Stanford Journal of Blockchain Law & Policy

Resolving NFT and Blockchain Disputes

Amy J. Schmitz, John Deaver Drinko-Baker & Hostetler Professor of Law at The Oh

Published on: Jun 24, 2023

URL: https://stanford-jblp.pubpub.org/pub/resolving-nft-blockchain-disputes

Abstract

Non-Fungible Tokens (NFTs) are disrupting ideas around "assets." They are novel digital assets that have value for various uses, despite their questionable status under current law. Furthermore, the smart contracts that control NFTs are disrupting the way enforcement occurs and deals are done. Moreover, smart contracts may seek to prevent disputes through computer code—but instead, they raise new and complex conflicts. Indeed, disputes regarding NFTs and smart contracts are inevitable. Accordingly, parties need means for dealing with these highly technical issues. This article tackles this challenge and proposes that parties turn to online arbitration (what I have termed "OArb"). OArb may be the best means for efficiently and fairly resolving NFT and blockchain disputes. Furthermore, the article acknowledges the benefits and challenges of current means for addressing blockchain issues and proposes ideas for how designers could address those challenges and incorporate OArb to provide efficient and fair resolutions.

I. Introduction

We live in an age of technological disruption.[1] In fact, technology is changing the way we do deals, and what we think of as art or even how one looks at an essay. Gone are the days when most deals were negotiated in person and sealed with a handshake.[2] Gone are the days when we could detect that we are interacting with robots. Instead, we now expect to make most purchases online through e-contracts, sealed with a click on the "accept" button instead of wet ink signatures.[3] Even corporate leaders now use e-mails and text messages to negotiate deals, which they eventually "sign" online through services like DocuSign.[4] Furthermore, parties may even use iterative technologies like ChatGPT in contract negotiations.

Computer code and algorithms have replaced many of the processes and concepts that were integral to contracting, and even what we see as an asset. For example, even simple e-contracts are being replaced by "smart contracts" on the blockchain. E-contracts are still traditional contracts with offer, acceptance, and consideration. The "e" simply means that we accept them by clicking a button on a computer or phone screen. Smart contracts, in contrast, push the envelope further into the digital age and allow parties to codify performance or enforcement in computer code.[5] Those with no coding background cannot easily read or interpret a smart contract in its rawest form. Here is one picture of a smart contract from a simple online search:[6]

```
(define-keyset 'accounts-admin
  (read-keyset "accounts-admin-keyset"))

(module accounts 'accounts-admin
 "Simple account functionality."

 (defschema account
  "Schema for accounts table."
  balance:decimal
  amount:decimal
  keyset:keyset
  note)

 (deftable accounts:{account})

 (defun create-account (address keyset)
  (insert accounts address
         { "balance": 0.0, "amount": 0.0, "keyset": keyset,
           "note": "Created account" }))

 (defun transfer (src dest amount)
   "transfer AMOUNT from SRC to DEST"
  (with-read accounts src
             { "balance":= src-balance
             , "keyset" := src-ks }
    (enforce-keyset src-ks)
    (check-balance src-balance amount)
    (with-read accounts dest { "balance":= dest-balance }
     (write accounts src
            { "balance": (- src-balance amount)
            , "amount": (- amount)
            , "note": { "transfer-to": dest } })
     (write 'accounts dest
            { "balance": (+ dest-balance amount)
            , "amount": amount
            , "note": { "transfer-from": src } })))))

 (defun check-balance (balance amount)
   (enforce (<= amount balance) "Insufficient funds"))
)

(create-table accounts)
```

Account balance smart contract in Pact | Download Scientific Diagram

Smart contracts, built into the blockchain, amount to computer code spread across blockchain nodes distributed throughout the world.[7] "Nodes" are computer coded algorithms that live in a decentralized digital ledger, or blockchain.[8] Indeed, even attempting to summarize an explanation of smart contracts in an Introduction to an article seems foolish, as concepts around blockchain have morphed and become more complex over time.

At the same time, blockchain technology has given rise to new types of digital assets known at NFTs—nonfungible tokens. NFTs usually exist on a blockchain, a secure distributed ledger that records transactions through nodes spread out among many computers in a network.[9] Furthermore, NFTs are usually powered through smart contracts, meaning that smart contracts control the transferability and ownership of NFTs. In

other words, smart contracts are not the same as NFTs but are generally foundational to their use. Accordingly, many of the disputes that arise with respect to NFTs go back to the smart contracts that control them.[10]

Although NFTs have been around for almost ten years, they are gaining notoriety now because they are becoming an increasingly popular way to buy and sell digital artwork. NFTs are different from cryptocurrencies and fungible tokens in that each individual NFT is completely unique. This uniqueness flows from the fact that NFTs are generally one of a kind, or at least one of a very limited run, and have unique identifying codes. Furthermore, when someone creates or mints an NFT, they execute computer code stored in smart contracts added to the blockchain. This makes NFTs trackable and transparent on blockchains such as Ethereum's (as an example, although they can exist on another ledger).

An NFT's value is typically tied to its ability to guarantee authenticity. Some examples of their use include digital art, GIFs, collectibles, music, legal documents, signatures, etc. An NFT can only have one owner at a time, generally managed through a smart contract that assigns ownership and manages the transferability. NFTs may even be used to authenticate documents in litigation, or records showing ownership of important items. Still, most are familiar with NFTs for digital art or in gaming, where they are integral to unique digital assets that represent in-game content. NFTs power player ownership and have helped give blockchain potential in gaming to drive mainstream adoption and a new value model within the gaming industry.[11]

As one commentator noted:

> Thanks to the implementation of blockchain technology in the gaming industry, you can save in-game purchases, sell them to other players, or move them into other supported games. Meanwhile, the scarcity of in-game NFT purchases is provable through the immutable records embedded in an NFT's underlying blockchain network — as is its history of ownership. Because NFTs are unique and can be designed to retain value beyond the game in which they originated, blockchain-built games and dApps have the potential to expand gaming economies, establish new gaming categories, and fuel development of new games.[12]

Still, smart contracts are a key component for driving transactions and enforcement mechanisms with respect to NFTs. This is important because smart contracts may have the potential to create efficiencies and largely eliminate the need for complicated and costly financing by digitizing automatic enforcement or payment.[13] If computer code can automate enforcement, there is no need for lawyers or litigation—at least in theory.

The reality, however, is that smart contracts, like most emerging technologies, often generate more issues than they resolve.[14] Inevitably, disagreements and conflicts arise regarding the coding and content of smart contracts and NFTs.[15] Parties to smart contracts may not understand what they agreed to, or there may be disputes about what exactly the smart contract has codified.[16] Coding errors are also common. A 2016 study revealed that there are 100 errors per 1,000 lines of coding. [17] Extrapolated to NFTs and smart contracts, this

means that digital assets and smart contracts may not be accurately coded to encompass the parties' original intentions.[18] Indeed, computer coders may be negligent, and subject to liability, in some cases.[19]

Importantly, there is no articulated and clear system of legal rules that apply to smart contracts and NFTs.[20] There is a great deal of ambiguity, and legislators, who may not even understand what a smart contract is, are quick to seek ways to codify laws around smart contracts that may create more questions than they answer. For starters, it is unclear whether smart contracts are in fact "contracts" under civil and common law.[21] Smart contracts do not fit neatly into legal concepts like offer, acceptance and consideration. Additionally, if a matter falls under the statute of frauds, it is unclear whether a coded transaction will constitute a "writing" and whether the keys to encrypt smart contracts will constitute signatures of the parties for purposes of the law.[22]

Moreover, even if one could establish that there is an agreement underlying a smart contract, litigation regarding these digital creations is highly problematic.[23] What remedies exist for the smart contract party who wants to prevent or reverse enforcement? What remedies are there for an NFT owner who wants to stop transfer of the NFT per a smart contract? If this were a traditional contract, a party could file and action in court, and seek rescission or a menu of judicial remedies. With smart contracts, however, enforcement on the blockchain is automatic and the code is immutable. Again, these are not really "contracts" in the traditional sense and "enforcement" is based on code, not courts.

Furthermore, parties holding NFTs may have very different understandings and expectations. Some holders of NFTs may not understand what they own, and individuals may have different ideas around the agreement that may underlie the code in a smart contract. Parties to these digital assets may not really understand that code—while coders hay also have different thoughts around the code. At the same time, digital art may raise intellectual property claims if parties claim that minting an NFT with respect to a prior physical art piece would infringe another's rights.[24] Nonetheless, this article will not dive into the intellectual property claims, which deserve a separate analysis. Instead, this article will focus more generally on best venue and means for resolving blockchain-related claims.

Again, smart contracts do not eliminate disputes through codification—inevitable disputes still emerge: What law will apply to these issues if "code is law" in smart contracts? Where will parties turn to resolve their smart contract and NFT disputes? Will judges be able to answer questions asked or provide remedies? Litigation seems nonsensical since it is unclear what court would have jurisdiction, as smart contracts exist within the context of a distributed ledger system. It is also unclear whether or how contract law should apply, what laws govern the transaction, and what evidence could be collected to adjudicate the matter. As one commentator stated: "Given the complexity and technical character of the issues connected with NFTs, it is of the utmost importance that any disputes be resolved by creative and open-minded people."[25]

Even putting aside the jurisdiction and other issues noted above, offline litigation undermines the smart contracts' promise of efficiency. Furthermore, the anonymous nature of smart contracts and the fluidity of

online identities make it difficult to determine party identity in some cases.[26] It is also difficult to conceptualize how judges could fashion remedies that often consist of developing new code to update a smart contract—especially when the code is append only deployed on a blockchain.[27]

Accordingly, this article discusses smart contract NFT disputes, dilemmas with respect to resolving blockchain-related disputes, and current offerings for blockchain dispute resolution. Furthermore, this article proposes online dispute resolution ("ODR"), or specifically online arbitration ("OArb"), built into smart contracts to efficiently and fairly resolve blockchain-related disputes. With this in mind, Part II of the article lays a foundation by providing greater explanation and background on the evolution of NFTs, and smart contracts that drive them. It also tackles questions regarding the complexities of smart contracts and their status under current law. Part III then notes new means for dealing with smart contract and blockchain issues. Part IV will include discussion of ideas for fashioning OArb to provide fast and fair resolution, noting cautions for policymakers. Part V will conclude.

II. Blockchain, smart contracts, and NFTs

A. Digital Backbone of NFTs

Blockchain is the digital backbone for NFTs and smart contracts. As noted above, blockchain is a distributed ledger spread across an internet network. It allows for information to be stored in different, redundant locations throughout the world. This makes it much more difficult to "hack" than systems that rely on one central location. When a document or asset is put into the blockchain, it is replicated across every archival node, so it would take over 50% of a network's mining hash rate to hack:

"Imagine if you had a notepad where everything you wrote in the notepad would be duplicated exactly in other notepads around the world (and everything written in those notepads would appear in your notepad as well). Even if your notepad was destroyed, the other notepads around the world would have everything you wrote in it, so the contents would never be lost. Also, imagine if there were global rules that governed what could be written in the notepads. If someone tried to write something in a notepad that didn't follow the rules, then all the other notepads would reject it."[28]

This structure makes it very difficult to spoof or edit the information placed in the blockchain, which is vital to smart contracts' immutability. Furthermore, NFTs are by their nature non-fungible and unique.

This makes smart contracts and NFTs built into the blockchain valuable for particular use cases. When smart contracts built into the blockchain are driving ownership and transfer of NFTs, the goal is for computer code to prevent any need for lawyers or courts. This new system, built on smart contracts and blockchain, enforces agreements through code instead of judges and jails. The idea is "code is law," rendering jurisdiction and legal rules largely irrelevant because the system itself establishes the basis for enforcement.[29]

Under "code as law," a computer network manages all enforcement across jurisdictions. With the help of blockchain technology, enforcement does not rely on information housed in one central location, vulnerable to outages and hackers. This can enhance trust and enforceability, while reinforcing privacy and security. The blockchain also provides encryption with public and private keys, which are blockchain-based identification numbers provided by the network.[30] This eliminates need or reliance on physical signatures, or even e-signatures inserted in a PDF, which are more vulnerable to fraudulent duplication.

That said, a blockchain can be "hacked" and has its own problems and risks.[31] Proponents of the blockchain claim that the distributed ledger is safe, "immutable," "secure," and "trustless."[32] However, hackers can manipulate the technology and it is important to recognize that there is no such thing as a perfectly secure system. Fraudsters can infiltrate the blockchain by, for example, using a "hard fork" to steal data and assets. A well-executed "hard fork" can even make a blockchain vulnerable to collapse.[33] At the same time, blockchains are vulnerable to errors and outside manipulations, and we often hear about vulnerabilities exposed through connection with oracles. As we should have known, the idea that code alone will prevent fraud or disputes is unfounded.[34]

These risks have not slowed the blockchain boom.[35] In 2017, venture capitalists invested $1 billion in start-up blockchain companies.[36] At the same time, blockchain companies offered $5 billion in initial coin offerings ("ICOs"), which are now recognized by the Securities and Exchange Commission and regulated as securities.[37] Venture capitalists have continued to invest substantially in cryptocurrency start-up companies well into 2022 despite the volatility of cryptocurrency markets.[38] Cryptocurrency startups received over $9.7 billion in VC funds first quarter of 2022, and $5.3 billion in the second quarter.[39] At the same time, reports of cryptocurrency collapse have haunted the news networks, tainting the allure of blockchain.

Cryptocurrencies aside, blockchain has created new opportunities in law, as law firms are building blockchain departments and lawyers are specializing in smart contracts.[40] Large law firms are boasting "Web3 and Digital Assets" groups to advise "the largest and best-known Web3-native companies, as well as financial institutions, entertainment companies, global brands and sports leagues, on their Web3 and digital asset engagements."[41] Law firms recognize the need for legal guidance to assist clients with "tokenomics" as well as disputes regarding digital assets and blockchain.

While different sources vary in their estimates regarding NFT market volumes, one source states that NFT investments grew from as much as $15.54 billion in 2021 to $20.44 billion in 2022.[42] It could be that the NFT market will reach a high of $211.72 billion by 2030, according to Grand View Research.[43] Use of crypto wallets also signals growth in the industry. The number of crypto wallets belonging to owners of NFTs grew from 89,000 to 2.5 million wallets in 2021 alone.[44]
According to one statement, this drastic increase in the amount of people participating in NFT transactions generated a total of $5.4 billion in profits from NFT sales.[45] It is not surprising that this high volume of transactions is generating a high volume of disputes.

B. Ambiguous Legal Status

Despite the hype around NFTs and blockchain's potential, smart contracts raise many unanswered questions. Transfer and ownership of NFTs is usually driven by smart contracts, and an NFT may also contain a smart contract that includes terms and conditions regarding enforcement as well as governance of later sales of the NFT—including royalties for the original creator beyond the first sale. Smart contracts are therefore important in tracking enforcement of rights regarding NFTs. At the same time, smart contracts enjoy ambiguous legal status. They are not the same as e-contracts.[46]

Draped in legal uncertainty, it is no surprise that unforeseen disputes will almost certainly arise regarding smart contracts. As noted in the Introduction, smart contracts may not necessarily be legal contracts. The model of making and enforcing traditional agreements is closely tied to the judicial system, with litigation as the endgame. That means that parties usually know that they can litigate if one breaches a contract. The traditional contract model is nonetheless changing in the digital age. As noted above, parties continually agree to e-contracts each day by clicking a button and "accepting" terms they never read, while purchasing goods and services on the internet.[47] Nonetheless, these e-contracts are legal contracts that are generally enforceable and commonplace for most of us in our daily lives.[48]

In contrast to these e-contracts, smart contracts are computer code consisting of "if/then" statements laying out each obligation and eventuality. These computer programs can be self-enforcing, often linked to oracles to gather certain metrics that trigger events. This allows for continuous monitoring of key performance metrics to trigger the "if/then" statements leading to automatic enforcement. An oracle can be linked to any data, such as a commodity price or shipment delivery. Auto-enforcement through "if/then" triggers can add efficiencies for many kinds of agreements. This includes financing, shipping, manufacturing—NFT contracts. Parties need not worry about facing the inefficiencies of litigation or paying lawyers when the terms and enforcement are established in the computer coding per "if/then" rules. *If* event "x" happens (e.g. stock hits a certain price), *then* "y" occurs (e.g. the stock purchase occurs).[49] Again, this can lead to cost savings when properly coded and deployed, even with respect to NFTs.

Of course, this utopian view of smart contracts is often disrupted by the realities of errors and misunderstandings. Computer code may have errors, and there is a risk that faulty or fake data will improperly trigger, or fail to trigger, smart contract clauses. Oracles may provide false data and are notoriously prone to compromise. This may result in major financial losses.[50] Computer programmers, or coders, also may face liability for erroneous coding.[51] Coders working in concert with smart contract drafters could face damages for creating improperly structured contracts, while hackers may attempt to manipulate data to the advantage of one or the other party.[52]

At the same time, there is no articulated and clear system of rules that apply to smart contracts.[53] At the core of "contract law" is the concept of consent. This idea of consent requires some effective communication of an

intentional transfer of rights and obligations between parties.[54] Presumably the parties to a smart contract, like any contract, will have consented to the terms underlying the code.[55] However, as noted earlier, smart contracts are translated into code without the same pageantry of traditional contracts.[56] This means that it may be difficult for the parties to understand whether the code accurately memorializes their agreement. In this way, smart contracts lack the usual cautionary, evidentiary, and channeling functions of written contracts in the traditional system.[57]

At the same time, smart contracts may codify agreement or dictate actions outside of the legal system. Smart contracts may therefore allow parties to circumvent legal rules.[58] This is why lawyers debate whether smart contracts are "contracts" in the legal sense.[59] In common law, it is unclear that code constitutes true *offer, acceptance and consideration*. Civil lawyers then argue whether there is sufficient documentary evidence to support legal enforcement.[60] Moreover, even if one gets past contract formation questions by looking back to the originating documents, jurisdiction and other legal questions create hurdles for litigating smart contracts.[61]

Sometimes, it may not even be clear who the parties *are* to a smart contract. Smart contracts on a blockchain are generally anonymous, and become even more anonymous when they use cryptocurrencies that make it nearly impossible to discover true identities of the parties or their computers.[62] Without knowing the identity and domicile of the parties, courts are unable to establish jurisdiction using traditional rules based on minimum contacts or physical presence.[63] How would one even serve process on a party known only by a cryptographic key?

Furthermore, even if a court could determine jurisdiction of the parties, it would be difficult for a court to interpret a smart contract and understand the code behind an NFT. Code is written to be understood by programmers, not lawyers and judges.[64] At the same time, it would be difficult for a court to intervene to prevent or reverse automatic smart contract executions.[65] Furthermore, how could a traditional court fill gaps in smart contracts, especially given that blockchain technology does not generally allow for modifications?[66] Moreover, does a generalist judge, who is often an older adult with limited technological understanding, have the know-how to navigate blockchain issues—let alone fashion a proper remedy?

That said, some argue that governance standards around the blockchain will emerge to promote "confidence in the technology and the legal and regulatory environment."[67] They see government or other standards groups dictating rules that will govern smart contracts. In the United States, states are beginning to introduce and pass legislation regarding enforcement of smart contracts.[68] Some commentators also have proposed that legal rules could be coded into the blockchain contracts themselves.[69]

The problem with these ideas for governmental regulation is that blockchain technology is advancing faster than any law could possibly move. Reactionary legislation is largely meaningless for those creating and using smart contracts and NFTs. Traditional legal systems are notoriously political and slow to act.[70] Furthermore,

regulations would have to be international and widely accepted because blockchain contracts are cross-jurisdictional and international, among parties of varying nationalities and legal systems.[71]

Nonetheless, some US states have begun passing legislation in hopes that codifying enforcement of smart contracts will elevate their states as progressive to technology investors, and attractive for technology companies. For example, some states have passed legislation that define smart contracts per their jurisdiction and incorporate them into their existing legal structure. Different states' laws vary slightly in wording, but many states have passed laws similar to Tennessee's recognition of a cryptographic signature stored on the blockchain as a legitimate electronic signature.[72] Many states also follow Tennessee in allowing the use of smart contracts and stating that no contract relating to a transaction should be denied legal enforceability just because the contract is a smart contract, concluded in code.[73] It is unclear how much these laws achieve in practice, or what difference they make when it comes to practicalities of resolving smart contract disputes. The laws seem like window dressing—with questionable impact.

C. Remedies When Things Go Wrong

Smart contracts are not set up to allow for creative or equitable remedies. A smart contract is "a set of promises specified in digital form" carried out automatically by an algorithm, so an NFT governed by a smart contract either transfers or does not transfer. [74] Once a smart contract is created and put on the blockchain, execution is automated and irrevocable, or at least difficult to revoke.[75] As such, smart contracts essentially eliminate "do-overs." They are usually self-governing and self-executing.[76] This means that creating remedies would be problematic for a court of law dealing with a smart contract dispute.

Many have compared smart contracts to vending machines: the product is delivered once money is received with no ability for human intervention.[77] In other words, the terms are "embedded" in the machine, and it performs (delivers a product) in response to receiving the requisite amount of money.[78] The machine cannot refuse to perform, and its structure (thick glass face) protects the product from theft or fraud.[79] This means that one cannot make post hoc changes to her selections. If one chooses M&Ms, she is stuck with M&Ms. This is very efficient because the self-execution eliminates transaction costs, and requires no humans for the purchase. However, the consumer may grow angry when the M&Ms get stuck and the bag of chocolates does not fall all the way down to the doorway where it can be retrieved.

Smart contracts are similarly self-executing. As noted above, this automation makes smart contracts very attractive in terms of efficiency and diminished reliance on lawyers and courts—or at least, theoretically.[80] In a perfect world, smart contracts increase efficiency, lower transaction costs, and largely eliminate the need for litigation.[81] For example, a smart contract could allow for automatic transfer of an NFT while preserving anonymity of parties and securing originality on the blockchain. Once again, the problem is that coding does not eliminate conflict.

An example of automatic enforcement gone awry is the 2016 DAO (decentralized autonomous organization) debacle. Blockchain enthusiasts created the 2016 DAO using blockchain and a web of smart contracts as the foundation for what was to be a tamper-proof extra-legal company on the blockchain.[82] The 2016 DAO was an autonomous organization that would continue without the need for code changes once it began its operations.[83] A flaw in the DAO design, however, allowed an individual to withdraw $50 million from the DAO, while the DAO's self-enforcing code eliminated means for reversal or traditional remedies.[84] The only recourse was to completely terminate the DAO.[85] There was not allowance for an equitable remedy such as rescission, as we see in traditional contract law.

Some also raise the "oracle problem" as a hindrance for fair smart contracting. This refers to the lack of a reliable and secure delivery mechanism that exchanges real-time information with blockchain data systems.[86] Currently, there is no clearly secure delivery of information among systems.[87] For example, most existing oracles have the same security issues as any traditional data systems that can be "hacked."[88] Accordingly, smart contracts and NFTs are not immune to disputes and blockchain technology does not "code away" all problems. Moreover, coded enforcement creates problems for fashioning remedies. For example, a judge would have to somehow "code" to reroute a smart contract or provide a remedy other than a "do-over." Although smart contracts provide efficiencies and cost-savings, they create risks related to automation and limited remedies. The questions therefore focus on likely remedies and means for smart contract dispute resolution.

Accordingly, the courts do not appear to be the right place for resolving blockchain-related disputes. Instead, smart contracts and NFTs need their own dispute resolution systems. Interest in smart contracts and NFTs continue to expand, and the amount of investment in these new technologies continues to grow. Technology is only expanding—new technologies are not going away. Coding for possible breaches of contract can only go so far because there will always be a lack of foresight and information. It is impossible to code for all eventualities. Furthermore, humans create the code in the first place, and humans are fallible and often unpredictable.[89] There will be technical problems and mistakes in the coding.[90] Furthermore, traditional litigation fails to address smart contracts' need for remedies that preserve anonymity and fit within the blockchain.[91]

We often talk about "fitting the forum to the fuss" in dispute system design, and courts are simply not built for the "fuss" when it comes to resolving smart contract and NFT disputes.

III. Options for Resolving Blockchain and NFT Disputes

Most commentators and practitioners realize that blockchain-related disputes do not belong in court. Instead, smart contract and NFT disputes demand non-judicial remedy systems that are cross-jurisdictional, extra-legal, and efficient. Accordingly, many look to traditional arbitration or online arbitration (OArb) systems as a better means for resolving blockchain related disputes. There is also special interest in OArb models that use the

blockchain, crowd-sourced dispute resolution, AI-powered resolutions, and even metaverse processes. Developments in each of those areas are discussed below, and further ideas are presented.

A. Traditional Arbitration

Arbitration "took its rise in the very infancy of [s]ociety" as a private and self-contained process, outside of the courts.[92] Communities created arbitration systems designed to quickly and efficiently determine disputes in accordance with local norms and accepted equitable principles.[93] These self-contained arbitration systems served community needs for efficient, economical, equitable and private proceedings. [94] By the early twentieth century, nearly every trade or profession had developed its own machinery for arbitration.[95] Indeed, the New York Chamber of Commerce arbitration panels were independent from the judiciary and continued to resolve disputes between American and British merchants during and after the American Revolution. [96]

Arbitration has legal importance because international and domestic arbitration laws generally require enforcement of valid agreements to arbitrate, which often incorporate rules such as those promulgated by the American Arbitration Association (AAA) or the International Chamber of Commerce (ICC).[97] This relegates enforcement analysis to contract formation and validity issues, which courts have mainly approached in an efficiency-focused manner.[98] Proponents of arbitration argue that enforcement results in cost and time savings, while critics complain that it impairs consumer remedies and essentially allows companies to privatize law and avoid regulation through their arbitration programs.[99]

On the international level, the widely adopted New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards (New York Convention) generally mandates summary enforcement of arbitration agreements and awards.[100] The United States has implemented this Convention through Chapter Two of the FAA,[101] which United States courts have applied with a pro-enforcement glaze aimed to promote both arbitration and international comity.[102] This glaze has also led U.S. courts to narrowly read the Convention's allowance for public policy review of arbitration awards, and to curtail judicial power to mandate particular arbitration procedures or contract formation standards.[103]

U.S. courts similarly enforce domestic arbitration agreements under the FAA[104] and its state counterpart, the Uniform Arbitration Act (UAA).[105] These laws require courts to specifically enforce domestic arbitration agreements and augment this mandate with provisions for liberal venue, immediate appeal from orders adverse to arbitration, appointment of arbitrators if parties cannot do so by agreement, limited review of arbitration awards, and treatment of awards as final judgments.[106] Furthermore, the Supreme Court has held that the FAA preempts states from singling out arbitration for special treatment or otherwise hindering the enforcement of arbitration in contracts affecting interstate commerce. This importantly leaves states with little power to regulate arbitration provisions beyond application of general contract defenses.[107]

The U.S. Supreme Court has fortified strict enforcement of arbitration in the U.S.[108] This was solidified in cases including *Stolt-Nielsen SA* v. *Animalfeeds Int'l Corp*, *AT&T Mobility, LLC* v. *Concepcion*, and *Rent-A-Center* v. *Jackson*.[109] The Court significantly narrowed arbitrators' power to order class arbitration in *Stolt-Nielsen SA*, greatly limited application of contract defenses to void arbitration clauses in *AT&T Mobility, LLC*, and confirmed arbitrators' power to determine the scope of their own jurisdiction in *Rent-A-Center*.[110]

The Court has bolstered this enforcement, even where statutory claims are at stake. In *American Express v. Italian Colors Restaurant*, a would-be class of small businesses asserted antitrust violations against the credit card company for allegedly charging excessive fees and claimed that the class waiver in their arbitration agreements made it too expensive for them to vindicate their statutory rights.[111] The businesses argued that they could not pay the expert fees and related costs of proving antitrust violations unless they banded together.[112] However, the Court denied the class consolidation, emphasizing that complainants have no right to an economical or streamlined means for asserting antitrust violations.[113] The Court also indicated a distaste for class arbitrations, which it saw as frustrating the efficiency goals of the FAA.[114]

Additionally, most business-to-consumer contracts expressly preclude class proceedings in the wake of *AT&T Mobility LLC* v. *Concepcion*, which narrowed consumers' power to challenge class waivers based on traditional contract defenses.[115] The Supreme Court in *AT&T* held that the FAA pre-empts a court from using state contract law to condition enforcement of an arbitration clause on preserving consumers' ability to bring class-wide arbitration. [116] Consumers in that case filed a class action in contravention of the arbitration clause in AT&T's contract, alleging that the clause's class waiver effectively precluded vindication of their rights.[117] The California court agreed, but the U.S. Supreme Court reversed and enforced the class waiver. It held that the FAA pre-empted California's use of unconscionability to strike the clause because the contract allowed for small claims court actions, the recovery of double attorney fees if an award exceeded the company's settlement offer, and payment of arbitration costs by the company.[118]

Some have argued that this U.S. arbitration jurisprudence has gone too far in enforcing arbitration clauses, especially in employment, consumer and other cases where there is a power imbalance.[119] They contend that Congress should consider enacting a law that guarantees certain consumer protections in arbitration, like a fair location for the hearings, prohibition against abbreviated statutes of limitations, prohibitions against damage limitations, class procedures in some circumstances, requirement for public proceedings and filings, and heightened judicial review of arbitral awards for certain types of claims.[120] There have also been proposals for laws to ban pre-dispute arbitration clauses altogether in consumer, employment, and civil rights cases.[121] Nonetheless, FAA and its jurisprudence remain largely unchanged except for limited changes in narrow contexts like sexual harassment claims—where employees cannot be forced to arbitrate.

With the enforcement jurisprudence, it is no surprise that some have looked to arbitration for resolving blockchain-related disputes. Arbitration is especially attractive in these cases because parties can select arbitrators with the requisite expertise, unlike more generalist judges assigned by the government in court.

Furthermore, arbitration proceedings are private—meaning no one can attend except the parties and those they invite, like witnesses. Parties also may include confidentiality agreements within their arbitration provisions to secure secrecy. Moreover, parties have been keen to move proceedings online, using OArb for resolving blockchain disputes.[122]

OArb is just one example of online dispute resolution ("ODR"), which generally encompasses using technology to assist in preventing and resolving disputes. Most ODR, however, is not OArb because it involves facilitation of communications to aid voluntary settlement.[123] In contrast, OArb is a distinct subset of ODR because it culminates in a final award rendered by a third-party neutral, which is usually enforceable under the FAA and New York Convention noted above. This finality is especially attractive in technology disputes where time is of the essence.

OArb includes what has come to be known as *Zoom arbitration*. It also includes a wide variety of other uses of technology and digital tools to facilitate and execute processes ending in a final determination of a dispute by a neutral third party. For example, OArb may use asynchronous and/or synchronous communications for parties to present their cases to third party arbitrators in an online forum. Communications may be text-only or virtual hearings, and mixtures thereof. OArb's use of technology allows parties to upload and submit supporting documentation to support their claims at times that work their individual schedules since there is no need to travel to a physical office. Online hearings also save time, cost, and stress of traveling to and attending in-person processes.

OArb has spiked in the COVID-19 pandemic.[124] Virtual meeting technologies such as Zoom, Skype, Google Meet, WebEx, and Teams have made virtual hearings relatively cheap and easy, and it has become a norm.[125] In fact, OArb has become among the offerings of traditional dispute resolution institutions, such as the American Arbitration Association (AAA), the Judicial Arbitration and Mediation Service (JAMS), and the International Institute for Conflict Prevention & Resolution (CPR). For example, the AAA offers a secure portal for parties to file claims, upload and manage their claim-related documents, and view and rank potential arbitrators for selection.[126] In addition, the AAA offers virtual hearing capacity and guidance.[127] AAA and others can now provide OArb with expert arbitrators with respect to blockchain and NFTs who may be better equipped to decide related disputes than traditional judges.

Other OArb systems began developing within the blockchain realm. For example, OpenBazaar was a market platform for the sale of goods and services using bitcoin, and requiring online arbitration to ensure that exchanges between parties are conducted with minimal risk.[128] It sought to create an open marketplace for arbitration to "facilitate a polycentric merchant law to accommodate the requirements and preferences of each individual."[129] In particular, OpenBaazar allowed users to decide at the start if they wished to have an anonymous third party decide related cases regarding obligations on the blockchain. [130] Users opting for the service would pay a fee and deposit bitcoin into an escrow.[131] Despite aspirations, however, it appears that

OpenBaazar is no longer in operation.[132] Indeed, it seems that more standard OArb is having more success through traditional providers like the AAA, JAMS and CPR.

B. Tokenized Dispute Resolution

In contrast to simple OArb, tokenized dispute resolution allows anonymous users to vote on who they think should "win" a dispute using digital tokens. Selected voters have the dispute resolution power in crowdsourced dispute resolution, and the dispute is resolved based on voters' majority opinion.[133] The general ideas behind crowdsourced dispute resolution is not new. For example, more than twenty years ago, iCourthouse pioneered the notion of online crowdsourcing in civil cases and over ten years ago eBay India's Community Court invited other eBay users to decide whether a contested eBay review should be deleted.[134]

Tokenized crowdsourcing goes further to allow for voting on the blockchain. In other words, jurors vote with tokens (generally cryptocurrency) which they lose if they are on the losing side. In contrast, jurors on the winning side generally gain some reward. This process banks on game theory, expecting jurors to strive for "accuracy" in hopes of "winning."

For example, Kleros is a crowdsourced online arbitration "court" built on Ethereum for resolution of smart contract disputes.[135] Kleros's quest is to be "[a] fast, inexpensive, transparent, reliable and decentralized" ODR system built on game theory, and discovering a "Schelling point" for resolving disputes.[136] This builds on Thomas Schelling's theory that in the absence of communication and trust, people will nonetheless choose "Focal Points" to reach consensus.[137] Specifically, Kleros enlists "jurors" from around the world based on the number of "Pinakion" tokens (cryptocurrency) they deposit to show their interest in resolving a given dispute.[138] Parties to a dispute present their cases to the jurors, and jurors use tokens to vote with the proviso that they cannot change or reveal their votes before the voting is closed.[139] To combat fraud, jurors are penalized for communicating with each other and must "justify" their votes.[140] After the vote is closed, the party with the most juror support wins.[141]

Jurors benefit from "winning" resolutions by taking the tokens of jurors who sided with the "losing" party.[142] Additionally, jurors are paid from the arbitration fee the parties pay to use the Kleros court.[143] These fees rise as parties appeal jury decisions, and Kleros is continually updating and amending its program in order to combat collusion.[144] For example, attackers who would have to buy 51% of the staked work tokens in order to "buy" the jury.[145] In addition, Kleros can fork the system if necessary because it controls the tokens.[146] Moreover, Kleros tested the system through a large-scale study.[147] The study asked voters to evaluate pictures featuring cats and/or dogs, and to vote "dog" or "not dog." [148] After tabulating the votes, the researchers found that 70% of the cases resolved in favor of the plaintiff, and in the majority of those cases, by a unanimous vote and honest voters substantially prevailed by earning the most through the system.[149]

At least one court has recognized Kleros as a legitimate means for resolving disputes. For example, in September 2020 a disagreement arising from a rental estate leasing agreement in Mexico led to the use of Kleros Protocol to guide the arbitral decision. The parties in the case stipulated in their agreement that if a disagreement arose, it would be referred to an arbitrator who was to use Kleros. Accordingly, the arbitrator in the case compiled all the evidence and digital materials from both parties and submitted it to Kleros, which submitted it to three Kleros jurors. Based on the jurors' unanimous ruling for the landlord, the arbitrator rendered an arbitral award ordering payment of rent. The landlord then took the award and got it confirmed by a Mexican court.[150]

The Mexican Court's decision to recognize the arbitral award was significant, as it was the first to recognize this type of blockchain platform as a legitimate form of arbitration.[151] Kleros advertises itself as a fast and affordable alternative to other online dispute resolution platforms.[152] Currently, Kleros is available for small claims, insurance, ecommerce, finance, freelancing, token listing, content moderation, and intellectual property.[153] Having a court officially recognize a Kleros ruling for a small claim was also groundbreaking because it originated in the "real world," and not online.[154]

The Kleros homepage also displays some of the ongoing disputes being arbitrated on their platform, which are mostly related to online blockchain activities. There are several disputes about a "Proof of Humanity Registration Protocol" where jurors and judges are establishing their legitimacy as a unique identity not already existing on a platform. For example, Kleros jurors are deciding whether a user is supposedly creating multiple accounts to increase their voting power on a platform.[155] Another example case is an ongoing dispute over a claim from *Unslashed Insurance* related to losses sustained trading online tokens via the blockchain application Anchor + UST Peg.[156] The dispute contains documentation of the party's losses, their insurance policy, a comprehensive history of their online token trading, and other evidence.[157] Jurors with technical knowledge about the blockchain will vote on the "winner" following the Kleros protocol.[158]

Jur is another blockchain-driven webservice that seeks to modernize and revolutionize governance of online interactions.[159] Jur seeks to decentralize the legal field by providing an online jurisdiction that overcomes the legal challenges that come with traditional courts focused on physical jurisdiction.[160] With this in mind, Jur seeks to create open-source universal standard digital contracts to promote more efficient online business transactions among people on blockchain platforms.[161] In this regard, Jur is developing online mediation, arbitration, adjudication, assessment, technical verification, and expert opinion services for resolving related disputes.[162]

Nonetheless, it is hard to see where Jur is in this process. Jur does not appear to currently handle arbitration services, although they have established platform procedures and a "network state."[163] Jur's procedure is similar to Kleros in that enforcement seeks to remain "on-chain"—with staked assets that one loses as a losing party in a case.[164] The platform also seeks to work with individual courts to enforce potential court rulings and arbitration awards for 'off-chain' enforcement.[165] Jur also seeks to create a semi-democratic voting system as

part of "Jur citizenship."[166] Voters use their votes to check representatives and elect officials on the platform, again seeking to create a decentralized governance structure.[167]

C. Bot Resolutions

Artificial Intelligence (AI) is growing in acceptance, and data analytics have been employed to make decisions in many realms. In fact, AI is entering the courtroom and disrupting the law.[168] AI is helping judges set bail, and lawyers do legal research.[169] It is possible that AI or data analytics may assist fair and efficient dispute resolution for smart contract and NFT disputes by providing predictive analysis and quickly suggesting resolutions that may be subsequently entered into the blockchain. At the same time, machine learning and resulting algorithms will likely become "smarter" with the infusion of more data over time.

Nonetheless, use of AI can be problematic for legal determinations and potentially worsen the risk of bias in determinations.[170] First, there is evidence that people tend to defer to statistical data produced by the likes of an AI instead of using the data to help form an independent judgment.[171] Accordingly, we may hope that a human will remain "in the loop" and only use analytics to assist their decision accuracy, but there is fear that humans will "rubber stamp" AI or algorithmic decisions. There is fear that use of AI to provide "bot" predictions to judges or arbitrators could essentially mean bots actually decide cases. This is made worse when AI algorithms rely on data that reflects human prejudice or is incomplete or otherwise faulty.[172] This is the "garbage in, garbage out" problem that occurs when AI "learns" from biased information. Some also worry that machine learning may take on a life of its own, rendering it harder to identify the factors leading to a particular outcome as machine learning progresses.[173]

Of course, the day may come when predictive analytics and AI are capable of rendering quick and fair resolutions. This may even be true in NFT and smart contract cases. Furthermore, AI may have a place in providing predictions of how best to resolve disputes, especially in simple low dollar and low conflict cases. Some parties may prefer such data-driven decisions in some cases. Nonetheless, AI and machine learning are currently not sufficiently advanced to provide "bot" resolutions with sufficient accuracy and acceptance. This may change in the future or in specific cases, but we are not quite ready for a full sail "bot resolution" solution for smart contract disputes.

D. Metaverse Arbitration

The metaverse is a 3D digital world where individuals use virtual avatars to interact with other users to "purchase and sell goods and services, sign and enforce contracts, recruit and train talent, and interact with customers and communities."[174] Said another way, the metaverse is a general descriptor for an interoperable 3D virtual world or platform created by companies where users can interact.[175] Accordingly, individuals can create avatars and meet, discuss, make purchases, etc., in the metaverse. These individuals could therefore get into disputes and even resolve those disputes through avatars in the metaverse.

It is therefore no surprise that individuals could arbitrate through avatars in the metaverse.[176] Currently, such metaverse arbitration is in its early stages, prompting numerous questions about how the structure of international arbitration can be adapted to a metaverse environment.[177] Some ask: who should draft rules governing common metaverse-related disputes like crypto-disputes?[178] There are also questions on how to grapple with pseudonymity, as avatars allow for pseudonymity in the metaverse.[179] Arbitrators could potentially arbitrate as avatars in the metaverse and remain anonymous in the process, but how would parties then be able to assess partiality? Other questions relate to arbitration law itself, asking how existing arbitral clauses work for crypto company transactions and mergers.[180] One perspective of metaverse arbitration anticipates that arbitrators themselves will have avatars in these virtual worlds resolving disputes between other users.[181] Another potential issue with conducting traditional arbitrations virtually through avatars in the metaverse is efficiency.[182]

The metaverse may also provide means for resolving blockchain-related disputes, including smart contract issues, while maintaining party anonymity. For example, a party to a smart contract could maintain anonymity while submitting their case to an avatar arbitrator in the metaverse, and any decision could be immediately implemented through a smart contract. This would avoid any need for courts or revealing party identity (one of the perceived benefits of transacting through smart contracts).[183] Decentralized platforms often automatically draw decision-makers from a pre-constituted "pool" of expert arbitrators, and these decision-makers could occasionally preserve their anonymity while fulfilling their dispute resolution role in the metaverse.[184] Kleros essentially does this same thing through crowdsourced arbitration as noted above.[185] Accordingly, metaverse arbitration for NFT and smart contract disputes is not too far-fetched from what currently exists.

The issues will involve handling disclosures and ensuring impartiality while maintaining anonymity. On the one hand, if everyone is anonymous, there would be no bias concerns since an arbitrator would not know who the parties are, so the arbitrator would have no reason to be biased for or against a party. How can one harbor bias for a party if they have no idea who the party is? On the other hand, would the parties really be anonymous after putting forth evidence? An arbitrator would immediately know if their mom was presenting a case based on evidence presented, and even language used in submissions. Nonetheless, there may be ideas and areas where metaverse arbitration could provide a solution for smart contract and NFT disputes. Furthermore, limited disclosures could be in place to guard against bias, while appropriately protecting identities.

In sum, the metaverse may eventually provide an appropriate venue for resolving smart contract and NFT disputes. There are certainly interesting and provocative issues to explore in this realm. Nonetheless, we are not quite there for a metaverse solution, and the time is now to create and implement best practices for smart contract dispute resolution. The disputes are not going away, and traditional means are not well suited for these disputes.

IV. Fitting the Technology to the Fuss

As discussed above, disputes are inevitable and therefore it has become common in many traditional contracts to include arbitration and mediation clauses in the contract to avoid the time and expense of litigation in the event of a dispute.[186] Accordingly, it seems logical that smart contracts also should include coding for how any disputes will be resolved when disputes arise. Similarly, NFTs can include coding for dispute resolution provisions. This is wise because problems will inevitably arise regardless of how much careful planning or coding for anticipated eventualities predates contract execution.

Furthermore, the default—traditional litigation—is not well-suited for blockchain related disputes. If we seek to "fit the forum to the fuss" then litigation is illogical for blockchain disputes. Courts do not fit the "fuss" in such cases. Indeed, the blockchain operates so differently than traditional contracts that we need to design a different forum for the fuss. We need to fit technology not only to the forum, but also to the fuss. We need to envision resolution systems that are flexible and smart.

As noted, OArb is a good fit with smart contracts and blockchain-related disputes because it allows for selection of an expert decisionmaker, protects privacy, can be built for speed, and utilizes technology to same time, money, and stress. Furthermore, those utilizing smart contracts and dealing in NFTs are familiar and comfortable with the internet, so it seems natural to resolve any related disputes using technology. Why would parties who transact in NFTs want to physically travel to an outdated proceeding?

Moreover, the dispute resolution clause can be coded into the smart contract and provide for independent legal jurisdiction and "location" that is not tied to any one party. This will avoid the jurisdictional issues and "hometown" questions that could be especially problematic in blockchain-related disputes in which parties treasure their anonymity. If technology is used to craft the smart contract, then a clause can be inserted at creation, specifying the use of an OArb system within that software platform should any dispute eventually arise.

As Colin Rule and I suggested in a prior article, the OArb clause can operate in the same manner as the *Andon System* in the field of quality control.[187] The *Andon System* is an element of the Jidoka quality-control method pioneered by Toyota.[188] It allows any worker on a production line to push a button to stop the line if they identify a problem.[189] In the smart contract context, an OArb clause coded into the smart contract could enable both parties to push "pause" on a smart contract's execution when one of the parties identifies an issue. For example, a NFT would not immediately transfer per a smart contract if the buyer thought that the NFT is fraudulent or faulty or the seller had evidence that the buyer did not have the funds to cover the cost. This would trigger an OArb process.

In the prior article with Colin Rule, we left this system open to be developed as ODR, and not necessarily final and binding arbitration. However, it seems that OArb would be preferable because the parties usually want finality and an expert decision-maker. That is why various arbitration models have been most common in cryptocurrency cases to date. Furthermore, Kleros, noted above, opted for an arbitration model. Moreover,

parties who value anonymity would be especially loathe to mediate or engage in facilitated processes where they have to engage face-to-face, even if it is virtual.

The OArb process suggested here could follow as soon as an issue is detected in accordance with the parties' previous agreement. Ideally, the process would include strict time limits to further efficiency. In most cases, the hearing could be document-based only so that parties could even refrain from any visual interaction is they so choose. Nonetheless, the tools used within OArb could be based on parties' preferences, allowing for optionality. Parties may choose any one of the ideas noted in part III or something different that they craft for their particular issues. Depending on the outcome achieved, the smart contract may then resume operation, or it could be recoded for a different outcome. It could even be replaced by an entirely new arrangement. Again, it is apparent that traditional courts are not best suited for resolving smart contract disputes, but different parties may want different processes—and choice is quite important in serving process satisfaction. Accordingly, coding for OArb that provides process optionality for resolving eventual disputes could help parties find resolutions without resorting to expensive and inefficient, and often ineffective, litigation.

Nonetheless, parties should not be free to game the system. Again, strict time limits would be imposed, and penalties should be applied against those who file frivolous claims or otherwise misuse the ability to freeze smart contract execution. There could also be limits on when parties are able to pause execution, and requirements could be in place for showing "substantial cause" for the pause. For example, the smart contract code could include examples of when a pause is proper—such as where there is an indication that an NFT violates intellectual property rules, or a buyer lacks funds to cover a purchase. Other examples could be where there is evidence of faulty code or fraud in the sale.

Smart contracts could be used for enforcement of such OArb awards. For example, smart contracts have been suggested for enforcement of airline delay claims in Europe. An oracle could detect when a place is past legal limits of delay, and funds would automatically be sent to consumers harmed by the delay. The same could apply here. Awards could be paid automatically from funds that are deposited in an electronic escrow at the start of an OArb proceeding.

Again, dispute system design calls on creativity and intentionality in crafting systems that fit the particular context in light of goals, stakeholder, power, resources, etc. When it comes to blockchain and NFT disputes, this type of creativity is essential. NFTs and smart contracts, as well as the metaverse, all demonstrate how the old confines of what is "real" and what has "value" have changed. We no longer demand that art, for example, be on canvas and framed to a wall. We also have eschewed the idea that an agreement or performance must be a "written contract inked with a wet signature." Indeed, computer coded avatars can interact in the metaverse, as they buy and sell property. Similarly, we have moved into a new era of OArb, and have opportunities to reimagine access to remedies, and justice.

V. Conclusion

Smart contracts, NFTs, and blockchain more generally, have gained interest and investment for various uses. Of course, there will be fiascos and frauds, and their implementation and reception will not all be positive along the way.[190] There also will be poorly constructed smart contracts and by extension, bugs in how blockchains function. Indeed, blockchain-related conflicts and disputes will develop. Nonetheless, it seems clear that traditional courts are not the best forum for resolving smart contract and NFT disputes. The jurisdictional and coding issues alone indicate that the traditional judicial *forum* does not fit the blockchain *fuss*. Instead, OArb provides a more logical means for addressing smart contract issues. Furthermore, creative OArb that provides optionality may be best suited for addressing the wide range of parties and disputes we see in blockchain-related cases. The time is now to craft processes that fit not only the *forum to the fuss*, but also fit the *tech to the fuss*.

Footnotes

1. *See generally* Richard Susskind, Tomorrow's Lawyers: An Introduction to Your Future (2013). ↩
2. Amy J. Schmitz & Colin Rule, The New Handshake: Online Dispute Resolution and the Future of Consumer Protection ix (2017). ↩
3. *Id.* ↩
4. *Companies Using Verisign*, iDatalabs (2017), https://idatalabs.com/tech/products/verisign. ↩
5. David Zaslowsky, *What to Expect When Litigating Smart Contract Disputes*, Law360 (Apr. 4, 2018), https://www.law360.com/articles/1028009/what-to-expect-when-litigating-smart-contract-disputes. ↩
6. Resa M. Parizi, Smart Contract Programming Languages on Blockchains: An Empirical Evaluation of Usability and Security, (International Conference on Blockchain 2018), https://www.researchgate.net/figure/Account-balance-smart-contract-in-Pact_fig1_325216566. ↩
7. *Id.* ↩
8. Jakub J. Szczerbowski, Place of Smart Contracts in Civil Law: A Few Comments on Form and Interpretation (Proceedings of the 12th Annual International Scientific Conference 2017), https://ssrn.com/abstract=3095933. ↩
9. *Non-Fungible Tokens (NFT)*, Ethereum.org (Jan. 31, 2023), https://ethereum.org/en/nft. ↩
10. *What is an NFT? Non-Fungible Tokens Explained*, Forbes (Mar. 17, 2023), *https://www.forbes.com/advisor/investing/cryptocurrency/nft-non-fungible-token*. ↩
11. *Real-World Use Cases for Smart Contracts and dApps*, Cryptopedia (Dec. 23, 2021), https://www.gemini.com/cryptopedia/smart-contract-examples-smart-contract-use-cases. ↩

12. *Id.* ↩
13. Szczerbowski, *supra* note 8, at 333-37. ↩
14. *See* Ethan Katsh & Orna Rabinovich-Einy, Digital Justice: Technology and the Internet of Disputes 1-25 (2017). ↩
15. Pindar Wong, *Making Trade Wars Obsolete*, *in* Consensus 2018, 40-46 (2018), https://media.coindesk.com/uploads/events/2018/consensus/magazine/consensus-2018-magazine.pdf. ↩
16. *Id.* at 41. ↩
17. Zaslowsky, *supra* note 5. ↩
18. *Id.* ↩
19. *Id.* ↩
20. Szczerbowski, *supra* note 8, at 335. ↩
21. *Id.* at 336. ↩
22. Zaslowsky, *supra* note 5. ↩
23. Szczerbowski, *supra* note 8, at 335. ↩
24. Paweł Bukiel, *NFT-Relate Disputes: How to Resolve Them?*, Schoenherr (Jan, 3, 2022), https://www.schoenherr.eu/content/nft-related-disputes-how-do-you-resolve-them. ↩
25. *Id.* ↩
26. Szczerbowski, *supra* note 8, at 335. ↩
27. Zaslowsky, *supra* note 5. ↩
28. Amy J. Schmitz & Colin Rule, *Online Dispute Resolution for Smart Contracts*, 2019 J. Disp. Resol. 107. https://scholarship.law.missouri.edu/jdr/vol2019/iss2/8. ↩
29. Marco Dell'Erba, *Demystifying Technology: Do Smart Contracts Require a New Legal Framework? Regulatory Fragmentation, Self-Regulation, Public Regulation* 27-28 (Aug. 20, 2018), https://ssrn.com/abstract=3228445. ↩
30. *Id.* at 9. ↩

31. Angela Walch, *Blockchain's Treacherous Vocabulary: One More Challenge for Regulators*, 21 J. Internet L. 1, 5-7 (2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3019328. ↩

32. *Id.* at 5. ↩

33. *Id.* at 2-7. Instead of claiming the technology is "tamper-proof," some proponents now call it "tamper-resistant." *Id.* ↩

34. *Id.* ↩

35. Brant Carson et al., *Blockchain Beyond the Hype: What is the Strategic Business Value?*, McKinsey Digital (June2018), https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/blockchain-beyond-the-hype-what-is-the-strategic-business-value. ↩

36. *Id.* ↩

37. *Id.* ↩

38. Hannah Miller, *VCs Are Still Rushing to Back Crypto Startups*, Bloomberg (June 1, 2022), https://www.bloomberg.com/news/newsletters/2022-06-01/in-crypto-downturn-startups-are-still-getting-venture-capital-dollars. ↩

39. *Id.* ↩

40. Roger Aitken, *Accord Project's Consortium Launching First Legal 'Smart Contracts' with Hyperledger*, Forbes (July 26, 2017), https://www.forbes.com/sites/rogeraitken/2017/07/26/accord-projects-consortium-launching-first-legal-smart-contracts-with-hyperledger/#34781496472c. ↩

41. *Web3 and Digital Assets Group* Overview, Skadden, https://www.skadden.com/capabilities/practices/web3-and-digital-assets. ↩

42. *Non-Fungible Token Market Size, Share & Trends Analysis Report by Type (Physical Asset, Digital Asset), By Application (Collectibles, Art, Gaming), By End Use, By Region, And Segment Forecasts, 2022-2030*, Grand View Research (2022), https://www.grandviewresearch.com/industry-analysis/non-fungible-token-market-report. ↩

43. *Id.* ↩

44. Ryan Browne, *Trading in NFTs Spiked 21,000% to More Than $17 Billion in 2021, Report Says*, CNBC (Mar. 10, 2022), https://www.cnbc.com/2022/03/10/trading-in-nfts-spiked-21000percent-to-top-17-billion-in-2021-report.html. ↩

45. *Id.* ↩

46. Schmitz & Rule, *supra* note 28, at 203-225. ↩
47. Zaslowsky, *supra* note 5. ↩
48. Amy J. Schmitz, *Pizza-Box Contracts: True Tales of Consumer Contracting Culture*, 45 Wake Forest L. Rev. 863-901 (2010). ↩
49. Szczerbowski, *supra* note 8, at 333. ↩
50. Wong, *supra* note 15. ↩
51. Zaslowsky, *supra* note 5. ↩
52. *Id.* ↩
53. Szczerbowski, *supra* note 8, at 335. ↩
54. Meg L. Jones & Elizabeth Edenberg, The Legal Roots and Moral Core of Digital Consent, (The 46th Research Conf. on Comm., Info. & Internet Pol'y, 2018), https://ssrn.com/abstract=3131392. ↩
55. *See* Szczerbowski, *supra* note 7. ↩
56. Mark Verstraete, *The Stakes of Smart Contracts*, 50 Loy. U. Chi. L.J. 743 (2019) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3178393. ↩
57. Duncan Kennedy, *From The Will Theory to the Principle of Private Autonomy: Lon Fuller's "Consideration and Form,"* 100 Colum. L. Rev. 94, 103 (2000); Lon L. Fuller, *Consideration and Form*, 41 Colum. L. Rev. 799, 800-01. ↩
58. *Id.* ↩
59. Szczerbowski, *supra* note 8, at 33-35. ↩
60. *Id.* at 33-40. ↩
61. Wulf A. Kaal & Craig Calcaterra, *Crypto Transaction Dispute Resolution*, 73 The Bus. Lawyer. 109, 135-36 (2018), https://www.jstor.org/stable/26419193. ↩
62. *Id.* at 4. ↩
63. *Id.* at 36. ↩
64. *Id.* at 39. ↩

65. *Id.* at 40. ↩

66. Usha Rodrigues, *Law and the Blockchain*, 104 Iowa L. Rev. 679 (2018), https://ssrn.com/abstract=3127782. ↩

67. Joseph J. Bambara & Paul R. Allen, Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions 84-95 (2018). ↩

68. Zaslowsky, *supra* note 5, at 2. ↩

69. Kaal & Calcaterra, *supra* note 61, at 44. ↩

70. *Id.* at 45. ↩

71. *Id.* at 45-46. ↩

72. T.C.A § 47-10-202 (2018) ↩

73. *Id.* ↩

74. Dell'Erba, *supra* note 30, at 2-12. ↩

75. *Id.* at 14. ↩

76. *Id.* ↩

77. Verstraete, *supra* note 56, at 13. ↩

78. *Id.* ↩

79. *Id.* ↩

80. *Id.* Three justifications underlie this belief: (1) smart contracts can be a tool favoring consumers to overcome doctrines that now give an advantage to firms; (2) the transaction costs of forming and enforcing smart contracts is lower than traditional contracts; and (3) smart contracts allow individuals to set the terms of their agreement without state interference. *Id.* at 5-20. ↩

81. *Id.* at 7-8. ↩

82. Rodrigues, note 66, at 12. ↩

83. *Id.* at 29. ↩

84. *Id.* at 33. ↩

85. *Id.* at 36. Of course, the DAO could be resurrected with new coding using a corporate structure to shield liability, but the fact remains that coding is king in blockchain–but there must be means for resolving disputes along the way without dissolving the smart contract at the core. ↩

86. Mike Orcutt, *Blockchain Smart Contracts are Finally Good for Something in the Real World*, MIT Tech. Rev., Nov. 19, 2018, https://www.technologyreview.com/s/612443/blockchain-smart-contracts-can-finally-have-a-real-world-impact/. ↩

87. *Id.* ↩

88. Steve Ellis, Ari Juels, & Sergey Nazarov, *ChainLink: A Decentralized Oracle Network*, ChainLink (Sept. 4, 2017), https://link.smartcontract.com/whitepaper. ↩

89. *Id.* at 46-47. ↩

90. *Id.* at 47. ↩

91. Kaal & Calcaterra, *supra* note 61, at 47. ↩

92. Julius Henry Cohen, Commercial Arbitration and the Law 25 (1918) (quoting John Montgomerie Bell, Treatise on the Law of Arbitration in Scotland 1 (2nd ed. 1877)). ↩

93. *Id.* at 22-27 (emphasizing special utility of arbitration despite the development of a reputable judicial system in mercantile cases in which arbitrator expertise in technical matters is essential). *See also* James A.R. Nafziger, *Arbitration of Rights and Obligations in the International Sports Arena*, 35 Val. U. L. Rev. 357 (2001) (demonstrating communal concepts of arbitrations based on equity, norms and standards in modern international sports arbitrations); Earl S. Wolaver, *The Historical Background of Commercial Arbitration*, 83 U. Pa. L. Rev. 132, 144 (1934) (quoting Malynes, Lex Mercatoria 303 (1622)). ↩

94. Frances A. Kellor, American Arbitration: Its History, Functions and Achievements 3 (1948) ("Of all mankind's adventure in search of peace and justice, arbitration is among the earliest. Long before law was established, or courts were organized, or judges had formulated principles of law, men had resorted to arbitration for the resolving of discord, the adjustment of differences, and the settlement of disputes."). *See also* Paul L. Sayre, *Development of Commercial Arbitration Law*, 37 Yale L. J. 595, 597 (1928); Margit Mantica, *Arbitration in Ancient Egypt*, 12 Arb. J. 155, 155-59 (1957) (noting scarcity of records of early arbitrations because arbitrations generally involved purely private disputes that had little public significance); Will Durant, The Story of Civilization Volume 1: Our Oriental Heritage 645-47, 795-97 (1954) (describing arbitration systems in early Chinese civilization that provided means for "a wholesome compromise" and means for the people to end "minor" disputes in accordance with face-saving compromise). ↩

95. Harry Baum & Leon Pressman, *The Enforcement of Commercial Arbitration Agreements in the Federal Courts*, 8 N.Y.U. L.Q. Rev. 238, 247 (1930) (reporting that the following trade associations had active arbitration facilities: Automotive Industry, Bottlers Association, Clothing and Dry Goods, Construction Industries, Cotton and By-Products, Financial Organizations, Food Industries, Fuel, Heat, Light and Power, Fur, Grain, Hay and Seed, Hardware, Import and Export, Jewelers, Leather Hides and Skins, Lumber and Allied Industries, Manufacturers, Medical, Motion Pictures, Music, Paint, Oil and Varnish, Paper and Pulp, Printing and Engraving, Real Estate, Rubber, Silk, Theatre, Transportation, Warehousing, Wool. Professional communities with arbitration mechanisms included: Dental, Rotary, International, Legal Aid, Civil Engineers, American Institute of Accountants). ↩

96. William C. Jones, *Three Centuries of Commercial Arbitration in New York: A Brief Survey*, 1956 Wash. U. L. Rev. 193, 207. Chamber arbitrations continued during the British occupation in 1779, after the Chamber's need for arbitration prompted a special meeting that produced a letter to the British Commander requesting arbitrations to resolve mercantile disputes. *Id.* at 208. The Commander acquiesced in the request, and arbitration served as the only means for resolution of civil disputes during the British occupation. Arbitration continued to thrive after the revolution in both England and North America. *Id.* at 209-12. ↩

97. Richard E. Speidel, *Common Legal Issues in American Arbitration Law*, *in* Arbitration Law in America, 29, 31-34 (Edward Brunet et al. eds. 2009). ↩

98. *See* Amy J. Schmitz, *Curing Consumer Warranty Woes Through Regulated Arbitration*, 23 Ohio St. J. Dispute Resol. 627, 635-36 (2008) (discussing preemption and its impact on arbitration challenges). ↩

99. *See*, *e.g.*, Jean R. Sternlight, *Panacea or Corporate Tool?: Debunking the Supreme Court's Preference for Binding Arbitration*, 74 Wash. U. L.Q. 637, 637 (1996) (critiquing companies' inclusion of arbitration clauses in consumer and employment contracts); Joel Seligman, *The Quiet Revolution: Securities Arbitration Confronts the Hard Questions*, 33 Hous. L. Rev. 327 (1996) (discussing the mandatory nature of arbitration under NASD or NYSE rules in broker-dealer securities contracts). ↩

100. Alan Redfern & Martin Hunter, Law and Practice of Int'l Commercial Arbitration 67 (3rd ed. 1999); The New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards, Arts. 1-16 (1958), *reprinted in id.* at 491-94 (including Appx.) [*hereinafter* NY Convention]; *Status: 1958 – Convention on the Recognition and Enforcement of Foreign Arbitral Awards*, United Nations Commission on Int'l Trade Law ("UNCITRAL"), http://www.uncitral.org/uncitral/en/uncitral_texts/arbitration/NYConvention_status.html (noting 137 countries had adopted the Convention). ↩

101. FAA, 9 U.S.C. §§ 201-208 (implementing the New York Convention), §§ 301-307 (implementing the Panama Convention). ↩

102. Kenneth F. Dunham, *Int'l Arbitration is Not Your Father's Oldsmobile Convention*, 2005 J. Disp. Resol. 324, 326-27 (discussing the development of international commercial arbitration and noting the importance of the New York Convention in that development). ↩

103. NY Convention, *supra* note 4, art. 1-16; Dunham, *supra* note 102, at 330-31 (discussing importance of contract terms and rules incorporated therein in dictating the arbitration procedures). ↩

104. FAA, 9 U.S.C. §§ 1-16. ↩

105. UAA, 7 U.L.A. § 1 et seq. (1997). The UAA is model legislation nearly all states have adopted to require the same basic enforcement for local arbitration agreements and awards beyond the purview of the FAA. *Id.* ↩

106. *See* Amy J. Schmitz, *Ending a Mud Bowl: Defining Arbitration's Finality Through Functional Analysis*, 37 Ga. L. Rev. 123, 124–35 (2002) (discussing the FAA's pro-efficiency remedial provisions). ↩

107. *See* Southland Corp. v. Keating, 465 U.S. 1 (1984) (holding that the FAA applies in federal and state court); Allied-Bruce Terminix Cos. v. Dobson, 513 U.S. 265 (1995) (holding the FAA preempted Alabama law limiting consumer arbitration); Doctor's Associates Inc. v. Casarotto, 517 U.S. 681 (1996) (finding the FAA preempted state notice requirements for arbitration clauses). ↩

108. FAA, 9 USC §§ 201-08, 301-07 (2012) implements the New York Convention under §§ 201-208 and the Panama Convention under §§ 301-307. ↩

109. AT&T Mobility, LLC v. Concepcion, 131 S. Ct. 1740, 1743-56 (2011); Stolt-Nielsen SA v. AnimalFeeds International Corp, 130 S. Ct. 1758 (2010); *Rent-A-Center, W, Inc.* v. *Jackson*, 130 S. Ct. 2772, 2777-80 (2010). ↩

110. *See* Am. Express Co. v. Italian Colors Rest., 133 S. Ct. 2304, 2304-10 (2013), which enforces a class waiver in arbitration clauses with respect to anti-trust claims; *AT&T Mobility*, 131 S. Ct. at 1748-53 also states that classwide arbitration is inconsistent with the FAA; *Stolt-Nielsen*, 130 S. Ct. at 1773-76 holds that a party cannot be compelled to class arbitration unless there is a clear contractual basis for it; *Rent-A-Center, W, Inc*., 130 S. Ct. at 2777-80 holds that a clause in employment contract delegating to the arbitrator exclusive authority to decide enforceability of the arbitration agreement was a valid delegation under the FAA. ↩

111. *Am. Express Co.*, 133 S. Ct. at 2304–10. ↩

112. *Id.* ↩

113. *Id.* ↩

114. *Id*. ↩

115. Peter B Rutledge and Christopher R Drahozal, *Contract and Choice*, 2013 BYU L. Rev. 1, 38 (2013) (finding that 93.6% of the agreements studied waived any right to class arbitration). ↩

116. *AT&T Mobility, LLC*, 131 S. Ct. at 1743-56. ↩

117. *Id.* ↩

118. *See id*. at 1748-55, which emphasized that class action arbitration sacrifices informality; Sarah R. Cole, *On Babies and Bathwater: The Arbitration Fairness Act and the Supreme Court's Recent Arbitration Jurisprudence*, 48 Hous. L. Rev. 457, 481-91 (2011) (highlighting how recent Supreme Court opinions curtail class action relief). ↩

119. Imre Stephen Szalai, *The Prevalence of Consumer Arbitration Agreements by America's Top Companies*, 52 U.C. Davis L. Rev. Online 233, 234-248 (2019). ↩

120. *Id.* ↩

121. *H.R.1423 – Forced Arbitration Injustice Repeal Act*, Congress.gov (last updated Sep. 24, 2019), https://www.congress.gov/bill/116th-congress/house-bill/1423/text. The bill passed in the House, was received in the Senate on September 24, 2019, read twice, and referred to the Senate Judiciary Committee. ↩

122. Amy J. Schmitz, *'Drive-Thru' Arbitration in the Digital Age: Empowering Consumers Through Regulated ODR*, 62 Baylor L. Rev, 178 (2010): 178–244 (proposing "OArb" as a distinct type of online dispute resolution); Amy J. Schmitz, *Arbitration in the Age of Covid: Examining Arbitration's Move Online*, 22 Cardozo J. Conflict Res, 245-92 (2021). ↩

123. *See generally* Amy J. Schmitz & Colin Rule, *The New Handshake: Online Dispute Resolution and the Future of Consumer Protection* (American Bar Association, 2017); *See also* Amy J. Schmitz, *Building on OArb Attributes in Pursuit of Justice*, *in* Arbitration in the Digital Age: The Brave New World of Arbitration 182 (Maud Piers & Christian Aschauer eds., 2018). ↩

124. Melody Alger, *Conducting Arbitrations and Mediations Remotely During the Covid-19 Crisis and Beyond*, 68 R. I. Bar J. 15 (2020). ↩

125. . *See 2021 International Arbitration Survey: Adapting Arbitration to a Changing World*," White & Case LLP (May 6, 2021), https://www.whitecase.com/publications/insight/2021-international-arbitration-survey/technology-virtual-reality. ↩

126. *AAA-ICDR Technology Services*, American Arbitration Association, https://www.adr.org/TechnologyServices/aaa-icdr-software-and-online-tools. ↩

127. Interview by Amy J. Schmitz with Svetlana Gitman, (June 30, 2020), https://arbitrate.com/article.cfm?zfn=arbconv1.cfm; *AAA-ICDR Virtual Hearing Guide for Arbitrators and Parties*, American Arbitration Association (June, 29, 2020), https://go.adr.org/rs/294-SFS-516/images/AAA268_AAA%20Virtual%20Hearing%20Guide%20for%20Arbitrators%20and%20Parties.pdf . ↩

128. *Dispute Resolution in OpenBazaar*, GitHub Gist, https://gist.github.com/drwasho/405d51bd1b1a32e38145. ↩

129. *Id.* ↩

130. Kaal & Calcaterra, *supra* note 61, at 50-52. ↩

131. *Id.* ↩

132. Hazel FinTech, *The Shutdown of OpenBazaar or the Failure of Bitcoin as a Currency* (May 27, 2021), https://hazelfintech.medium.com/the-shutdown-of-openbazaar-or-the-failure-of-bitcoin-as-a-currency-e34d26f869c4 ↩

133. Yueh-Ping Yang, *The Crowd's Wisdom in Smart Contract Dispute Resolution: Is Crowdsourced Dispute Resolution Arbitration?*, 15 Contemp. Asia Arb. J. 175 (2022). ↩

134. Colin Rule & Chittu Nagarajan, *Crowdsourcing Dispute Resolution Over Mobile Devices*, *in* Mobile Technologies for Conflict Management: Online Dispute Resolution, Governance, Participation 93, 93-100 (Marta Poblet ed., 2011). When a seller receives a bad review on eBay that she doesn't believe she deserves, she may submit a claim to the Community Court. At that point, she and the buyer submit evidence, such as photos or explanatory text, through an online portal. Twenty-one eBay jurors are randomly selected from a pool of applicants, who are eBay users that have met eligibility requirements. These jurors all submit impartial votes, and whichever side gets more than half of the votes will win the case. ↩

135. Clement Lesaege & Federico Ast, *Kleros* 1 (Nov. 2018), https://kleros.io/assets/whitepaper.pdf. ↩

136. *Id.* ↩

137. *Id.* at 2. According to Schelling, the focal points reflect each person's expectation of what another person expects him to do. In this game theoretic model, even people who do not trust one another will decide to work together and be truthful because it is at this focal point that parties reach "win-win" results. ↩

138. *Id.* at 4. ↩

139. *Id.* at 7. ↩

140. Lesaege & Ast, *supra* note 135, at 7. ↩

141. *Id.* ↩

142. *Id.* at 8. Under its proposed governance, Kleros will create subcourts and update and adapt the program as necessary. ↩

143. *Id.* at 7. ↩

144. *Id.* at 8. ↩

145. *Id.* ↩

146. *Id. See also* Clement Lesaege & William George, *Kleros and Augur—Keeping People Honest on the Blockchain Through Game Theory*, https://medium.com/kleros/kleros-and-augur-keeping-people-honest-on-ethereum-through-game-theory-56210457649c (explaining why the Kleros system is more just than over crowdsourced dispute resolution in the founders' estimation). ↩

147. E-mail from William George, Cryptoeconomist at Kleros, to Amy J. Schmitz, Professor at University of Missouri (Oct. 9, 2018) (on file with author). ↩

148. *Observations from Doge Pilot* 1 (Oct. 15, 2018), dogeobservations.pdf (on file with author). ↩

149. *Id.* ↩

150. Lesaege & Ast, *supra* note 135. Kleros handles the resolution platforms. The primary types of disputes advertised include small claims, insurance, E-commerce, finance, freelancing, token listing, content moderation, and intellectual property. Having a court officially recognize a Kleros ruling for a small claim is a major step forward in opening the platform to be viewed as a valid source of arbitration for more than just disputes that arise on the blockchain. A real-world disagreement between a landlord and a tenant being resolved is a major step forward and might give rise to more variety in disputes being arbitrated on the Kleros platform. The Mexican Court's decision was groundbreaking since the dispute is different from many disputes on the Kleros platform that have to do with disputes that originate online. ↩

151. *See* Mauricio Virues Carrera, *Accommodating Kleros as a Decentralized Dispute Resolution Tool for Civil Justice Systems: Theoretical Model and Case Application* (June 8, 2022), https://ipfs.kleros.io/ipfs/QmcJAieUWo46VRuhpP7vyF8AcyryhdspQhRgYCGR21saNv/Accommodating%20Kleros%20as%20a%20Decentralized%20Dispute%20Resolution%20%20Tool%20for%20Civil%20Justice%20Systems_%20%20A%20Theoretical%20Model.pdf. ↩

152. Kleros, https://kleros.io. ↩

153. *Id.* ↩

154. *See id*; *see also* Mauricio Virues, *How to Enforce Blockchain Dispute Resolution in Court*, Kleros (June 8, 2022), https://blog.kleros.io/how-to-enforce-blockchain-dispute-resolution-in-court-the-kleros-case-in-mexico. ↩

155. *Case Details: Case #1224*, Kleros (June 2022), https://court.kleros.io/cases/1224. Case #1224 is a prime example of a case where there was evidence that allegedly showed that one person was controlling more than one account. The suspected "puppeteer," a person creating multiple accounts, uploaded counterarguments and documents in their defense. ↩

156. *Case Details: Case #1226*, Kleros (June 2022), https://court.kleros.io/cases/1226. ↩

157. *Id.* ↩

158. *Id*; s*ee* Stuart James, *3 Things to Know About Becoming a Kleros* Juror, Kleros (Jan. 24, 2019), https://blog.kleros.io/become-a-juror-blockchain-dispute-resolution-on-ethereum. ↩

159. *See* Jur, jur.io. ↩

160. *The Network State for the Digital Economy*, Jur Lightpaper 1, 3 (May 2022) https://storage.googleapis.com/jur-webiste/1/2022/05/Jur%20Lightpaper.pdf. ↩

161. *Id.* ↩

162. *Id.* at 9. ↩

163. *Id.* at 10. ↩

164. *Id.* ↩

165. *Id.* ↩

166. *Id.* at 11-15. ↩

167. *Id.* ↩

168. Matt O'Brien & Dake Kang, *AI in the Court: When Algorithms Rule on Jail Time*, Phys.Org (Jan. 31, 2018), https://phys.org/news/2018-01-ai-court-algorithms.html. ↩

169. *Artificial Intelligence and Lights-Out Court Document Processing*, Computing Sys. Innovations (Nov. 6, 2017), http://csisoft.com/artificial-intelligence-and-lights-out-court-document-processing; *see* Hal

Marcus, *Court Supports eDiscovery Machine Learning, Addresses AI Transparency*, Opentext (Dec. 12, 2017), https://blogs.opentext.com/court-supports-ediscovery-machine-learning-addresses-ai-transparency/. ↩

170. Stephen Buranyi, *Rise of the Racist Robots—How AI is Learning All Our Worst Impulses*, The Guardian (Aug. 8, 2017), https://www.theguardian.com/inequality/2017/aug/08/rise-of-the-racist-robots-how-ai-is-learning-all-our-worst-impulses. ↩

171. *Id.* ↩

172. *Id.* ↩

173. *Id.* ↩

174. *See Demystifying the Metaverse*, PWC, https://www.pwc.com/us/en/tech-effect/emerging-tech/demystifying-the-metaverse.html. ↩

175. *See* Andrew Mizner, *PAW2022: Blockchain, the Metaverse, and Arbitration*, Int'l. Compar. Legal Guide (Apr. 7, 2022), https://iclg.com/cdr/arbitration-and-adr/17796-paw2022-blockchain-the-metaverse-and-arbitration. ↩

176. *See* Elizabeth Chan & Emily Hay, *Something Borrowed, Something Blue: The Best of Both Worlds in Metaverse-Related Disputes*, 15 Contemp. Asia Arb. J. 205 (2022) (discussing how metaverse users and platforms are already choosing arbitration to resolve disputes). ↩

177. *See* Jalal El Ahdab & Claire Bentley, *Paris Arbitration Week Recap: Blockchain, NFTs, and the Metaverse*, Kluwer Arbitration: Blog (May 14, 2022), http://arbitrationblog.kluwerarbitration.com/2022/05/14/paris-arbitration-week-recap-blockchain-nfts-and-the-metaverse. ↩

178. *See supra* note 2. ↩

179. *See* Juliette Asso & Laura Azaria, *Arbitration in the Metaverse: How to Anticipate and Resolve Web3 Disputes*, The Fashion Law (May 23, 2022), https://www.thefashionlaw.com/arbitration-in-the-metaverse-how-to-anticipate-and-resolve-web3-disputes; *supra* note 2. ↩

180. *See supra* note 2. ↩

181. *See Avatar v. Avatar: A Look at International Arbitration within the Metaverse*, Wasel&Wasel (Feb. 2022), https://waselandwasel.ca/canada/avatar-v-avatar-a-look-at-international-arbitration-within-the-metaverse. ↩

182. *See* Chan & Hay, *supra* note 176 (conventional international arbitration is not time and cost efficient for small claims resolution, in part due to due process procedural requirements). ↩

183. *See* Sneha Vijayan, *Autonomous Arbitration in the Era of the Metaverse*, Kluwer Arbitration: Blog (Mar. 11, 2022), http://arbitrationblog.kluwerarbitration.com/2022/03/11/autonomous-arbitration-in-the-era-of-the-metaverse. ↩

184. Elizabeth Chan et al., *Paris Arbitration Week Recap: Metaverse-related Sessions*, Kluwer Arbitration: Blog (Apr. 24, 2022), http://arbitrationblog.kluwerarbitration.com/2022/04/24/paris-arbitration-week-recap-metaverse-related-sessions. ↩

185. *The Justice Protocol*, Kleros, https://kleros.io/; *Aragon Court*, Aragon, https://aragon.org/aragon-court. ↩

186. Alexander J.S. Colvin, *The Growing Use of Mandatory Arbitration*, Econ. Pol'y Inst. (Apr. 6, 2018), https://www.epi.org/publication/the-growing-use-of-mandatory-arbitration-access-to-the-courts-is-now-barred-for-more-than-60-million-american-workers. ↩

187. Amy J. Schmitz and Colin Rule, *Online Dispute Resolution*, supra note 28. ↩

188. *"Andon"—The Definition*, SageClarity, https://sageclarity.com/solutions/andon-system/. ↩

189. Gwynn Guilford, *GM's Decline Truly Began with its Quest to Turn People into Machines*, Quartz (Dec. 30, 2018), https://qz.com/1510405/gms-layoffs-can-be-traced-to-its-quest-to-turn-people-into-machines/. The Andon cord is "a sort of emergency brake that would, once pulled, immediately stop the assembly line." *Id.* ↩

190. Billy Bambrough, *Update: Bitcoin Falls Further, Hitting Ripple (XRP) and Ethereum—And Tron Turns Red*, Forbes (Jan. 10, 2019), https://www.forbes.com/sites/billybambrough/2019/01/10/bitcoin-falls-suddenly-dragging-ripple-xrp-and-ethereum-down-but-tron-leaps-higher/#53dbaf0f27df. *See also And So the CoinPocalypse Begins*, Reddit (Nov. 22, 2018), https://www.reddit.com/r/CryptoCurrency/comments/9z9esj/ and_so_the_coinpocalypse_begins; *The Coinpocalypse*, Investing in Chinese Stocks (Aug. 13, 2018), http://investinginchinesestocks.blogspot.com/2018/08/the-coinpocalypse.html. ↩