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INDEX

ARTICLES

Le don pur et parfait 2
François-Régis Mahieu

La philosophie au secours des rapports de responsabilité sociale de l'entreprise, ou comment dépasser les limites d'un discours «aphilosophique» sur la responsabilité : Deuxième Partie – Responsabilité et relations moi- autrui 10
Michel Dion

The Fed as a moral enterprise – a framework for decision-making 38
John D. Feldmann

Grey relational grades and neural networks : empirical evidence on vice funds 69
John Francis Diaz & Thanh Tung Nguyen

La pobreza en México : evolución reciente, explicación y perspectivas 89
María Teresa Herrera-Nebel & Miguel Ángel Carreño

Blockchain technology and corporate governance: the issue of smart contracts – current perspectives and evolving concerns 111
Akram Almatarneh

Blockchain Technology and Corporate Governance: The Issue of Smart Contracts — Current Perspectives and Evolving Concerns

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ABSTRACT

Traditional contracts are being replaced in an increasing number of instances by smart contracts that is, "decentralized agreements built in computer code and stored on a blockchain", which are able to automatically execute the terms within the contract and control the relations between parties so that no further "explicit but redundant" negotiations are needed. This paper assesses current and evolving concerns regarding the adoption of blockchain technology in the areas of financial services, and corporate and public governance. The author evaluates the risks and benefits of the utilization of smart contracts and assesses their suitability (in terms of transparency, accountability, responsibility and fairness) for use in the public services' "space". It concludes that while the benefits outweigh the disadvantages, great care should be exercised in terms of design and use because this is still a developing area in terms of both the technology itself and the regulatory environment.
Keywords: Smart Contracts; Blockchain; Corporate Governance; Financial & Public Services

RESUME

Les contrats traditionnels sont remplacés dans un nombre croissant de cas par des contrats intelligents, c'est-à-dire «des accords décentralisés construits en code informatique et stockés sur une blockchain», qui sont capables d'exécuter automatiquement les termes du contrat et de contrôler les relations entre les parties afin qu'aucune autre négociation «explicite mais redondante» ne soit nécessaire. Cet article évalue les préoccupations actuelles et leurs évolutions concernant l'adoption de la technologie blockchain dans les domaines des services financiers et de la gouvernance d'entreprise et publique. L'auteur évalue les risques et les avantages de l'utilisation de contrats intelligents et évalue leur aptitude (en termes de transparence, de responsabilité, d'équité) à une utilisation dans «l'espace» des services publics. Il conclut que même si les avantages l'emportent sur les inconvénients, une grande prudence doit être exercée en termes de conception et d'utilisation, car il s'agit toujours d'un domaine en développement en termes à la fois de technologie et d'environnement réglementaire. Mots-clés: Smart Contracts; Blockchain; Gouvernance d'entreprise; Services financiers et publics

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1. INTRODUCTION

Traditional contracts are looking like they will soon be a thing of the past, as they are being replaced by smart contracts, i.e. "decentralized agreements built in computer code and stored on a blockchain", which are able to automatically execute the terms within the contract and control the relations between parties so that no further "explicit but redundant" negotiations are needed (Sklaroff, 2017).

A contract, simply defined, is generally a formal written agreement enforceable by law (although verbal agreements can exist). A feature of traditional contracts is the thousands of pages of paper printed and squandered when such contracts are read and the fine details sifted through to find any loopholes and the document further amended (perhaps several times) and then earlier versions and excess hard copies discarded. Conversely, a smart contract has multiple definitions, depending on whether it is being described from a computing language point of view or a business one. One such former definition is that "smart contracts are decentralized agreements built in computer code and stored on a blockchain" (Sklaroff, 2017). In simple terms, smart contracts are like normal contracts, except that they are computerized and they automatically execute the terms within the contract and control the relations between parties, so no further 'explicit but redundant' negotiations are needed (Sklaroff, 2017).

This paper attempts to assess the current and evolving concerns regarding blockchain technology in the area of corporate governance. Blockchain technology proposes to create value by the creation, verification, validation, and secure storage of business transactions and activities, both within and between institutions (Hsieh *et al*., 2018).

The author evaluates the risks and benefits of the utilization of smart contracts and assesses their suitability (in terms of transparency, accountability, responsibility, and fairness) for use in the public services' "space". The author concludes that while the benefits outweigh the disadvantages, great care should be exercised in terms of design and use because this is still a developing area in terms of both the technology itself and the regulatory environment.

In this paper, the author examines the different uses of blockchain technology in the business world with a special focus on smart contracts in financial services and public governance. Firstly, this paper provides a general discussion on the nature of blockchain and a historical perspective of its development. Secondly, this paper evaluates the risks and benefits of utilizing blockchain technology for the provision of public services. Finally, this paper assesses the suitability of this technology for ensuring the main objectives of corporate governance, with those being transparency, accountability, responsibility, and fairness.

2. THE NATURE OF BLOCKCHAIN

To truly understand how smart contracts work, we must first establish an understanding of "blockchains" as they are a vital component of smart contracts. A blockchain is a "distributed database of organized economical [sic] transactions" (Tulsidas, 2018) and/or all vital information in the digital world. They allow all the parties involved in the transaction to see what is going on, by "providing a decentralized database, or digital ledger"

(Subassandran, 2018). Many considered blockchain to be the "technological backbone of cryptocurrency, but now [it] has started to have a significance of its own" (Savelyev, 2017).

A blockchain is essentially a decentralized peer-to-peer (P2P) mechanism or operation consisting of a permanent, distributed, digital ledger, resistant to tampering and carried out collectively by all the nodes of the system. Computers on the network ("the nodes") use cryptographic algorithms and smart contracts to confirm the transactions that are then written into blocks, and chains of such blocks form a ledger. When transactions occur, records of ownership of such as assets and their values are permanently entered in ledgers and there are as many identical ledgers as the number of related nodes (OECD, 2018).

As an irreversible and tamper-proof public records repository for documents, contracts, properties, and assets, the blockchain can be used to embed information and instructions with a wide range of applications. These include, for instance, smart contracts, namely automatized, self-executing actions in the agreements between two or multiple parties; and multi-signature transactions, which require the consent of multiple parties for their execution and smart properties, namely, the digital ownership of tangible and intangible assets embedded in the blockchain, which can be tracked or exchanged on the blockchain itself. In these cases, the advantage of the blockchain consists of removing the need for a trusted third-party, such as a notary, instead enforcing the execution of instructions by a cryptographic code, with protection of participants against risks of fraud. It also offers a significant reduction in management overheads. Because of the remarkable advantages related to automation, transparency, accountability and cost-effectiveness, the blockchain may represent a disruptive innovation for a variety of contracts and business activities (Atzori, 2015). This "immutability" feature of blockchains is what makes them strong and an alternative to traditional centralized databases. In theory, there is no need for an authorized intermediary to confirm the transactions and hence there is no need for a central database or repository of transactions and records. This mechanism results in a decentralized and distributed database of ledgers with a continually growing record of transactions.

There is a common term that is used in blockchain, "proof of work", which essentially explains that everything that happens within the network i.e. a chain of data/computers must be approved by the majority before it can be accounted for and recorded. Ethereum is a direct example of how blockchains are used, and their adoption was mainly due to their "immutable nature" (Subassandran, 2018).

Blockchains are not only used in the cryptocurrency world, as in bitcoin, but are also a vital component of smart contracts, especially since they help "multiple parties that do not know or trust each other to maintain consensus as to the state of and changes made to shared databases" (Ream *et al*., 2016). This is extremely important as it helps keep a record of the data in the smart contracts and because they automatically apply the terms and conditions set out by the multiple parties to the contract.

3. How do Smart Contracts Operate and How are They Used?

Blockchain can serve as an efficient platform on which new applications such as smart contracts can be developed. A smart contract is basically a software program designed to execute certain tasks if certain conditions are met. The program code comprises the

initiation, verification, execution, and enforcement of the terms and conditions of a contract involving two or more parties. The code itself and all its executions in chronological order are recorded in the blockchain using the same consensus and security mechanisms as in other transactions (Nakamoto, 2008). In theory, if a code of law or any regulation can be embedded as a smart contract in a blockchain, then breaking the law is tantamount to breaking the code. In other words, the only way to infringe the law is to "crack" the computer code. This is potentially a very powerful tool not only to automate contractual transactions but also to automate legal supervision and enforcement (OECD, 2018).

GoFundMe is an example of a third-party company that allows an individual to start a fund campaign that other supporters pay towards, through the third-party. These transactions are characterized by a target amount and a date by which that target is to be reached. The third-party that is added into the transaction is entrusted with it and held accountable by the other parties. Firstly, both donor and recipient involved in the transaction need to trust GoFundMe to handle and allocate their money according to the donor's and recipient's instructions. If the campaign is properly funded and its funding target reached, the individual/team expects to get the money from the third-party company and the supporters expect their money to go to the team's campaign. If the campaign does not meet its goal, the supporters expect the third-party company, that has been entrusted with holding the donor funds in the interim, to reimburse the money that they gave (Berezuev, 2017). Only when the target is met, do funds flow from GoFundMe to the final recipient person/team account.

The scenario (or example) above is quite simple to understand and the system easy for donors and recipients to use, but it requires trust and compliance on the part of all involved. A smart contract operating in that space would essentially do the same thing but eliminates the need for a third-party completely. Since a smart contract is digital, it can be programmed to hold the funds from the supporting parties until the goal of the individual/team is met. The supporters transfer their money directly via the smart contract and if the campaign is fully funded or subscribed, i.e. the target is reached, the money directly gets transferred to the individual or team; if it is not fully funded, the donor parties are reimbursed in full.

One mode of creating smart contracts is through a platform (operating system) called Ethereum. The company creates the blocks we use in a blockchain to essentially produce the smart contract. It offers a simple interface allowing anyone to create a smart contract, which is produced in the Ethereum Virtual Machine (EVM). The work of this virtual machine is to separate the investors and the company, along providing consequences in the contract for either the release or withdrawal of money.

Considering that smart contracts are run digitally, the transactions within the smart contract are all done automatically, using a blockchain. It does this according to the terms agreed upon within the smart contract itself. This holds two important properties: firstly, that it is "immutable", meaning that once a smart contract is created and agreed upon, it cannot be changed, so that nobody can actually find loopholes or change/disagree with the contract itself; and secondly, it is "distributed", meaning that everything has to be validated by everyone within the network for decisions to be made. These blockchains are used to "run resilient, tamper-resistant, and autonomous smart contract code… [and support] a new generation of digital contracts that are rigid, modular, dynamic and… less ambiguous than agreements written in traditional legal prose" (Filippi, 2018).

Companies grow within legal rules and procedures created by the government. With blockchains, a company can use code to apply its own rules and procedures while ensuring that it acts within the law. It is possible to represent or tokenize an ownership interest in a corporation or other legal entity and rely on smart contracts to manage economic rights, such as the distribution of dividends or the allocation of profits and losses (Filippi, 2018). These distributions can be easily and automatically implemented because of social contracts and not by any accountant trying to regulate payments relevant to these distributions, or even, it has been claimed, by legislation.

The implementation of smart contracts in the business sector has allowed for unconventional new practices for furthering the success of a business. Some have succeeded and others failed, and far more are in the process of development.

Case Example One

AXA is a French-based global insurance company and provides a case study for its attempted (but ultimately unsuccessful) adoption of blockchain technology in one of its insurance products. AXA utilized smart contracts to insure clients against flight delays and automatically compensated them when their flight was delayed by more than two hours (AXA news release, AXA goes blockchain with fizzy, 13 September 2017). Launched in 2017, fizzy initially operated on a limited basis in Europe (France and Italy), but AXA anticipated that the system would spread to cover airlines throughout Europe and to Asia. Under the smart contract system (launched in 2017), eligibility for indemnification was automatically evaluated due to carefully built-in parameters, so there was no paperwork or fallible, personal decisions to be made by individual staff (AXA, 2017). As Laurent Benichou (AXA R&D director) commented in 2018, "it's not the insurer, it's the smart contract on the blockchain' that determined eligibility (Al-Saqqaf, 2018). AXA recorded payment of premiums on its 'fizzy' platform, which utilized Ethereum blockchain (described by AXA as 'a tamperproof network', the use of which made the contract similarly tamperproof: AXA, 2017). When a client's flight was delayed, the client had the choice of either rescheduling their flight or taking advantage of the opportunity offered to request a refund. In the latter case, the client's money was returned straight to their credit card. In this situation, the delayed flight triggered the smart contract, alerted the client of their choice, whether for a rescheduled flight or compensation (PolySwarm, 2018). The speed and ease of the transaction offered advantages over the traditional insurance model, which could require many phone calls and/or forms to be completed and submitted and deters some from applying. For many companies, decreased costs is the prime motivation. In the case of AXA, initially the company knew it would have to bear some slight additional costs as fewer passengers are deterred by the paperwork than otherwise would have been the case, but the company hoped that the automaticity and speed of compensation to all eligible passengers would build trust in the insurer and in the longer term generate additional business and customer loyalty due to the much improved customer experience. Unfortunately, the company found that by late 2019 it could no longer support the model as, despite its innovative nature and advantages, it struggled to meet business projections. The public did not embrace the product to the degree anticipated, and it was finally discontinued in November 2019. Elliot Hill noted: 'Many experts have claimed that the insurance industry lends itself well to blockchain disruption. However, many may now question the relevance

of blockchain for insurance purposes if a company as well-funded as AXA can't make decentralized solutions work" (Hill, 2019). From this company's experience, it can be seen that the target market might need to be educated about the nature of the product, and the advantages it offers customers so that product acceptance and uptake is sufficient to justify company outlays and contribute to greater profitability.

Case Example Two

A second example of the adoption of a type of blockchain technology is US-based Propy (Propy 2019) but the founder later described the decade to 2020 as "real estate's decade of digital dystopia" (Karayaneva, 2020), possibly due to a poorer than anticipated uptake or delays in uptake (as it was only in June 2019, that Propy was one of two startups selected for use by the NAR in contractual negotiations and transactions (Tucker, 2019)), as well as problems that arose (such as digital misbehavior, where scams and cyberfraud had continued to grow in a digitized space) or obstacles encountered in synching with regulators. This a real estate transaction management software platform that utilizes an ERC-20 smart contract which records data on an Ethereum blockchain for offers of purchase, payment and deed registration. It allows, for example, individuals to reserve properties that they are interested in, by paying a small "reservation fee". If the seller of the property decides not to sell the property to the buyer, then the reservation fee will be refunded directly to the potential buyer. Smart contacts benefit the buyer as well as the seller, whether the property is sold or not. If the seller does come to an agreement with the seller, the smart contract will go through initiating the terms of the contract (PolySwarm, 2018). Propy also offers to use cryptocurrencies for transactions. However, while Propy claims it simplifies and facilitates US domestic and international real estate transactions and can be configured to suit the requirements of buyers and sellers and government regulations, and it nevertheless admits that it is still 'working on' having its registry recognized as proof of ownership by several governments, and persons 'cannot make changes to government records based on what's recorded on Propy's blockchain registry' (Propy, undated). This is a serious limitation. It is also a common one that continues to exist in any jurisdiction where the legislative framework has not 'caught up' with the technological advances made possible by the adoption of blockchain technology in real estate transactions and limits its further acceptance and development.

The technology is on the cusp of gaining serious traction in the field of Australian real estate (not just registration and conveyancing where it is now entrenched). In late 2019, the Real Estate Institute of Queensland and Brisbane-based technology startup Igloo announced an agreement to develop a blockchain-based tenancy agreement platform (Facility Management, 2019). The platform will involve smart contracts to let property and automated payments systems, with additional information regarding length of tenancy, time vacant etc. also stored, making available greater detail and offering greater transparency than is currently possible and in real time rather than with lengthy delays in collating data statewide. Blockchain technology as shared, tamperproof, peer-to-peer ledgers are claimed to provide an irrefutable and immutable source of [transaction] truth for all parties. In several Australian states, however, electronic conveyancing and property registration are becoming a reality after some years in the planning. Mandated adoption (supported by appropriate

legislation) has secured the future of the technology in various states where it has been introduced.

In Australia, blockchain technology was first considered in 2016 for adoption in share market operations (for records and transactions) by stock transfer and registrar company Computershare and British financial technology startup SETL (Kelly, 2016) Australia was viewed as the trial run for the system which was to use SETL's blockchain to record asset ownership and automate title transfer. However, in 2017, the ASX (Australian Stock Exchange) announced a decision to replace its Clearing House Electronic Sub-register System (CHESS) with Digital Asset Holdings LLC's distributed ledger technology (DLT). In December 2019, the ASX announced work was continuing on the implementation of the DLT system (consultation on design and principles) and transition from CHESS to a DLT system project was progressing, and industry and market engagement underway (ASX, 2020). Extensive technical development and consultation with users should increase its acceptability to clients. The ASX intends to apply blockchain to its registry, settlement and clearing systems in 2021 (Partz, 2019).

Another area where the use of blockchain technology is being attempted is event ticketing, an area rife with fraud especially in ticket resale. Ticket sales (both initial and resale) are today largely conducted online via computer or mobile sales rather than in person attendance at a box-office. Sale of fraudulent tickets have caused problems for reputable companies as trusting consumers buy tickets on-line from fraudulent operators or 'scammers', only to find when approaching a venue that their tickets are bogus, or that they replicate the tickets already sold to others. This leads to confusion and discontent among theatre goers or those attempting to attend other events. An early adopter is this area, primarily to reduce fraud and improve the ticketing experience, is the Shubert Organization in the USA. In October 2019, Boston-based startup True Tickets (which utilizes an IBM-based blockchain mobile ticketing service) announced a pilot operation to commence in 2020 that will involve at least part of the Shubert Ticketing division's operations, including its Telecharge and Broadway Inbound ticketing. Blockparty, a NY-based startup, also uses blockchain technology for concert and event ticketing (Zara, 2019).

There are many business sectors that smart contracts can be applied to, namely, government (property registry, voting, digital identity, etc.), media, healthcare, agriculture, manufacturing, supply chain management, and energy. However, the most positive application of smart contracts includes the financial segment of the business world. Smart contracts can be used in various segments of the financial sector, for example, in investments, insurance (as above), loans, and trading stocks, as well as real estate (also above). Different segments will use a different type of smart contract that is programmed specifically for their needs. In the case of stocks, where there are two parties, the buyer and a company, a smart contract can be created with the terms and conditions of the contract stating that the buyer has to pay a specific fee to obtain the stocks, and in return the company has to pay a certain dividend per stock to the buyer within a certain period of time.

4. POTENTIAL BENEFITS AND COSTS OF SMART CONTRACTS

Along with being immutable and distributive, smart contracts also have a level of certainty for both parties as it reduces human error and can verify the total amounts that need to be

given to all individuals. Moreover, due to smart contracts being computerized, the speed with which all the transactions take place is much faster than that of transactions conducted by the paper-based contracts that are used today. The contracts that are currently used, are extremely costly and can take an excruciating amount of time and effort, and negotiations to finalize. With smart contracts, the cost to create, implement, distribute, and utilize them is much less than that of current paper-based contracts. They also take less time and effort, and provide a sense of security due to their digital nature, the fact that all parties have a copy, and the difficulty in hacking or finding loopholes within them. Smart contracts also offer an opportunity for lawyers to move away from traditional work to a modern style of legal work that "frees lawyers to do more creative, high-value work" (Kennedy, 2018).

Another way in which smart contracts can beneficially be used is in the mortgaging process. Financial institutions could potentially save a substantial amount of money by digitizing mortgages and utilizing smart contract technology to create and execute mortgage contracts. In this way, the entire process could be made much more efficient through automation and shared digital access to the required legal documents, such as title deeds and land registry records. These savings could then be passed onto the consumer who would benefit from better interest rates on their mortgages (Lielacher, 2017).

In many ways, smart contracts are seen to be very positive and good, but they do also have their drawbacks, especially when they are used for entire legal agreements. Some of these negatives can include that "they are less private than today's written agreements, code [of a smart contract] is not publicly disclosed and explained in human-readable language… [and moreover] its autonomous and disintermediated nature… can support or facilitate criminal activity" (Filippi, 2018). Furthermore, "if the code is not written precisely to the intention of the parties or simply correctly in programming language, the system will not execute as intended in the first place" (Tulsidas, 2018). While eliminating much human activity (and costs), their dependability still depends on accurate human design and input, while their use depends on their acceptability to all parties involved if use is not mandated.

In a volatile market, prices and companies are everchanging, the static nature of a smart contract could pose a threat to many organizations that use them, as such contracts may be unable to accommodate particular unforeseen specific changes. Hence, their lack of flexibility could prove to be a disadvantage. Although it was previously mentioned that third parties like GoFundMe are no longer needed, this is not entirely true because there will be a new market for IT firms and lawyers to create smart contracts and advise clients on their use.

The other challenge that smart contracts face is contractual secrecy. As smart contracts are visible to all parties involved in a transaction, the issue of confidentiality (especially related to pricing) would be a problem. This, however, could be addressed by implemented cryptographic structures that only allow certain parties to access certain information (Lielacher, 2017).

5. REGULATORY LANDSCAPE

In regard to the adoption of blockchain technologies, changes in regulation and legislation may be required. In this space (as in many others), technological advance can outstrip legislation and regulation. For example, in the adoption of blockchain in digital

conveyancing, changes were required in different states to legislation governing related activities, such as electronic land transactions, acceptability of digital signatures or none at all, and land registry instruments and supporting documents (see, for example, the *Conveyancing (Legislation) Amendment Act 2018* (NSW Office of the Registrar General of NSW, 2018)). Property settlements in Victoria have been digitized and lodged online since October 2018, Western Australia since December 2018) and NSW since July 2019 (Butkovich, 2018). Each government saw advantages in moving from paper records to digital records of transactions and registration. Each had to amend existing legislation to facilitate the transfer, and such lodgment became compulsory (some electronic conveyancing, NECS and PEXA, had been available as early as 2013: Rosier, 2013). A new owner might like to see the signatures of past owners, the stamps previously affixed etc., but this is not now possible.

A potential problem with all blockchain technology is that, despite claims to the contrary, while it is immutable, its record is only as perfect as the data inputted — or as is commonly observed 'garbage in, garbage out'. In conveyancing, misspellings and simple errors in paper documents that could hold up property transfer (as many as one in five according to one Australian real estate institute) and other transactions were supposed to be eliminated by digitization. Instead, a misspelling can be perpetuated and multiplied, rather than corrected at the outset. Any error can only be corrected by adding another blockchain, approved by all parties. At least one major law firm has noted that the removal of highly trained personnel from the loop who previously served vital functions may result in regulatory compliance errors, while there are also questions related to privacy issues, the knowledge of an affected party of a need for correction and obtaining a correction, among other issues in permissioning (limited permitted access) and permissionless (public access) blockchains (Deloitte, 2019). The same firm also points out that some blockchain participants are pseudonymous, and the author reflects that this surely reduces apparent transparency and trust.

The regulatory landscape is changing, and with it so must the actions of designers of blockchain contracts. Data protection and safety and privacy concerns are areas of specific concern. One platform CEO praise regulatory progress (such as the passage of the *California Consumer Privacy 2018*) and she and others noted the need for business to company with the European Union's General Data Protection Regulation (Karaneva, 2020; Nadeau, 2019). Although business is conducted across international boundaries, legislation differs from one jurisdiction to another. In a simple example, e-signatures have been broadly adopted in the US real estate industry via the National Association of Realtors (NAR) in the US, but Dubai and Japan have not approved their use (Karanaeva, 2020). Blockchain (smart) contracts promise simplicity, immutability, lower costs, data protection, security, but their acceptability varies with the area of proposed uptake, risk profiles, and human greed (desire to hack and defraud).

Also, while smart contracts try to protect their clients as much as possible, they pose in themselves a variety of legal challenges. They face the issue of misinterpretation as the buyer may not comprehend the contents of the contract, as was observed by the man widely acknowledged as the creator of Bitcoin and perhaps the smart contract (otherwise attributed to the pseudonymous Satoshi Nakamoto), Nick Szabo. According to Szabo, "They are just a

combination of codes" (Trüeb, 2017). Furthermore, the customer can claim that they were deceived by the organization and so they can file a legal motion challenging the validity of the contract. Another legal issue is that, with the creation of smart contracts, if there were to be an issue with a certain block in the chain, in a court of law, the matter of 'who is to blame' presents itself. A further problem resides in the privacy of smart contracts. Although, by definition, it is public, certain information and facts and evidence may be held back from the public thereby allowing for incomplete evidence being presented for the case.

Since the technology is still in the early stages of development, there is also a lack of a generally accepted terminology and standards for blockchain. Despite this, some jurisdictions have started to enact new laws and regulations. For example, Russia has announced a regulatory framework for Initial Coin Offerings (ICOs), and France allows crowdfunding records to be kept on blockchain ledgers. Several states in the USA have enacted state laws on smart contracts, blockchain-based digital signatures, and legal admissibility of blockchain ledgers as evidence. Since the technology is still evolving, there is a risk that new legislation may prove inadequate and necessitate amendment. Moreover, regulating a business without adequate comprehension of its true nature is often possible only via complex and hence costly regulation, which in turn becomes a barrier to entry for innovative start-ups. Finally, without a common global interpretation of the terms utilized in a new technology and its operation, independent local or national regulation may also cause legal confusion (OECD, 2018).

Considering the shortcomings of the above positions, some jurisdictions have concluded that it is both premature to bring in new regulation, but also risky to just 'wait and see'. They have chosen to provide regulatory guidance for how new technologies fit into existing legal frameworks and to provide 'sandboxing' opportunities for new models. 'Sandboxing' means a providing a legally safe environment (often through some regulatory exemptions) for blockchain developers to test their products. Products are implemented on a controlled scale for a limited period of time and under close supervision. This approach is expected to be mutually beneficial for developers, he government and the public. In 2016, the FCA in the UK started to permit FinTech 'sandboxes', including blockchains, in the market. Canada and Australia have also announced similar sandboxing initiatives. Singapore, Switzerland, and Luxembourg have followed suit. In 2017, the European Commission issued a statement recognizing sandboxing in FinTech services as an acceptable regulatory tool (OECD, 2018).

6. CONCLUDING REMARKS

Overall, smart contracts can be said to have overwhelming benefits compared to the disadvantages that they may cause. Ethically, there may only be a few issues regarding the subject. The biggest concern or challenge with regards to smart contracts would be misunderstanding or misinterpreting the computer-based language used. Moreover, the absence of government intervention and regulation in this area creates non-arbitrary movement in the business world which leaves it to the parties involved in a matter to create their own laws or rules regarding that matter. Another major ethical implication would be that having smart contracts would put third-party companies out of business and, therefore, there would be job losses. Nevertheless, "The main challenges with the use of smart contracts tend to be more technical than legal" (Mik, 2017). Lastly, in the business world,

having smart contracts would resolve many of the issues including money and time constraints that are currently problems with regards to businesses. Although there may be a few ethical concerns, "proponents [still] imagine a future where commerce takes place exclusively using smart contracts, avoiding the high cost of contract drafting, judicial intervention, opportunistic behavior, and the inherent ambiguities of written language" (Sklaroff, 2017). On the other hand, what must be understood is that smart contracts are still in the developmental stage and due to their only recently gained popularity among businesses, they could still take a few years to become the preferred mode for legal contracts and agreements. Their formulation would need to take into consideration any legal implications involved in the terms and operation of the contract, possible limited transferability of the contract to different clients without amendment, and again, formulation of the operation of the contract must comply with the demands of the relevant legislative and regulatory environment so as to preempt any later challenge.

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