The impact of blockchain technologies and smart contracts on dispute resolution: arbitration and court litigation at the crossroads

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Abstract
This article investigates the twofold impact that blockchain technologies and smart contracts have on dispute resolution. On the one hand, these technologies enable private parties to devise arbitral systems that are self-enforcing and, therefore, largely bypass the recognition and enforcement procedures through which State courts traditionally exert a certain control over arbitration. This phenomenon may in the future allow arbitration to become entirely self-sufficient, thus leading to the marginalization of State courts. On the other hand, however, such a marginalization has not taken place yet; to the contrary, the recent blockchain-related phenomenon of initial coin offerings has given rise to some prominent court cases. These cases raise particularly interesting jurisdictional questions, especially in light of the difficulty of reconciling the decentralized nature of the blockchain with the territorial approach whereby jurisdiction is typically allocated among national courts.

I. Introduction
Despite the significant interest that blockchain technologies have sparked in legal scholars, one particular aspect remains largely unexplored: the effects of distributed ledgers (and the devices associated with them, such as smart contracts) on dispute resolution. This article fills the gap by providing an account of the distinctively twofold nature of these effects.

On the one hand, the unprecedented degree of contractual automation brought about by these technologies fosters the emergence of private, self-enforcing systems of arbitration. These systems can potentially bypass the recognition and enforcement procedures through which States traditionally exert a modicum of control over arbitral rulings; inasmuch as self-enforcing adjudication based on blockchain technologies spreads, hence, the role of national courts may be

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progressively marginalized. On the other hand, however, the blockchain-related phenomenon of initial coin offerings (ICOs) has recently triggered the opposite tendency; rather than rendering State courts obsolete, ICOs have generated a wave of court litigation, arising in connection with prominent start-up ventures active in this field. These ICO cases raise some interesting legal questions, especially as far as jurisdiction is concerned. The delocalized and decentralized nature of the technology, in particular, does not sit well with the eminently territorial approach through which international jurisdiction is still allocated among different courts. The article will analyse these problems and propose some tentative solutions, with specific reference to the European Union (EU).

The remainder of this article proceeds in four sections. After this introduction, Section II shows how the tendency of blockchain technologies towards the creation of private adjudication systems was already implicitly present in bitcoin from the outset. Section III, then, outlines the current landscape of self-enforcing arbitration based on these technologies, assessing its impact on the supervisory role of courts vis-à-vis arbitration. Subsequently, Section IV scrutinizes the rise of ICO-related court litigation and the challenges it poses to the traditional criteria for the allocation of jurisdiction. Finally, Section V draws some consequences.

II. Blockchain technologies’ inherent tendency towards judicialization

The idea of the blockchain first emerged at the end of 2008, with the white paper published by anonymous authors under the pseudonym of ‘Satoshi Nakamoto’.

Throughout the last decade, the blockchain ethos has often been summarized by reference to the notion of ‘decentralisation’; the white paper outlined the technical solutions enabling the development and maintenance of a mechanism aimed ‘to make payments over a communications channel without a trusted party’, where the classical functions of money (medium of exchange, store of value, unit of account) would be carried out on a peer-to-peer basis, without relying on any central authority and, most importantly, outside of the shadow of State authority. In light of the obvious Hayekian overtones of the project, and considering the vertiginous value fluctuations of bitcoin, the amount of academic

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1 Satoshi Nakamoto, ‘Bitcoin: A Peer-to-Peer Electronic Cash System’ (2008) <https://bitcoin.org/bitcoin.pdf> (accessed 3 May 2019). For a sociological background see Nathaniel Popper, Digital Gold: Bitcoin and the Inside Story of the Misfits and Millionaires Trying to Reinvent Money (Harper, New York 2015).

2 Primavera de Filippi and Aaron Wright, Blockchain and the Law: The Rule of Code (HUP, Cambridge 2018) 34–35.

3 Nakamoto (n 1) 1.

4 For a critical account of Bitcoin’s ability to perform these functions see Stefan Eich, ‘Old Utopias, New Tax Havens: The Politics of Bitcoin in Historical Perspective’ in Philipp Hacker, Georgios Dimitropoulos, Stefan Eich, and Ioannis Lianos (eds), Regulating Blockchain: Political and Legal Challenges (OUP, Oxford 2019) forthcoming.

5 Beat Weber, ‘Bitcoin and the legitimacy crisis of money’ (2016) 40(1) Cambridge Journal of Economics 17.
attention that bitcoin received from economists and social scientists in the years following the publication of the white paper is not surprising.\textsuperscript{6} There is, however, one aspect of the bitcoin white paper (and its subsequent percolation into countless blockchain-related ventures) that has not received extensive attention so far: bitcoin’s inherent tendency towards judicialization—that is, the development of its own dispute resolution architecture. This particular notion will provide the backdrop against which the relationship between blockchain technologies and dispute resolution will be scrutinized in this article.

The world envisaged in the white paper (which never materialized beyond the province of libertarian dystopias) is populated by individuals interacting with each other on a peer-to-peer basis, without the supervision of central authorities. In Nakamoto’s vision, the technological self-sufficiency of the system would render States, with their laws and their judicial apparatus, largely obsolete. Given these premises, a question arises: in a system that does not recognize the role of any central authority to supervise transactions and grant redress where appropriate, how can individuals protect themselves? The question is all the more relevant if one considers that cryptographically secure technologies such as bitcoin, while not entirely anonymous, allow for a high level of pseudonymity;\textsuperscript{7} as a result, it is possible for two parties to engage in a transaction without having any type of certainty regarding the identity of the counterpart, as the numerous examples of online marketplaces on the so-called ‘darknet’ recently demonstrated.\textsuperscript{8} How, then, can one trust a perfect stranger in such a bizarre lawless land?

The need for ‘trust’, which Nakamoto emphatically rejects as suboptimal at the beginning of the paper, seems to immediately crawl back between the lines of the white paper. The relevance of the question at hand is particularly evident in the context of electronic commerce, which is the primary focus of bitcoin;\textsuperscript{9} for instance, how can a buyer confidently transfer funds to the seller without any guarantee as to what the real identity of the seller may be and in the absence of

\textsuperscript{6} See e.g., without any pretense at exhaustiveness, Reuben Grinberg, ‘Bitcoin: An Innovative Alternative Digital Currency’ (2012) 4(1) Hastings Sci & Tech LJ 159; Dorit Ron and Adi Shamir, ‘Quantitative Analysis of the Full Bitcoin Transaction Graph’ in Ahmad-Reza Sadeghi (ed) Financial Cryptography and Data Security: 17th International Conference, FC 2013, Okinawa, Japan, April 1–5, 2013, Revised Selected Papers (Springer, Berlin 2013) 6; Nicholas A Plassaras, ‘Regulating Digital Currencies: Bringing Bitcoin within the Reach of IMF’ (2013) 14(1) Chi J Int’l L 377; Bill Maurer, Taylor C Nelms and Lana Swartz “’When perhaps the real problem is money itself’: the practical materiality of Bitcoin” (2013) 23 (2) Social Semiotics 261; Danton Bryans, ‘Bitcoin and Money Laundering: Mining for an Effective Solution’ (2014) 89(1) Ind LJ 441; Andreas M Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies (O’Reilly, Sebastopol 2015); David Yermack, ‘Is Bitcoin a Real Currency? An Economic Appraisal’ in David Lee Kuo Chuen, Handbook of Digital Currency: Bitcoin, Innovation, Financial Instruments, and Big Data (Elsevier, London 2015) 31; Gerald P Dwyer, ‘The economics of Bitcoin and similar private digital currencies’ (2015) 17 Journal of Financial Stability 81.

\textsuperscript{7} Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction (Princeton University Press, Princeton 2016) 32–33.

\textsuperscript{8} Sesha Kethineni, Ying Cao and Cassandra Dodge, ‘Use of Bitcoin in Darknet Markets: Examining Facilitative Factors on Bitcoin-Related Crimes’ (2018) 43(2) American Journal of Criminal Justice 141.

\textsuperscript{9} Nakamoto (n 1) 1.
any central authority empowered to revert the effects of the transfer in case of fraud or, more generally, in case of a failure to perform? The white paper answers this question with a single, cryptic sentence: ‘[R]outine escrow mechanisms could easily be implemented to protect buyers.’ This apparently incidental statement contains the key to understanding blockchain technologies’ inherent tendency towards self-sufficient dispute resolution.

The white paper’s reference to ‘routine escrow mechanisms’ essentially means that a buyer can, rather than paying the sale price directly to the seller, keep it in escrow with a third party. If no disputes arise out of the sale agreement, the funds held in escrow will be unblocked in favour of the seller. If, by contrast, a dispute does arise, the escrow service provider will have the ultimate say as to where the money should be directed: either to the seller or back to the buyer. Needless to say, both seller and buyer must trust that the escrow service provider will not steal the coins or collude with one of the two parties.

In a nutshell, the escrow mechanism envisaged by Nakamoto is precisely the type of ‘trusted third party’ that the white paper purports to render obsolete. Behind the smokescreens of ‘code as law’, what the bitcoin system actually aims to develop is a realm of transnational social interaction that inherently tends towards judicialization. In the absence of State courts, individuals are invited—and in practice required, when they have no extrinsic guarantee as to each other’s trustworthiness—to devise their own adjudication mechanisms, selecting the private adjudicators (in casu, escrow service providers) of their preference.

From this point of view, bitcoin is far from revolutionary; it is actually a return to a rather ancient, pre-Westphalian past, where jurisdiction was not an

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10 When e-commerce payments are made through credit cards, such a layer of protection is offered by the chargeback systems that credit card service providers typically offer: Fumiko Hayashi, Zach Markiewicz and Richard J Sullivan, ‘Chargebacks: Another Payment Card Acceptance Cost for Merchants’ (2016) Federal Reserve Bank of Kansas City Working Paper No. 16-01. In addition to that, whenever the transaction takes place on a centrally managed platform (such as Amazon or eBay), the platform normally provides a dispute resolution mechanism of its own: Ethan Katsh and Orna Rabinovich-Einy, Digital Justice: Technology and The Internet of Disputes (OUP, Oxford 2017) 57-80. For a discussion of the ‘regulatory’ role of platforms see Christoph Busch, ‘European Model Rules for Online Intermediary Plaform’ in Uwe Blaurock, Martin Schmidt-Kessel and Katharina Erler (eds), Plattformen: Geschäftsmodel und Verträge (Nomos, Baden-Baden 2018) 37.

11 Nakamoto (n NOTEREF _Ref1375744 \h 1) 1.

12 The oft-misunderstood expression ‘code as law’ finds its origins in Lawrence Lessig, Code and Other Laws of Cyberspace, Version 2.0 (2nd edn, Basic Books, New York 2006) 1–8.

13 Parallels between international commercial arbitration and the medieval practice of dispute resolution among merchants have been drawn by Berthold Goldman, ‘Frontières du droit et lex mercatoria’ (1964) Archives de philosophie du droit 177; Clive M Schmitthoff, ‘The Unification of the Law of International Trade’ (1968) Journal of Business Law 105. See also, for an extra-European historical account, Jan Paulsson, The Idea of Arbitration (OUP, Oxford 2013) 10-13. This narrative of arbitration is often closely connected to normative arguments favouring the ‘decentralized’ nature of private adjudication: see e.g. Emmanuel Gaillard, Legal Theory of International Arbitration (Nijhoff, Leiden 2010) 15–66; Emmanuel Gaillard, ‘Transcending National Legal Orders for International Arbitration’ in Albert Jan van den Berg (ed), International Arbitration: The Coming of a New Age? (ICCA Congress Series No 17, Kluwer, Deventer 2013) 371; Julian Lew, ‘Achieving the Dream: Autonomous Arbitration’ (2006) 22(2) Arbitration International 179. Michaels, however, casts doubts as to the possibility to draw a direct parallel between the medieval history of commercial law and the current emergence of
emanation of State sovereignty but, rather, a private service, provided by professionals and largely based on the consent of the disputing parties.\textsuperscript{14} It is for this reason that systems such as bitcoin spontaneously tend towards judicialization; by rejecting the authority of the State and its courts, they automatically trigger the need for the parties to set up their own ‘courts’. Inasmuch as distributed ledger technologies permeate different aspects of society, they generate as a by-product a multitude of arbitral fora, enforcing contractual obligations on the request of the private parties themselves. While Nakamoto’s vision never fully came into being, many of the current developments concerning blockchain technologies seem to corroborate this conclusion. For this reason, the next section will consider the currently existing ecosystem of blockchain technologies from the particular point of view of transnational arbitration.

III. The ecosystem of blockchain arbitral systems: a terra incognita of transnational arbitration

In order to explore the terra incognita of transnational arbitration based on blockchain technologies, it is first of all necessary to look at the current reality of the phenomenon within the bitcoin system (subsection 1). Subsequently, it will be possible to enlarge the perspective and look at parallel developments in other blockchain-based applications (subsection 2).

1. Self-enforcing bitcoin arbitration based on multi-signature addresses and its consequences on recognition and enforcement

Within the bitcoin system, users have devised a private adjudication system that is slightly more sophisticated than the escrow mechanism initially envisaged by Nakamoto: the multi-signature address.\textsuperscript{15} This device essentially works like a lock with two keyholes; it can only be opened if two keys are used. Two parties entering into a transaction can use this device to store coins (for example, the price for the sale of certain goods), until the obligations arising out of that transaction have been performed. Both parties are provided with a digital key to the address; if no dispute arises, they can use the two keys to unlock the coins, jointly determining their final destination (typically, the address of the seller). In case of a dispute, however, neither party can access the coins autonomously, but either of them can ask a private adjudicator to review the facts of the case and determine which of the two disputants is entitled to the disputed funds.

\textsuperscript{14} Salvatore Satta, \textit{Contributo alla dottrina dell’arbitrato} (Vita e Pensiero, Milan 1931) 50; for a detailed historical account see Nicola Picardi, \textit{La giurisdizione all’alba del terzo millennio} (Giuffrè, Milan 2007).

\textsuperscript{15} ‘Address’ is, in Bitcoin jargon, the equivalent of a bank account, where funds can be stored.
What the adjudicator is asked to conduct, in sum, is a rudimentary form of arbitration, assessing the facts of the case and determining which party should prevail. The private adjudicator is provided with a third key; unlike an escrow service provider, hence, he or she has no unilateral access to the disputed coins (which can only be collected if two keys are jointly used). The adjudicator, however, can provide his or her key to the prevailing party, thus ensuring that the disputant entitled to the funds (who will now have two of the three keys) will actually receive them. A multi-signature address, then, allows private parties to set up a dispute resolution procedure that (despite its obviously primitive character in many respects) is effectively able to enforce its own outcomes.\(^{16}\)

While the use of bitcoin multi-signature addresses is by no means a mainstream trend in transnational commerce, the scale of the phenomenon does come across as surprising. At the time of writing, over 30 per cent of the existing coins are stored on addresses of this type,\(^{17}\) and specialized websites even offer arbitrator-rating services that the parties can use to find a private adjudicator for their dispute, if need be.\(^{18}\) It is puzzling that the phenomenon at hand has been largely ignored by arbitration specialists and transnational lawyers so far; adjudication based on multi-signature addresses seems to be a unique form of transnational arbitration, operating outside of the shadow of State law with a high degree of finality and self-sufficiency. It could be argued that, from a purely technical standpoint, this form of blockchain-based adjudication is the most advanced practical instantiation of the theory of ‘delocalized arbitration’ put forth by prominent scholars.\(^{19}\) Yet, to date, very little is known about the practical reality of this procedure; the identity of the arbitrators (who are often non-lawyers),\(^{20}\) the modes in which the parties and the arbitrators interact, the evidence-taking mechanisms, and the substantive rules or principles applied to the disputes still remain a sort of *terra incognita* of private adjudication, where most arbitration scholars have not ventured yet.\(^{21}\)

In order to fully grasp the impact of this set of technologies on private adjudication, it is particularly useful to look at their effects on the notions of recognition and enforcement. Traditionally, an arbitral award can only produce legal effects in a given national legal system once it has been recognized, and the law governing recognition (most notably, in the context of international arbitration, Article V of

\(^{16}\) For a more detailed account of this technology see Pietro Ortolani, ‘Self-Enforcing Online Dispute Resolution: Lessons from Bitcoin’ (2016) 36(3) *Oxford Journal of Legal Studies* 595.

\(^{17}\) Addresses used to devise *inter alia* a multi-signature transaction are called ‘pay-to-script hash’: for statistical data see <https://p2sh.info> (accessed 3 May 2019).

\(^{18}\) <https://www.bitrated.com> (accessed 3 May 2019).

\(^{19}\) See *supra* (n 13).

\(^{20}\) See the arbitrator ratings on the Bitrated platform (n 18).

\(^{21}\) The lack of academic visibility of these forms of arbitration is also discussed in Pietro Ortolani, ‘The Three Challenges of Stateless Justice’ (2016) 7(3) *Journal of International Dispute Settlement* 596.
the 1958 New York Convention) allows the courts of the requested State to decline recognition in the presence of a limited, but meaningful, set of circumstances, such as a violation of the right to be heard or irreconcilability with that particular jurisdiction’s public policy. In other words, States maintain a certain ‘gatekeeping’ function vis-à-vis decisions rendered by arbitral tribunals; recognition constitutes a minimal, but important, filter for arbitral awards, preventing a ruling issued by arbitrators from producing any kind of practical effect in cases that are widely regarded as ‘pathological’. By contrast, in the case of an arbitration based on a multi-signature address, this filter is entirely bypassed; although the ruling issued by the private adjudicator may well be denied recognition by State courts, and the procedure may not even be regarded as a form of arbitration at all, the private decision produces practical effects (namely, the coins are directed to the prevailing party) without the need for any kind of intermediation on the part of the State and its courts. It is, effectively, a form of self-enforcing arbitration, where the issuance of an arbitral decision and its practical implementation not only are closely connected but also factually overlap entirely.

Further important effects can be observed with respect to the enforcement phase, which traditionally follows recognition when the award debtor fails to perform one or more of the obligations imposed in the arbitral award. Enforcement is regarded, by its very nature, as an expression of the State’s monopoly over the use of force; whenever coercion is necessary, such a result can only be achieved by relying on public authority. Importantly, while the law applicable to these matters varies significantly across different jurisdictions, enforcement normally requires the creditor to follow articulate procedures, which strike a certain balance between the need to enforce the creditor’s right (favor creditoris) and the protection of certain interests of the debtor, which cannot be entirely disregarded (favor debitoris). In other words, one could informally say that there are good reasons why enforcement does not usually happen overnight; by way of example, the national rules governing the time frames for asset forfeiture, or

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22 Notably, however, the mechanisms set forth in the New York Convention are extended to domestic awards as well by Articles 35 and 36 of the UNCITRAL Model Law on International Commercial Arbitration.

23 From this point of view a parallel can be drawn with ICANN arbitration, which allows for a high-degree of self-enforcement while not being regarded as a form of arbitration which precludes de novo court litigation: Thomas Schultz, ‘Private Legal Systems: What Cyberspace Might Teach Legal Theorists’ (2007) 10 Yale Journal of Law and Technology 151.

24 Interestingly, this is true not only for arbitration, but also for the intra-European Union (EU) enforcement of court judgments, despite the close cooperation in judicial matters that EU Member States are required to engage in. As far as arbitration is concerned, Article III of the New York Convention specifies that arbitral awards must be enforced ‘in accordance with the rules of procedure of the territory where the award is relied upon’. For court judgments circulating among EU Member States, Article 41 of Regulation 1215/2012 (Brussels I bis Regulation) states that ‘the procedure for the enforcement of judgments given in another Member State shall be governed by the law of the Member State addressed’. Enforcement, hence, seems to be immune from most attempts of harmonization, probably in light of its inextricable link with the State’s sovereignty over its own territory.

25 Carlos Rogel Vide, Favor debitoris: Análisis crítico (Temis, Madrid 2010).

26 For a comparative overview see Carel van Lynden, Enforcement of Judgments, Awards and Deeds in Commercial Matters (Thomson Reuters, Toronto 2013).
those setting certain limits to the possibility of attachment of earnings, serve the important purpose of ensuring that the enforcement requested by the creditor will not result in undue violations of certain fundamental rights of the debtor.

Needless to say, not all national legal systems strike the same balance between the need for enforcement and the protection of the debtor’s rights, and an excess of favor debitoris may be one of the reasons for the existence of significant obstacles hindering the enforcement of arbitral awards and court judgments in some jurisdictions. Nevertheless, despite these differences, most national laws seem to acknowledge the need for some kind of balancing rather than enabling creditors to obtain an immediate and entirely frictionless enforcement. Technologies such as bitcoin, by contrast, do not adhere to the same logic; the allocation of the disputed assets to the prevailing party happens instantaneously, by technological means, without the intermediation of State courts and bailiffs and, most importantly, without any kind of evaluation as to whether certain rights of the debtor should be protected. This shift from balancing to automation may not come across as particularly worrisome for the time being, given that self-enforcing arbitration based on multi-signature addresses is not a widespread practice beyond the community of those who choose to trade in bitcoin. However, things may change in the near future as contract automation and self-enforcing dispute resolution extend to a multitude of other social systems. Hence, it is now necessary to focus on these further developments.

2. Blockchain technologies, smart contracts, and other animals: automating dispute resolution?

While bitcoin never developed into the mainstream payment system that its inventor(s) had envisaged, it did have an important effect: the introduction of the blockchain, the technology through which a ledger can be consistently maintained by users interacting on a peer-to-peer basis without the need for centralized supervision. The blockchain has been recently promoted as a solution applicable to a wide range of problems. While an assessment of the real usefulness of distributed ledgers (as opposed to other types of technologies) falls clearly outside of the scope of this article, it is undeniable that the last few years have

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27 See e.g., in England and Wales, Section 6(5)(b) of the Attachment of Earnings Act 1971, requiring that an attachment of earnings order specify the protected earnings rate, having regard to the debtor’s resources and needs.

28 It is however interesting to note that the attitudes of different national lawmakers may progressively converge, also as a result of the pressure exerted by comparative evaluations such as the World Bank’s Doing Business Report or the EU Justice Scoreboard: Alexander Strelkov, ‘EU Justice Scoreboard: a new policy tool for “deepening” European integration?’ (2019) Journal of Contemporary European Studies, forthcoming; Adriani Dori, ‘The EU Justice Scoreboard: Judicial Evaluation as a New Governance Tool’ (2015) MPI Luxembourg Working Paper Series 2.

29 In practice, the existence of a small number of powerful ‘miners’ has cast doubts as to the real absence of supervisory authorities in the Bitcoin network; Ittay Eyal and Emin Gün Sirer, ‘Majority Is Not Enough: Bitcoin Mining Is Vulnerable’ in Nicolas Christin and Reihaneh Safavi-Naini (eds), Financial Cryptography and Data Security (Springer, Berlin 2014) 436.
been characterized by a significant enthusiasm\textsuperscript{30} for peer-to-peer record-keeping solutions beyond the specific application of ‘digital cash’.\textsuperscript{31}

One of the most prominent ventures based on blockchain technologies is undoubtedly Ethereum. Ethereum was launched in 2015 with the main purpose of overcoming some of the limitations of bitcoin and, in particular, enabling users to enter into transactions more complex than a simple transfer of funds. When two Ethereum users enter into an agreement, they are able to translate (at least significant parts of) that agreement into software script, thus relying on the technology (rather than on each other’s good faith and individual initiative) to ensure the performance of the obligations arising out of it. This type of mechanism is widely labeled as ‘smart contract’. Such a definition is partially misleading as the legal qualification of this type of transaction as a contract is not absolute (but obviously depends on the formal and substantive details of the transactions as well as the applicable law),\textsuperscript{32} and the script simply provides a deterministic infrastructure rather than any form of artificial intelligence. Despite the terminological pitfalls, however, it is important to assess to what extent this application of blockchain technologies may have an impact on dispute resolution.

The idea of a self-executing agreement may apparently suggest that any need for third party contract enforcement\textsuperscript{33}—for example, through arbitration or court litigation—is rendered obsolete.\textsuperscript{34} This, however, clearly cannot be the case as long as software script only allows for the automation of those parts of an agreement that are deterministic in nature. For any non-trivial transaction,\textsuperscript{35} a significant portion of the parties’ agreement cannot be encoded in if-then statements but, rather, is encompassed by non-deterministic notions and general clauses such as good faith, reasonableness, and the many other concepts forming the backbone of contract law. Unless artificial intelligence develops to the stage where a machine can mimic human reasoning in this respect, the need for a third party human adjudicator cannot be excluded, whenever a contractual dispute requires the application of this type of legal concept.\textsuperscript{36}

\begin{footnotes}
\item\textsuperscript{30} For an analysis of the negative consequences of such wave of enthusiasm on the part of retail investors see infra, section IV.
\item\textsuperscript{31} Nakamoto (n 1).
\item\textsuperscript{32} Mateja Durovic and André Janssen, ‘The Formation of Blockchain-based Smart Contracts in the Light of Contract Law’ (2018) 26(6) European Review of Private Law 753.
\item\textsuperscript{33} On the need for enforcement that normally arises out of contractual interaction see Alec Stone Sweet, ‘Judicialization and the Construction of Governance’ (1999) Comparative Political Studies 147.
\item\textsuperscript{34} On this topic see the analysis carried out by Larry A DiMatteo and Cristina Poncibo, ‘Quandary of Smart Contracts and Remedies: The Role of Contract Law and Self-Help Remedies’ (2018) 26(6) European Review of Private Law 805.
\item\textsuperscript{35} From this point of view, it is telling that the notion of ‘smart contract’ has been developed with reference to vending machines: Nick Szabo, ‘Formalizing and Securing Relationships on Public Networks’ (1997) 2(9) First Monday. While the purchase concluded through a vending machine does constitute a contract, it is obvious that not all commercial transactions can be reduced to that paradigm.
\item\textsuperscript{36} Eric Tjong Tjin Tai, ‘Force Majeure and Excuses in Smart Contracts’ (2018) 26(6) European Review of Private Law 787.
\end{footnotes}
Despite the persistent need for third party adjudication, the tendency towards contract automation (evinced by current trends such as the one of smart contracts) does have an important consequence for dispute resolution. In platforms like Ethereum, such a consequence is normally referred to with the notion of an ‘oracle’.\(^{37}\) Despite its magniloquent name, the idea is quite simple; an oracle is an external source of information, which a script (for example, a smart contract) can refer to and draw inferences from. Let us suppose, for instance, that the contract whereby a traveler purchases an airplane ticket is encoded in a smart contract. If programmed correctly, the smart contract may use the data concerning the time of departure and arrival of the flight as an oracle to determine whether the flight schedule was respected. If, on the basis of that information, it appears that a delay occurred, the smart contract could be programmed to immediately transfer the price (or a part thereof) back to the traveler as a compensation.\(^{38}\)

The mechanism of oracles can be readily applied to arbitration; a smart contract can defer to the decision of a third party adjudicator, such as an arbitral tribunal, and determine the final recipient of certain disputed assets on the basis of a ruling made by that oracle. In other words, the external information retrieved by the smart contract could be an arbitral award, and software script could be used to enforce the outcome of the procedure. Through this type of device, the potential for self-enforcement already inherent in the ‘routine escrow mechanisms’ first theorized by Nakamoto could extend to a much wider range of economic interactions, inasmuch as different types of contracts are increasingly translated into code.\(^{39}\)

The technologies at hand offer an unprecedented opportunity for arbitration to evolve. As the possibility for parties to encode their contracts into script extends beyond the rather narrow limits originally imposed by the bitcoin protocol, new prospects for efficient arbitral procedures arise. It is perhaps not unrealistic to imagine that, in the near future, the leading arbitral institutions will consider adapting their current rules to the needs of ‘smart contract arbitration. In this respect, it would be particularly desirable to develop normative criteria as to how the operative part of an arbitral award should be drafted in order to facilitate its use as an oracle, feeding information into the smart contract. Notably, even assuming the absence of any initiative on the part of ‘traditional’ arbitral institution, many blockchain-related ventures such as EOSIO\(^ {40}\) and Mattereum\(^ {41}\) are

\(^ {37}\) De Filippi and Wright (n 2) 75.

\(^ {38}\) The example is drawn from an actual proposal to automate compensation for flight and railway delays, in Germany: ‘Entschließung des Bundesrates „Fahrgastrechte stärken: Entschädigungsansprüche der Verbraucherinnen und Verbraucher bei Verspätungen und Ausfällen im Flug- und Bahnverkehr automatisieren“’ <https://www.bundesrat.de/SharedDocs/drucksachen/2018/0501-0600/571-18(B).pdf?__blob=publicationFile&v=1> (accessed 3 May 2019).

\(^ {39}\) To be sure, any such endeavour to translate the language of contracts into code is fraught with obstacles, also in light of the differences existing across legal systems as to drafting styles: Michel Cannarsa, ‘Interpretation of Contracts and Smart Contracts: Smart Interpretation or Interpretation of Smart Contracts’ (2018) 26(6) European Review of Private Law 773.

\(^ {40}\) <https://eoscorearbitration.io/> (accessed 3 May 2019).

\(^ {41}\) <https://mattereum.com/> (accessed 3 May 2019).
currently developing solutions to integrate arbitration within the architecture of smart contracts.

While opening new possibilities, the growing self-enforceability of arbitral awards also poses significant challenges. First and foremost, the marginalization of recognition procedures (already present in the case of bitcoin adjudication based on multi-signature addresses) risks becoming a large-scale issue. Importantly, however, the existence of such a risk is not enough to immediately conclude that a restrictive regulatory approach is necessary. In principle, even if blockchain technologies did succeed at devising widely used systems of self-enforcing arbitration, other techniques could be available to safeguard the values (such as public policy) that State-controlled recognition procedures currently protect. Let us, for instance, consider the hypothesis of an arbitral award granting damages for the breach of an anti-competitive agreement. Traditionally, such an award may be denied recognition and enforcement under Article V(2)(b) of the New York Convention, inasmuch as the provisions of competition law violated by the award have public policy status in the requested State. By contrast, assuming that the anti-competitive agreement could be encoded in a smart contract providing for arbitration and using any resulting arbitral award as an oracle, it would in principle be possible for the tribunal to force compliance with the award ‘on-chain’, despite its incompatibility with competition law. States, however, may have other possibilities of reaction—for example, ordering that the sums of money automatically paid by the smart contract (on the basis of the information provided by the anti-competitive award oracle) be paid back ‘off-chain’. In other words, the fact that some contractual obligations may increasingly be enforced through technological means does not entail that the State’s control over those obligations must occur via those same means. The only serious obstacle, in this respect, would arise in a hypothetical future where all relevant assets circulate on technological platforms allowing for a high degree of automation, thus rendering the prospect of an off-chain transaction reversal factually impracticable. Such a scenario, however, seems to mainly belong to the realm of dystopian literature for the time being.

A further challenge concerns the aforementioned need to strike a balance between creditor and debtor rights in the context of enforcement procedures. As illustrated above, the logic of frictionless automated enforcement appears difficult to reconcile with the balancing paradigm traditionally adopted by the national laws governing enforcement. If self-enforcement were to spread beyond the specific and rather isolated settings in which it currently exists, it would likely

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42 In fact, the prevailing regulatory attitude at the moment aims at encouraging decentralization, rather than limiting it: Philipp Hacker, Ioannis Lianos, Georgios Dimitropoulos and Stefan Eich, ‘Regulating Blockchain: Techno-Social and Legal Challenges – An Introduction’ in Hacker, Dimitropoulos, Eich and Lianos (n 4) forthcoming.
43 See, with reference to EU law, case C-126/97, Eco Swiss China Time Ltd v Benetton International NV, ECLI:EU:C:1999:269.
44 See supra, section III.1.
become necessary to regulate code, posing certain limits to the ways in which private enforcement (inter alia, of arbitral awards) can take place. Let us consider the hypothesis of a residential rental agreement, where a smart contract is capable of controlling the door lock of the apartment, blocking it if the tenant fails to pay the amounts that the parties have agreed upon. In such a scenario, automatic enforcement may evidently result in the violation of the tenant’s fundamental rights, and the circumvention of guarantees traditionally put in place by State law. To limit this type of risk, the law of enforcement may progressively need to become a law of software, providing bright-line criteria as to the limits within which the code should be allowed to operate.

One of the most delicate questions that have arisen, having foreshadowed the possible future need for regulation of self-enforcement, is what the most appropriate regulatory venue may be. Considering that the procedures governing enforcement are usually regarded as strictly linked to national sovereignty, it may at first sight appear desirable to leave it to each State to take action in this respect. There are, however, two reasons why the regulation of self-enforcement at the State level would be suboptimal. First, regulating code requires a relatively new type of expertise, which is not likely to be distributed evenly among national legislators. The likely result, hence, would be that some legislators would take action, while other ones would not be as ready or able to adapt their enforcement laws to this new technological reality. This, in turn, would result in a level of protection so uneven as to be difficult to justify. Second, if the legislative framework applicable to self-enforcement changed drastically depending on the law applicable to a given contract, businesses offering their services internationally would be faced with significant compliance costs; in the worst-case scenario, new scripts would have to be developed for every jurisdiction where a given business operates.

For these reasons, regulation at the transnational level seems to be particularly desirable. In order to ensure effectiveness while avoiding excessive restraints on technological evolution, a first meaningful step could be the development of soft law guidelines, identifying a list of practices that coders should avoid. Additionally, a trust mark could be offered to the developers who voluntarily

45 Notably, the technology envisaged in this example is already offered by several companies offering `smart lock’ products: (accessed 3 May 2019).
46 See e.g., in England and Wales, section 21(1)(b) of the Housing Act 1988, according to which a tenant must be given at least two months’ notice before an order for possession of the house can be issued by the court.
47 See supra, (n 18) and accompanying text.
48 As pointed out in section III.1. above, the lack of harmonization as to the national laws governing enforcement is to a certain extent understandable and not problematic. Such a fragmentation would however probably become excessive, if some national legal systems put in place guarantees to prevent the use of self-enforcement devices that are likely to have a negative impact on fundamental rights, while other legislators took no action at all in this respect.
49 To complicate things further, some of these hypothetical automation-limiting laws may in some instances have extraterritorial application, in light of the particular interests they aim at protecting.
50 This regulatory approach has already proved useful in the case of the 2004 IBA Guidelines on Conflict of Interest in International Arbitration, which contain different lists describing practical scenarios and attaching different types of consequences to them.
agree to comply with the guidelines, certifying the respect of some basic guarantees and principles. In sum, the degree of automation brought about by new technologies should be no cause for immediate alarm, but it should encourage transnational lawyers to observe the evolution of these phenomena closely and propose commensurate reform, where appropriate.

IV. Blockchain technologies and court litigation: decentralization and its discontents

The analysis carried out so far indicates that blockchain technologies will trigger the emergence of self-sufficient private adjudication systems, where arbitral rulings can be enforced without relying on the support of State courts. This in turn suggests that, as technology-driven self-enforcement gains momentum, it may become increasingly difficult for national courts to scrutinize the contents of dispute resolution outcomes. This assessment, however, looks at the future rather than at the current state of affairs. For the time being, blockchain technologies have not succeeded in marginalizing State courts yet, but have in fact triggered the opposite phenomenon: a significant amount of court litigation, especially in the USA, connected with the rise of ICOs. Over the past two years, ICOs have disrupted the landscape of venture capital, financial markets, and corporate finance law, but they have also given rise to some notable high-value court cases. These cases pose some fascinating and yet-to-be-answered questions, especially concerning jurisdiction. In order to understand this type of effect that blockchain technologies have had on dispute resolution, it is first of all necessary to briefly summarize what ICOs are.

1. ICOs: a primer

ICOs are a crowdfunding instrument, mainly meant for start-up ventures. While it is impossible to account for a host of details, which may vary depending on the project, most ICOs are based on the same structure: a company is seeking capital to develop an idea, typically concerning distributed ledgers and other blockchain-related technologies. Rather than relying on traditional channels (such as debt or equity), the company advertises its project in a ‘white paper’, where the agenda for future technological and commercial growth is described and a minimum amount of funds necessary for the project is set. Investors (especially at the retail level) are invited to fund the project by buying ‘tokens’. The procedure whereby the investors pay for the tokens and receive them is normally regulated by the ICO general terms and conditions (T&C). Once the ICO is concluded, the capital should be used by the start-up to commence development as long as the minimum threshold is met; by contrast, if the funds raised do not reach the threshold, the investors should immediately receive their capital back.

Tokens are, in essence, digital assets registered on a blockchain. Token holders benefit from tokens in two main ways. First, the tokens may grant access to certain benefits once the start-up project comes to fruition; they may, for instance, be
used as a platform-specific currency or as a voucher ensuring the enjoyment of services or goods. Second, tokens are tradable on the secondary market; the holders can resell them rather than waiting for the start-up to successfully complete development.

The proportions of the ICO phenomenon are far from negligible; US $6 billion were raised through ICOs in 2017, and Ether (the cryptocurrency most frequently used to buy tokens) rose in price from US $9.70 on 1 January 2017 to US $1,016.50 on 1 January 2018. Because of this sudden popularity, ICOs seemed destined to fund a wave of important, innovation-driven ideas. Soon, however, significant problems surfaced; many projects for which ICOs were deployed turned out to be unviable, and national regulators (such as the Securities and Exchange Commission in the USA) began to argue that the tokens may qualify as securities (hence, implying the existence of serious violations of securities law).

2. A wave of ICO-related litigation

Year 2017 was marked by the filing of class actions in the USA against companies that had raised capital through ICOs. The causes of action in these cases, which are currently pending, include securities fraud, false advertisement, unfair competition, breach of contract, and breach of consumer law. In this respect, the Tezos ICO is particularly interesting. In 2017, Tezos managed to raise US $232 million through an ICO, and the subscribers received a specific type of token called a ‘tezzie’. The Tezos project, however, faced some unexpected complications, related, inter alia, to a dispute over the project’s governance. The token holders then filed a number of lawsuits in US courts, and a US district judge for the Northern District of California denied a motion to dismiss filed by the defendants.

The Tezos case is particularly notable, but it is not the only example of ICO-related litigation. Given that tokens were purchased not only in the USA but also

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51 CoinDesk, ICO Tracker <https://www.coindesk.com/ico-tracker> (accessed 3 May 2019).
52 BitStamp <https://www.bitstamp.net/> (accessed 3 May 2019).
53 Securities and Exchange Commission, ‘Initial Coin Offerings (ICOs)’ <https://www.sec.gov/ICO> (accessed 3 May 2019).
54 For a background in the Tezos ICO and its aftermath see Gideon Lewis-Kraus, ‘Inside the Crypto World’s Biggest Scandal’ (Wired, 19 July 2018).
55 Ibid.
56 In re Tezos Sec. Litig., No. 17-CV-06779-RS, 2018 WL 2387845 (N.D. Cal. May 25, 2018); see also Baker v. Dynamic Ledger Sols., Inc., No. 17-CV-06850-RS, 2018 WL 656012 (N.D. Cal. Feb. 1, 2018); MacDonald v. Dynamic Ledger Sols., Inc., No. 17-CV-07095-RS, 2017 WL 6513439 (N.D. Cal. Dec. 20, 2017); Okusko v. Dynamic Ledger Solutions, Inc. et al., Case No. 17-cv-6829; GGCC, LLC v. Dynamic Ledger Sols., Inc., No. 17-CV-06779-RS, 2018 WL 1388488 (N.D. Cal. Mar. 16, 2018).
57 Order on Defendant’s Motion to Dismiss <https://www.scribd.com/document/385729594/Tezos-doc#from_embed?campaign=SkimbitLtd&ad_group=100652X1574425X732a2411f047fa7b8feed214cd9cf9c8&keyword=660149026&source=hp_affiliate&medium=affiliate> (accessed 3 May 2019).
58 See e.g. Rensel v. Centra Tech Inc., et al., 17-cv-24500-JLK (S.D. Fla.); Hodges, et al. v. Monkey Calital, LLC, et al., 17-81370 (S.D. Fla.); Balestra v. ATBCOIN, LLC, et al., 17-10001 (S.D.N.Y.);
all over the world (both via the primary and the secondary market), it is reasonable to assume that disputes of this type will surface in other jurisdictions too in the near future. Out of the many unresolved problems that these cases unavoidably raise, one of them has an important impact on dispute resolution; the decentralized nature of the peer-to-peer network on which the tokens circulate, coupled with the existence of a transnational secondary market where the tokens can rapidly change hands, makes it particularly difficult for State courts to determine whether they have jurisdiction or not. The next subsection will address this problem, using Tezos as a case study and analysing these issues from the specific perspective of EU law and, in particular, the Brussels I bis Regulation. 59

3. Consequences of decentralization for court jurisdiction

In Tezos, the problem of jurisdiction was one of the first that the district judge had to address. 60 In general, whenever general jurisdiction does not attach to the defendant, US courts can claim jurisdiction in the concurring presence of three requirements:

(i) the defendant must purposefully direct his activities or conduct transactions with the forum or a resident thereof;
(ii) the claim must arise out of these activities;
(iii) the exercise of jurisdiction must be reasonable. 61

Applying these criteria to ICOs, it could be possible for US courts to establish personal jurisdiction in cases where the ICO was, for example, advertised on a website hosted on a server located in the forum, which marketed the offering to investors residing therein.

Assuming that similar questions would rise before the courts of an EU Member State, the most intuitive way to establish jurisdiction would be reliance on Article 4(1) of the Brussels I bis Regulation; however, in cases where the defendant is not domiciled in the forum, it would become necessary to rely on the special heads enshrined in the instrument. If the investor is not a professional, a possible approach could consist in the invocation of the forum actoris provision set forth in Articles 17 and 18 for the protection of consumers. From this point of view, however, the reasoning of the Court of Justice of the European Union (CJEU) in Kolassa may prove to be a significant obstacle. 62 In Kolassa, the Court held that consumer jurisdiction can be established pursuant to the provisions at hand 63

Stormsmedia, LLC v. Giva Watt, Inc., et al., 17-00438 (E.D.Wash.); Davy, et al. v. Paragon Coin, Inc., et al., 18-00671 (N.D.Cal.).

59 See supra (n 23).
60 See supra (n 57).
61 Schwarzenegger v. Fred Martin Motor Co., 374 F.3d 797, 802 (9th Cir. 2004).
62 Harald Kolassa v Barclays Bank plc, case C-375/13, ECLI:EU:C:2015:37.
63 Articles 15 and 16 of the Brussels I Regulation, corresponding to Articles 17 and 18 of the Brussels I bis Regulation.
only if a direct contractual relationship exists between the issuer of the securities and the non-professional subscriber. Therefore, if one were to apply the same rationale to ICOs, claimants may only invoke the protective head of consumer jurisdiction if they acquired the tokens (as non-professional investors) directly from the issuer (that is, the start-up company or the different legal entity conducting the ICO on its behalf). If, conversely, the tokens were purchased on the secondary market, as it often happens, a non-professional investor could not use Articles 17 and 18 to establish jurisdiction. For the same reasons, the establishment of jurisdiction in contractual matters under Article 7(1) of the Brussels I bis Regulation would likely be precluded, as the privity requirement (as entailed in Kolassa) may not be met in the case of a secondary market purchase.

In this scenario, a claimant wishing to avoid the courts of the Member State where the respondent is domiciled may have no choice but to try to establish tortious jurisdiction under Article 7(2) of the Brussels I bis Regulation. In this respect, the decentralized nature of the blockchain poses some particularly interesting challenges. Once again, Kolassa constitutes an important starting point; in that case, the CJEU held (also on the basis of its previous case law) that, while the mere fact of having suffered financial damage is not enough to establish tortious jurisdiction at a given location, Member State courts have jurisdiction when the ‘damage alleged occurred directly in the applicant’s bank account held with a bank established within the area of jurisdiction of those courts’. Adapting the same reasoning to the ICOs, it may potentially be argued that the courts of a Member State have jurisdiction under Article 7(2) of the Brussels I bis Regulation if the private encryption key through which the claimant accessed her or his wallet (for example, Ethereum) was stored on a device located in that Member State. It must be noted, though, that the analogy is not perfectly fitting; by their very nature, blockchains are decentralized, and a wallet storing tokens is therefore not entirely comparable with a bank account. More specifically, in the case of tokens, the physical location of the assets can be established only in an indirect fashion, looking at the location of the private key, rather than at the tokens, which only exist on a global distributed ledger with no specific geographical coordinates. Furthermore, the CJEU itself distinguished Kolassa in the Universal Music judgment, holding that for tortious jurisdiction to exist the location of a bank account is not sufficient in and of itself, but further factual circumstances must be

64 Corr. to Art. 5(3) of the Brussels I Regulation.
65 Kolassa (n 62) para 48 with reference to Kronhofer, case C-168/02, ECLI:EU:C:2004:364.
66 Paras 42–57.
67 The private encryption key is the equivalent of a password, through which the investor gains access to the tokens he or she has purchased.
68 A similar argument has been put forth with reference to cryptocurrencies in the USA by Max I Raskin, ‘Real of the Coin: Bitcoin and Civil Procedure’ (2015) 20(4) Fordham Journal of Corporate and Financial Law 969.
69 Case C-12/15, Universal Music International Holding BV v Michael Têtreault Schilling and Others, ECLI:EU:C:2016:449, paras 36–39. See also the AG Opinion in the same case, ECLI:EU:C:2016:161, paras 44–45.
present. Thus, given that the physical location of a private encryption key may be difficult to determine in practice and easy to manipulate, further criteria must be found in order to determine whether Article 7(2) of the Brussels I bis Regulation is applicable to cases where the claimant purchased blockchain-based tokens on the secondary market. The case law of the CJEU offers some further important indications in this respect.

The CJEU revisited the problem of jurisdiction in another prospectus liability case, Löber,70 which provides some meaningful comparisons with ICO-related litigation. Löber concerned a claim brought by a non-professional investor against the issuer of a financial instrument. Importantly, the claimant and respondent were located in two different EU Member States, and the question arose whether the courts of the Member State where the claimant-investor was resident had jurisdiction pursuant to Article 5(3) of the Brussels I Regulation71 on the basis of the characterization of the investor’s place of residence as the ‘place where the harmful event occurred’. Having reiterated that specific heads of jurisdiction should be construed narrowly,72 the Court clarified that ‘the mere fact that the applicant has suffered financial consequences does not justify the attribution of jurisdiction to the courts of the applicant’s domicile if both the events causing damage and the damage itself occurred in the territory of another Member State’.73 Against this background, the Court then proceeded to reconcile Kolassa with Universal Music, stating that, while the location of a bank account may in and of itself not be sufficient to establish jurisdiction in a claim for damages constituted by a purely financial loss,74 it may be possible to establish jurisdiction in cases where other specific factors of the case (other than the location of the investor’s bank account) point towards the territory of the same Member State.

In light of the above considerations, the CJEU concluded in Löber that the courts of the Member State where the investor was domiciled (namely, Austria) had jurisdiction because, besides the location of the investor’s bank account, other factors connected the dispute to that Member State. More specifically, the investor had made all payments from Austria and had dealings only with Austrian banks, the instruments were purchased on the Austrian secondary market, the information concerning the instruments had been notified to the

70 Helga Löber v Barclays Bank PLC, Case C-304/17, ECLI:EU:C:2018:701; see also AG Opinion, ECLI:EU:C:2018:310, in particular paras 68–81, also with reference to Matteo Gargantini, ‘Capital markets and the market for judicial decisions: in search of consistency’ (2016) MPI Luxembourg Working Paper Series 18; Matthias Lehmann, ‘Prospectus liability and private international law: assessing the landscape after the CJEU Kolassa ruling (Case C-375/13)’ (2016) Journal of Private International Law 318; Andra Cotiga, A., ‘C.J.U.E., 28 janvier 2015, Harald Kolassa c. Barclays Bank PLC, Aff. C-375-13’ (2015) Revue internationale des services financiers 40.
71 Corresponding to Article 7(2) of the Brussels I bis Regulation.
72 Löber (n 70) para 23 with reference to Marinari, case C-364/93, ECLI EU:C:1995:289, para 14; Kronhofer (n 65) para 19 and Universal Music (n 69) para 34.
73 Löber (n 70) para 24.
74 Ibid para 30.
Austrian supervisory authority, and the investment contract was signed in Austria.75

Transposing the judgment in Löber to the case of tokens, it appears that at least some of the aforementioned factors may be relevant for the establishment of jurisdiction. Although the issuance of tokens in the recent past has often taken place without the publication of a prospectus and a formal notification to the competent supervisory authority (which, in and of itself, may constitute a cause of action), other elements may play an important role in ICO-related cases. In particular, the place of conclusion of the contract could provide an important connection between this type of case and the territory of an EU Member State.

To further complicate the legal framework for the establishment of jurisdiction in ICO-related cases, the ICO T&C often adds a further layer of complexity. In this respect, the most obviously relevant type of agreement are exclusive jurisdiction clauses; in the case of Tezos, for instance, the T&C specified that ‘(a)ny dispute arising out of or in connection with the creation of the [tokens] and the development and execution of the Tezos Network shall be exclusively and finally settled by the ordinary courts of Zug, Switzerland’. As noted by the US district judge denying the motion to dismiss, this is best understood not as a ‘click-wrap agreement’ but, rather, as a ‘browsestrap’ one; when subscribing, investors were not asked to check a box indicating consent to the T&C but simply enabled to retrieve the T&C on the website advertising the ICO.76 In order to determine whether the forum selection clause is binding, hence, a case-by-case assessment is necessary, evaluating whether—given the circumstances of this case, such as the structure of the website—it is reasonable to expect the users to access the T&C and whether the claimant(s), in particular, had any demonstrable knowledge of the contents of that document.

Should analogous ICO-related cases be brought before the courts of an EU Member State, the same type of considerations would likely be relevant. More specifically, the case law of the CJEU on click-wrap agreements77 may sometimes not be applicable, depending on the structure of the token subscription process. Furthermore, Article 19 of the Brussels I bis Regulation would generally prevent the enforcement of such a clause whenever the subscribers would qualify as consumers.

Additional doubt could be cast in regard to the enforceability of a forum selection clause in cases where the claimant has purchased the tokens on the secondary market; in this setting, they would only bind the token holder under two (demanding) conditions:

(i) that she/he succeeded in the rights and obligations of the primary market purchaser she or he bought the tokens from, under the applicable national law and

75 Ibid para 33.
76 See supra (n 57), section 2.i.
77 Jaouad El Majdoub v CarsOnTheWeb.Deutschland, case C-322/14, ECLI:EU:C:2015:334.
that she or he had the possibility to acquaint herself or himself with the contents of the T&C. 78

Finally, it is in any case doubtful to what extent a forum selection clause may cover tortious claims (such as the ones based on an allegation of securities fraud). In practice, the language and scope of the clause would play a crucial role in this respect, possibly falling short of binding the token holders. 79

The same observations would largely apply to cases where the T&C contain an arbitration clause; consumer disputes (such as the ones involving retail investors) may be deemed non-arbitrable, and further problems may in any case arise depending on the attitude adopted by the seized court as to the incorporation by reference of agreements to arbitrate 80 and on the scope of the clause vis-à-vis non-contractual claims.

V. Conclusion

Blockchain technologies have a twofold impact on dispute resolution. On the one hand, looking at potential future developments, these technologies seem to have the ability to marginalize State courts by enabling the creation of self-enforcing systems of private dispute resolution. These arbitral systems pose some significant challenges and trigger the need for transnational law-making, concerning, in particular, the balancing of conflicting needs in the enforcement phase. On the other hand, however, such a marginalization of State courts has not yet taken place. To the contrary, the recent phenomenon of ICOs has resulted in a wave of court cases that create delicate jurisdictional issues. Especially in lawsuits where general jurisdiction does not attach to the defendant, the establishment of jurisdiction may be difficult in the EU, in light both of the conditions set forth by the CJEU with reference to prospectus liability cases and the decentralized nature of the network on which the tokens circulate.

78 Profit Investment SIM SpA v Stefano Ossi and Others, case C-366/13, ECLI:EU:C:2016:282

79 Apple Sales International and Others, case C-595/17, ECLI:EU:C:2018:854; Cartel Damage Claims (CDC) Hydrogen Peroxide SA v Evonik Degussa GmbH and Others, case C-352/13, ECLI:EU:C:2015:335. A subtler issue concerns general terms and conditions (T&C) provisions purporting to select the place where the contribution procedure and the token creation and allocation takes place. For instance, the Tezos T&C read as follows: ‘The Contribution Software and the Client are located in Alderney. Consequently, the contribution procedure, the (token) creation and (token) allocation is considered to be executed in Alderney’. This provision may in theory be relevant for the identification of both the place of performance (for contract claims) and the place where the harmful event occurred (for tortious claim). However, the analysis necessary to locate the relevant elements of the case ultimately remains a factual one. Any such clause, hence, should normally be disregarded when it appears that, in reality, the facts took place elsewhere.

80 Alessandro Villani, ‘Arbitration Clauses Incorporated by Reference: An Overview of the Pragmatic Approach Developed by European Courts’ (Kluwer Arbitration Blog, 2015) <http://arbitration-blog.kluwerarbitration.com/2015/03/03/arbitration-clauses-incorporated-by-reference-an-overview-of-the-pragmatic-approach-developed-by-european-courts/> (accessed 3 May 2019).