ARBITRATION AND BLOCKCHAIN IN THE BANKING AND FINANCING SECTOR

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1. New blockchain technologies are invading the banking and financing industries at an unstoppable pace. Created as shared digital databases, and impermissible to any intrusion or unauthorised modification, these technologies serve to centralise record-keeping systems based on distributed ledger platforms. Developed as a technology that allows the generation and growth of transactions attached to a string of blocks, unsusceptible to adulteration, blockchain has been the basis for the offering of cryptocurrencies, such as Ethereum and Bitcoin.

It is a secured means of operating and recording transactions that reduces not only the intervention of numerous human processes and documentation but also the costs and time attached to those operations. This technology allows the users, for instance, to make transfers of currencies in a blink of an eye, thus cutting off the time and expenses associated with regular banking transactions.

The use of blockchain is beyond our imagination. Blockchain technologies are being developed to allow the trace of goods and services, and to allow access to every possible detail of any given transaction or service. Ranging from medical data management to land titling, the capabilities of this new technology stretch the horizon of the economic agents and the economy as a whole. To give an example, IBM announced that it is working with Nestle, Unilever and Walmart in joining efforts to reduce food contamination by using blockchain that "would enable food suppliers to source information about the origin, condition and movement of food, and to trace contaminated produce in mere seconds."[1] Essentially, virtually every transaction can be processed through blockchain technology.

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[1] *See* Ryan Browne, *IBM Partners with Nestle, Unilever and Other food Giants to Trace Food Contamination with Blockchain*, CNBC NEWS (Aug. 22, 2017),

In the words of Marco Iansiti and Karim Lakhani, "blockchain will become the foundation for the way that all digital contracts, transactions and records will be executed and stored in future."[2]

2. For that reason, it is worth providing a broad description of the fundamentals of this system. We borrow the words from Satoshi Nakamoto, thought to be the pseudonym of the author of a white paper proposing the creation of Bitcoin.[3]

The transactions operated under blockchain are computationally impractical to reverse and to change. Taking the case of Bitcoin, this electronic coin is a

> [C]hain of digital signatures. Each owner transfers the coin to the next by digitally signing a hash of the previous transaction and the public key of the next owner and adding these to the end of the coin. A payee can verify the signatures to verify the chain of ownership.[4]

To annul the potential problem of "doubling spending" (if limited to this aspect, the system would not be able to avoid any given user to double-spend his or her coin) and to avoid the intervention of a trusted central authority to prevent this double-spend risk altogether, the system provides a feature that makes everyone aware of all transactions by setting forth a database (a chain) containing the single history of the "order in which they were received."[5] This is done using a "timestamp" that marks proof of the time at which each transaction has occurred, using a "peer-to-peer" network. Therefore,

> [t]he network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing

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https://www.cnbc.com/2017/08/22/ibm-nestle-unilever-walmart-blockchain-food-contamination.html.

[2] *See* Marco Iansiti & Karim Lakhani, *The Truth About Blockchain*, HARV. BUS. REV., Jan.–Feb. 2017, at 118.

[3] *See* Satoshi Nakamoto, BITCOIN: A PEER-TO-PEER ELECTRONIC CASH SYSTEM, https://bitcoin.org/bitcoin.pdf.

[4] *Id.* at 2.

[5] *Id.*

the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed but proof that it came from the largest pool of CPU power.

Nakamoto better describes the solution proposed that begins with a timestamp server. Essentially,

a timestamp server works by taking a hash of a block of items to be timestamped and widely publishing the hash, such as in a newspaper or Usenet post. The timestamp proves that the data must have existed at the time, obviously, in order to get into the hash. Each timestamp includes the previous timestamp in its hash, forming a chain, with each additional timestamp reinforcing the ones before it.[6]

To exemplify:
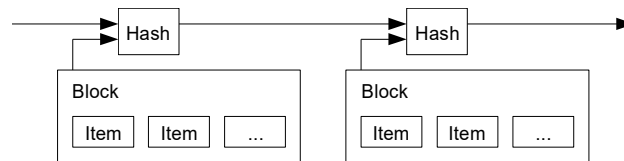
3. This system, therefore, allows the generation of immutable chains, from the beginning of the contractual transaction to its very end. In fact,

[I]n a blockchain system, the ledger is replicated in a large number of identical databases, each hosted and maintained by an interested party. When changes are entered in one copy, all the other copies are simultaneously updated. So as transactions occur, records of the value and assets exchanged are permanently entered in all ledgers. There is no need for third-party intermediaries to verify or transfer ownership. If a stock transaction took place on a blockchain-based system, it would be settled within seconds, securely and verifiably.[7]

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[6] *Id.*

[7] *See* Marco Iansiti & Karim Lakhani, *The Truth About Blockchain*, HARV. BUS. REV., Jan.–Feb. 2017, at 118.

4. Some banks are already partnering or investing in start-ups that use blockchain technologies ("fintech" companies). Although not yet submerged in the use of blockchain, banks such as UBS and Morgan Stanley are undertaking substantial research and development efforts in adopting the use of blockchain on a day-to-day basis. And some banks are also developing their proprietary blockchain solutions.[8]

More significantly, "over 100 banks, financial institutions, regulators, trade associations, professional services firms and technology companies" are working with R3CEV, a consortium enterprise software firm, "to develop Corda," a "distributed ledger platform designed specifically for businesses."[9] Among the members of R3, one may find Banco Santander, Bank of America, Deutsche Bank, and Citibank. In May 2017, R3 "completed the first two of three tranches in its Series A fundraising round, securing USD 107 million," bringing together a "diverse group of investors represent[ing] an equal geographical split across Europe, Asia-Pacific and the Americas."[10] The Corda version v1.0 was first launched on October 1, 2017.[11] Built on an open source platform aimed at providing a "direct alternative to the disparate legacy systems financial services institutions are forced to use today, creating unnecessary costs, risks and inefficiencies,"[12] the platform reaches numerous players and numerous industries. Corda may also facilitate the implementation and operation of smart contracts in several areas.

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[8] *See* Andrew Meola, *How Banks and Financial Institutions are Implementing Blockchain Technology*, BUSINESS INSIDER (Sept. 17, 2017), http://www.business insider.com/blockchain-technology-banking-finance-2017-9

[9] SIA AND R3 PARTNER TO ACCELERATE THE ADOPTION OF BLOCKCHAIN APPLICATIONS BY 600 BANKS AND CORPORATES 5 (2017), https://www.r3.com/news/sia-and-r3-partner-to-accelerate-the-adoption-of-blockchain-applications-by-600-banks-and-corporates/ (last visited Mar. 4, 2019).

[10] R3 SECURES LARGEST EVER INVESTMENT FOR DISTRIBUTED LEDGER TECHNOLOGY WITH USD 107 MILLION FROM OVER 40 INSTITUTIONS 2, 3 (2017), https://www.r3.com/news/r3-secures-largest-ever-investment-for-distributed-ledger-technology-with-usd-107-million-from-over-40-institutions/ (last visited Mar. 4, 2019).

[11] *See* R3 LAUNCHES VERSION 1.0 OF CORDA DISTRIBUTED LEDGER PLATFORM 2 (2017), https://www.r3.com/blog/2017/10/03/r3-launches-version-1-0-of-corda-distributed-ledger-platform/ (last visited Mar. 4, 2019).

[12] *Id.* at 3.

5. As previously mentioned, blockchain technologies are at the very foundation of cryptocurrencies, such as a Bitcoin. To grasp the real significance of these new currencies, it is worth looking at the evolution of the exchange rate of Bitcoin from its inception. When Satoshi Nakamoto "mined"[13] the first coin (the so-called "genesis block") in 2009, this coin had a virtually null face value. In March 2010, a bitcoin was worth USD 0.003, boosting to a current value of USD 5,832.27,[14] with variations along the way. It has been estimated that around ninety billion dollars are circulating in the market at the time this text is being written.

6. The continuous growth in the use of cryptocurrencies and other virtual currencies has already gained the attention of local regulators.

A report on regulation of bitcoin in selected jurisdictions was published in 2014 by the Law Library of the United States Congress:

> [R]eporting on any regulations or statements from central banks or government offices on the handling of bitcoins as well as any significant use of bitcoins in business transactions. Topics covered include whether bitcoins are recognized as legal tender, the possibility of negative impacts on the national currency, concerns about fraud, and how transactions using the Bitcoin system are viewed by tax authorities.[15]

In the meantime, alerted by the hacking of the Decentralized Autonomous Organization ("DAO") Ether funds,[16] and CoinDash's initial coin offering in July 2017, and fearing Ponzi schemes based

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[13] Mining is a peer-to-peer computer process that secures and verifies bitcoin transactions, where the transaction data is added to the bitcoin's global public ledger of past transactions.

[14] Exchange rate dated as of October 26, 2017, at "XE Currency Converter." To check the current exchange rate visit http://www.xe.com/currencyconverter/convert/?Amount=1&From=XBT&To=USD.

[15] REGULATION OF BITCOIN IN SELECTED JURISDICTIONS 1 (2014), http://www.loc.gov/law/help/bitcoin-survey/regulation-of-bitcoin.pdf (last visited Feb. 25, 2019).

[16] The funds worth more than USD 150 million in May 2016, when the attack produced a leak of Ether coin equivalent to around USD fifty million.

on blockchain could be established and threaten social and financial stability, the government of the People's Republic of China closed down sixty initial coin offering trading platforms in September 2017. Before that, the New York State Department of Financial Services had issued regulation on virtual currencies.[17] Additionally, Japan's Financial Services Agency approved eleven companies as operators of cryptocurrencies exchanges on September 22, 2017, shortly after a new law approved the use of bitcoin as a legal payment method in April 2017.[18] In Switzerland, the Federal Council issued a report on virtual currencies in 2014,[19] and it was reported that in 2016 the locality of Zug has granted its residents the option of paying their fees in bitcoin. Although its bitcoin currency system is limited to the equivalent of CHF 200, Zug is being hailed as the first city in the world where the bitcoin is accepted as currency.[20]

7. The potential is, therefore, colossal, and the changes cryptocurrency introduces in the financial system seem to be inexorable. This potential will also reach other more salient areas in which banks and financial institutions are involved, namely the transactional components of their activities where smart contracts can play a fundamental role in financial products such as derivatives, security issues, and stock transactions, to name a few.

In the very near future, banks and financial institutions will be able to make use of the blockchain technology for processing payments, improving efficiency and costs on clearance and settlement, authenticating the identity of customers and counterparties, and processing transactions in syndicated loans.

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[17] *See Virtual Currency Businesses*, NEW YORK STATE DEPARTMENT OF FINANCIAL SERVICES, https://www.dfs.ny.gov/apps_and_licensing/virtual_currency_businesses (last visited Mar. 1, 2019).

[18] *See* Arjun Kharpal, *Bitcoin Value Raises Over $1 Billion as Japan, Russia Move to Legitimize Cryptocurrency*, CNBC (Apr. 12, 2017), https://www.cnbc.com/2017/04/12/bitcoin-price-rises-japan-russia-regulation.html.

[19] *See* FEDERAL COUNCIL REPORT ON VIRTUAL CURRENCIES IN RESPONSE TO THE SCHWAAB (13.3687) AND WEIBEL (13.4070) POSTULATES (June 25, 2014), http://www.news.admin.ch/NSBSubscriber/message/attachments/35355.pdf (last visited Mar. 1, 2019).

[20] *See* Christian Uhlig, *Alpine 'Crypto Valley' Pays with Bitcoin*, DEUTSCHE WELLE (Jan. 7, 2016), http://www.dw.com/en/alpine-crypto-valley-pays-with-bitcoins/a-19371082.

Smart contracts, smart assets, share and stock trading are also in an almost go to market stage for the financing industry, thus making the existence of the middleman virtually redundant. Cross-border transactions will be fast and simplified, allowing them to be better traceable and transparent. The old and cumbersome realm of trade finance, based almost exclusively on paper, will also witness the entrance of this technology as a tool to overcome the usual two-week period necessary to process the payment of transactions, reducing its costs substantially. In this regard, it is worth mentioning that the use of blockchain technology will foster the unity of banks, shippers, freight forwarders and credit agencies into a single online platform, where players are vetted before admission. Barclays Bank and Wave claimed to have accomplished the first blockchain based trade finance transaction in September 2016, reducing a procedure that usually takes seven to ten days to complete to a few hours.[21]

The advantages seem obvious in that the use of blockchain technologies will save financial institutions considerable amounts of financial resources.[22]

8. Essentially, "we can imagine a world in which contracts are embedded in digital code and stored in transparent, shared databases, where they are protected from deletion, tampering, and revision."[23] While it is currently possible that a stock transaction can take place in seconds, the "settlement—the ownership transfer of the stock—can take as long as a week. That's because the parties have no access to each other's ledgers and can't automatically verify that the assets are in fact owned and can be transferred."[24]

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[21] *See* Press Release, Barclays, Barclays and Wave Complete World First Blockchain Trade Finance Transaction (Sept. 7, 2016), https://newsroom. barclays.com/r/3396/barclays_and_wave_complete_world_first_blockchain_trade.

[22] *See* Andrew Meola, *How Banks and Financial Institutions are Implementing Blockchain Technology*, BUS. INSIDER (Sept. 20, 2017), https://www.business insider.com/blockchain-technology-banking-finance-2017-9 (reporting that Banco Santander has estimated the saving in costs of around 20 billion USD per year to the whole banking industry).

[23] Marco Iansiti & Karim R. Lakhani, *The Truth About Blockchain*, HARV. BUS. REV., Jan.–Feb. 2017, https://hbr.org/2017/01/the-truth-about-blockchain.

[24] Iansiti & Lakhani, *supra* note 23.

With smart contract solutions based on blockchain technology, this verification becomes virtually instantaneous, with the addition that third parties, such as banks and financial institutions, cannot intervene and "cannot decide not to perform it."[25] Payment of mortgages and performance of bank demand guarantees are only two examples that come to mind where the use of smart contracts and blockchain technology can reach. Completion and recording of private securities transactions is another example, along with public securities, and debt offerings.

9. Smart contracts are complex computer protocols or codes intertwined in a string (chain) which provides self-execution of a fraction or the whole terms of a contract. In a way, a smart contract is a self-executed contract. Being a part of the blockchain technology, smart contracts will simply dispense with any intermediary, thus reducing transaction costs considerably. Any given transaction can be made on a mobile phone to another device.

10. The questions that follows are if and subsequently how can arbitration be "imbedded" in the blockchain technology and, thus, in the smart contracts that are reaching the banking and financing industry? The answers are already provided.

Datarella, a Munich based big data and blockchain solution provider, claims to have conducted the first mock arbitration under its proprietary platform CodeLegit, a software that aims to "bridge the gap between technology and law by auditing the compliance of software code."[26] Grounded in the premise that "no code is bug-free" and "no contract is non-performance free," CodeLegit contains an "arbitration library" that enables parties to agree upon the arbitration rules and remits the dispute to an expert decision maker (or decision maker with the assistance of experts in the area), while pausing the performance of the contract in case a bug or a non-performance is found in the blockchain.[27] The particular language of the arbitration agreement contained in the "arbitration library" may be found alongside the

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[25] Arthur Piper, *Blockchain and Smart Contracts*, 71 I.B.A. GLOBAL INSIGHT 13, 15 (Aug. 2017).

[26] *See* CodeLegit website: http://codelegit.com/.

[27]*See Arbitration Library in Smart Contracts is a Must-Have*, (May 27, 2018), http://codelegit.com/2017/06/02/arbitration-library-in-smart-contracts-is-a-must-have/.

general contractual terms and conditions that govern any given transaction or smart contract which, in turn, are also attached to the blockchain. In other words, the blockchain transaction will contain the general terms, conditions applicable to such transactions, and will include an agreement to arbitrate any dispute that may arise.

The "arbitration library" works according to the following diagram[28] (the piece of software code is written at the appropriate location in a block of the chain):
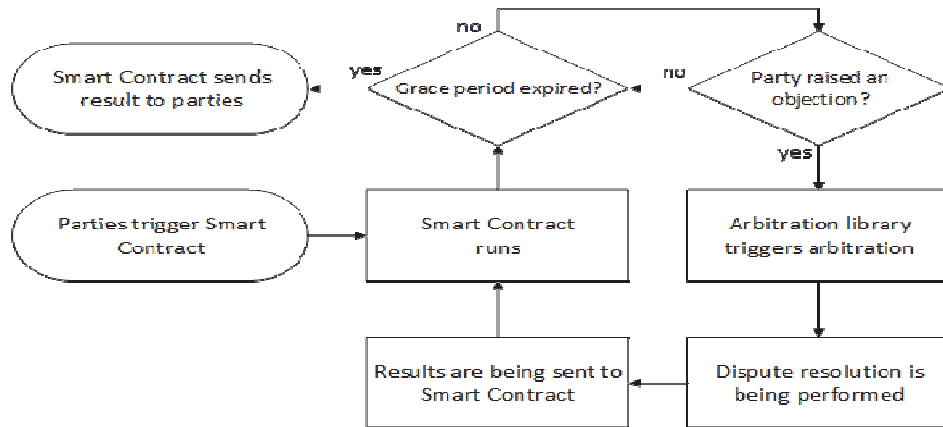

Thus, in the event of a non-performance, or of a bug in the smart contract, the "arbitration library" is triggered and will pause, resume, modify, or terminate a smart contract through direct contact with human decision makers with the appropriate expertise. In the mock arbitration conducted by Datarella, the parties had agreed in a smart contract to apply UNCITRAL Arbitration Rules, and the code used a simulated appointing authority. All the communication was done by email and other electronic means, assuring the security via hashes written in the public blockchain. The following diagram[29] illustrates the mock case:

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[28] With the kind permission of Datarella – CodeLegit, Copyright 2017.

[29] With the kind permission of Datarella – CodeLegit, Copyright 2017.

Arbitral Proceeding using CodeLegit Arbitration Library and Blockchain Arbitration Rules
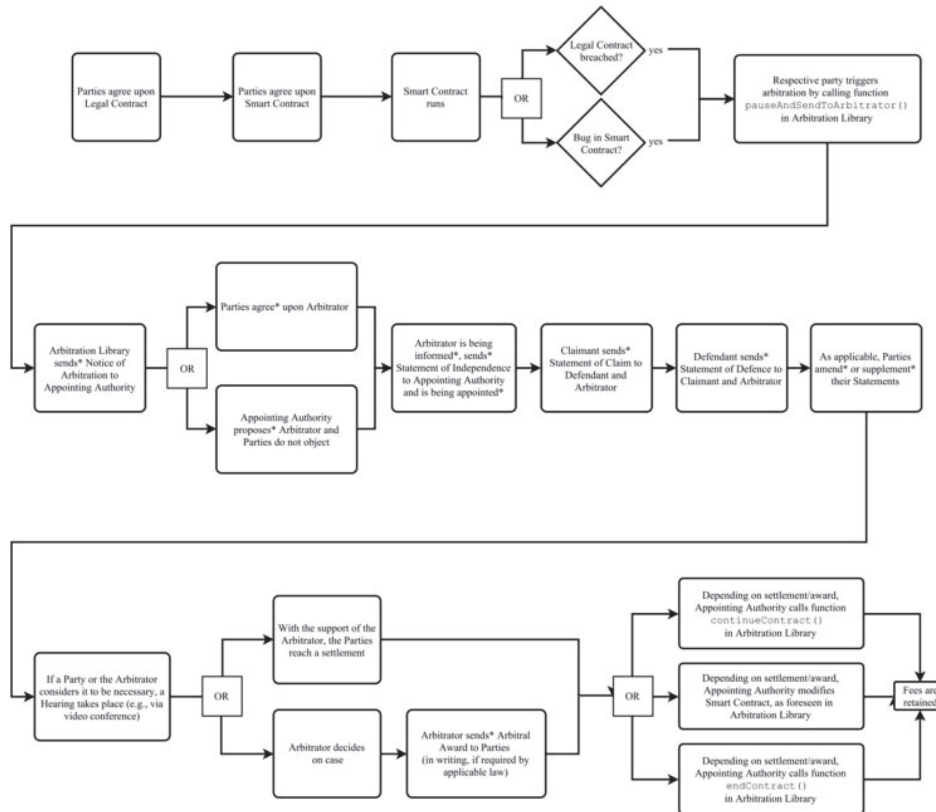
* All communication is carried out by means chosen by the Parties. In order to secure the communication, it is hashed and the hash and a timestamp are stored on the public Bitcoin and Etherum Blockchains.

In this mock case, one of the parties considered the other to have breached the contract and paused its performance by triggering the "PauseAndSendToArbitrator" function. This function notified the appointing authority, which subsequently appointed an arbitrator. After reviewing the statements of claim and defence, the arbitrator rendered a final binding award that was subsequently conveyed to the parties in dispute. The result, as said, could have been the resuming, modification, or termination of the contract, with the arbitrator being paid with funds available in the smart contract.[30]

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[30] *See* Datarella, *World's First Smart Contract-Based Arbitration Proceedings Conducted*, http://www.trustnodes.com/2017/07/17/worlds-first-smart-con tract-based-arbitration-proceedings-conducted.

11. The mock case illustrated above seems to elicit the potential of using arbitration in blockchain technologies, including smart contracts, and how the banking and financial industry may benefit from it.

Let us take the case of a bank demand guarantee. Upon a demand guarantee, the issuer (bank) must pay the beneficiary (creditor of the underlying legal relationship) the demanded amount on "first demand," should the primary obligor fail to perform the contract. The obligation of the issuer is independent of the underlying legal relationship, and any dispute between the primary parties (beneficiary and obligor) may not be invoked by the issuer to deny the payment of the amount covered by the guarantee. The issuer must pay according to the terms of the guarantee and is not entitled to discuss the merits of the underlying relationship. However, many jurisdictions, in principle, admit that the issuer may refuse the payment in the case of a guarantee demanded in fraud or otherwise wrongfully. On the other hand, in the aftermath of the 2008 financial crisis, many banks questioned the payment of demand guarantees to their holders. Therefore, raising uncertainty to the transactions backed by those guarantees, to the credibility of those banking institutions, and to the banking system. Although most times banks have collateralised counter-guarantees (like third-party bank demand guarantees, mortgages, or bank deposits), banks opt to discuss the merits of the payment, the legitimacy of the transaction, and the solvability of the obligor. These situations make a case for the use of blockchain and of its arbitration mechanism altogether.

The payment and the settlement of the demand guarantee may be processed via a blockchain-based smart contract: once the default, breach or otherwise non-compliance with the terms of the underlying contractual relationship is triggered, the system will perform a payment of the demand guarantee. The obligor may then have the option to trigger a "fraud" or "wrongful" act block so that a "PauseAndSendToArbitrator" function is executed. Similar processes may exist for other banking and financial transactions, such as documented credit, trade finance, stock transactions, and even payments. Again, the potential is enormous, but, certainly, there are legal hurdles and challenges to the use of arbitration in blockchain based transactions. These

hurdles and challenges, at the same time, may prove that the use of arbitration in blockchain and smart contracts is the best solution to resolve disputes.

12.   First and foremost, blockchain-based contracts may virtually (and will certainly) "travel" across the globe and get in contact with numerous jurisdictions. We may say that once a hash is added to the chain, a new consent is required and subsequently is produced, and this can happen in various jurisdictions at multiple times. However, this will create concerns related to the applicable law which will have to deal with different issues. Issues of consent and formality are also involved. Consequences of default, misrepresentation, mistake, and duress, and changes in the law are other examples of the humps one may find. Finally, issues related to the enforcement of the award—under the New York Convention—may also arise, especially if a "digital" or otherwise "binary" decision is made in the blockchain.

13. Indeed, if a contract is the product of the human will or equated to a human will, such as with the consent of legal entities, is there a binding contract in blockchain based contracts? Further, and to put it differently, who are the parties in a smart contract if often the real parties hide themselves behind an alias? Can we know who they are and if they are capable of entering into a contract?

The consequences of errors in the coding, and discrepancies between the code and the "human language" versions, may also be questioned. This may happen in many places and under many different legal approaches. On the other hand, how will issues such as repudiatory breach, mistake, misrepresentation, duress and the like will be dealt with?

At the same time, smart and other blockchain-based contracts may pose questions on the confidentiality of the source code or otherwise protected proprietary information. Therefore, disputes related to them do require a deep level of expertise and sophistication of the decision maker in dealing with highly technical issues. These requisites, coupled with the need of in-depth knowledge of financial and banking matters, make it difficult to leave unclear the choice of the dispute resolution mechanism.

14. By the very same token, arbitration can be the best dispute resolution mechanism to put in place in case of other blockchain-based solutions, such as digital currency that originates from initial coin offerings ("ICO"). Indeed,

> in order to attract investment, a company launching an ICO will provide certain information about its business, which may include an offering memorandum or prospectus, in some respects comparable to an offering circular issued by a company engaging in a rights or bond issue. Arbitration clauses could be the logical dispute resolution mechanism to include in such documents.[31]

The breach of the terms and conditions thereof, as well as the way the operations have been conducted, may give grounds to potential claims from investors against offerors.

On the other hand, and as it was sharply pointed out by Maynard and Chan,[32] an investment in blockchain-based currencies may be affected by State regulation and even banned by States (as it happened in China in September 2017). Therefore, there are situations that seem to be paving the way to claims under relevant international instruments for the protection of foreign investment and these instruments usually contain arbitration provisions.

15. The reasons for the parties to opt for arbitration need not be addressed in this article. Further, this work is not intended to address every possible hurdle one may find in the use of smart contracts and blockchain technology in financial and banking matters. However, one may not turn a blind eye on the evolution of technology and the impact it may produce in different industries, such as the finance and banking industry.

More particularly, one should always bear in mind that disputes involving blockchain-based solutions (whether crypto-

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[31] *See* Simon Maynard and Elizabeth Chan, *Decrypting Cryptocurrencies: Why Borderless Currencies May Benefit from Borderless Dispute Resolution*, KLUWER ARBITRATION BLOG (Nov. 2, 2017), http://arbitrationblog.kluwerarbitration.com/ 2017/11/02/decrypting-cryptocurrencies-borderless-currencies-may-benefit-borderless-dispute-resolution/.

[32] *Id.*

currencies, smart contracts or other distributed ledger technologies) are exposed to the global circulation of the uncountable transactions to which they support and give rise. Thus, complex issues of jurisdiction and forum will come across, which will be inexorably intertwined with the technical complexity of the subject matter of the dispute.

Therefore, it is almost self-evident that arbitration will bring the invaluable benefits of a mechanism that solves disputes with technical expertise by neutral experts. This mechanism accords the parties the choice of a proper reliable seat. Also, it produces a binding legal instrument capable of *traveling* (and hence be enforced) in 160 countries (at the time of writing). More importantly, in arbitration the proceedings can be tailor-made to fit the needs of the parties.

16. In this respect and at a broader level, it is worth mentioning the results of a survey conducted by the Silicon Valley Arbitration and Mediation Centre and its international arm, the Global Technology Dispute Resolution Council. This survey was conducted among "corporate counsel, law firm counsel, neutrals and users in the technology sector, representing wide expertise in technology business and law."[33] According to the GTDRC and SVAMC survey,

> cost is viewed as the top problem with litigation involving technology companies, with over 64% of the survey respondents listing it as one of the top three problems with litigation. Time to resolution ranked a close second at 57% and inexperienced and unqualified judges came in third at 46%. Legal fees for major technology company patent disputes range from $3M-$5M accordingly to the latest AIPLA study and major litigations typically take 3-5 years to reach a final judgment. Litigation results can be unpredictable when decided by judges and juries with limited technology industry and technology law expertise. Overly intrusive discovery practice, random jury verdicts

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[33] *See* Gary Benton, *Technology Dispute Resolution Survey Highlights US and International Arbitration Perceptions, Misperceptions and Opportunities*, KLUWER ARBITRATION BLOG (October 28, 2017), available at http://arbitrationblog. kluwerarbitration.com/2017/10/28/technology-dispute-resolution-survey-high lights-us-international-arbitration-perceptions-misperceptions-opportunities/.

and lack of an international enforcement mechanism were identified as top problems by over 20% of the survey respondents.[34]

Litigation is, therefore, viewed by technological companies as costly, time-consuming, handled by inexperienced decision-makers, subject to the unpredictability of jury trials, and to the intrusion of extensive and expensive discovery. Further, the final court decision may face unexpected hurdles when enforced in foreign jurisdictions.

Conversely and according to the survey, the most critical advantage of arbitration is the possibility to have an expert decide the dispute. This advantage was perceived by 76% of the respondents in the SVAMC / GTDRC survey, while 54% of the respondents said that the major advantage of arbitration is its costs when compared to litigation. Moreover, around 40% of the interviewees noted that the confidentiality that arbitration is capable of securing is the most important factor when compared to litigation in state courts, while the fourth position of the preferences (with 35% of answers) is for "streamlined and flexible proceedings."

17. Looking more particularly at the banking and finance industry, it suffices to say that the stakeholders and other players of this industry will have to face the question of when and how they should resort to arbitration (or other alternative mechanisms) to solve disputes existing in blockchain based transactions or related to the use of that technology. If that is the case, as it appears to be, then thoughtful consideration should be given on the following significant issues related to the use of arbitration in blockchain-based contracts.

18. Consent is one of the paramount requisites to an arbitration agreement's validity. Therefore, parties must cautiously avoid any possible challenges to it to securing an agreement's validity.

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[34] *See* the Report of the Global Technology Dispute Resolution Council and of the Silicon Valley Arbitration and Mediation Centre, available at https://svamc. org/wp-content/uploads/SVAMC-2017-Survey-Report.pdf, last accessed on 27 May 2018.

On the other hand, the formalities must also be diligently dealt with. In fact, under virtually every jurisdiction in the world, the validity of an arbitration agreement relies on the presence of a meeting of the minds in writing. Indeed, the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards of 1958 requires the existence of "… an arbitral clause in a contract or an arbitration agreement, signed by the parties or contained in an exchange of letters or telegrams."[35]

However, there are a comfortable number of jurisdictions where the arbitration law follows the pattern of the UNCITRAL Model Law on International Commercial Arbitration ("Model Law"). The "Model Law" provides that the "arbitration agreement shall be in writing,"[36] but considers also that

> the requirement that an arbitration agreement be in writing is met by an electronic communication if the information contained therein is accessible so as to be useable for subsequent reference; "electronic communication" means any communication that the parties make by means of data messages; "data message" means information generated, sent, received or stored by electronic, magnetic, optical or similar means, including, but not limited to, electronic data interchange (EDI), electronic mail, telegram, telex or telecopy.

Thus, it seems that the parties should choose a set of legal rules to apply to their agreement to arbitrate that adopted the "Model Law." Currently, 80 States and 111 jurisdictions adopted an arbitration law based on the "Model Law."[37]

The parties should opt for a seat that does not contain rules that could render a smart or otherwise blockchain based contract invalid or unenforceable. The same applies in regard to the law

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[35] Art. II (2) of the "New York Convention 1958."

[36] Art. 7(2) of the UNCITRAL Model Law on International Commercial Arbitration ("Model Law"), available at https://www.uncitral.org/pdf/english/texts/arbitration/ml-arb/07-86998_Ebook.pdf, (last visited May 27, 2018).

[37] A list of jurisdictions adopting a law based on the "Model Law" http://www.uncitral.org/uncitral/en/uncitral_texts/arbitration/1985Model_arbitration_status.html, (last visited May 27, 2018).

applicable to the merits of the dispute, that is, to the contents or effects of the contract itself).

Furthermore, the parties should be savvy enough to provide that the arbitrators should have a set of qualifications or otherwise pick an arbitral institution that has a pool of qualified arbitrators, familiar with technology and financial/banking matters.

Finally, care should also be given to the confidentiality of the proceedings (to protect proprietary information) and to the adoption of an arbitration mechanism that can meet the expectation of the parties regarding the time and costs associated, and of the flexibility of the proceedings. Regarding the use of flexible and time-saved proceedings, the parties may think about using a set of rules (or otherwise provide in their arbitration clauses) that allow either expedited procedures or summary dispositions of the case. To some extent, these considerations are reflected in the preferences perceived by users of arbitration in the tech sector.