrupted? Are all rules abandoned? Is some hybrid rule developed? Do we institute and implement a *sui generis* approach? Whatever the answer, the ecosystem stakeholders must work as a multifaceted, multidisciplinary community to resolve these questions.

B. *Existing International Dispute Resolution Frameworks*

Web 2.0—the Internet of information—"was not and is not governed by the United Nations (UN), the International Telecommunication Union (ITU)," or other international institutions, but rather by numerous multi-stakeholder networks, "involving the private sector, civil society, government, academia, and others."[39] Any cross-border dispute resolution model must similarly embrace such a multifaceted, multidisciplinary approach.[40] It must also include existing multinational legal frameworks, set forth by international bodies and implemented by national stakeholders.[41]

Uniform laws, especially those promulgated by international bodies of member nations, avoid the morass of disagreements over which

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36. DE FILIPPI & WRIGHT, *supra* note 26, at 47–49.

37. TAPSCOTT, *supra* note 34, at 5 ("There has never been a more important or challenging time to be a regulator.").

38. *What it Takes to Build Your Blockchain*, PWC GLOBAL, https://www.pwc.com/gx/en/issues/blockchain/blockchain-in-business/build-an-ecosystem.html (last visited May 6, 2019).

39. TAPSCOTT, *supra* note 34, at 11.

40. Koji Takahashi, *Implications of the Blockchain Technology for the UNCITRAL Works*, UNCITRAL 21, https://www.uncitral.org/pdf/english/congress/Papers_for_Programme/30-TAKAHASHI-Implications_of_the_Blockchain_Technology_and_UNCITRAL_works.pdf (last visited May 6, 2019).

41. *Id.*

jurisdiction's existing legal system is superior.[42] On ratification of a treaty or convention, member nations are then charged with the task of implementation—either by reconciling the ratified model law within its existing legal framework or by adopting the model law as a *sui generis* framework.[43]

Existing international frameworks include conventions, treaties, and institutions promulgated by the United Nations.[44] The UN created the United Nations Commission on International Trade Law (UNCITRAL), the core international trade law system of the UN, that seeks to modernize and to harmonize international business rules.[45]

Prudent BDR platforms and services will leverage the wide reach of international arbitration and dispute resolution guidance, similar to the guidelines created by the 1958 New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards, to serve as the legal framework to provide certainty, predictability, and uniformity in the resulting decisions made via such platforms and services.[46] UNCITRAL

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42. *Id.*

43. *Id.*

44. The United Nations, founded by charter in 1945, seeks to "take action on the issues confronting humanity in the 21st century, such as peace and security, climate change, sustainable development, human rights, disarmament, terrorism, humanitarian and health emergencies, gender equality, governance, food production, and more." *Overview,* UNITED NATIONS, http://www.un.org/en/sections/about-un/overview/index.html (last visited May 6, 2019).
The Purposes of the United Nations are:

> 1. To maintain international peace and security, and to that end: to take effective collective measures for the prevention and removal of threats to the peace, and for the suppression of acts of aggression or other breaches of the peace, and to bring about by peaceful means, and in conformity with the principles of justice and international law, adjustment or settlement of international disputes or situations which might lead to a breach of the peace;
> 2. To develop friendly relations among nations based on respect for the principle of equal rights and self-determination of peoples, and to take other appropriate measures to strengthen universal peace;
> 3. To achieve international co-operation in solving international problems of an economic, social, cultural, or humanitarian character, and in promoting and encouraging respect for human rights and for fundamental freedoms for all without distinction as to race, sex, language, or religion; and
> 4. To be a cent[er] for harmonizing the actions of nations in the attainment of these common ends.

U.N. Charter art. I, ¶¶ 1–4.

45. *About UNCITRAL,* UNITED NATIONS COMM'N ON INT'L TRADE L., https://uncitral.un.org/about (last visited May 6, 2019).

46. Iyke Aru, *A Decentralized Dispute Resolution Platform Emerges on the Blockchain,* COINTELEGRAPH, https://cointelegraph.com/news/a-decentralized-dispute-resolution-platform-emerges-on-the-blockchain (last visited May 6, 2019). As of this date, 159 nations are signatories to this Convention. *Status: Convention on the*

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involves numerous other initiatives that may prove illustrative for different aspects of blockchain-based disputes.[47] These include the Model Law on Electronic Commerce,[48] the Model Law on Electronic Signatures,[49] the Convention on the Use of Electronic Communications in International Contracts,[50] the Model Law on Electronic Transferable Records,[51] the Rotterdam Rules,[52] and the Model Law on Secured Transactions.[53] Koji Takahashi provides thorough and thought-provoking scholarship on the implications these various UNCITRAL works have on blockchain technology.[54] Flexible rules to evaluate and settle international disputes is important.[55] But, without a corresponding enforcement mechanism, such rules would be rendered meaningless.[56]

C. UNCITRAL

Although distributed ledger technology did not exist when UNCITRAL first came into existence, UNCITRAL's reach is

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Recognition and Enforcement of Foreign Arbitral Awards (New York, 1958), UNICTRAL,
http://www.uncitral.org/uncitral/en/uncitral_texts/arbitration/NYConvention_status.html (last visited May 6, 2019).

47. *See About UNCITRAL, supra* note 45.

48. *Model Law on Electronic Commerce*, UNCITRAL,
https://uncitral.org/uncitral/en/uncitral_texts/electronic_commerce/1996Model.html (last visited May 6, 2019).

49. *Model Law on Electronic Signatures*, UNCITRAL,
https://uncitral.org/uncitral/en/uncitral_texts/electronic_commerce/2001Model_signatures.html (last visited May 6, 2019).

50. *See generally* United Nations Convention on the use of Electronic Communications in International Contracts, U.N. Doc. No. A/60/21, Annex, Nov. 23, 2005.

51. *Model Law on Electronic Transferable Records*, UNCITRAL,
https://uncitral.org/uncitral/en/uncitral_texts/electronic_commerce/2017Model.html (last visited May 6, 2019).

52. *The Rotterdam Rules*, UNITED NATIONS CONF. ON TRADE & DEV.,
https://unctad.org/en/Pages/DTL/TTL/Legal/Rotterdam-Rules.aspx (last visited May 6, 2019).

53. *Model Law on Secured Transactions*, UNCITRAL,
https://uncitral.org/en/uncitral_texts/security/2016Model_Secured.html (last visited May 6, 2019).

54. *See generally* Takahashi, *supra* note 40. In this paper, Takahashi focuses on a different aspect of blockchain's impact on UNCITRAL works. *See generally id.* First, he examines what issues presented by blockchain can be resolved by the model laws mentioned in the body of this paper. *Id.* Second, he examines whether it is possible to obtain restitution for cryptocurrencies—specifically tokens—by means of proprietary claims. *Id.*

55. *See* Takahashi, *supra* note 40, at 22.

56. *Id.* at 21.

technologically agnostic in its application to electronic commerce.[57] Therefore, blockchain-based cross-border transactions are well within the reach of UNCITRAL's laws, rules, regulations, and enforcement mechanisms.[58] In the 2010 Report of the United Nations Commission on International Trade Law, the Commission detailed, among other things, the finalized and adopted revised version of the UNCITRAL arbitration rules.[59]

The rules are divided into four sections: introductory rules, composition of the arbitral tribunal, arbitral proceedings, and the award.[60] The rules provide a comprehensive set of procedural rules upon which parties may agree for any controversy arising out of their commercial agreement that necessitates a formal resolution.[61] The rules are widely-used in both ad hoc arbitrations and administered arbitrations.[62] They cover all aspects of the arbitral process and provide a model arbitration clause as well as other important dispute resolution frameworks and guidance.[63]

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57. *Id.* at 2–3 ("Th[is] principle helps ensure that the law is able to accommodate future technological developments.").

58. *Id.*

59. Rep. of United Nations Comm'n on Int'l Trade L., at 4–12, U.N. Doc. A/65/17 (2010).

60. *Id.*

61. *UNCITRAL Arbitration Rules*, UNCITRAL, http://www.uncitral.org/uncitral/en/uncitral_texts/arbitration/2010Arbitration_rules.html (last visited May 6, 2019).

62. *Id.*

63. *Id.* For example, in addition to the rules mentioned in the body of the text, the rules cover other parts of the arbitration process including:

> [S]etting out procedural rules regarding the appointment of arbitrators and the conduct of arbitral proceedings, and establishing rules in relation to the form, effect and interpretation of the award. At present, there exist three different versions of the Arbitration Rules: (i) the 1976 version; (ii) the 2010 revised version; and (iii) the 2013 version.

Id.

D. New York Convention[64]

The two essential functions of the New York Convention are: (1) for contracting parties (Contracting States or States) to recognize and enforce foreign arbitral awards of other States; and (2) for courts of Contracting States to refer the parties to arbitration at the request of one of the parties (unless the arbitration agreement is invalid).[65] The court decisions interpreting and applying the New York Convention have been published in the Yearbook of Commercial Arbitration since its first volume was published in 1976.[66] Decisions are indexed by description, topic, and country.[67] These decisions could provide essential data and decisional metrics for recognized topics and the commitment of

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64. *In Brief*, N.Y. ARB. CONVENTION, http://www.newyorkconvention.org/in+brief (last visited June 18, 2019). The following describes one action contemplated by the New York Arbitration Convention:

> The first action is the recognition and enforcement of foreign arbitral awards, i.e., arbitral awards made in the territory of another (Contracting) State. This field of application is defined in Article I. The general obligation for the Contracting States to recognize such awards as binding and to enforce them in accordance with their rules of procedure is laid down in Article III. A party seeking enforcement of a foreign award needs to supply to the court (a) the arbitral award and (b) the arbitration agreement (Article IV). The party against whom enforcement is sought can object to the enforcement by submitting proof of one of the grounds for refusal of enforcement which are limitatively [sic] listed in Article V(1). The court may on its own motion refuse enforcement for reasons of public policy as provided in Article V(2). If the award is subject to an action for setting aside in the country in which, or under the law of which, it is made ("the country of origin"), the foreign court before which enforcement of the award is sought may adjourn its decision on enforcement (Article VI). Finally, if a party seeking enforcement prefers to base its request for enforcement on the court's domestic law on enforcement of foreign awards or bilateral or other multilateral treaties in force in the country where it seeks enforcement, it is allowed to do so by virtue of the so-called more-favourable-right provision of Article VII(1).

Id.

65. *Convention on the Recognition and Enforcement of Foreign Arbitral Award*, U.N. Conference on International Commercial Arbitration, art. III (1958), http://www.newyorkconvention.org/11165/web/files/original/1/5/15432.pdf.

66. *Court Decisions*, N. Y. ARB. CONVENTION, http://www.newyorkconvention.org/court+decisions (last visited May 6, 2019). To date, more than 1,700 court decisions have been published. *Id.* The decisions are labeled with a "unique number in the Yearbook (e.g., 'US 503'). The reasoning of each decision is indexed by subject matters ('Topics', e.g., '¶ 105') and paragraph number (e.g., 'US 503 (sub 4)'). Those data appear in the 'chapeau' of each court decision as reported in the Yearbook and online at www.kluwerarbitration.com." *Id.*

67. *See Court Decisions, supra* note 66.

Contracting States to recognize and enforce decisions of other States.[68] To date, there are 159 parties to the New York Convention.[69]

E. BDR Mechanics

As noted above, smart contracts are pieces of software code that run on top of a blockchain protocol.[70] Parties program smart contracts to autonomously execute or perform an obligation under predefined conditions (e.g., "if X, then Y").[71] When the "if" occurs successfully, the "then" of the smart contract is triggered to complete the output and write the results to the relevant blockchain that supports the smart contract.[72]

Smart contract code facilitates the performance of an agreement between the parties.[73] This is particularly useful in the blockchain space, where parties are often pseudonymous actors identified only by public key address.[74] An example will help bring this nebulous concept into focus. Two parties, Alice, the buyer, living in the United States and Bob, the seller, living in Ghana, agree that Bob will create a website for Alice to go live on a specified date for a specified series of payments (one-third on contract, one-third on soft launch, one-third on final launch). Alice informs Bob that the website must be completed, tested, and launched before the grand opening of her business, and Bob agrees to those "time-is-of-the-essence-terms." Bob agrees to receive payment in cryptocurrency.

If a breach occurs, what law will apply to settle the controversy and make the parties whole (in the parlance of American contract law), where two parties live under vastly different legal regimes of two different countries? If the parties agree at the outset to subject their mutual

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68. *Id.*

69. *Contracting States*, N.Y. ARB. CONVENTION, http://www.newyorkconvention.org/list+of+contracting+states (last visited May 6, 2019) (noting that these parties include 156 of the 193 United Nations member-States plus the Cook Islands, the Holy See, and the State of Palestine and that the United States has been a contracting member since September 30, 1970).

70. *See* Szabo, *supra* note 6; *see also Smart Contracts*, BLOCKCHAINHUB, https://blockchainhub.net/smart-contracts (last visited May 6, 2019).

71. Joel Comm, *How Smart Contracts Could Change The Way You Do Business*, FORBES (May 16, 2018), https://www.forbes.com/sites/forbescoachescouncil/2018/05/16/how-smart-contracts-could-change-the-way-you-do-business/#10d79c171288. Recall the vending machine example.

72. *Id.*

73. *See Smart Contracts, supra* note 70.

74. For a discussion on asymmetric-key encryption, also referred to as public-key encryption, see generally Jeff Tyson, *How Encryption Works*, HOWSTUFFWORKS (Apr. 6, 2001), https://computer.howstuffworks.com/encryption3.htm.

obligations and contractual terms to smart contracts (for example, to automate payment) and to BDR (to retain the ability to pause automated performance, in case of a controversy, and apply a pre-defined set of rules as interpreted and applied by a BDR arbitrator or arbitral panel), they can opt into a private dispute resolution that is faster, far less expensive, borderless, and more efficient than traditional State-based dispute resolution in either country.[75] Additionally, arbitral outcomes would be recorded to a blockchain to preserve transactional data on-chain and related information, like authenticated documents.[76] Results would also be recorded off-chain, by means of Inter Planetary File Storage (IPFS) or a similar decentralized file storage system.[77]

F. Risks of Blockchain ODR

I detailed above a range of potential benefits of a fully-functioning BDR solution. However, exploration of the possibilities of a decentralized dispute resolution would be wholly inadequate and incomplete without identifying the risks as well. In *Decentralized Justice in the Era of Blockchain*, Dr. James Metzger explored some of the challenges of a specific blockchain-based dispute resolution platform, Kleros, which may prove illustrative for broader concerns in decentralized dispute resolution.[78] Those challenges include: (1) technological and educational barriers to participation; (2) cryptocurrency volatility affecting, in the case of Kleros, the price of Ether and the Kleros platform token values;[79] (3) jury pool compositions; (4) applicable laws; and (5) cryptoeconomic incentives.[80]

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75. Aru, *supra* note 46.

76. *See* Julius Arie Hermanto, *On-Chain and Off-Chain Transaction Settlement in Cryptocurrency Exchange—New Advanced Technology behind Blockchain.io as A New Generation of Cryptocurrency Exchange*, MEDIUM (July 27, 2018), https://medium.com/@juliostore83/on-chain-and-off-chain-transaction-settlement-in-cryptocurrency-exchange-new-advanced-technology-f50085179af8.

77. For an explanation of IPFS, see generally *About,* IPFS, https://ipfs.io/#why (last visited May 6, 2019); Juan Benet, *IPFS - Content Addressed, Versioned, P2P File System (DRAFT 3),*
IFPS,
https://ipfs.io/ipfs/QmR7GSQM93Cx5eAg6a6yRzNde1FQv7uL6X1o4k7zrJa3LX/ipfs.dr aft3.pdf (last visited May 6, 2019).

78. James Metzger, *Decentralized Justice in the Era of Blockchain*, 5 INT'L J. OF ONLINE DISP. RESOL. 69 (2018).

79. The PNK token is the platform token used in Kleros, a decentralized application (dApp) that runs on the Ethereum Network. *See Kleros*, COINMARKETCAP, https://coinmarketcap.com/currencies/kleros/ (last visited May 6, 2019).

80. Metzger, *supra* note 78, at 69–81.

1. Technological and Educational Barriers

An initial fundamental challenge that impacts all BDR solutions is the need to obtain the native currency of the respective blockchain (for example, ETH for Ethereum) in order to exchange that native coin for the BDR's tokens (for example, PNK for Kleros).[81] This process of on-boarding from fiat currency to cryptocurrency is incredibly time-consuming and challenging from the average user's point of view.[82] This reality dramatically shrinks the available pool of participants to submit controversies to BDR services as well as the pool of available arbitrators (called jurors in the Kleros example).[83]

Additionally, the technological tools needed to on-board involve, in the case of Kleros or any dApp that runs on Ethereum, a Web3-enabled browser plug-in (such as MetaMask[84]) as a layer between centralized web-browser tools (for example, Google Chrome or Mozilla Firefox) and blockchains.[85] These technological hurdles exist before one can even register to serve as a juror in Kleros.[86] Again, many BDR platforms have similar on-boarding challenges.[87]

2. Cryptocurrency Volatility Affecting Price

A related concern to Part II(F)(1), immediately above,[88] is the volatility of the cryptocurrency market for both native coins and ERC-20 tokens like PNK that often track the ups and downs of Bitcoin, the

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81. Hugo Renaudin, *Shortfalls of Decentralized Exchanges*, MEDIUM (Jan. 15, 2018), https://medium.com/lgogroup/shortfalls-of-decentralized-exchanges-8f2bf7d2bd50.

82. Swati Goyal, *The Difference Between Fiat Money and Cryptocurrencies*, YAHOO FIN. (Aug. 9, 2018), https://finance.yahoo.com/news/difference-between-fiat-money-cryptocurrencies-132027811.html; *see generally* Sam Stone, *Fiat Gateway: Why it's a key element for security tokens*, MEDIUM (Dec. 7, 2018), https://medium.com/swarmfund/fiat-gateway-75b5fbd2d05b.

83. Obtaining cryptocurrency is somewhat analogous to exchanging foreign currency, which is presumably a more common endeavor in the twenty-first century. But, says Dr. Metzger, "even that comparison may suggest a significant enough barrier to entry for many." Metzger, *supra* note 78, at 76.

84. *See* METAMASK, https://metamask.io/ (last visited May 6, 2019).

85. *See id.*

86. *See* Federico Ast and Clément Lesaege, *Kleros: Frequently Asked Questions about Peer-to-Peer Justice: What do I need to set up before the sale?*, MEDIUM (Oct. 2, 2017), https://medium.com/kleros/kleros-frequently-asked-questions-about-peer-to-peer-justice-5a921cb76abe

87. *See supra* note 84.

88. *See supra* Part II.F.1.

dominant coin in terms of market cap.[89] Questions exist about how token value changes juror fidelity to meting out justice in the form of optimal arbitral results.[90] High volume also impacts cryptocurrency and gas prices on platforms like Ethereum.[91] An example of how high volume can drastically increase the cost of Ethereum transactions required to participate in Kleros is best illustrated by the impact Cryptokitties had on the Ethereum network at the height of that dApp's popularity at the end of 2017.[92] Despite any benefits of BDR solutions, these new variables in the dispute resolution arena need careful attention to ensure platforms are built to be impervious to such volatility. This volatility would inject uncertainty into a system where certainty and trustworthiness are of critical importance.

3. Jury Pool Composition

Due to the high technological and educational barriers to entry and price volatility, jury pool composition is a substantial concern.[93] Although some controversies might be single-issue, garden-variety ones, it is far more likely that parties who submit to BDR have complex issues requiring a certain level of education and sophistication of both the legal issues at hand and the technology that enables decentralized dispute resolution.[94]

4. Applicable Laws

What laws apply is an ever-present concern. Ensuring arbitrators use the same set of rules and metrics to evaluate and settle disputes is paramount to ensuring predictable and optimal results. It is for this

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89. *See Bitcoin*, COINMARKETCAP, https://coinmarketcap.com/currencies/kleros/ (last visited May 6, 2019); *see also* Chrisjan Pauw, *How Cryptocurrency Prices Work, Explained*, COINTELEGRAPH (July 24, 2018), https://cointelegraph.com/explained/how-cryptocurrency-prices-work-explained.

90. *See* William George, *Why Kleros Needs a Native Token?*, MEDIUM (June 7, 2018), https://medium.com/kleros/why-kleros-needs-a-native-token-5c6c6e39cdfe.

91. *See generally What is Gas?*, MYETHERWALLET, https://kb.myetherwallet.com/gas/what-is-gas-ethereum.html (last visited May 6, 2019).

92. *See* Evans, *supra* note 2, at 10–11; *see also* Michael Taggart, *Itty Bitty Kitties are Killing Ethereum*, MEDIUM (Dec. 7, 2017), https://medium.com/@michaelx777/little-bitty-kitties-are-killing-ethereum-a1253b18b501.

93. *See* Metzger, *supra* note 78, at 69–81.

94. See Oliver Marquais, *Introduction to Programmable Contracts: A Dispute Resolution Perspective*, L. GAZETTE (Sept. 2018), https://lawgazette.com.sg/feature/introduction-to-programmable-contracts-a-dispute-resolution-perspective/.

reason, I advocate that BDRs adopt international model laws, rules, and enforcement mechanisms to create a reliable and predictable arbitral platform.

5. Cryptoeconomics, Incentives and Decentralized Justice

The success of BDR solutions is necessarily premised on "a combination of cryptoeconomics principles and game theory [to] provide necessary incentives to keep jurors honest, [and therefore] administer[] fairness of decision-making."[95] Honesty is inextricably linked to the desire of rational actors to protect their token balance.[96] Sufficient application governance must exist to ensure the stability, validity, and security of the platform. Further, that platform must reside on an equally stable, valid, and secure blockchain.

III. CONCLUSION

Rather than disrupting dispute resolution, I imagine that BDR solutions will augment and improve upon existing ODR systems. Additionally, I assert that the most effective means of achieving an optimal result is to utilize existing international rules and regulations promulgated by the United Nations as the legal infrastructure for BDR solutions.

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95. Metzger, *supra* note 78, at 81.
96. See James Chen, *Rational Choice Theory*, INVESTOPEDIA (Feb. 14, 2019), https://www.investopedia.com/terms/r/rational-choice-theory.asp.