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NUMERO TEMATICO

Il ruolo delle Corti nella costruzione dello Spazio europeo di libertà, sicurezza e giustizia

JURISDICTION, RECOGNITION AND ENFORCEMENT OF JUDGMENTS IN CLAIMS ARISING OUT OF SMART CONTRACTS UNDER THE BRUSSELS I REGULATION (RECAST) AND ON THE BLOCKCHAIN

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1. Introduction

Blockchain or *Distributed Ledger Technology* is a transformational computing innovation.[1] It was created under the pseudonym Satoshi Nakamoto in 2009 as a protocol to the Bitcoin cryptocurrency.[2] Blockchain is a decentralized database, which is stored and updated simultaneously in a network of computers called nodes.[3] Transactions are carried out peer-to-peer or user-to-user, chained together and cannot be separated. Each operation is irreversibly registered in a block of data which stores several operations and encrypts the block's content through an algorithm called "hash". The encryption key of a blockchain transaction is based on the previous transaction. In this way, access to a particular transaction allows to know all its previous history. Indeed, when a transaction is decrypted to be read, if the previous transaction has been manipulated, the current transaction will not be readable.[4] The blocks of transactions are distributed among the different nodes.[5] This means that a given transaction is recorded uniformly across

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[1] D. TAPSCOTT AND A. TAPSCOTT, *Here's Why Blockchains Will Change the World' Fortune* (8 May 2016), http://fortune.com/2016/05/08/why-blockchains-will-change-the-world.
[2] S. NAKAMOTO, *Bitcoin: A Peer-to-Peer Electronic Cash System*, BITCOIN PROJECT, http://bitcoin.org/bitcoin.pdf.
[3] M. SWAN, *Blockchain: Blueprint for a New Economy*, 2015, Preface VIII.
[4] A. RANGONE, *Managing Corporate Innovation. Determinants, Critical Issues and Success Factors*, Cham, 2019, p. 78.
[5] M. SWAN, *Blockchain: Blueprint for a New Economy*, cit., Preface VIII.

multiple systems. Information already contained in a verified blockchain cannot be suppressed or altered without reaching consensus with the entire network.[6] As a result, the blockchain is "simultaneously resilient, transparent and inviolable".[7]

A blockchain transaction is initiated when the transferor enters a unique digital key that remains secret to him ("private key") as well as the publicly known key of the transferee ("public key") to a chain of digital signatures on the internet.[8] All transactions are public but are considered anonymous because nothing relates individuals or organizations to the accounts that are identified in the transactions.

Since Satoshi Nakamoto created the original Bitcoin Blockchain, several different variations of blockchains have emerged. The original blockchain is open/public (permissionless), but there are also closed/private (permissioned) and semi-public blockchains.[9] Public ledgers are the most common and they are open to the public. Anyone can become a user of the network where trust is created by math and the consensus mechanism. A public blockchain, like Bitcoin,[10] Ethereum,[11] Stellar[12] or Dash,[13] provides more transparency because anyone with the necessary software can view the information recorded in the blockchain. Only the transaction information is openly viewable, but not the traders or users.

Blockchain has the potential to disrupt the traditional way transactions are processed. Typically, registries are stored in a single, central location, so the whole model is based on trust in an authoritative intermediary. Blockchain may revert this model because parties are able to transact directly – peer-to-peer. In addition, the technical immutability of the ledger provides the trust established by authoritative third parties in the traditional model.[14]

Although the potential and scope of this new technology is yet to be determined, blockchain application is not exclusive to the financial sector. More and more sectors are exploring its full potential, such as insurance, telecommunications, energy, industry 4.0, health, SMEs, online gambling, media, NGOs, the public sector, etc.

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[6] M. RASKIN, *The Law and Legality of Smart Contracts*, in *Georgetown Law Technology Review*, 2017, n. 1, pp. 305-341, p. 328.
[7] B. CARRON, V. BOTTERON, *How smart can a contract be?* in KRAUS DANIEL ET AL. (eds.), *Blockchains, Smart Contracts, Decentralised Autonomous Organisations and The Law*, Cheltenham, 2019, pp. 101, 106.
[8] S. NAKAMOTO, *Bitcoin: A Peer-to-Peer Electronic Cash System*, Bitcoin Project, http://bitcoin.org/bitcoin.pdf.
[9] G. GABISON, *Policy Considerations for the Blockchain Technology Public and Private Applications*, in *Southern Methodist University Science & Tech Law Review*, 2016, n. 19, pp. 327-350.
[10] https://bitcoin.org.
[11] https://ethereum.org.
[12] https://www.stellar.org.
[13] https://www.dash.org.
[14] L. DOWNES, C. REED, *Blockchain for Governance of Sustainability Transparency in the Global Energy Value Chain*, in *Queen Mary School of Law Legal Studies Research Paper No. 283/2018*, August 22, 2018. Available at SSRN: https://ssrn.com/abstract=3236753.

Smart contracts

A significant application of DLT are the so-called smart contracts. The term *smart contracts* was coined by computer scientist and jurist Nick Szabo in 1994[15] as contractual agreements where the verification, application and execution of the terms of the contract is automated, for example, a beverage vending machine. In recent years the term is used to refer to computer programs that eliminate human discretion in the execution of the contract. This guarantees compliance with the contractual terms without having to resort to judges and courts, since the program has control over the necessary physical or digital objects to carry out execution.[16] Examples of smart contracts are a program installed on a vehicle that prevents its implementation if the rental terms are not met or a banking software that automatically transfers money under certain conditions. The emergence of blockchain technology also means that the terms of the contract and the conditions related to its execution can be programmed into the blockchain and thus guarantee the trust of its immutability and neutrality. In this way we obtain a program that will always act in the same way without requiring the goodwill of the other party or a third party.

Smart contracts that use blockchain technology have the ability to operate, to a large extent, outside the legal system and challenge the traditional legislative and judicial monopoly of the State. Transactions come about by the transferor combining its private key with the public key of the transferee and the following confirmation of the transfer through the verification process. This takes place without the intervention of notaries, lawyers or any other intermediary.

A wide range of legal problems may arise from blockchain transfers. For instance, cases of fraud, mistake or misrepresentation that plague a blockchain transfer and which would make a smart contract voidable from a legal point of view. However, parties may be using a smart contract across far more jurisdictions than might exist in the case of text-based contracts. Accordingly, as a preliminary issue to the above and other related legal problems, important legal questions relating to jurisdiction and applicable law need to be determined.

The present contribution considers the jurisdictional issues that may arise under the framework of the Brussels I Regulation (Recast). In particular, it addresses two main issues. On the one hand, it analyzes whether the Brussels I Regulation (Recast) can respond to the main challenges that arise in relation to smart contracts, taking special consideration to recent case law on the topic. On the other, it studies the phenomenon of blockchain dispute resolution and its interaction with the European judicial system.

[15] N. SZABO, *Smart Contracts*, 1994, available at: https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html.

[16] M. RASKIN, *The Law and Legality of Smart Contracts*, cit., pp. 305-341.

2. Jurisdictional issues in contractual claims under the Brussels I Regulation (Recast)

Regulation (EU) 1215/2012 of the European Parliament and of the Council on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters (recast) (Recast Brussels Regulation) regulates jurisdiction and the recognition and enforcement of judgments between EU member States.[17]

The Regulation embodies a detailed regulation of international jurisdiction, which is complemented by the provisions contained in Chapter III (arts. 36 to 57), relating to the recognition and enforcement of judgments.

In most general terms the heads of jurisdiction under the Regulation can be grouped as follows:[18]

(a) Exclusive jurisdiction

(b) Choice of court (prorogation of jurisdiction)

(c) Tacit prorogation

(d) General rule

(e) Special/alternative jurisdictional grounds

(f) Rules on jurisdiction for disputes involving a 'weaker party'

In contractual claims the most relevant heads of jurisdiction are choice of court, the general rule and the special jurisdictional grounds. The rules on jurisdiction concerning weaker parties may also apply.

Unless the matter of the dispute is covered by an exclusive jurisdiction (art. 24) or the agreement is contrary to the provisions of the protective fora of articles 15, 19 or 23, referred to contracts of insurance, consumer or labour (article 25.4), the parties – irrespective of their domicile – may agree to submit their claim to the courts of a particular Member State (prorogation of jurisdiction). To be valid, the agreement on choice of jurisdiction must fulfill certain requirements and respect the formal demands specified in paragraph 1 of Article 25, under penalty of nullity.

Accordingly, jurisdiction agreements must be concluded:

a) In writing or evidenced in writing; or

b) In a form which accords with practices which the parties have established between themselves; or

c) In international trade or commerce, in a form which accords with a usage of which the parties are or ought to have been aware and which in such trade or commerce is widely known to, and regularly observed by, parties to contracts of the type involved in the particular trade or commerce concerned.

In the absence of a valid jurisdiction agreement, claims in matters relating to contractual obligations may be brought, when the defendant is domiciled in a Member

[17] Regulation (EU) No 1215/2012 of the European Parliament and of the Council of 12 December 2012 *on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters*, in OJ L 351, 20 December 2012, p. 1-32.

[18] G. VAN CALSTER, *European Private International Law*, II ed., Oxford, 2016, p. 71.

State, at the courts of the Member State of the defendant´s domicile (art. 4.1) or, alternatively, at the courts the Member State for the place of performance of the obligation in question (art. 7.1).

Art. 7.1 of the Regulation reads as follows:

'A person domiciled in a Member State may be sued in another Member State:

(a) in matters relating to a contract, in the courts for the place of performance of the obligation in question;

(b) for the purpose of this provision and unless otherwise agreed, the place of performance of the obligation in question shall be:

— in the case of the sale of goods, the place in a Member State where, under the contract, the goods were delivered or should have been delivered,

— in the case of the provision of services, the place in a Member State where, under the contract, the services were provided or should have been provided;

(c) if point (b) does not apply then point (a) applies;'

Thus, a defendant domiciled in a Member State may be sued in another Member State if that is the place of performance of the contractual obligation in question (*forum solutionis*). This provision has a complex structure where paragraph 1(a) contains a general rule, whereas paragraph 1(b) presents a specific rule for contracts of sales of goods and contracts to provide services. When it is another type of contract, the relevant criterion provided under 1(b) points to a place of performance in a non-EU Member State or the parties agree otherwise, relevant is paragraph 1(c) in connection with paragraph 1(a).[19]

Other alternative heads of jurisdiction which may be relevant in connection with contractual claims are the rules on disputes arising out of operations of a branch, agency or other establishment (Art. 7 para 5), the rules related to disputes involving multiple defendants, counter-claim, third-party proceedings, matters related to contract combined with matters related to rights in rem (Art. 8) and to a lesser extent, the rule on disputes relating to non-contractual obligations – tort, delict or quasi-delict (Art. 7 para 2).

Finally, specific jurisdiction rules apply in contractual claims involving "weak parties" - consumers, employees, and insurance policy holders. Basically, the provisions contained in Sections 3, 4 and 5 of the Regulation can be summarized as follows:[20]

(a) A weaker party (a policyholder, the insured or a beneficiary, consumer, or employee) may bring proceedings against the other party either in the court of the Member State of the other party's domicile or in the court of the Member State of the weaker party's domicile (or the habitual place of work in the case of individual contracts of employment or a Member State which is otherwise closely related to a dispute).

(b) Conversely, proceedings may be brought against a weaker party to the contract only in the courts of the Member State in which a 'weaker' party is domiciled.

[19] U. MAGNUS ET AL., *Brussels Ibis Regulation – Commentary*, München, 2016, p. 121 ff.; G. VAN CALSTER, *European Private International Law*, cit., p. 136.
[20] U. MAGNUS ET AL., *Brussels Ibis Regulation – Commentary*, cit., p. 406 ff.

(c) Forum selection clauses in these disputes may be successfully invoked against a weaker party only if the conditions provided in the relevant provisions of the Regulation are met.

(d) Violation of the rules on jurisdiction results presents a reason to refuse the recognition of enforcement in other Member States (Art. 45).

3. Jurisdiction in claims related to a smart contract

Smart contracts challenge the abovementioned heads of jurisdiction in several ways. To start with, it is unclear whether claims arising out of smart contracts are contained within the Regulation's scope of application. Furthermore, the main features of this technology, namely, decentralization, anonymity/opacity, immutability, interconnectivity, and automation do not fit well with jurisdictional rules based on territorial connecting factors, such as domicile, place of performance etc.

Can claims in matters relating to smart contracts be brought at the courts of the Member States based on the Regulation's jurisdictional rules? The current legal framework in different countries lack sufficient support for smart contracts and their legal status is unclear. In this regard, it is important to draw a difference between a smart contract as a computer program coded to effectuate an outcome upon the occurrence of a triggering event and a smart legal contract in the sense of a legally binding agreement. The English Law Commission, which has recently launched its Advice to Government on smart legal contracts, defines the term as "a legally binding agreement that is digital and able to connect its terms and the performance of its obligations to external sources of data and software systems".[21]

Smart contracts pose a series of problems in relation to traditional principles and institutions of contract law. In common law, for example, the difference between a contract and mere social or moral agreements is that a contract is a legally binding agreement that creates mutual obligations enforceable by law. In a smart contract, by contrast, enforcement is not carried out by the coercive mechanisms of the State, but by the terms and mechanisms established in the computer program that gives rise to it.[22] Moreover, since transactions on the blockchain can be carried out anonymously, in the event of a dispute, it may be impossible to identify the defendant to initiate a legal action

[21] https://s3-eu-west-2.amazonaws.com/lawcom-prod-storage-11jsxou24uy7q/uploads/2021/11/Smart-legal-contracts-accessible.pdf, 2.11, p. 11.

[22] M. RASKIN, *The Law and Legality of Smart Contracts*, cit., p. 322.

against him/her.[23] It is likely that a judge will deny the legally binding effects of a blockchain transaction when the other contracting party is unidentified.[24]

The notion of smart contract may be problematic from the perspective of continental law, as well. A smart contract does not create obligations in its legal meaning. The notion of obligation, which originates from Roman law and is a key to the continental contract law is alien to smart contracts. According to Justinian's classic definition, an obligation "is a bond created by law in accordance with the laws of our community. This bond we can be compelled to sever by the performance of some act, generally the transfer of something."[25] That is, an obligation is the bond established between two people (or groups of people), by which one of them can compel the other to deliver something, to do something or to abstain from doing something.[26] The key elements of a contractual obligation are therefore (1) its orientation towards the future and (2) a "will" component. Since the obligatory link exists to the extent that certain actions or omissions must be carried out in the future and the debtor has some discretion to perform or not to perform it, when nothing depends on the will of the debtor, as in smart contracts, where the performance is executed automatically, then we cannot speak of a debtor's obligation to the creditor.[27] Although contract law acknowledges certain types of agreements, which are performed instantaneously at the moment of conclusion (for instance, "executed" contracts in Anglo-American law), according to the doctrine, it is more correct to affirm that the main consequence of the conclusion of a smart contract is not the creation of obligations, but the self-limitation of certain rights by technical means.[28]

Notwithstanding the above, under the Brussels I Regulation (Recast), all terms, concepts and provisions are to be interpreted autonomously. This means that the concept of contract is autonomous and independent of corresponding national legal concept. According to the case law of the ECJ/CJEU "Contractual matters" is to be understood as covering a situation in which there is an obligation freely assumed by one party towards another. [29] This consensual element may be difficult to establish in the case of smart

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[23] N. ROSE FULBRIGHT, *Can smart contracts be legally binding contracts?*, November 2016, http://www.nortonrosefulbright.com/knowledge/publications/144559/can-smart-contracts-be-legally-binding-contracts.

[24] F. GUILLAUME, *Aspects of private international law related to blockchain transactions*, in D. KRAUS ET AL. (eds.), *Blockchains, Smart Contracts, Decentralised Autonomous Organisations and the Law*, Cheltenham, 2019, p. 76.

[25] *Obligatio est iuris vinculum, quo necessitate adstringimur alicuius solvendae rei secundum nostrae civitatis iura*, Inst. iii, 13, pr.

[26] For instance, as provided in Article 1088 of the Spanish Civil Code.

[27] A. SAVELYEV, *Contract law 2.0: 'Smart' contracts as the beginning of the end of classic contract law*, in *Information & Communications Technology Law*, 2017, n. 26(2), pp. 116-134, p. 130.

[28] Ibid.

[29] Court of Justice, Judgment of 17 October 2013, *OTP Bank Nyilvánosan Működő Részvénytársaság v Hochtief Solution AG*, C519/12, EU:C:2013:674, paragraph 23. Vid. the judgments of 17 June 1992, *Jakob Handte & Co. GmbH v Traitements Mécano-chimiques des Surfaces SA*, C-26/91, EU:C:1992:268, paragraph 15, of 27 October 1998, *Réunion européenne SA and Others v Spliethoff's Bevrachtingskantoor BV and the Master of the vessel Alblasgracht V002*, C-51/97, EU:C:1998:509, paragraph 17, of 17 September 2002, *Fonderie Officine Meccaniche Tacconi SpA v Heinrich Wagner Sinto Maschinenfabrik GmbH (HWS)*, C-334/00, paragraph 23; of 5 February 2004, *Frahuil SA v Assitalia SpA*, C-265/02,

contracts since they are scripts (computer codes) written with programming languages. This means that the terms of the contract are pure statements and commands in the code that forms it, drawn up by one developer and accepted by the other party, regardless of whether they understand them or not. In the real world, the parties do not usually understand the programming language of a smart contract, a language that has technical similarities with Java, such as Python or Solidity, with a materially oriented syntax that can only be executed on the Ethereum Virtual Machine (EVM). Legally, therefore, the question that arises is whether the fact that a party does not understand the source code of a smart contract has effects on an act of bilateral will, that must be at the basis of any contract. So far, the CJEU has not ruled on this matter, but according to the doctrine, parties who enter into a smart contract accept the binding force of their technical terms, even if they don't really understand all the technological details. In short, when a smart contract is accepted, the parties are giving their implicit consent to the underlying programming code.[30] Accordingly, obligations arising out of smart legal contracts can be characterized as falling under the scope of the Regulation.

Insofar the Regulation applies to claims arising out of smart contracts, there are possible challenges related to the fact that the Regulation's jurisdictional rules are based on territorial connecting factors, such as domicile or the place of performance.

In the absence of exclusive jurisdiction or jurisdiction agreements, the anonymity of blockchain transactions present inherent difficulties to apply the Regulation. With the mentioned notable exceptions, the Regulation applies, in principle, only when the defendant has his or her domicile in a EU Member State. The definitions of 'domicile' is given in Article 63 of the Regulation, as well as the provision of Article 62 referring to the conflict of law rules to determine 'domicile' of natural persons. But it is problematic to identify a party's identity or domicile in the context of smart legal contracts because parties can use pseudonyms in transactions on a distributed ledger. Logically, this creates challenges concerning the application of the general rule of the defendant´s domicile under Article 4 of the Regulation.

Smart contracts also challenge the special jurisdiction rule in contractual matters under Article 7(1). Where the underlying contract is a sale of goods or a provision of services, even in situations where the obligation encoded as smart contract is not the delivery of goods or the provisions of service, Article 7(1)(b) of the Regulation applies.[31] However, complexity increases when the delivery of goods and provision of services are to be deployed on a distributed ledger. In Internet transactions performed online, the

EU:C:2004:77, paragraph 24, of 20 January 2005, *Petra Engler v Janus Versand GmbH*, C-27/02, EU:C:2005:33, paragraph 50, of 18 July 2013, *ÖFAB*, paragraph 33, of 14 March 2013, *Česká spořitelna, a.s. v Gerald Feichter*, C-419/11, EU:C:2013:165, paragraph 47 and of 21 April 2016, *Austro-Mechana*, C-572/14, EU:C:2016:286, paragraph 36.

[30] R.H. WEBER, *Blockchain technology, smart contracts and virtual currencies*, in A. DE FRANCESCHI and R. SCHULZE (eds.), *Digital Revolution- New Challenges for Law*, München, 2019, pp. 299-312, p. 304.

[31] P. DE MIGUEL ASENSIO, *Blockchain and Smart Contracts Relating to Copyright: Jurisdiction and Applicable Law*, in D. De Angelis et al., *La tecnologia blockchain e il diritto d'autore: miraggio o realità?*, ALAI Italia, 2021, pp. 41-53.

identification of the place of delivery of goods and provision of services can be established taking into account relevant elements such as: the location of the server which hosts the digital content being supplied or the data relevant for the provision of the service; the place from where that content was uploaded on the server or the service is administered; the seller´s or provider's domicile; the place of receipt, access or downloading of the information; and the recipient's domicile.[32] Yet, some of these connecting points cannot be always determined in the case of smart contracts, where the contractual obligations expressed in computer code are performed by the computers on the network. The involvement of a node is random, and no node has control over the other nodes. There is not even a central server that could be used as an anchor to establish the location of the data. Smart contracts running through a blockchain are *nowhere* and *everywhere*.[33] For the same reason, the application of Article 7(1)(a) and (c) of the Regulation may remain irrelevant. Smart contracts *per se* have not any particular place of performance. Delocalization is, indeed, one of the main features of Distributed Ledger Technology. Therefore, it may prove difficult to determine the *forum solutionis*. As put by the English Law Commission: "Smart contracts may pose certain unique challenges when seeking to identify the geographical location of performance, actions and enrichment, such as where the obligations under a smart contract are performed on a distributed ledger rather than involving any physical performance in the real world."[34]

Parties to a smart contract may also choose to submit to the courts of a Member State in case of a dispute. In this regard, several questions arise: Does the jurisdiction agreement need to be part of the smart contract coding? What is the effect of a jurisdiction agreement included in the general conditions applicable to a given blockchain? Do the chosen courts need to recognize smart contracts a veritable source of contractual obligations to establish their jurisdiction? On the other hand, since blockchain technology keeps the users' identities secret, it can also allow those who are not legally allowed to give their consent or incur in a legal prohibition, to operate (for instance, ex Articles 1263 and 1264 of the Spanish Civil Code).

The prorogation of jurisdiction may be stated in the underlying contract or even directly in the smart contract. Jurisdiction agreements can also be specified in the rules that must be accepted by any participant to a given blockchain. For instance, the choice of court may be stated in the general terms and conditions for the blockchain.[35] When the designated courts are the courts of a Member State, Article 25 of the Brussels I Regulation (Recast), applies. This means that the choice of court must be in writing or evidenced in writing.[36] Any communication by electronic means which provides a durable record of the agreement shall be equivalent in writing.[37] When the choice of court agreement is included in standard terms and conditions, it may be accepted by the click-wrapping

[32] Ibid.
[33] F. GUILLAUME, *Aspects of private international law related to blockchain transactions*, cit., p. 70.
[34] *English Law Commission on Smart Contracts*, cit., p. 23.
[35] F. GUILLAUME, *Aspects of private international law related to blockchain transactions*, cit., p. 76.
[36] Article 25(19 a) Brussels I Regulation (Recast).
[37] Article 25(2).

method, provided the other party is given the possibility of obtaining a durable record of the prorogation agreement before entering into the contract.[38]

A valid choice of court agreement in the underlying contract shall cover disputes between the parties concerning the performance of the resulting obligations coded in the smart contract. The same is true regarding court agreements coded directly in the smart contract or specified in the rules that must be accepted by any participant to a given blockchain. The relevant factor is that the agreement of the parties as to the choice of court can be effectively established.[39] However, the Regulation also provides that the choice of court agreement can be in a form which accords with practices which the parties have established between themselves and, in international trade or commerce, in a form which accords with a usage of which the parties are or ought to have been aware and which in such trade or commerce is widely known to, and regularly observed by, parties to contracts of the type involved in the particular trade or commerce concerned.[40] In this regard, some authors argue that the widespread deployment of transactions on the blockchain will lead to the expansion of a new subset of law, the so-called *Lex Cryptographia*, conformed by rules administered through self-executing smart contracts and decentralized (autonomous) organizations.[41] It is premature to claim that there are already practices regarding the blockchain.[42] However, over time, it is likely that there will be industry-specific blockchain networks and industry-specific smart contracts, whose rules, practices and programming texts will be observed and well-known to the participants, to such an extent to qualify as valid jurisdiction agreements.

Under the Regulation, the law of the Member State of the chosen courts governs the substantive validity of the jurisdiction agreement.[43] This law will apply, for instance, to consider whether the agreement has been concluded by a party who is not legally allowed to give his/her/its consent or who may incur in a legal prohibition to operate. Since blockchain technology usually keeps the identities of users secret, complex problems appear in practice.

Certain consumer contracts are granted a special protective framework under Articles 17-19 of the Brussels I Regulation (Recast). The protection applies to contracts concluded between a consumer and a trader or professional where the latter pursues his commercial activity in that country or directs his activities by any means to that country, and the contract is concluded as a result of such activities. These contracts present a certain connection to the country of the consumer's domicile, typically because the consumer has been "hunted" by the foreign professional. Accordingly, when a contract falls under this

[38] Court of Justice, Judgment of 21 May 2015, *Jaouad El Majdoub v Cars OnTheWeb.Deutschland GmbH*, Case C-322/14, ECLI:EU:C:2015:334.
[39] F. GUILLAUME, *Aspects of private international law related to blockchain transactions*, cit., p. 77.
[40] Article 25(1) b) and c). Court of Justice, Judgment of the Court (First Instance) of 20 April 2016, *Profit Investment SIM SpA v Stefano Ossi and Others*, Case C-366/13, ECLI:EU:C:2016:282.
[41] A. WRIGHT, P. DE FILIPPI, *Decentralized Blockchain Technology and the Rise of Lex Cryptographia*, (10 March 2015), p. 4. Available at: https://ssrn.com/abstract=2580664.
[42] F. GUILLAUME, *Aspects of private international law related to blockchain transactions*, cit., p. 77.
[43] Article 25(1).

category, the consumer is granted a *forum actoris* in Article 18 of the Regulation, in addition to the courts of the Member State of the professional's domicile. However, the professional can only bring proceedings in the courts of the Member State in which the consumer is domiciled. Other grounds of jurisdiction, in particular the special rule on jurisdiction in matters relating to contract in Article 7(I) are not applicable to consumer transactions.

Choice of court agreements falling within the scope of the protective regime of the Regulation are only valid in the three exceptional situations provided for in Article 19: if they are entered into after the dispute has arisen; if they allow the consumer to bring proceedings in courts other than those indicated in Article 18 or if they confer jurisdiction on the courts of that Member State where both the consumer and the professional are domiciled at the time of conclusion of the contract, provided that such an agreement is not contrary to the law of that Member State.

Most smart contracts are simple B2B transactions with simultaneous execution and do not fall within the category of protected consumer contracts. However, on November 4 2020, the Austrian Supreme Court ruled on the applicability of the consumer jurisdiction under Article 18 of the Brussels I Regulation (Recast) to transactions related to Bitcoin.[44] As noted above, this is a decentralized digital currency that can be sent from user to user on the peer-to-peer bitcoin network, verified by network nodes through cryptography and recorded in a blockchain. In the referred case, an Austrian resident offered investment opportunities on a cross-border basis. The German defendant wanted to invest in bitcoins, which is why an agent of the Austrian plaintiff visited the defendant in Germany with the plaintiff's mobile phone. Under the agreement the German defendant would borrow 6 Bitcoins from the Austrian plaintiff. The transfer was carried out in several transactions on December 18 and 19, 2016 to an investment account in the name of the German defendant. The parties agreed that the Bitcoins would be reimbursed within four weeks at the latest to the plaintiff's wallet on his mobile phone. When the German defendant failed to do so, the Austrian offeror sued the former in Austria. The Austrian courts at first and second instance rejected the defendant's claim that they had no jurisdiction. The contract was characterized as a loan agreement which is regarded by the CJEU as a contract for the provision of services governed by the autonomous rule of Article 7(1) b) 2º of the Brussels I Regulation (Recast). Accordingly, the place of performance of the obligation in question was located at the lender's domicile.[45] When the case reached the Austrian Supreme Court the debate was cut short. In the Court's opinion the agreement was a protected consumer contract that fell under Article 17 of the Regulation. The German defendant had acted for a purpose that was outside her trade or profession and the Austrian plaintiff was an entrepreneur that had directed his activities towards the consumer's country of residence. In consequence, under Article 18(2) of the

[44] 3 Ob 95/20x.

[45] Court of Justice, Judgment of 15 June 2017, *Saale Kareda v Stefan Benkö*, Case C-249/2016, ECLI:EU:C:2017:472.

Regulation, proceedings against the consumer could be only brought at the courts of the Member State of the consumer's domicile.

By doing so, the Austrian Supreme Court avoided the debate as to whether Bitcoin can be characterized as money for the purpose of the Regulation. If Bitcoin were to be regarded as money, the autonomous rules for sales and provision of services under Article 7(1) b) would apply. Contrarily, if it lacked the legal characteristics of money, any transaction involving Bitcoin would fall under Article 7(1) a) and jurisdiction would be established by the national rules applicable to the transaction and their characterization of Bitcoin.[46]

Legal certainty is, therefore, desirable on the questions related to blockchain transactions, including jurisdictional issues. Given the growing importance of distributed ledger technology and smart contracts, the European legislator should take the opportunity to introduce specific jurisdiction rules regarding blockchain transaction in a future recast of the Brussels I Regulation. Meanwhile, the CJEU will need to clarify the applicable framework when given the chance.

4. Recognition and enforcement of judgments in claims arising out of smart contracts. Execution in a decentralized network

In addition to the detailed regulation of international jurisdiction under Regulation 1215/2012, Chapter III (arts. 36 to 57) contains rules relating to the recognition and enforcement of judgments. The underlying principle is mutual trust between Member States by establishing the automatic recognition and exequatur (without any procedure) of judgments issued in other Member States, to allow the free movement of judgments in the EU.[47]

Generally, judgments issued by a court in a Member State are to be automatically recognized in the requested Member State. According to Article 36.1 of the Regulation: "A judgment given in a Member State shall be recognised in the other Member States without any special procedure being required". Automatic recognition means that any decision by a court in a Member State may be invoked directly before the authorities of any other Member State, without the need for any *ad hoc* procedure. The judgment is to be fully recognized and the effects derived from it extend to the Member State requested.[48] Recognition may be only refused, at the request of any interested party, on the basis of the exceptions listed in Article 45. The request for refusal of recognition shall be made in accordance with the procedure laid down for refusal of execution.

[46] See M. LEHMAN, *Bitcoin Trades and Consumer Jurisdiction*, EAPIL Blog, 29 January 2021, https://eapil.org/2021/01/29/bitcoin-trades-and-consumer-jurisdiction/.
[47] U. MAGNUS ET AL., *Brussels Ibis Regulation – Commentary*, cit., p. 812 ff.
[48] Court of Justice, Judgment of the Court of 4 February 1988, *Horst Ludwig Martin Hoffmann v Adelheid Krieg*, C-145/86, ECLI:EU:C:1988:61.

The Regulation has eliminated the exequatur procedure, that is, the need for declarations of enforceability in the requested State. According to Article 39 "A judgment given in a Member State which is enforceable in that Member State shall be enforceable in the other Member States without any declaration of enforceability being required." This means that the winning party may directly apply for execution in the requested State.

Upon request of the interested party, the court of the State of origin will issue a certificate using the form set out in Annex I, which shall be presented by the applicant to the competent enforcement authority (in Spain, for instance, the *Juzgado de Primera Instancia*), a copy of the judgment which satisfies the conditions necessary to establish its authenticity. The certificate shall be served on the person against whom the enforcement is sought who may apply for refusal of enforcement under any of the grounds set forth in Article 45 of the Regulation: contradiction to public policy; violation of the rights of defence; inconsistency of judgments and infringement by the judge of the State of origin of the rules on international jurisdiction consecrated in the Regulation in matters of exclusive jurisdiction (Article 24), insurance, employment and consumer contracts (Articles 10-23).

The judgment creditor will have to get the available traditional execution methods in the foreign jurisdiction.[49] Typically, the creditor may request the seizure of assets, although in some scenarios, a judicial receiver may be also appointed, and the creditor may also request to manage the assets seized in order to be repaid with their profits. In addition, interim measures could also be requested (for instance, interim freezing of assets, deposit of a movable asset, registration of the claim within a Property or Commercial Registry, prohibition to make any act of disposal concerning the assets or properties at stake etc.).

Enforcing remedies in the context of smart contracts may be challenging. The intangibility, immutability, and decentralization of blockchain may impair the capacity of a court decision to be executed.[50] There is a substantial limit for enforcement of decisions requiring the power or authorization to modify an open-source piece of software. Even a party with a perfected security interest in bitcoin or another blockchain-based asset, cannot foreclose on the asset unless the applicable smart contract code makes the transfer possible.[51] And, overall, obtaining remedies is dependent on being able to identify the parties.

Enforcement of a remedy to reverse a transaction in a distributed ledger may be difficult, for example, when the court has determined that a smart contract is void or voidable due to a mistake, lack of capacity, or duress.

[49] In Spain, for instance, judgments are executed under the procedure set out in Articles 538 et seq of the Civil Procedure Act.

[50] *Chamber of Digital Commerce*, *Smart Contracts, Is the Law Ready?*, 2018, p. 62, https://digitalchamber.org/smart-contracts-whitepaper/.

[51] Ibid, p. 59.

Difficulties may also arise when a court has issued a remedy that excuses future performance when a smart contract performs automatically once initiated. Or, if available, when the judgment provides for a specific performance for a breach of contract.

Potentially, a judgment for payment of cryptocurrency can be executed through the seizure and sale of property that could be paid for in cryptocurrency/equivalent and cryptocurrency/equivalent debts could be garnished. When the judgment requests the restitution of cryptocurrency, the production of the resistant debtor's private key might be compelled, perhaps, with the assistance of committal orders for non-compliance.[52] Likewise, in a claim against a cryptocurrency exchange which holds cryptocurrency for traders in wallets, the debtor can be compelled to produce private keys under pain of contempt of court orders against their officers. Yet, even the U.S. government has had difficulties obtaining bitcoin in forfeiture cases—unless it has access to the hardware on which the wallet and the applicable private key is stored. In U.S. vs 50.44 Bitcoin,[53] the court did not have to force a transfer of the bitcoin through technological means, because the holder of the bitcoin voluntarily transferred them to the government. In other cases, though, it has only managed to seize cryptocurrency assets through physical means such as seizing a laptop or an unencrypted computer.

Considering all these difficulties, parties can try other ways to gain certainty over whether a court can enforce a judgment over a blockchain-based asset. For instance, parties can enter a dispute resolution smart contract that automates the execution of the judgment, where the orders made in the judgment are communicated to the smart contract. An oracle/oracles may then receive data on the judgment from off the blockchain and feed that to the dispute resolution smart contract in order to activate the execution.[54] Nevertheless, an additional difficulty comes into the picture. Smart contracts are *per se* transnational and the law applicable to these matters varies significantly across different jurisdictions. Furthermore, judicial power is restricted to a given territory. As a result, new ways are being explored to solve disputes through blockchain dispute resolution and avoid having to receive data from off-blockchain to activate execution.

5. The way forward. Decentralized dispute resolution?

Enforcement is an expression of the State's monopoly over the use of force; when necessary, coercion can only be achieved by relying on public authority. However, judicial power is limited by its territorial dimension. The capacity of courts to address

[52] Z. ER LOW, *Execution of Judgements on the Blockchain- A Practical Legal Commentary*, in *Harvard Journal of Law & Technology. Digest*, 2021, available at https://jolt.law.harvard.edu/digest/execution-of-judgements-on-the-blockchain-a-practical-legal-commentary.
[53] *United States of America, Plaintiff, v. 50.44 BITCOINS, Defendant*, United States District Court for the District of Maryland, 31May 2016, Civil Action No. ELH-15-3692.
[54] Z. ER LOW, *Execution of Judgements on the Blockchain- A Practical Legal Commentary*, cit., p. 3.

disputes related to smart contracts and enforce judgments is thus limited due to delocalization.[55]

There is a number of attempts to move into full-on blockchain dispute resolution, where typically the original transaction, the adjudication, issuance of the decision and the execution happen on blockchain itself.

Most emerging initiatives are blockchain private courts and decentralized arbitration systems such as Mattereum,[56] LTO Network,[57] Kleros,[58] The Aragon Project[59] or The Blockchain Arbitration Society.[60] Some of them run using blockchain jurors that get to decide cases by staking tokens or by building up credit.[61] Decisions are supposedly based on a communal sense of what is fair and equitable[62] and when the final ruling is emitted, the proposal can be executed on blockchain itself.

Private platforms intend to provide a more efficient and accessible system of dispute resolution independent from national jurisdictions and centralized courts. They build on the idea of poor judicial performance and efficiency and claim that adjudication can be improved with new software developments and automations. Kleros, for instance, replaces the truth-seeking process essential to judicial adjudication by a series of efficient inputs and outputs automated with the right software.[63]

These so-called cryptocourts are highly controversial for several reasons. They have been criticized, for instance, for their lack of legitimacy and their speculative character. According to Dylag & Smith, "cryptocourts organize jurors around speculating which outcome is most likely to win, and subsequently rewards those that vote coherently with that outcome. This is precisely how cryptocourt financialization operates through a legal imaginary that encourages jurors to engage in speculative predictions, and indeed gambling on, a future outcome of a dispute. In this way, justice is synonymous speculative investment."[64]

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[55] M. CLÉMENT, *Smart Contracts and the Courts*, in L.A. DIMATTEO, M. CANNARSA, C. PONCIBÒ, *The Cambridge Handbook of Smart Contracts, Blockchain Technology and Digital Platforms*, 2019, Cambridge, pp. 271-287, p. 285, doi:10.1017/9781108592239.015,

[56] https://mattereum.com.

[57] https://ltonetwork.com/.

[58] https://kleros.io/es/.

[59] https://aragon.org/.

[60] https://theblockchainarbitration.com/.

[61] F. AST, B. DEFFAINS, *When online dispute resolution meets blockchain: the birth of decentralized justice*, in *Stanford Journal of Blockchain Law & Policy*, 2021, n. 4, pp. 241-256, p. 251.

[62] M. DYLAG & H. SMITH, *From cryptocurrencies to cryptocourts: blockchain and the financialization of dispute resolution platforms*, in *Information, Communication & Society*, June 2021, DOI: 10.1080/1369118X.2021.1942958; D. W. E. ALLEN, A.M. LANE, M. POBLET, *The Governance of Blockchain Dispute Resolution*, in *Harvard Negotiation Law Review*, 2019, n. 25, pp.75-101; L. BERGOLLA, K. SEIF, C. EKEN, *Kleros: A Socio-Legal Case Study Of Decentralized Justice & Blockchain Arbitration*, in *Ohio State Journal on Dispute Resolution*, 2021, n. 37(1), available at SSRN: https://ssrn.com/abstract=3918485 or http://dx.doi.org/10.2139/ssrn.3918485.

[63] M. DYLAG, H. SMITH, *From cryptocurrencies to cryptocourts: blockchain and the financialization of dispute resolution platforms*, cit., p. 8.

[64] Ibid, p. 10.

Scholars have also warned about the potential risks to procedural safeguards presented by anonymous and economically-incentivized jurors. Buchwald, for example, stresses that "the realities of blockchain pseudonymity negate any possibility of compelling third-party document production and testimony",[65] which is essential in arbitration. Likewise, it is noted that mandatory disclosure may be put at risk if it goes against the interest of certain businesses, which may be then tempted to start donating to anti disclosure judges.[66] All of this may conflict with the principles of independence, impartiality, accessibility or procedural fairness, which are characteristic of international arbitration.

Furthermore, in cryptocourts, the jurors do not apply the laws of a specific jurisdiction. Claims are solved based on the logic of speculative finance, where parties bet on matters of fact, such as which party has been wronged in a legal dispute. To that end, jurors apply a communal sense of what is fair and equitable at the cost of national principles and legal values. Cryptocourts may, for instance, award damages for the breach of an anti-competitive agreement, even though such an agreement violates public policy in a given State. Presuming that the anti-competitive agreement is part of a smart contract encoded with a blockchain arbitration clause, the resulting award could be enforced online notwithstanding its incompatibility with competition law.[67]

Generally, state-controlled recognition procedures currently protect legal values such as public policy. For instance, one of the grounds listed in Article 45 of the Brussels I Regulation (Recast) for refusal of both recognition and enforcement is contradiction to public policy – "if such recognition is manifestly contrary to public policy in the Member State in which recognition is sought."

Public policy under the Brussels I Regulation (Recast) refers both to substantive public policy,[68] and procedural public policy, for instance, rights of defence not covered under b).[69] However, decisions rendered by cryptocourts cannot be subject to recognition under the Regulation. These decisions cannot be characterized as a "judgment given by a court or tribunal of a Member State", as required in Article 2 a). Assuming that they are arbitral awards, Article 1(2)(d) of the Regulation states expressly that it does not apply to arbitration. The scope of the Brussels I Regulation in terms of arbitration has been addressed by the Court of Justice of the European Union in a number of decisions, such

[65] M. BUCHWALD, *Smart contract dispute resolution: the inescapable flaws of blockchain based arbitration*, in *University of Pennsylvania Law Review*, 2020, n. 168, pp. 1369-1423, p. 1400.
[66] Ibid.
[67] P. ORTOLANI, *The impact of blockchain technologies and smart contracts on dispute resolution: arbitration and court litigation at the crossroads*, in *Uniform Law Review*, 2019, pp. 430–448, doi:10.1093/ulr/unz017, p. 440.
[68] Judgment of the Court (Fifth Chamber) of 11 May 2000, *Régie nationale des usines Renault SA v Maxicar SpA and Orazio Formento*, C-38/98, ECLI:EU:C:2000:225.
[69] Judgment of the Court of 28 March 2000, *Dieter Krombach v André Bamberski*, C-7/98, ECLI:EU:C:2000:164 and Judgment of the Court (First Chamber) of 2 April 2009, *Marco Gambazzi v DaimlerChrysler Canada Inc. and CIBC Mellon Trust Company*, C-394/07, ECLI:EU:C:2009:219.

as *Marc Rich v Societa Italiano Impianti*,[70] *Van Uden*,[71] and *West Tankers*,[72] none of them providing a satisfactory answer.[73] However, it is clear that recognition and enforcement of arbitral awards are outside the scope of the Regulation. Article 73(2) of the Regulation expressly says this with regard that "The Regulation shall not affect the application of the 1958 New York Convention."

The application of the 1958 New York Convention to decisions rendered in cryptocourts present difficulties, as well.[74] Among several reasons,[75] according to Article 1(1) of the New York Convention, "This Convention shall apply to the recognition and enforcement of arbitral awards made in the territory of a State other than the State where the recognition and enforcement of such awards are sought, and arising out of differences between persons, whether physical or legal. It shall also apply to arbitral awards not considered as domestic awards in the State where their recognition and enforcement are sought." Blockchain arbitration is delocalized. When a cryptocourt is involved in the decision of a dispute, identifying the place where the arbitral award was made may not be straightforward, when considering that the parties may access the procedure from different countries, and the decision is stored and powered by numerous computers located in different countries. Additional issues may also arise as to the place where the arbitral award was signed or regarding the grounds for refusal, which specifically refer to a State or the law of a State. Article V.1(a), for instance, "a party resisting to the recognition and enforcement of the award can oppose to the proceedings if it can prove that "(…) the said agreement is not valid under the law to which the parties have subjected it or, failing any indication thereon, under the law of the country where the award was made". Recently, a Mexican court recognized and enforced an arbitral award that was substantially governed by the Kleros protocol, although outside the New York Convention framework.[76]

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[70] Judgment of the Court of 25 July 1991, *Marc Rich & Co. AG v Società Italiana Impianti PA*, Case C-190/89, ECLI:EU:C:1991:319.

[71] Judgment of the Court of 17 November 1998, *Van Uden Maritime BV, trading as Van Uden Africa Line v Kommanditgesellschaft in Firma Deco-Line and Another*, Case C-391/95, ECLI:EU:C:1998:543.

[72] Judgment of the Court (Grand Chamber) of 10 February 2009, *Allianz SpA and Generali Assicurazioni Generali SpA v West Tankers Inc.*, Case C-185/07, ECLI:EU:C:2009:69.

[73] T. HARTLEY, *Arbitration and the Brussels I Regulation – Before and After Brexit*, in *Journal of Private International Law*, 2021, n. 17(1), pp. 53-73, DOI: 10.1080/17441048.2021.1907942.

[74] F. AST, B. DEFFAINS, *When online dispute resolution meets blockchain: the birth of decentralized justice*, cit., p. 255.

[75] I. NG (HUANG YING), V. BENEDETTI DEL RIO, *When the Tribunal is an Algorithm, Complexities of Enforcing Orders Determined by a Software under the New York Convention*, in K. FACH GOMEZ, A.M. LOPEZ RODRIGUEZ, *60 Years of the New York Convention: Key Issues and Future Challenges*, Alphen aan den Rijn, 2018, pp. 121-134.

[76] M. VIRUES CARRERA, *Accommodating Kleros as a decentralised dispute resolution tool for civil justice systems: theoretical model and case of application*, 2021, https://ipfs.kleros.io/ipfs/QmfNrgSVE9bb17KzEVFoGf4KKA1Ekaht7ioLjYzheZ6prE/Accommodating%20Kleros%20as%20a%20Decentralized%20Dispute%20Resolution%20Tool%20for%20Civil%20Justice%20Systems%20-%20Theoretical%20Model%20and%20Case%20of%20Application%20-%20Mauricio%20Virues%20-%20Kleros%20Fellowship%20of%20Justice.pdf.

State-controlled recognition procedures are, moreover, unfeasible in cases where all relevant assets circulate on technological platforms. Here, the prospect of an off-chain transaction reversal would be almost impracticable. Against this context, some national legislators are moving towards the creation of blockchain judicial courts where both the decision and execution are made on the blockchain itself. The Hangzhou Court, for instance, offers an end-to-end judicial platform, where contracting parties who have been pre-identified as eligible execute a smart contract to record their original transaction.[77] In the United Arab Emirates (UAE), both Dubai and Abu Dhabi have launched a Court of the Blockchain, which in the long run is looking to have all applicable laws and regulations on the blockchain so that disputes can be resolved on the blockchain itself likely with minimal human involvement.[78]

6. Conclusions

The present article has assessed main issues related to jurisdiction, recognition and enforcement of judgments arising out of smart contracts under the Brussels I Regulation (Recast), including existing caselaw on the topic. It has also analyzed the so-called cryptocourts and their potential advantages and risks.

The first section has presented the concept of distributed ledger technology and blockchain as a transformational computing innovation. Although the potential and scope of this new technology is yet to be determined, blockchain is "expected to revolutionize industry and commerce and drive economic change on a global scale because it is immutable, transparent, and redefines trust, enabling secure, fast, trustworthy, and transparent solutions that can be public or private."[79] The so-called smart contracts are one of the most relevant applications of blockchain technology. These computer programs run on the blockchain and eliminate human discretion in the execution of the contract. Contractual terms are complied with without having to resort to judges and courts, since the program has control over the necessary physical or digital objects to carry out execution. So far there is lack of regulation for this technology, which exposes users to a wide range of legal risks. The legal vacuum has not prevented commercial operations using this technology. In fact, blockchain is devised as an alternative mechanism to the law.

One of the main legal questions yet to be answered relate to jurisdiction. The second section has presented the main heads of jurisdiction related to claims arising out of smart contracts within the framework of the Brussels I Regulation (Recast). These are prorogation of jurisdiction, the defendant's domicile, and the special jurisdictional ground

[77] S.T. ZHENG, *Virtual Hearing in China's Smart Court*, in *Conflict of Laws.net*, 14 November 2021, https://conflictoflaws.net/2021/virtual-hearing-in-chinas-smart-court/.
[78] Z. ER LOW, *Execution of Judgements on the Blockchain- A Practical Legal Commentary*, cit., p. 7.
[79] S. UNDERWOOD, *Blockchain beyond Bitcoin (other applications of blockchain technology)*, in *Communications of the ACM*, 2016, n. 59 (11), pp.15-17, p. 15, DOI: 10.1145/2994581.

on contractual matters. The rules on jurisdiction concerning certain consumer contracts may also apply.

The third section has shown how some of the main features of this technology, namely, decentralization and anonymity do not fit well with jurisdictional rules based on territorial connecting factors, such as domicile under Article 4.1 Brussels I Regulation (Recast) or the place of performance under Article 7.1 of the Regulation. To be on the certain side, parties should, therefore, opt for a prorogation of jurisdiction under Article 25 of the Brussels I Regulation (Recast), either in the underlying contract or even directly in the smart contract. Jurisdiction agreements could be also specified in the rules that must be accepted by any participant to a given blockchain. For instance, in the general terms and conditions for the blockchain. Over time, it is even likely that there will be industry-specific blockchain networks and industry-specific smart contracts, whose rules, practices, and programming texts will be observed and well-known to the participants, to such an extent to qualify as valid jurisdiction agreements under Article 25 of the Regulation. The section has also analyzed existing case law on the application of the special jurisdiction rules on certain consumer contracts.

The fourth section has examined the recognition and enforcement of judgments arising out of smart contract claims under the framework of the Brussels Regulation. Recognition and enforcement are automatic and may be only refused, at the request of any interested party, based on the exceptions listed in Article 45 of the Regulation. However, the judgment creditor will have to get the available traditional execution methods in the foreign jurisdiction. And executing remedies in the context of smart contracts may be challenging. The anonymity, intangibility, immutability, and decentralization of blockchain may sometimes impair the capacity of a court decision to be executed. For instance, to reverse a transaction in case of mistake or fraud, to execute an order for specific performance etc. Even when judgments order payment or restitution of cryptocurrency, assets cannot be foreclosed unless the applicable smart contract code makes the transfer possible. Taking all these difficulties into account, new ways are being developed to gain certainty on the enforcement of judgments over blockchain-based assets.

The fifth section has explored the so-called cryptocourts. These online dispute resolution platforms have emerged as a response against the limited capacity of courts to address blockchain disputes and enforce judgments on the net due to delocalization. Dispute resolution systems coded as smart contracts in blockchains have the advantage of guaranteeing that their rulings will be enforced. However, they have also some potential risks. Jurors are economically incentivized, a circumstance that encourages them to engage in speculative predictions, and gambling on, the future outcome of a dispute. Anonymity may impair procedural safeguards such as third party document production and testimony. Furthermore, corporations may be tempted to sponsor anti-disclosure jurors if business interests so require. All this may conflict with generally accepted principles of international arbitration such as independence, impartiality or procedural fairness. In addition, it is unclear whether blockchain decisions are subject to court review

or recognition and enforcement. The Brussels I Regulation (Recast) states expressly that it does not apply to arbitration. Moreover, blockchain awards do not seem to fulfil some of the conditions for an award to be enforceable in courts of the member countries under the framework of the 1958 New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards. As a result, cryptocourts may render decisions, even if fair and equitable, that violate public policy in a given State, and which are enforced online without any form of judicial control.

The global Smart Contracts market size is expected to reach USD 345.4 Million by 2026, from USD 106.7 Million in 2019.[80] Major factors behind the growth of smart contract market size are, increasing applications in industries such as supply chain, banking, government, insurance, and real estate. Furthermore, the rising popularity of blockchain technology is driving the demand for the Smart Contracts Market.

As technology matures, more organizations are expected to take advantage of it to reduce costs and enable fast and secure transactions. To maximize the applications of smart contracts, however, we still need to sort out some problematic legal issues that need further thought and analysis. One of them is legal clarity in relation to jurisdiction. Anonymity, immutability, and the delocalized nature of blockchain, inject complex issues into judicial proceedings.

Smart contracts are immutable and self-executing, yet not infallible. There might be coding errors or issues relating to the functionality of the smart contract platform itself. There might be also varying understandings and interpretations by the parties. Accordingly, decision-making mechanisms are needed to solve situations where subjectivity is involved while respecting the functionality of the whole system. And new mechanisms of enforcement need to be explored to guarantee the efficient execution of decisions on the blockchain.

Adjudication is witnessing the emergence of new actors and ways of practicing law and conflict resolution, which may distort existing legal institutions and the traditional monopoly of the State on legislation and legal enforcement. Private initiatives that move into blockchain dispute resolution have been welcomed by users,[81] although the respect of general interests, principles, and values it yet to be examined and improved.

Some national courts are also entering this space. The Hangzhou, Abu Dhabi and Dubai blockchain courts have been already mentioned as examples from countries where the legislator is trying to find responses to the novel issues posed by distributed ledger technology. As this is an economically growing sector, the European legislator should also consider specific solutions in future recasts of the Brussels I Regulation. Exploring heads of jurisdiction without territorial connecting factors and recognition of automated execution methods on the blockchain could be on the agenda for reforms. Parties with court judgments for cryptocurrency or regarding records kept on the blockchain could already benefit from having specific rules for blockchain related disputes. Overtime, as

[80] Valuates Reports, 5 April 2021, https://www.prnewswire.com/in/news-releases/smart-contracts-market-size-to-reach-usd-345-4-million-by-2026-at-cagr-18-1-valuates-reports-832536081.html.
[81] Kleros has already entertained over 1000 cases, https://klerosboard.com/.

more relevant assets circulate on technological platforms, the development of full-on blockchain dispute resolution sponsored by the European Union may be necessary to strengthen legal certainty, execution, and the protection of general values and principles.

ABSTRACT: The emergence of Distributed Ledger Technology (DLT)/blockchain and its application through the so-called *smart contracts* poses significant challenges from the point of view of classical contract law and private international law. Its decentralization, anonymity/opacity, immutability, interconnectivity, and automation certainly generate complex legal problems, including relevant questions pertaining to jurisdiction. This article deals with jurisdiction, recognition and enforcement of judgments arising out of smart contracts under the Brussels I Regulation (Recast), including existing caselaw on the topic. The article also addresses the issue of blockchain dispute resolution.

KEYWORDS: Smart contracts – jurisdiction – enforcement – Brussels I Regulation (Recast) – blockchain.