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Theme:

**“INTO THE RABBIT HOLE OF BLOCKCHAIN: LEGAL ISSUES SURROUNDING
INTERNET 2.0 REVOLUTION”**

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FOREWORD

It gives me immense pleasure to write the foreword for the fourth edition of the RGNUL Student Research Review (RSRR). I would like to take the opportunity to appreciate the efforts made by the students of RGNUL in the form of an Editorial Board for the successful completion of this edition. RSRR has inspired the young and innovative students to undertake legal research and articulate it in a comprehensible form. In the course of running the Review, the editors have not only learnt editing skills but also managerial and organizational skills.

The support of our peer-reviewers who are the leading academicians of this country, practicing advocates and other legal luminaries has been invaluable to us and I humbly thank them for the time they took out to review the articles that were submitted for consideration. I would like to take this opportunity to thank our contributors for their excellent work. I also convey my deep regards to EBC Publishers for agreeing to publish the journal for wider circulation of the excellent work undertaken through this academic endeavor.

The authors in have very succinctly dealt with the issue of Blockchain and its effects and implications on legal and financial industry. Furthermore, the contributors have provided articles on a wide spectrum of topics, discussing the need for regulation of Bitcoin in India and the legality of Smart Contracts

We would appreciate any further improvements in the journal as may be suggested by the contributors.

Prof (Dr.) Anand Pawar
Faculty Editor

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EMERGING FROM THE RABBIT HOLE: THE FUTURE OF THE LEGAL INDUSTRY

Mr. SEAH Ern Xu & Mr. ONG Shaw Shiuan¹

ABSTRACT

This article assesses the impact blockchain technology can have on the legal industry. Two possible approaches are explored. The first approach is a top-down approach where a government regulator adopts blockchain technology, giving rise to industry-wide effects. The top-down approach will be examined in the context of land registries, and the effects of blockchain technology on real estate litigation and the conveyancing practice will be discussed. Specifically, the blockchain solution employed in Sweden's land registry will be used as a case-study in this article. The second approach is a bottom-up approach, where individual law firms apply blockchain technology to their work. The bottom-up approach will be examined in the context of smart contracts, and the effects on firm structure and firm operations will be discussed. Specifically, the role of lawyers of the future will be highlighted.

INTRODUCTION

“For almost 200 years, our own business has been built on the basis that people need to transact but often lack the trust to rely on a handshake alone...While we have previously seen technology upend certain areas of our business, it is unprecedented for a technological development to cast such stark light on the future of the legal profession.”

– Allens, Client Report on Blockchain (2016)²

The opening quote is obtained from a client report prepared by Allens, one of the leading firms in Australia. It reflects the general pessimistic attitude held by the legal industry towards blockchain. Law firms all over the world are bracing for disruption and change. Beyond the confusing and challenging legal issues raised, blockchain also poses operational and structural “rabbit holes”. It is in this climate of concern that we examine the impact of blockchain on the future of legal practice.

We define blockchain as the following: a decentralized collection of data that is verified by members of a peer-to-peer network.³

The unit of a blockchain is a block, which is a software-generated container that bundles together hashes, which can represent any sort of information that the developer wishes to encode (e.g. credits/debits information). A block is verified by nodes, which are computers in a network, before being tacked onto previously verified blocks in the blockchain. Any information already contained in a verified block cannot be overwritten unless consensus is reached with the entire network to propagate the altered information.⁴

The following framework will be used to examine blockchain's impact:

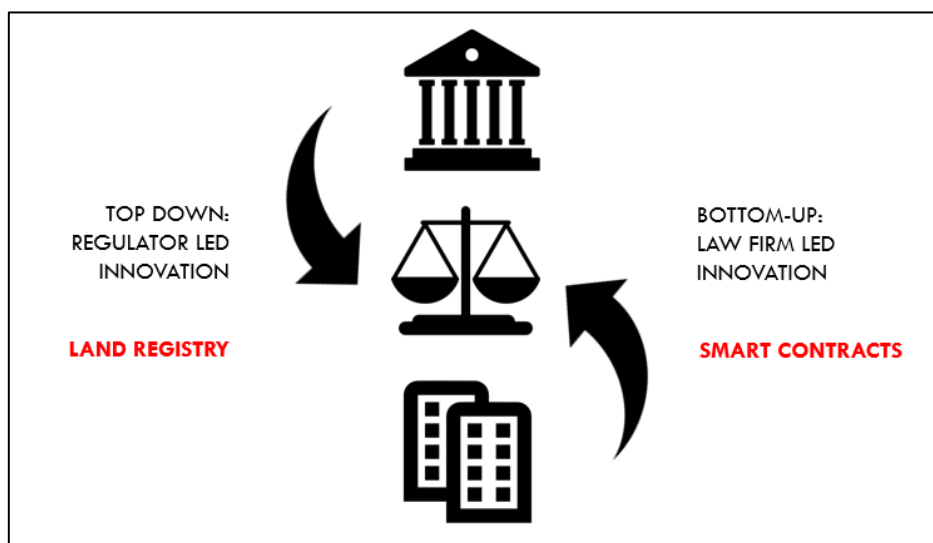
¹ 2nd Year Law students, National University of Singapore.

² Rebecca Campbell, *Blockchain & Smart Contracts Could Spell Doom for Corporate Law Firms*, *cryptocoinsnews* (20/06/2016), available at <https://www.cryptocoinsnews.com/lawyers-prepare-for-driverless-ma-as-smart-contract-era-dawns/>, last seen on 5/01/2017

³ R. Böhme & et al., *Bitcoin: Economics, Technology, and Governance* 29:2 *J. Econ. Perspectives* 213, 213 (2015)

⁴ M. Castillo, *Ethereum Executes Blockchain Hard Fork to Return DAO Funds*, *Coindesk* (20/07/2016), available at <https://www.coindesk.com/ethereum-executes-blockchain-hard-fork-return-dao-investor-funds/>, last seen on 5/12/2017

- Top-down approach: Examining blockchain innovation led by the *government regulator* in the context of land registries.
- Bottom-up approach: Examining blockchain innovation led by *law firms* in the area of smart contracts.



LAND REGISTRIES

1. Importance of secure property rights

Secure and well-defined property rights is a key ingredient that generations of economists have argued must exist for markets to function effectively. In more recent times, development economist Hernando de Soto explains that well-defined property rights are required for healthy economic growth and capital formation.⁵ Firstly, poorly-defined property rights weaken the incentives for property owners to make long-term capital investments. Secondly, it also impedes the ability of property owners to use their property as collateral to secure loans to finance investments. Without access to credit and with little incentive to invest, capital formation and economic growth will be hindered. Seen in this light, the land-titling system, through which property rights are secured, is a fundamental institutional structure of an economy.

Given the importance of the land-titling system, weakness in the system will be of concern. To improve their existing systems, various countries have considered integrating blockchain solutions into their land registries and Sweden has made the most progress in this respect. Last year, the Swedish land registry authority, the Lantmäteriet, spearheaded a project to test the possibilities of using blockchain as a technical solution for real estate transactions and mortgage deed processes (“Swedish Experiment”).⁶ The Lantmäteriet has since concluded their second testbed experiment and had published their findings in March 2017. This section examines the Swedish Experiment as a case-study, and considers the implications of such a blockchain solution on the legal industry.

2. Contextualising the Swedish case-study

Before delving into the methodology employed in the Swedish Experiment, the context which gave rise to the Swedish Experiment should first be discussed. Sweden’s blockchain solution was a response to two problems in their existing system:

⁵ Claudia R Williamson, *The Two Sides of de Soto: Property Rights, Land Titling, and Development*, Annual Proceedings of the Wealth and Well-Being of Nations, 95 (2011)

⁶Sweden, Lantmäteriet, *The Land Registry in the blockchain – testbed* (March 2017), available at https://chromaway.com/papers/Blockchain_Landregistry_Report_2017.pdf, last seen on 5/12/2017

- susceptibility to property fraud; and
- tedious process.

Firstly, with the existing system, the Lantmäteriet is only involved at the latter stages of a typical real estate transaction, such as a purchase of private property, when registration of title is required. The entire sale and purchase process prior to registration is conducted by the buyer and seller, their respective housing agents and their respective conveyancing lawyers. In a real estate transaction, the Lantmäteriet is the actor with the highest credibility. If the Lantmäteriet is only involved much later in the transaction, the confidence and transparency in the real estate transaction process is diminished. Furthermore, without the scrutiny of the Lantmäteriet in the early stages, the risk of property fraud is also higher.

Secondly, the existing process is time-consuming. It has been noted that the time between the signing of a legally binding purchasing contract, and when Lantmäteriet receives the bill of sale, and subsequently makes the approval of title, can stretch from three to six months.⁷ The time-sinks lie in the checking and verification processes carried out by different parties independently. For instance, the buyer's agent will need to check on the owner and the property several times throughout the transaction. Likewise, the bank will need to check the creditworthiness of the buyer and real estate information of the mortgaged property several times.⁸ Getting everyone to agree on every stage of a property transaction is a major feat of coordination.

3. Regulator-led Innovation: the Swedish Experiment

The Lantmäteriet's solution consists of seven key components.⁹ They are:

1. the blockchain;
2. file storage;
3. land registry;
4. application/contract engine;
5. user-interface;
6. identification; and
7. real world representation.

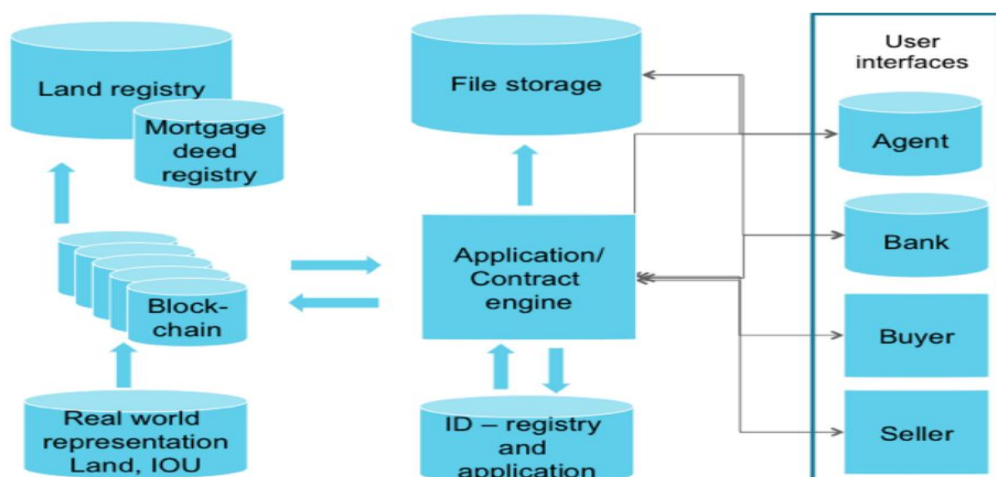
Below is a diagrammatic representation of the Lantmäteriet's blockchain solution.¹⁰

⁷ *Ibid*, at 15

⁸ *Ibid*, at 44

⁹ *Ibid*, at 59

¹⁰ *Ibid*, at 60



Blockchain

The Swedish Experiment employs a private blockchain checked by the Lantmäteriet and other parties (which can vary depending on the particular transaction). The blockchain operates on a permission basis and only trusted partners can validate transactions.

Encoded into the blockchain is a fingerprint algorithm, which can assign verification codes to digital files, such as digital copies of sales agreements. Each verification code is known as a cryptographic hash. The blockchain functions as a database for these numerous unique hashes.

The blockchain allows parties to verify the authenticity of key transactional documents. For example, in the case of a mortgage loan, a bank can run the fingerprint algorithm to obtain a corresponding verification code. If the hash obtained by the bank corresponds with the hash on the blockchain, the bank can be assured that the contract they have received is genuine.

It will be a misconception to think that the Lantmäteriet's experiment aims to digitally represent all packages of land so that they can be traded directly on the blockchain. That is incorrect. Rather, the aim is to represent the *process* by which property is transferred between parties. Hence, what the blockchain seeks to represent are the verification records of key transaction documents and signatures. To further clarify, the blockchain in the Swedish Experiment saves only the verification records of key documents and information such as the purchase contract and bill of sale. The original key documents are stored in file storage separate from the blockchain.

File storage

Since the blockchain only stores the verification codes, the original files will have to be stored separately. Where the original files are stored is entirely up to the end-users. Though, the Lantmäteriet maintains that it may be possible to store the full purchasing contract and bill of sale in the blockchain in the future.

Land registry

The existing land registry is a huge repository of information about the real estate, and can include obligations as well as rights for the property in relation to others, such as right to use water or roads of another property. The data contained in the land registry can be conceptualised as metadata – a set of data that describes and gives information about other data.

The Lantmäteriet keeps the existing land registry intact and separate from the blockchain. Hence, if the actors wish to retrieve the information in the existing land registry, they will still have to contact the

Lantmäteriet. Similarly, to update the existing land registry, any transactional data on the blockchain will be retrieved from the blockchain to the land registry.

Application/Contract engine

In a traditional database, the database is separate from the application layer. Similarly in blockchain, it is possible to separate the verification records from the application layer, the latter of which is referred to as an “embedded contract”. The addition of “embedded contracts” is the system of adding code and logic that are normally part of the application layer of an IT architecture, on top of the verification records contained in a blockchain.

However, the blockchain in the Lantmäteriet’s experiment does not contain an embedded contract. Instead, the entire contract-engine, runs as a middleware on the end-user’s hardware. In other words, the contract-engine is the bridge linking the blockchain to the end-users.

User interface

The user interface allows three categories of end-users to access the contract-engine:

- the buyer and seller;
- professional users, such as banks, agents, and the Lantmäteriet; and
- contract administrators such as the Lantmäteriet and the architects of the contract-engine and the blockchain.

Identification and authorisation

The actors that will authorise the different steps in a real estate transaction process have to be identified. Hence, there must be an identification solution to ensure that the correct actor is indeed authorising the transaction, and not some other impersonator.

Real world representation

The verification codes contained in the blockchain need to be assigned to specific key documents, and this role of assigning codes is left to the Lantmäteriet. Since the key documents represent the identities of all the relevant actors and the transacted property, by assigning the verification codes to the corresponding documents, the Lantmäteriet ensures that the verification codes are authoritatively connected to the real world correspondents.

4. Impact assessment of the Swedish Experiment

The blockchain solution adopted in the Swedish Experiment addresses the two problems flagged out earlier in Section (b).

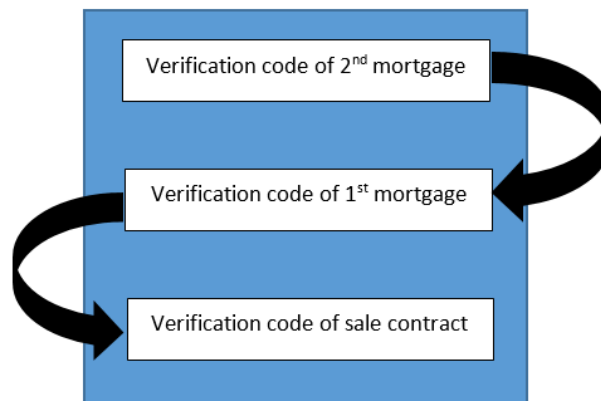
Reduces risk of property fraud

By recording the transactions on a blockchain administered by the land registry authority, the authority will be involved in the transaction from the get-go. This increases the level of trust in the transaction and lowers the possibility of property fraud.

Furthermore, blockchain technology possesses two unique qualities that help to reduce property fraud. Firstly, cryptographic hashes (which are the verification records) in the blockchain are impossible to replicate. In this sense, blockchain prevents the problem of double-spending. A digital unit, such as a bitcoin in a public ledger, cannot be spent twice to finance two separate transactions. A single digital unit in a block cannot be found to go towards separate ends; two separate blocks cannot receive inputs from the same source containing the digital unit. Blockchain further prevents double spending because it is not possible to create two identical digital units on a single blockchain since every hash is unique.

This quality is significant in the context of conveyancing because this means that a single property transaction cannot be fraudulently used to obtain two first mortgages. With blockchain, the sale contract is tagged to a particular verification code, say verification Code A. A first mortgage that is obtained later will have verification Code B. Because Code B is coded to be based off Code A, another bank would know, by looking at the blockchain, that the property had already been used as security for

a first mortgage. That bank will then know not to offer a first mortgage, but to offer a second mortgage.



Secondly, digital files cannot be manipulated easily. The blockchain makes it possible to ensure that a digital file, perhaps representing a sale contract, will remain the same as it was when it was first recorded on the blockchain. If a contract has been doctored, this alteration will be detected when the verification record generated by the fingerprint algorithm is different from that found in the blockchain.

Speeds up conveyancing process

The contract-engine allows for automation of tasks. For instance, upon the signing of a sale agreement, this particular act can initiate an automation sequence encoded in the contract-engine. The encoded consequence will be the delivery of the relevant title documents to the interested parties, such as the conveyancing lawyers. Automation, made possible by the contract-engine, greatly reduces time spent on verification and checking by all interested parties.

Furthermore, because the contract-engine can also be programmed to be a common platform, which was the case in Sweden, the relevant actors can be placed on the same page from the get-go. This makes coordination between multi-parties simpler and less time-consuming. Lantmäteriet posits that the time between the drafting of the purchasing contract and the registration of the property can be reduced from approximately four months to just a few days.¹¹

5. Predicted impact on legal industry

Three effects to the legal practice are predicted:

1. reduced real estate litigation
2. reduced scope-of-work for conveyancing lawyers; and
3. shift from billable hours to flat fees.

Reduced real estate litigation

By reducing the risk of property fraud, the Swedish blockchain solution will also have the corollary effect of reducing real estate litigation. In India, for instance, property-related and land-related litigation make up about two thirds of all civil litigation in the country.¹² Recently, the Indian states of Andhra Pradesh and Telangana are looking to integrate blockchain with their land registration processes, and these blockchain solutions are expected to reduce litigation.

Furthermore, the possibility of programming triggers onto the smart contract (or a middleware contract-engine such as that employed in the Swedish Experiment) can help reduce litigation by

¹¹ *Ibid*, at 15

¹² Rina Chandran, *Indian states look to digitize land deals with blockchain*, Reuters (10/08/2017), available at <https://www.reuters.com/article/us-india-landrights-tech/indian-states-look-to-digitize-land-deals-with-blockchain-idUSKBN1AQ1T3>, last seen on 05/12/2017

preventing abortive and capricious behaviour. For instance, the smart contract can be programmed to automatically transfer the property on receipt of funds, which would automatically be recorded on the land registry. Triggers can be layered as well. For instance, the smart contract can provide for an additional option for a seller to abort the transaction, but doing so would automatically trigger a compensation payment to the buyer.¹³

Reduced scope-of-work

While it is unlikely that the Swedish blockchain solution will render the role of conveyancing lawyers otiose, the blockchain solution will significantly reduce their scope-of-work.

Currently, in a typical conveyancing process, the lawyer's scope-of-work includes the following:

- conducting title searches to ensure that the seller has good root of title;
- negotiation of contractual terms in the sales contracts; and
- registration of certificates of title upon completion of sale.

Since the contract-engine in the Swedish blockchain solution can automate the title-search and registration, the lawyer's scope-of-work will be reduced to the negotiation of contractual terms. This effectively means that the conveyancing lawyers have less to do. The scope of work will therefore be streamlined.

Consequently, clients may no longer find it justified to pay existing rates for a reduced scope-of-work, and rates may eventually be reduced.

Shift to flat fees

Given that the Swedish Framework can drastically shorten the conveyancing process, billing by billable hours will no longer be viable. Instead, a flat fee may be more appropriate. Law firms will be under pressure to diverge from the traditional model in favour of alternative billing models. Such a move will allow law firms to foster relationships and meet the needs of cost-conscious clients.

SMART CONTRACTS

Blockchain technology also allows for the development of smart contracts. A smart contract is a “set of promises, specified in digital form, including protocols within which the parties perform on these promises”. It is an agreement whose execution is automated.¹⁴

This section examines smart contracts which are embedded on a blockchain and considers the potential applications and challenges. It then envisions how law firms will engage in smart contract transactions and the type of operational and structural changes that might occur.

1. Firm-led Innovation

Smart contracts deployed on blockchain

From the outset, it should be established that smart contracts are not unique to blockchain. Many smart contracts already exist – vending machines that release drinks when conditions are met is one common example.

However, smart contracts embedded on to the blockchain are unique in two ways.

Firstly, blockchain-based smart contracts have prohibitive costs of revocation and modification. Any malicious act which is targeted at overriding the terms of the smart contract will involve high equipment and electricity costs.¹⁵

¹³ Dan Bindman, *Blockchain technology will be “game changer” in conveyancing*, legalfutures (26/04/2017), available at <https://www.legalfutures.co.uk/latest-news/blockchain-technology-will-be-game-changer-in-conveyancing>, last seen on 05/12/2017

¹⁴ C. Clack., *Smart Contract Templates: Foundations, Design Landscape and Research Directions*, arxiv (4/10/2016), available at <http://arxiv.org/pdf/1608.00771v2.pdf> [https://perma.cc/8Z5P-QRM9], last seen on 05/12/2017

Secondly, the state of facts relating to the contract are interpreted independently by disinterested and decentralised nodes. Unlike a vending machine, where the intermediary software and hardware are usually owned by the seller, the inputs and outputs of a blockchain-based smart contract are determined by a neutral blockchain.

Taken together, these qualities of a blockchain-based smart contract reduces counterparty risk, lowers monitoring costs and expands contracting opportunities.

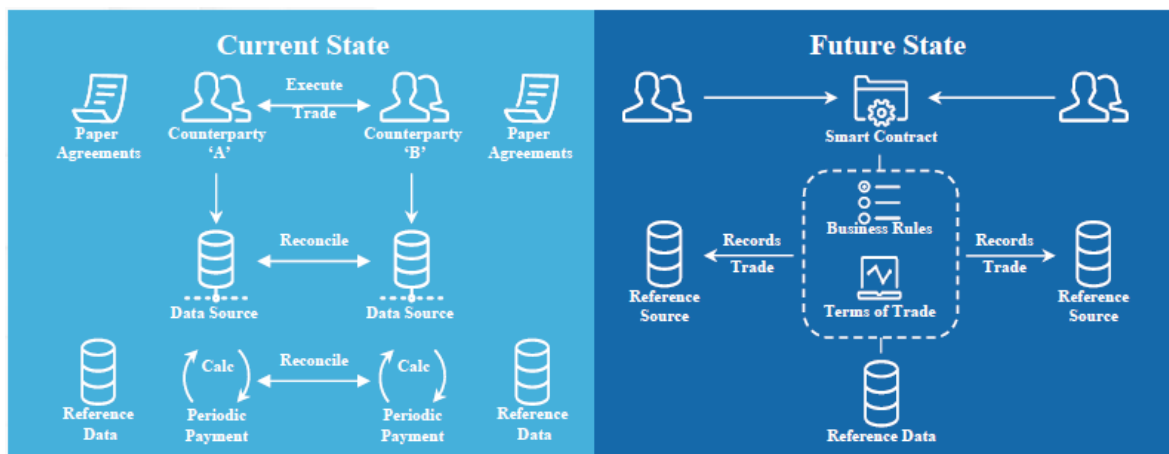
Potential Applications

To illustrate the potential advantages and application of smart contracts, two use cases will be briefly highlighted: (1) Derivatives & (2) Trade Finance. These are not exhaustive.

a. Derivatives

Blockchain-specific smart contracts are likely to be applied in the processing of over-the-counter (OTC) derivatives. Currently, for most OTC derivatives, the reconciliation process is managed independently by each contracting party and trade events such as periodic payments and triggered manually.

However, the current conditional obligations are highly suitable for a Smart Contract. A Smart Contract will allow for the automated execution of obligations and eliminates the duplicative verification processes undertaken by each contractual party. The use case diagram is reflected below:



Smart Contract Alliance (December 2016)¹⁶

A proof of concept for such smart contracts has been conducted. Last October, a consortium of firms (including J.P. Morgan, Thomson Reuters and Axoni) successfully completed a test of over-the-counter equity swap smart contracts.¹⁷ The group conducted over 100 test scenarios with a 100% success rate operationally. The tests also reflected improvements in efficiency and cost savings for mark-to-market calculations of positions and exposures under the transactions.

b. Trade Finance

¹⁵ G. Greenspan, *The Blockchain Immutability Myth*, MultiChain (4/05/2017) available at

<https://www.multichain.com/blog/2017/05/blockchain-immutability-myth/>, last seen on 05/12/2017

¹⁶ Smart Contracts Alliance, *Smart Contracts: 12 Use Cases for Business & Beyond*, Blockchain.com (10/12/2016) available at

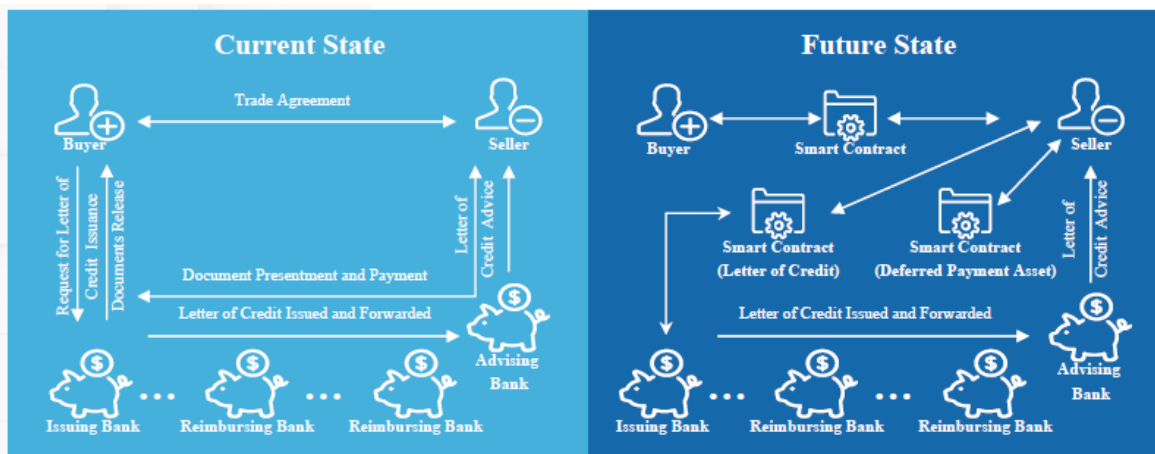
<http://www.the-blockchain.com/docs/Smart%20Contracts%20-%2012%20Use%20Cases%20for%20Business%20and%20Beyond%20-%20Chamber%20of%20Digital%20Commerce.pdf>, last seen on 05/12/2017

¹⁷ Axoni, *Axoni Completes Successful Nine-Firm Blockchain Implementation for Equity Swaps*, Axoni (18/10/2016) available at

<https://axoni.com/updates/axoni-completes-successful-nine-firm-blockchain-implementation-for-equity-swaps>, last seen on 05/12/2017

Blockchain-specific smart contracts can facilitate international transfers of goods by automating trade payment. Currently, within the context of a Letter of Credit (LOC), the issuance process can be time-consuming, costly and paper intensive.

A smart contract will streamline payment processes through the automated compliance and monitoring of LOC conditions by the decentralised network. This, in turn, will increase the liquidity of financial assets given the ease at which they can be transferred. The use case diagram is reflected below:



Smart Contract Alliance (December 2016)¹⁸

A proof of concept for a Trade Finance Blockchain-based platform has been tested by the Hong Kong Monetary Authority alongside a consortium of banks.¹⁹ The tests revealed that blockchain technology reduces the risk of fraudulent trade and duplicate financing.

Smart contracts and lawyers

In view of the potential applications of blockchain based smart contracts, there are some who believe that smart contracts will render lawyers irrelevant.²⁰ However, it is this paper's position that blockchain is unlikely to have such far-reaching effects for two reasons.

Firstly, there are many complex situations which cannot be programmed as a smart contract. As highlighted in the two use cases above, Blockchain-based smart contracts are more suitable for transactions based on conditional logic (e.g. payment mechanisms).²¹ This excludes descriptive clauses that are less amenable to self-execution (e.g. jurisdictional clauses). Given these limitations, smart contracts are likely to be complementary to traditional contracts.²²

Secondly, blockchain technology, while disruptive, will also create new opportunities for lawyers. For example, lawyers will have to grapple with the enforceability of blockchain-based smart contracts and its relationship with traditional contract doctrine. There will also be advisory work that will require legal inputs in the design of smart contracts for various fields of application.

Challenges facing blockchain-specific smart contracts

¹⁸ *Ibid*

¹⁹ P. Bhunia, *Hong Kong Monetary Authority develops Blockchain proof-of-concept for Trade Finance in partnership with industry*, OpenGov (11/04/2017) available at <http://opengovasia.com/articles/7476-hong-kong-monetary-authority-develops-blockchain-proof-of-concept-for-trade-finance-in-partnership-with-industry>, last seen on 05/12/2017

²⁰ Evan Weinberger, *Smart Contracts' Won't Eliminate Need For Lawyers*, LAW360 (6/05/2015) available at <http://www.law360.com/articles/637833/smart-contracts-won-t-eliminate-need-for-lawyers>, last seen on 05/12/2017

²¹ Linklaters, *Smart Contracts and Distributed Ledger- A Legal Perspective*, ISDA (August 2017) available at <https://www2.isda.org/attachment/OTU3MQ==/Smart%20Contracts%20and%20Distributed%20Ledger%20%20A%20Legal%20Perspective.pdf>, last seen on 05/12/2017

²² R. Howlett, *A Lawyer's Perspective: Can Smart Contracts Exist Outside the Legal Structure*, BITCOIN MAGAZINE (11/07/2016) available at <https://bitcoinmagazine.com/articles/a-lawyer-s-perspective-can-smartcontracts-exist-outside-the-legal-structure-1468263134>, last seen on 05/12/2017

The widespread adoption of smart contracts is contingent on developments in law, regulations and technology.

Firstly, the legal framework regarding smart contract must be determined. This includes issues of liability, jurisdiction and enforceability when there is a fall-out or design failure in the smart contract.²³

This is a pre-requisite for major players to fully engage the technology. Currently, there is little consensus on how blockchain contracts fit into the current legal framework. Clarity on the legal framework will require law firms, industry leaders and the regulators to work closely together.

Secondly, there will be regulatory challenges when adopting the technology. For instance, regulators will likely seek to implement industry-wide standards for smart contract templates and procedures for wider acceptability.²⁴ There have also been suggestions by regulators in Australia that smart contracts should be built with a “kill switch”, to stop their ability to self-execute in times of force majeure.²⁵ These are concerns that impede the mass adoption of technology.

Thirdly, the technology must meet the minimum standards of cybersecurity and data privacy. The smart contract, programmed by a fallible human, is susceptible to bugs. Recently, a hacker stole \$55 million of ether by exploiting a bug in the smart contract governing a Decentralized Autonomous Organization.²⁶ Furthermore, the terms of a smart contract, while triggered by a digital input, ultimately relate to an event in the physical world. There is a need to ensure that the digital verification of physical events is comprehensive and not easily tampered with.²⁷ Smart contracts cannot be fully operationalized until the quality of the technology is assured.

However, given the present levels of interest, investment and testing, the current trajectory suggests that these issues will be fully addressed in the not too distant future. The challenges highlighted above are likely to be solved through the concerted efforts of law firms, industry leaders and regulators.

2. Prediction of impact on the legal industry

Likely strategies firms will adopt

This paper therefore posits that blockchain-based smart contracts will still be implemented over two general phases as shown below:

Phases	Firm Structure	Firm Operations
I: Advising on Smart Contracts	Forming Alliances	Blockchain Advisory Practice
II: Actualising Smart Contracts	Working with technology companies	Testing Smart Contracts and Drafting Smart Contracts

Advising on smart contracts

In the first phase, law firms will increase their technical understanding of blockchain technology.

²³ *Supra*, n 16, at 22

²⁴ *Ibid*

²⁵ James Eyers & Misa Han *Lawyers prepare for 'driverless M&A' as smart contract era dawns*, AFR (June 2016) available at <http://www.afr.com/technology/lawyers-prepare-for-driverless-ma-as-smart-contract-era-dawns-20160616-gpknyz> , last seen on 05/12/2017

²⁶ M. Leising, *The Ether Thief*, Bloomberg Markets (13/06/2017), available at <https://www.bloomberg.com/features/2017-the-ether-thief/>, last seen on 05/12/2017

²⁷ M. Gronbaek, *Blockchain 2.0, Smart Contracts and Challenges*, Bird & Bird (16/06/2016) available at <https://www.twobirds.com/en/news/articles/2016/uk/blockchain-2-0-smart-contracts-and-challenges>, last seen on 05/12/2017

In terms of *firm operations*, law firms will start advising on blockchain-related regulatory matters. This will be done through a blockchain-specific practice²⁸ or by expanding the scope of the current Fintech or Technology, Media and Telecommunications (TMT) practices.

In terms of *firm structure*, law firms will start to form formal alliances with other industry players. This will be similar to working groups developed abroad, such as the Enterprise Ethereum Alliance Legal Industry Working Group,²⁹ a consortium of ten law firms and four institutions, which ensures that blockchain-based technologies are compliant with the financial system.

The changes in this phase are largely low-cost and low-risk. They do not involve huge capital investments but require the acquisition of knowledge on the regulatory aspects of blockchain. However, at the same time, the changes are low-impact, in the sense that firms will not be directly involved in the development of blockchain technology. Law firms who adopt such measures will remain as service providers instead of market leaders in the deployment of smart contracts.

The majority of firms are likely to transit into this phase and remain there for a considerable time. These changes allow firms to appear technologically savvy externally to clients without undergoing momentous changes internally.

Actualizing Smart Contracts

In contrast, the second phase will be marked by active engagement by firms in the development of blockchain-based smart contracts.

In terms of *firm operations*, firms in this phase will start to develop close relationships with technology companies as a precursor to partnerships. This is evident in the United Kingdom, with some firms like Allen & Overy opening up technology incubators for legal tech start-ups.³⁰ These firms offer office space for the opportunity to interact with legal technology companies, and to build potential alliances.

Eventually, law firms will then work with technology companies to test prototype smart contracts. This is currently done by overseas firms such as Hogan Lovells and Frost Brown Todd.³¹ Such law firms marry their legal experience and expertise on transactions, with the technological capabilities of technology companies. Upon successful tests, these law firms and technology companies will start drafting smart contracts for clients.

For phase two to succeed, drastic changes to the law firm structure is needed. Most law firms, as they currently exist, do not have the deep technical knowledge to form successful partnerships with technology companies.

This will have an impact on *firm recruitment*. In phase two, law firms will be on the lookout for individuals who can act as a bridge between the legal experts and technological experts. These individuals can be developed internally or sourced externally.

In terms of internal development, law firms are likely to start grooming lawyers. This has been done by firms such as King & Wood Mallesons, which have begun to teach coding to junior lawyers.³²

²⁸ L. Shin, *As Bitcoin Technology makes inroads, one law firm launches multidisciplinary blockchain practice*, Forbes (9/09/2016) available at <https://www.forbes.com/sites/laurashin/2016/08/09/as-bitcoin-technology-makes-inroads-one-law-firm-launches-multidisciplinary-blockchain-practice/#7902406e2dab>, last seen on 05/12/2017

²⁹ Enterprise Ethereum Alliance, *Enterprise Ethereum Alliance Legal Industry Working Group Press Release*, Entethalliance (14/09/2017) available at <https://entethalliance.org/ethereum-enterprise-alliance-legal-industry-working-group-press-release/>, last seen on 05/12/2017

³⁰ T. Connelly, *Eight tech start-ups set to join Allen & Overy's hipster-esque 'Fuse' innovation hub*, Legal Cheek (25/09/2017) available at <https://www.legalcheek.com/2017/08/eight-tech-start-ups-set-to-join-allen-overys-hipster-esque-fuse-innovation-hub/>, last seen on 05/12/2017

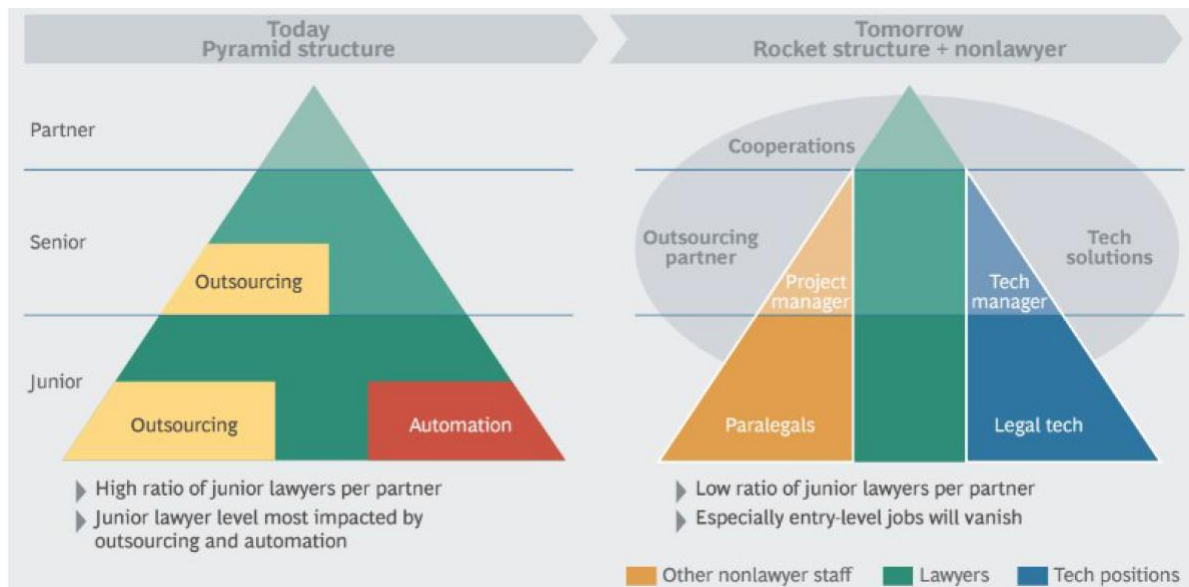
³¹ Frost Brown Todd, *Frost Brown Todd Creates Smart Contract App for Software Escrow Agreements*, Frost Brown Todd (22/05/2017), available at <http://www.frostbrowntodd.com/newsroom-press-frost-brown-todd-creates-smart-contract-app-for-software-escrow-agreements.html>, last seen on 05/12/2017

³² J. Eyers, *Blockchain 'smart contracts' to disrupt lawyers*, Financial Review (30/05/2016) available at <http://www.afr.com/technology/blockchain-smart-contracts-to-disrupt-lawyers-20160529-gp6f5e>, last seen on 05/12/2017

Candidates with some STEM backgrounds³³ will be attractive to such firms. Such internal development will likely require a lengthy incubation period.

In terms of sourcing externally, law firms can adopt alternative business structures, with cross-hires such as data scientists and technologists. For example, Wavelength.law is one such legal engineering firm in the United Kingdom which adopts a multidisciplinary approach to problem-solving. As noted by its Chief Executive Officer, Mr. Peter Lee, having diversity in academic backgrounds will guard against groupthink.³⁴ With the easing of regulation of alternative business structures, many law firms are likely to move towards sourcing externally.

Be it internal or external development, the common thread is that the law firm of the future is likely to be a mix of legal and technology professionals, as seen in the diagram below:



Source: <http://legal-tech-blog.de/from-pyramid-to-rocket-how-legal-technology-will-change-the-business-of-law>

The changes in this second phase involve high-cost and high-risk. It will require investments in technology and training, but it comes with the upside of becoming a market leader. Firms who move into this phase will be able to make a high-impact by differentiating themselves against their peers and increasing their marketability to clients. This is because such firms will not only be able to issue regulatory advisory advice but are likely to be able to provide the full range of services, including contract design and execution.

The future of the legal practice is likely to be changed by blockchain technology. Legal products are likely to be commoditized by blockchain and smart contracting technology. While this means that fewer lawyers are involved in the process chain of contract formation to performance, it also means that there will be new advisory roles for lawyers to play.

Contextualising to countries

The two phases highlighted above are likely to differ from jurisdiction to jurisdiction. In technologically-advanced legal markets such as the United States and the United Kingdom, such changes are likely to be implemented sooner, with most firms now shifting to the second phase. However, the implementation of smart contract solutions is likely to lag across Asia, where firms are more traditional and less technologically inclined.

³³ K. Silverberg, *Getting Smart: Contracts on the Blockchain Note*, Institute of International Finance (2016) available at www.iif.com/publication/research-note/getting-smartcontracts-blockchain, last seen on 05/12/2017

³⁴ Peter Lee, personal communication, 7 November 2017

The primary barrier to quick adoption is likely to be psychological rather than technical. Although lawyers recognize the value proposition of technology, partners at firms list “competing priorities, lack of time and resource and the lack of a strong business case”³⁵ as barriers. Specifically, in Singapore, a recent survey conducted³⁶ confirms this, with 56% of lawyers surveyed noted that a shift in mindset is necessary to improve beyond the current level of digital adoption. This coupled with the pyramidal partnership structure create a stifling attitude towards innovation.³⁷

CONCLUSION

Having examined the applications of blockchain in land registries and smart contracts, there are three takeaways.

Firstly, the doomsayers are overly pessimistic. Blockchain will not wipe out the legal industry. While there may be disruptive effects, blockchain concurrently creates opportunities for lawyers and we see this in the case of smart contracts. Blockchain then, as a technological innovation, is akin to a “gale of creative destruction”³⁸ that incessantly destroys and incessantly creates.

Secondly, lawyers must be holistically aware of technological developments and cannot be myopically drawn into the blockchain’s hype. While this paper has focused primarily on the effects of blockchain, the reality is that the future of law is also affected by other complementary technologies like automation. We see this in the case of Sweden’s Experiment, where the impact on the legal industry is brought about by both the contract-engine and the blockchain.

Further, blockchain is but one technological solution out of many. For example, some technologists have recently put forth the view that Hashgraph³⁹ is better suited for the deployment of smart contracts than blockchain. Despite the uncertainty over the future of technology, there is certainty that the future of law will be irrevocably changed by technology.

Thirdly, lawyers of the future must proactively start to adapt and adjust in the present. The changes brought about by blockchain technology are not fast and immediate but rather gradual and steady. If lawyers choose to turn a blind eye to this reality, they will be no different from the frog swimming in a simmering pot, slowly being boiled alive.

In order to avoid becoming the figurative boiled frog, lawyers must start to prepare themselves for a different type of legal practice. One such way is for lawyers to increase their technical proficiency and understanding of technology. Individuals who do so will exist as “legal engineers”, a term coined by Richard Susskind.⁴⁰ In performing the role of a legal engineer, these lawyers will be able to interface between experts from law and experts from technology and act as a bridge.

In conclusion, while blockchain technology may appear to be a rabbit hole, it is not all doom and gloom. Blockchain technology, while bearing uncertainty, carries potential applications. If law firms successfully transit into the era of blockchain technology, they will emerge out of the rabbit hole as more savvy and efficient entities who are better able to serve their client’s needs.

³⁵ N. Alintissar, Law, *Disrupted: The impact of digital transformation on Singapore’s legal industry*, unpublished manuscript, 28 March 2017, 38

³⁶ *Ibid* at 40

³⁷ *Ibid* at 28

³⁸ W. Michael Cox & Richard Alm, *Creative Destruction*, The Concise Encyclopedia of Economics available at <http://www.econlib.org/library/Enc/CreativeDestruction.html>, last seen on 05/12/2017

³⁹ JP Buntinx, *Can Hashgraph Dethrone Blockchain as the Future Backbone of Consensus Algorithms?*, The Merkle (31/10/2017) available at <https://themerke.com/can-hashgraph-dethrone-blockchain-as-the-future-backbone-of-consensus-algorithms/>, last seen on 05/12/2017

⁴⁰ R. Susskind, *Tomorrow’s Lawyers: An Introduction to Your Future*, (1st ed, 2013)

BLOCKCHAIN BOOM & CORPORATE FINANCE REVOLUTION: A FUTURISTIC SOLUTION OR MERE SUPERSTITION?

Lakshana R⁴¹

ABSTRACT

Distributed ledger technology is widely touted as the next big innovation after the advent of the internet and the digital age. The system runs on a decentralised blockchain platform that is diametrically opposite to conventional centralised command engines. Blockchain systems provide unique advantages that may be realized across banking, finance, corporate, real estate, fashion and even Government sectors. This paper aims to study the scope of application of blockchain solutions in corporate finance systems. The paper will specifically focus on five capital raising avenues that are arguably mature enough and well-suited to benefit from the blockchain boom. They are post-trade plumbing in capital markets, electronic shareholder voting system, mining mutual fund units, peer-to-peer lending and online crowdfunding. The initial three systems relate to traditional capital market methods, whereas the latter two concern alternative finance. While discussing the scope for blockchain applications in these capital raising routes, the paper will analyse existing distributed ledger solutions implemented in foreign jurisdictions and understand the legal framework that exists with respect to the same. Following a discussion on the pertinent capital raising systems in India, the paper will delve into potential applications of blockchain technology in the Indian scenario and the legal ambiguities involved therein. Wherever relevant, the regulations that exist in foreign jurisdictions will be discussed to suggest legal changes in the Indian context. The paper will also deal with the disadvantages in implementing blockchain solutions, in order to provide a holistic picture of the scope for advancements in international financial markets through the implementation of distributed ledger technology.

INTRODUCTION

Corporate finance is witnessing great technological advancements through the integration of blockchain with capital markets and businesses. Traditional financing systems like banks and equity capital markets are experimenting with blockchain applications that are touted to have the potential to replace them. International legal and accounting firms are also wary of DLT (Distributed Ledger Technology) developments and they scramble to incorporate blockchain applications into their service offerings to better address client needs and market demands. Businesses and Governments around the world are jumping on the blockchain bandwagon. Dubai aims to become the blockchain capital of the world by

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2020⁴² while Sweden, Georgia and Ghana are employing blockchain applications to track land records.⁴³ Several Indian states such as Andhra Pradesh, Telangana and Maharashtra are undertaking pilot projects to identify blockchain solutions to e-governance hurdles.⁴⁴

However, there is looming disconcert owing to regulatory uncertainty. Governments are in the process of understanding the unique regulatory questions posed by this technology-enabled disintermediation software. The UK, Australia and Singapore, among other countries have created regulatory sandboxes to nurture blockchain innovations in a controlled ecosystem. The UK Financial Conduct Authority prescribes limitations on client risk exposure and provides certain legal compliance exemptions to fintech innovators.⁴⁵ This approach reduces legal ambiguity and adopts a test-and-learn method of rule-making.⁴⁶ From the innovator's perspective, the lowered thresholds of compliance helps concentrate focus on building fintech wonders and provide better access to investments. India needs a regulatory sandbox approach to develop laws that achieve synergy between new technology, investor protection and effective regulatory oversight.⁴⁷

The aim of this paper is to understand the immense potential that can be realised by introducing blockchain solutions to corporate financing avenues. The first part of the paper will provide a short note on DLT and the basic concepts behind the same. The second section will discuss a select few blockchain applications that are revolutionizing conventional capital markets. It will be followed by a discourse on the potential applications of blockchain in alternative finance, in the third section. With the help of five blockchain applications that augment existing corporate finance systems, the developing legal landscape in foreign jurisdictions will be discussed and the implications for India will be briefly visited. The paper will be concluded with a short note on the future of blockchain in corporate finance and capital markets.

PART I: BLOCKCHAIN BASICS

Blockchain is a decentralised highly secure peer-to-peer system that removes the need for trusted third parties and facilitates instant transactions.⁴⁸ The blockchain system functions as a distributed ledger that records timestamped transactions that may not be unilaterally altered. The process of recording transactions on the ledger is called mining.⁴⁹ The originally envisioned blockchain prototype requires all

⁴² Saqr Eriqat, Blockchain in Dubai: Smart cities from concept to reality, IBM BLOCKCHAIN BLOG, April 10, 2017. Available at <https://www.ibm.com/blogs/blockchain/2017/04/blockchain-in-dubai-smart-cities-from-concept-to-reality/>

⁴³ Will Blockchain revolutionise global real estate next?, THE HERALD, September 19, 2017.

⁴⁴ The Governments are employing blockchain solutions with the help of Broadridge and start-ups such as SimplyFi, Zebpay and Snapper Technologies. See Mugdha Variyar & Varshal Bansal, Blockchain tech is joining e-gov dots in AP, Telangana, ECONOMIC TIMES, June 27, 2017.

⁴⁵ Regulatory Sandbox, FCA PRESS RELEASE, April 11, 2015. Available at <https://www.fca.org.uk/firms/regulatory-sandbox>.

⁴⁶ Financial Conduct Authority provides update on regulatory sandbox, FCA PRESS RELEASE, June 15, 2017. Available at <https://www.fca.org.uk/news/press-releases/financial-conduct-authority-provides-update-regulatory-sandbox>.

⁴⁷ Samraat Basu, The future of crypto-financing in India, MINT, October 3, 2017.

⁴⁸ Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System, BITCOINORG (2008).

⁴⁹ Judd Bagley, What is Blockchain Technology? A Step-by-Step Guide For Beginners, BLOCKGEEKS, 2016.

transactions to be greenlighted by all nodes that form part of the distributed ledger. This ensures that hacking is nearly impossible and the system remains transparent. Complete transparency provided a solid basis for the reliability of the blockchain ledger that was not based on personal trust.

However, such a rigid method of authorisation leads to security concerns and cost and time inefficiencies in large-scale ledger facilitated transactions. Hence, the blockchain platform has been re-innovated to allow pre-identified nodes to approve transactions and retain control over alterations of the ledger. Similarly, several modified versions of the blockchain ledger exist in the market.⁵⁰ Ethereum is one such blockchain system and it supports smart contracts that have tremendous potential to revolutionize capital market transactions.

Smart contracts refer to ethereum applications that facilitate automatic performance of pre-negotiated contractual terms. This system removes the need for third-party intermediaries like lawyers and banks since the terms of the digital contract are coded in a distributed ledger that cannot be unilaterally altered. Agreements will self-execute once trigger events like deadlines are met as smart contracts incorporate algorithmic protocols that do not rely on a centralized commanding engine.

In brief, the key elements of a blockchain or DLT are fourfold:⁵¹

- (1) A distributed ledger that records time-stamped information;
- (2) A network of participants or nodes that can access the ledger and make alterations based on the specific configuration;
- (3) A consensus mechanism that is essentially a set of algorithms that nodes execute to approve the records on the ledger; and
- (4) Cryptography in order to secure storage and prevent hacking.

PART II: DLT IN CAPITAL MARKETS

Smart contract applications are currently being employed by fintech companies for issue of private securities on Nasdaq⁵² and Borsa Italiana⁵³. Several more bourses such as those in Chile and Japan et al are in the process of implementing blockchain solutions. The primary areas in capital markets where blockchain can be applied are:⁵⁴

- (1) Post-trade plumbing, which refers to clearing, settlement and custody of securities.
- (2) Regulatory transparency, which mainly entails periodic disclosures, provisions against insider trading and reporting and audit requirements; and

⁵⁰ Building on the Blockchain, *Nasdaq Blockchain Report*, March 2016.

⁵¹ *Evaluating DLT*, ASIC Information Sheet 219 (INFO 219), issued in March 2017. <http://asic.gov.au/regulatory-resources/digital-transformation/evaluating-distributed-ledger-technology/>

⁵² Nasdaq Linq Enables First-Ever Private Securities Issuance Documented With Blockchain Technology, *NASDAQ RELEASE*, December 30, 2015.

⁵³ *The London Stock Exchange owns the Italian Stock Exchange*. See Roger Aitken, IBM's Blockchain Securities Collaboration With LSE Heralds New Trading Opportunities, *FORBES* July 19, 2017.

⁵⁴ *Laura Shin*, Why Nasdaq Is Even More Optimistic About Blockchain Than It Was 3 Years Ago, *FORBES*, February 23, 2017.

(3) Issuer-investor relationship, which majorly involves contracting of terms and conditions, execution of the agreement and management of shareholding, collateral. Client onboarding KYC and AML

This section provides a brief discourse on the trailblazing blockchain solutions to mechanisms and processes in international financial markets and attempts to demonstrate their applicability to analogous systems operating in the Indian markets.

3. Post-Trade Plumbing

The advent of algorithmic trading led to the operation of stock exchanges in a computerized platform that had the capacity to support around 10,000 transactions per second. Post-transaction plumbing takes longer time periods and actual transfer of ownership and delivery is generally delayed by a day or two. This leads to business latencies since capital that could otherwise be utilized, is unnecessarily stuck in the T+3 process. Shorter time intervals would also minimise counterparty risks and reduce collateral requirements. However, the extended settlement intervals applicable today are not the result of mere technological limitations. It is a combination of factors ranging from market practices to regulatory requirements.⁵⁵ Hence, blockchain implementation may not necessarily reduce the time period to T+0 without regulatory overhaul. It is important to note that in a T+0 system, short-selling of securities may not be possible, thereby eliminating a major chunk of market liquidity that comes from such sophisticated trade.

i) United States

The Securities and Exchange Commission (SEC) recently replaced the T+3 formula and introduced a T+2 settlement system for shares, ETFs, municipal securities, specified mutual funds and certain limited partnerships that are listed.⁵⁶ The Treasury bill is the only security that can be settled in less than a day in the US.

ii) European Union:

Target 2 Securities (T2S) is a service for Central Securities Depository that provides a single IT platform for settlement of all national and cross-border securities transactions in the Europe in Central Bank money.⁵⁷ The integrated model provides faster and easier settlement of securities in Europe and even facilitates settlement of foreign securities at significantly shorter intervals. T2S is a remarkable development upon the diverse settlement mechanisms that previously existed across Europe. The advantages of a uniform pan-European settlement method spills over into financial markets across the world.

⁵⁵ Milos Dunj, Post-Trade Clearing & Settlement Processing Optimization: An Opportunity for Blockchain?, *May 3, 2016*. Available at <https://letstalkpayments.com/post-trade-clearing-settlement-processing-optimization-an-opportunity-for-blockchain/>

⁵⁶ Sarah Lynch, SEC shortens settlement cycle for securities trades, *REUTERS, March 22, 2017*.

⁵⁷ Hans Degryse, Mark Van Achter & Gunther Wuyts, Plumbing of Securities Markets: The Impact of Post-Trade Fees on Trading and Welfare, *SOCIAL SCIENCE RESEARCH NETWORK WORKING PAPER SERIES (October 2016)*.

iii) ***Australia***

Australia recently announced a collaboration with JP Morgan Chase to build a blockchain solution to digitise the Australian Stock Exchange (ASX's) share registry.⁵⁸ ASX may not implement a holistic blockchain system owing to the troubling transparency of the DLT. Market participants would not want rival traders and brokers to track their trading activities. Hence, major modifications to the DLT are required before ASX can employ a blockchain application. The aim is to allow peer-to-peer trade clearance and create sub-networks for individual transactions. For instance, a chain of brokers may be configured to record the time, nature and the number of transactions and the price of shares traded. The ASX should also create an overarching centralised digital platform, alterable only by Government authorities.

iv) ***India***

Indian capital markets have followed the T+2 rolling settlement mechanism from the financial year 2003-4.⁵⁹ SEBI is mulling over the idea of introducing T+5 hours rolling settlement for certain types of equities, in the near future.⁶⁰ The existing Indian financial market system is relatively advanced for a developing country at this stage of economic growth.⁶¹ Indian stock exchanges, depositories and clearing corporations have shown willingness to adapt to technological developments in the past. It would not be surprising if NSE and BSE announce plans to adopt blockchain solutions to post-trade plumbing, as seen in the case of ASX.

Technological disruption of post-trade processing in international capital markets would be welcome. Blockchain platforms could be employed as the base for financial transactions in fully dematerialised markets such as Singapore. However, owing to the linear nature of the blockchain ledger, the potential of blockchain applications to support large-scale data retrieval and analytics that exist in traditional capital markets remains unclear.⁶²

4. Electronic Shareholder Voting System

Nasdaq successfully tested a blockchain solution to improve existing proxy voting system for companies listed in the Tallin Stock Exchange of Estonia. The DLT application supports remote voting and delegation of voting power. Delegation happens through transfer of tokens representing ownership to one's preferred proxy. The system allows for the votes to be tracked. Hence, shareholders

⁵⁸ *Adrian Lee & KIHoon Hong*, How blockchain technology is about to transform sharemarket trading, *The Conversation-Australia*, February 4, 2016. Available at <https://theconversation.com/how-blockchain-technology-is-about-to-transform-sharemarket-trading-53807>

⁵⁹ T+2 rolling settlement-Cash Market- Risk Management, *SEBI Circular*, SEBI/MRD/SE/AT/47/03, December 30, 2003.

⁶⁰ *Badri Narayan*, How about T+3 hours settlement in stock market?, *BUSINESS LINE*, November 4, 2016.

⁶¹ *Pallavi Sethi*, Financial Innovation In Indian Capital Market, 2(11) *INT'L JINN R&D* (Nov. 2013).

⁶² *Christopher Tozzi*, To Conquer Financial Services, Blockchain Needs Scaling Solutions, *NASDAQ*, August 17, 2017.

have a way of ensuring that the proxy followed the instructions given, which is absent in the present system.⁶³

In India, Section 105 of the Companies Act 2013, allows proxies to vote on behalf of members. The instrument of proxy must be duly signed and written and the proxy would not have any right to speak in a shareholder's meeting. There is no recourse available to shareholders under the Companies Act in cases where the proxies do not vote in accordance with the instructions given. Electronic shareholder voting on a blockchain platform would allow shareholders to configure the instructions into the ledger and thereby avoid breaches by the proxy. NSE and BSE should consider providing such DLT services to listed companies.

5. Mining Mutual Fund Units

Nordic bank SEB and Nasdaq have announced a joint project to test a developed prototype for a mutual fund trading platform based on blockchain technology. The fund markets are seen by SEB and Nasdaq as ripe ground for a blockchain trial, because, in contrast to the equities market, which relies on a Central Securities Depository (CSD), the Swedish fund market lacks a central, primary point for registering holdings. The aim is to create a faster, simpler, more effective and reliable fund market that increases productivity, reduces manual work and the risk for errors. Using blockchain, the market can replace the costly processes that are normally used to ensure secure trading, including paper-driven processes and follow-up telephone calls.⁶⁴

In India, there is a centralized body that oversees the listing of mutual fund schemes. Reg 32 of SEBI (Mutual Funds) Regulations, 1996 mandates the registration of close-ended mutual fund schemes. A close-ended fund is one that has a predetermined maturity period and allows subscription only at the time of launch.⁶⁵ Investors can trade in the units of the scheme on the stock exchanges where the units are listed.⁶⁶ Some close-ended schemes also provide periodic repurchase at NAV related prices.⁶⁷ But it is mandatory for at least one of the two exit routes to be provided. Peer-to-peer verification and confirmation may not be possible in such a strictly monitored system. However, under the overarching regulations, it is possible to implement blockchain solutions for trading in mutual fund units during the transaction, determination and settlement stages.

⁶³ *Anna Irrera*, Nasdaq successfully completes blockchain test in Estonia, *REUTERS*, January 23, 2017.

⁶⁴ *Tom Turula*, Nasdaq and SEB are setting blockchain free on the Swedish mutual fund market, *BUSINESS INSIDER (NORDIC)*, October 2, 2017.

⁶⁵ *SEBI FAQs for investors*, Investments in Mutual Funds, May 2017

⁶⁶ Reg 37, *SEBI (Mutual Funds) Regulations, 1996*.

⁶⁷ Reg 33, *SEBI (Mutual Funds) Regulations, 1996*.

PART III: DLT IN ALTERNATIVE FINANCE

India's alternate lending sector is the third largest in the world and it provides capital access to numerous local fintech startups.⁶⁸ Alternative finance refers to capital raised using non-traditional instruments that may not be intermediated through conventional banking channels or capital markets.⁶⁹ The World Bank estimates that more than 20 crore small and medium-sized enterprises (MSMEs) in developing countries lack the ability to secure traditional bank loans owing to the informal nature of their businesses and their lack of collateral and credit history.⁷⁰ The post-recession caution of traditional banking systems against lending to MSMEs led to the creation of an alternative finance industry.⁷¹ Alternative financing activities range from equity and reward based crowdfunding to private placements and standard peer-to-peer lending.⁷² The broad spectrum of alternative financing activities are supported through shadow banking mechanisms that include cryptocurrencies and smart contracts built on blockchain platforms.

6. Online P2P Lending

Peer-to-peer (P2P) lending entities operated in a regulatory lacuna until RBI notified them as non-banking finance companies in September 2017. The RBI further issued Master Directions on October 4, 2017 to regulate peer-to-peer lending platforms,⁷³ incorporating several proposals from its 2016 consultation paper on P2P lending firms.⁷⁴

Faircent is an online P2P lending marketplace in India.⁷⁵ The lending process adopted by Faircent is threefold. After initial verification by the platform, the prospective borrowers and potential lenders are connected based on their specified requirements. Once the parties contract the terms of the loan, the escrow account of the lender is debited. Repayments are scheduled as EMIs credited to the lender's escrow account through the digital account of the borrower. The time duration of the transactions are extended due to the involvement of traditional banking intermediaries. Shifting to ethereum smart contracts would make the transactions quicker and more transparent and reliable.

⁶⁸ *Abhishek Kothari*, How India's online lending startups compare to their global counterparts, *VCCIRCLE*, 5 June, 2017. Available online at <https://www.vccircle.com/how-do-indian-lending-firms-compare-to-their-global-counterparts/>

⁶⁹ F.ALLEN, E. CARLETTI, J.QLAN & P.VALENZUELA, *HANDBOOK OF THE ECONOMICS OF FINANCE*, Chapter 11: Financial Intermediation, Markets, and Alternative Financial Sectors (2012).

⁷⁰ *Roger Crook*, How Asia Is Adapting To The Alternative Finance Revolution, *FORBES*, June 16, 2017. Available at <https://www.forbes.com/sites/outofasia/2017/06/16/how-asia-is-adapting-to-the-alternative-finance-revolution/#49593b263d21>

⁷¹ Small Business Lending in the United States 2013, U.S. *Small Business Administration*, Office of Advocacy, 2014. <https://www.sba.gov/advocacy/small-business-lending-united-states-2013>; See also *Rob Straathof*, 17 Bankable Facts about Alternative Finance in 2017, *MONEY HIGH STREET*, April 3, 2017.

⁷² P.Baek, L.Collins & B.Zhang, *Understanding Alternative Finance: The UK Alternative Finance Industry Report 2014* (Cambridge University & Nesta)

⁷³ *Non-Banking Financial Company – Peer to Peer Lending Platform (Reserve Bank) Directions*, 2017, RBI/DNBR/2017-18/57.

⁷⁴ Reserve Bank of India, *Consultation Paper on Peer to Peer Lending*, April 2016. Available at <https://rbidocs.rbi.org.in/rdocs/content/pdfs/CPERR280416.pdf>

⁷⁵ The official website of Faircent can be accessed here: <https://www.faircent.com/>

7. *Virtual Token Sales*

An initial coin offering (ICO) is a form of crowdfunding that allows companies to raise capital online through issue of tokens created using a blockchain platform.⁷⁶ For instance, Kik is a major teenage online chat app that is currently in the process of issuing cryptocurrency coins to its users for performing transactions on the application, thereby upgrading its payment systems to the blockchain.⁷⁷

v) *United States*

The SEC recognizes the legality of token sales funded through digital and fiat currencies.⁷⁸ The ICO shall fall under the ambit of Federal Securities laws⁷⁹ only if the token sale qualifies as offering, buying, selling or performing an activity involving 'securities' as defined under S.2(1) of the Securities Act, 1933. Once SEC determines that an ICO token qualifies as a 'security', SEC registration becomes mandatory and extensive reporting obligations under the Securities Exchange Act, 1934 come into play.

vi) *Australia*

Based on the circumstance of the ICO, it may only be subject to the general law and the Australian consumer laws regarding the offer of services or products. In certain cases, the ICO may fall within the ambit of the Corporations Act. Information sheet 225 provides guidance on the classification of ICOs based on the attributes of the offerings regardless of whether ICO is hosted in Australia or abroad.⁸⁰

vii) *India*

India's first ICO was kickstarted on October 1st, 2017 to fund social service activities and the tokens are termed as 'indicoins'.⁸¹ However, Indians have invested in numerous ICO across jurisdictions. BitcoinGrowthFund's recent successful ICO to retail investors saw 50% retail investment coming from India.⁸²

A sector in the Indian alternative finance market where blockchain could be applied is online marketplaces for trading in private securities. The biggest digital platforms soliciting investments with promises of high returns are GREX Alternative Investments Market (GREX), LetsVenture, Termsheet, Equity Crest and Tracxn.⁸³ Electronic crowdfunding platforms charge listing fees, fund raising commission (circa 2-6% of funds raised) and in some cases, seek 0.5-1% equity in companies for whom

⁷⁶ Charlie Morris, Bitcoin is not a fraud – it's dotcom 3.0, *MONEYWEEK*, September 22, 2017.

⁷⁷ Robert Hackett, Cryptocurrency Gets Its Biggest Test Yet, *FORTUNE MAGAZINE*, July 21, 2017.

⁷⁸ Investor Bulletin: Initial Coin Offerings, *US Securities and Exchange Commission*, July 25, 2017.

⁷⁹ Federal Securities laws include Securities Act of 1933, Securities Exchange Act of 1934, Investment Company Act of 1940, Investment Advisers Act of 1940 and Trust Indenture Act of 1939, as amended subsequently.

⁸⁰ Initial Coin Offerings, ASIC Information sheet 225 (INFO 225), issued in September 2017. Available at <http://asic.gov.au/regulatory-resources/digital-transformation/initial-coin-offerings/>

⁸¹ Indicoins – India's first ICO to begin on 1st October, *NEWSBTC*, September 27, 2017.

⁸² BitcoinGrowthFund raises ₹ 95 cr via initial coin offering, *BUSINESSLINE*, June 1, 2017.

⁸³ Anirudh Laksar, Sebi taking a fresh look at crowdfunding norms, *MINT*, March 17, 2017.

they have raised capital. Because of such active involvement, there is an expectation of return created. The researcher shall focus specifically on GREX since the virtual organisation has been in the limelight recently.

GREX is a virtual market that facilitates primary capital raising and secondary market transactions in unlisted companies. It has successfully escaped the scrutiny of SEBI by structuring itself in such a way that it would not qualify as a stock exchange and also stay clear of equity crowdfunding, which is illegal in India.⁸⁴ Recently, SEBI sent notices GREX and the unlisted companies obtaining online funding through the webpage.⁸⁵ SEBI argued that it is an offer to more than 200 people and thereby a deemed public offer under S.42(4) of the Companies Act, 2013. Further, SEBI argued that the nature of the transactions facilitated by GREZ make it a stock exchange. Grex was accused of being in violation of Securities Contracts (Regulation) (Stock Exchanges and Clearing Corporations) Regulations, 2012 since it does not meet the 100 crore net worth threshold⁸⁶ and 1000 crore minimum transaction requirement⁸⁷. Earlier, upon a single click, all the information in relation to the specified unlisted companies were available. SEBI argued that the information contained all the essentials of a private placement offer letter and concluded that since it is freely available to anyone with internet access, the 200 limit is exceeded. Subsequently, GREX revamped its operations and now companies are required to submit their latest PAS-5 and GREX estimates the number of share allotments that have already happened in the particular financial year. Based on the figure, dedicated mailing lists are created and the company information is shared with a limited number of potential investors so as to not exceed the 200 threshold prescribed under S.42(2) of the Companies Act, 2013.

GREX case is just one example of the regulatory lacuna surrounding online crowdfunding in India.⁸⁸ SEBI issued a consultation paper on crowdfunding in 2014.⁸⁹ It is expected to issue guidelines by the end of 2017 mainly to provide eligibility criteria for start-ups based and digital trading platforms.⁹⁰ SEBI also issued a caution note to investors in 2016, warning against unauthorized electronic platforms that are ‘*similar to stock exchanges*’.⁹¹ Though crowdfunding investments made in India are not regulated by SEBI, similar investments made abroad are curtailed by remittance thresholds. However, such investments are not considered share purchase in India regardless of whether the ICO involves equity-based crowdfunding or not. This creates problems because the ICO could eventually be termed as an

⁸⁴ Only reward-based crowdfunding and donor-based crowdfunding are legal in India. See Is Crowdfunding Legal in India? SEBI Regulations & It's Implications, ZINGOHUB CROWDFUNDING HANDBOOK, 17 October, 2016.

⁸⁵ Shailesh Menon, Sebi warning turns off crowdfunding tap for startups, ECONOMIC TIMES, September 9, 2016.

⁸⁶ Reg 14(1), Securities Contracts (Regulation) (Stock Exchanges and Clearing Corporations) Regulations, 2012.

⁸⁷ Exit Policy for De-recognized/ Non-operational Stock Exchanges, CIR/MRD/DSA/14/2012, SEBI Circular dated May 30, 2012.

⁸⁸ Shwetha Chandrashekar, Equity-Based Crowdfunding as an Early-Stage Financing Alternative: Critique of the Regulatory Proposals in India, INDIAN CORPORATE LAW, March 27, 2016.

⁸⁹ Consultation Paper on Crowdfunding in India, SEBI, June 17, 2014.

⁹⁰ Anirudh Laskar, Sebi close to finalizing crowdfunding norms, MINT, August 14, 2017.

⁹¹ PR No.: 137/2016.

offer of securities in the concerned foreign jurisdiction. Owing to the non-involvement of SEBI, the Indian investors would not be liable to the reporting requirements that the investors from the host jurisdictions will be subject to. Something similar happened in the case of DAO wherein the US SEC held that the tokens issued by the virtual organisation qualify as securities.⁹² This changed the nature of the transactions closed by investors from across the globe and raised several legal questions. Fortunately or unfortunately rather, no legal consequences ensued in this particular case since the digital entity in question went defunct soon after the completion of the ICO. Hopefully, SEBI will soon clarify the legal position on equity- ICO investments made by Indians abroad and crypto-token sales in India.

CONCLUSION

It is unlikely that any significant overhaul of international corporate finance will result from blockchain applications in the near future. It may be reasonably predicted that the DLT solutions will mainly exist within the existing infrastructural ecosystem to increase the efficiencies of current processes. The fundamental issue in the widespread expansion of blockchain technology lies in its inherent scaling limitations. The distributed ledger can only support a limited number of blocks of transactions at efficient speeds. Beyond that, the mining speed would reduce and transactions would be delayed.

Further, there has been no proof of concept for any sustainable solution to address failure of the DLT. There is a pressing need for post-hack recovery mechanisms, answers to data feed issues, and upstream security issues and problems that affect the execution timeframes at all. The lack of replacement options within the blockchain ledger is also concerning. A major function of intermediaries is to ensure that if one counterparty is unable to fulfill their part of a transaction the others can be saved from loss and systemic risk is thereby reduced. There is no blockchain prototype to resolve such unanticipated issues and provide risk mitigation. The concept of sidechains is being mooted, however. Sidechains are blockchains backed by pre-identified central authorities that verify, approve and record transactions on the ledger. The concept of a sidechain defeats the aim of decentralised medium but it is the only tenable alternative. For instance, if a clearinghouse is providing services on a DLT, it could also operate sidechains to be prepared for contingencies.

Hence, it is likely that blockchain solutions will not replace the current capital markets ecosystem, at least in the next two decades. This technology has the potential to fundamentally re-architect processes global finance industry. It is crucial that countries create a regulatory sandbox to foster such fintech revolutions. Right now, this new technology will work simply to make existing solutions more efficient. In the near future, applications of blockchain technology will satisfy needs that cannot be met with

⁹² Report of Investigation Pursuant to Section 21(a) of the Securities Exchange Act of 1934: The DAO, *Securities and Exchange Commission, Release No. 81207 / July 25, 2017.*

today's technological advancements. The next phase is when blockchain will deliver solutions to address needs that business and markets did not realise they had.

DECENTRALISING THE INTERNET: THE TECHNICALITY AND LEGALITY BEHIND SMART CONTRACTS

Aditi Vinzanekar, Shashank Venkat⁹³

ABSTRACT

A new, popular and rapidly arising technology known as “Smart Contracts” have gained popularity in the recent years. These Smart Contracts, based on blockchain technology, take the form of legal agreements that are executed automatically and do not require any middlemen or intermediaries. This paper examines and explains the technical, legal, and economic significance of these Smart Contracts. In essence, the research conducted for this paper is a study of the position and applicability of smart contracts in the existing purview of Contract Law. The issue of legal significance arises due to the fact that Smart Contracts are regulated entirely by users alone, without any formal central authority to oversee them.

The authors focus on explaining the basics of what smart contracts are and believe that for a comprehensive understanding of the topic, the study of its technicalities, history and evolution are pivotal. After delving into the origins of smart contracts and their advantages and disadvantages, the authors would then move on to the core principle on which blockchain technology and smart contracts are based, decentralisation, and further explain how this leads to effective cost cutting as well as eradication of the middleman, which in the long run would lead to mutual benefits to transacting parties. The authors will then move on to discuss the legal implications that accompany this technology, the issues that stem from it, and possible solutions to ensure that the positives do outweigh the negatives. Conclusively, the authors examine to what extent this technology can be used today.

INTRODUCTION

Over the last few years, innovators and computer experts, have been formulating various technologies that can bring about a “self-help”⁹⁴ approach to the world of contracts. Due to their self-executory nature, these contracts have come to be known as smart contracts⁹⁵. To understand smart contracts, we must first understand the technology⁹⁶ that forms the basis for smart contracts.

⁹³ Students, 2nd Year, B.A LL.B (Hons.), Symbiosis Law School, Pune.

⁹⁴ Max Raskin, “*The Law and Legality of Smart Contracts*”, Georgetown Law Technology Review, Volume 1: Issue 2, 1 GEO. L. TECH. REV. 305 (2017)

“Self-help is nothing new. Whether building walls to stymie trespassers or changing locks to evict squatters, individuals regularly act on their own before invoking the formal legal system.”

⁹⁵ Nick Szabo, “*Smart Contracts: Building Blocks for Digital Markets*”, 1996, available at -

http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_2.html , last seen on 29/07/2017, wherein Nick Szabo coined the term “Smart Contracts” as follows:

“New institutions, and new ways to formalize the relationships that make up these institutions, are now made possible by the digital revolution. I call these new contracts “smart”, because they are far more functional than their inanimate paper-based ancestors. No use of artificial intelligence is implied. A smart contract is a set of promises, specified in digital form, including protocols within which the parties perform on these promises.”

⁹⁶ Blockchain Technology helps Smart Contracts maintain their decentralised chain, thus reducing need to depend on central authority, and allows two exchanging parties to directly interact and deal with one another.

Blockchain Technologies have been considered a technological revolution and have begun changing the very face of common financial interactions, such as property purchases, and, as mentioned earlier, contracts. Blockchain, the underpinned technology for Bitcoin, seeing as how each of the blockchain databases are shared by all participants in the system. Just like Bitcoin, other blockchains based implementations aren't regulated by any central authority throughout the world, and is regulated exclusively by users.

A "blockchain" is basically a public ledger of all cryptocurrency transactions, put forth in a digitised and decentralised fashion. Blockchain refers to the storage of digital information, in blocks of data. These "blocks"⁹⁷ store/record a few current/recent transactions, after which, the block goes into the blockchain into chronologically arranged, permanent, databases. It thus, allows all participants in market transactions, to keep a track of all transactions made on a digital currency basis without a centralised mechanism of information storage. Therefore, there is no central authority through which these databases are regulated and hence remaining entirely in the hands of those participating in such contracts⁹⁸.

When A pays B for any good or service, only A and B are party to this transaction, and there is no middleman/ third party required to process the said transaction.

However, due to the lack of central authority oversight into the processes of entering into Smart Contracts, the question of formal legal intervention arises. The legality of these contracts must be assessed, and it is required to formulate a few simple rules to form a framework for even the most complex of situations⁹⁹.

Smart Contracts have a mechanism that can be represented by that of a vending machine¹⁰⁰. You can simply drop a unit of cryptocurrency into the vending machine, and whatever you purchase will appear in your account. Smart contracts, generally conform to almost all the rules and regulations that are part of a traditional contract, and can also automatically enforce whatever relevant, mentioned obligations.

Due to the decentralised nature of the blockchains, a legal scholar/cryptographer, by the name of Nick Szabo, realised that the technology had the potential to be used for the formation of self-executing contracts. For this, contracts had to be converted to code, and that code was to be replicated onto the systems.

⁹⁷ Ben Yuan, Wendy Lin, and Colin McDonnell, "Blockchain and Electronic Health Records", available at http://mcdonnell.mit.edu/blockchain_ehr.pdf last seen on 27/12/2017

⁹⁸ Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System", Bitcoin Project, 31/10/2008, available at - <https://bitcoin.org/bitcoin.pdf> last seen on 21/12/2017

⁹⁹ Donald Skull, and Kathleen M. Eisenhardt, "Simple Rules for a Complex World", Harvard Business Review, September 2012 Issue available at - <https://hbr.org/2012/09/simple-rules-for-a-complex-world> last seen on 23/12/2017

¹⁰⁰ The comparison of Smart Contracts to a Vending Machine was given by Nick Szabo in his "Vending Machine Model", and a brief description of the concept of vending machines has also been given by Max Raskin, (Supra 1)

Thus, smart contracts are a mechanism that help you exchange money, property, or shares, and help you carry out monetary transactions, effectively without the use of middlemen, thus transforming the role of lawyers, bankers and brokers all over the world¹⁰¹.

SMART CONTRACTS

A) Smart Contracts Defined

Simply speaking, a Smart Contract is an agreement whose execution is automated¹⁰². The principle characteristic of a “Smart Contract” is its self-executory and automated nature¹⁰³. However, if we need to investigate a broader, more detailed definition of the term, we can look to the definitions proposed by Josh Stark. Josh Stark, is a lawyer, and was previously the head of the legal and operations teams at a former blockchain consulting and development firm known as Ledger Labs¹⁰⁴.

Various definitions of the term ‘smart contract’, have been proposed such as: “*contracts between parties that are stored on a blockchain*” or even, “*any computation that takes place on a blockchain*”.

Josh Stark also clarified, that while there is no well settled definition of what a smart contract really is, there have been countless definitions proposed and most of them fall under one of two categories. One, which focuses on defining a smart contract as a specific technology, i.e. a code that is stored, verified and executed on a block chain; and the second, which focuses on the application of blockchain technology, as a complement or substitute for legal contracts.

We already have the understanding that blockchain was mainly incentivized by the termination of a middleman and having peer-to-peer transparent transactions. In simple terms, a blockchain will effectively give users access to a database which can be modified and simultaneously updated for multiple users at once. A blockchain effectively creates digital cash which can be transferred without an intermediary. This digital cash is valued on the basis of the trust that humans assign to it.¹⁰⁵

¹⁰¹ Arthur Piper, “*Blockchain and Smart Contracts*”, 25/08/2017, available at - <https://www.ibanet.org/Article/NewDetail.aspx?ArticleUid=e64618b4-02bc-4e57-a5a6-3167027de3f9> last seen on 21/12/2017

¹⁰²More detailed definitions of Smart Contracts are discussed further, but from a legal perspective, the relevant fact to be mentioned within the definition is the one regarding the elimination of human intervention to contracts.

¹⁰³ Christopher D. Clack, Vikram A. Bakshi, Lee Braine, “*Smart Contract Templates: Foundations, Design Landscape and Research Directions*”, 2/08/2016 (Unpublished Manuscript), available at - <https://arxiv.org/pdf/1608.00771.pdf> last seen on 24/12/2017

“A smart contract is an agreement whose execution is both automatable and enforceable. Automatable by computer, although some parts may require human input and control. Enforceable by either legal enforcement of rights and obligations or tamper-proof execution.”

¹⁰⁴ Ledger Labs was a Canada based firm, specialising in blockchain services and solutions for clients all over the world. However, recently they have decided to cease their provision of consultancy services, and to now focus on developing their own product, by partnering with BlockGeeksLab.

¹⁰⁵ Josh Stark, “*Making Sense of Blockchain Smart Contracts*”, 4/6/2016, available at - <https://www.coindesk.com/making-sense-smart-contracts/> last seen on 12/12/2017

Creator of Ethereum¹⁰⁶, Vitalik Buterin, at a DC Blockchain Summit¹⁰⁷, held at Georgetown University, explained that in a smart contract approach; an asset or currency is transferred into a program, *“and the program runs this code and at some point it automatically validates a condition and it automatically determines whether the asset should go to one person or to the other person, or whether it should be immediately refunded to the person who sent it or some combination thereof.”*

The decentralised ledger also stores/replicates the document which provides to the process, a certain degree of security and immutability. Thus, the applications of blockchain technology accompanied with coded conditions can have a multitude of use-cases in our world today whether it be in the field of transfer of property, transparent transactions or to simplify¹⁰⁸ tasks of contract drafting; all this while also terminating the role of an intermediary and reducing costs overall. The nuances that however need to be addressed are with respect to legal culpability and responsibility and will be delved into in later sections of the paper.

B) Advantages and Disadvantages of Smart Contract Technology

Just like every other creation in the world, the practice of entering into smart contracts has proved to have its pros as well as its cons.

The issuance of smart contracts into the world of finance, insurance, and now even auditing/taxation processes, can imply a lot of positive progress, but at the same time could do as much harm as good. Due to its unregulated nature, these choices and decisions lie solely with the users, and only they can decide for themselves whether the weight of advantages is lighter or heavier than the weight of the disadvantages of smart contracts.

Advantages-

- ***Speed and Time Saving Quality-*** *As experience has proven, technology will always be able to work faster than human beings. An invention as simple as a calculator can save so much time and human effort. Just so, it has been realised that digital contracts are much faster and far more accurate than the processing of physical documents and*

¹⁰⁶ Vitalik Buterin, Ethereum: A Next-Generation Cryptocurrency and Decentralized Application Platform, Bitcoin Magazine, 24/01/2014, available at- <https://bitcoinmagazine.com/articles/ethereum-next-generation-cryptocurrency-decentralized-application-platform-1390528211/> last seen on 24/12/2017

¹⁰⁷ The Chamber of Digital Commerce, partnering with Georgetown University held the Inaugural Blockchain Conference, where companies such as Microsoft, Deloitte, IBM, Bloq, Nasdaq etc had attended.

¹⁰⁸David Yermack, *“Corporate Governance and Blockchains”*, Review Of Finance, Volume 21, Issue 5, 19/01/2017, available at - <http://revfin.org/corporate-governance-and-blockchains-by-david-yermack/> last seen on 23/12/2017

“A firm could post all of its business transactions on a blockchain, allowing anyone to aggregate them into an income statement and balance sheet at any time. This may significantly reduce the need for of auditors, deter accruals earnings management, and deter related party transactions.”

paperwork. Time, is probably one of the most valuable of human resources, and the automated processes on which smart contracts operate, saves a lot of this valuable time.

- **Accuracy-** *Technology has also proven to be far more effective and accurate, due to the fact that it leaves no room for human error. Smart contracts are thus exceedingly accurate due to the lack of human involvement in its technical processes.*
- **Independence from Intermediaries**¹⁰⁹ - *As one of the main objectives that were meant to be achieved with the invention of smart contracts, the elimination of middlemen has certainly saved money, time and effort on the part of the users. This technology, as mentioned before, brings about an environment of self-help, thus enabling users to handle their contractual agreements independently and effectively without forced reliance on third parties..*
- **Security and Reliability-** *One of the most attractive qualities of the Blockchain, is that its data cannot be altered or removed. The parties to a contract are protected by these unchangeable conditions, since they remain protected in the event of breach by the opposite party. The fact that middlemen are eliminated also increases security.*¹¹⁰

Disadvantages-

- **Unregulated-** *Though some people may see this as an advantage, the unregulated nature of these contracts may make it difficult for the world to ascertain the legality of these contracts. It has been suggested that there needs to be some presiding authority that investigates the matters of ongoing smart contracts as a regulatory system.*
- **Implementation problems-** *Since the world of blockchain is so vastly separate from the traditional way of operating as of now, it may be difficult to implement some of the contracts in the real world due to development and acceptance of such contracts, thus causing the users a certain degree of time, money and effort.*
- **Rigid security-** *As mentioned before, the data in blockchains cannot be altered or modified. While being one of the top advantages of smart contracts, this can also prove as a disadvantage in situations where the parties want to make urgent changes to the contract. It has thus been proposed, that the technology for supplementary contracts to be added should be looked into.*

C) Distinction Between Strong and Weak Smart Contracts

¹⁰⁹ Supra 14,

“A smart contract is an automatic way to execute a contract: for example, a self-driving car could drive to the bank if the borrower defaults on a car loan. The blockchain can implement smart contracts cheaply, for example changing the title of collateral upon a default, substantially reducing enforcement costs. Finance professors might not be able to write papers in the future about difficulties in seizing collateral!”

¹¹⁰ BitFury Group, “*Smart Contracts on Bitcoin Blockchain*”, Version 1.1, 4/09/2015, available at - <http://bitfury.com/content/5-white-papers-research/contracts-1.1.1.pdf> last seen on 27/12/2017

“One of the advantages in using Bitcoin as a medium for smart contracts is the inherent low trust approach. Built-in Bitcoin mechanisms let users minimize counterparty risks by utilizing mathematical and algorithmic tools, not by relying on a mediator’s authority, as it is often the case in the traditional approach.”

It has come to be understood that some smart contracts are legally enforceable while others may not be. However, the vending machine mechanism of smart contracts may enforce all agreements, even if *ex post* the law finds the agreement legally unenforceable. To understand the distinctions between a strong and a weak smart contract, we must keep in mind the traditional and the non-traditional¹¹¹ methods of enforceability:

- **Traditional Method-** The traditional methods of enforcing any contract are with the power of any established legal authority, which uses a variety of dispute resolution techniques. In certain situations, one can approach a court of law, and in other situations can seek arbitrators. The courts have the power to award damages, or provide other appropriate reliefs, as per the degree of wrong-performance/non-performance of the contract.
- **Non Traditional Method-** There exists discussion and experimentation on what actions can be taken in case of needing to enforce a smart contract code, without needing to seek recourse from formal legal authorities. This effort/method of enforcement however, becomes questionable due to the existence of “tamper-proof” technology. Tamper proof technology refers to code that is unstoppable in its execution, foul play, or natural/mechanical disruptions. Thus, traditional methods of enforcing a contract are preferred, because no overrides or variations can be made to an agreement launched code that is “tamper-proof”.

On the basis of the degree of effort and method of enforcing a smart contract, Max Raskin¹¹² has proposed a distinction between strong and weak smart contracts. In his article, he defines strong smart contracts as those that require large costs and efforts to altering or changing them, while explaining that weak contracts are those that courts can alter with relative ease even after they are executed.

The legal issue to be addressed exists mainly in case of strong smart contracts. The fact that any legal authority would be rendered helpless post execution of a “tamper-proof” contract, brings us to question the legality behind such an unstoppable agreement. The point of a “smart” contract is that as soon as it has been initiated, it will execute itself, by definition.

HISTORY AND EVOLUTION OF THE CONCEPT

¹¹¹ Ibid, at 4.

¹¹² Supra 1, at 310

“..For legal purposes, I will further differentiate between strong and weak smart contracts. Strong smart contracts have prohibitive costs of revocation and modification, while weak smart contracts do not. This means that if a court is able to alter a contract after it has been executed with relative ease, then it will be defined as a weak smart contract. If there is some large cost to altering the contract in a way that it would not make sense for a court to do so, then the contract will be defined as strong.”

The first ever definition of a “Smart Contract” was proposed¹¹³ in 1997, by the American cryptographer/programmer Nick Szabo, who has been one of the leading authorities on blockchain and smart contracts for nearly the last two decades. As previously mentioned, his first definition was proposed at a time, when the idea and concept of a smart contract could only exist in theory, due to the lack of adequate technology to implement something so complex. The reasoning behind this proposition by Nick Szabo was for two fundamental reasons. Firstly, he worked on the basic psychology of every human being that wants to reduce costs. Nick Szabo conceived the idea on the basis of the need to eliminate the cost of middlemen from the process of contractual agreements. Secondly, he realised the ability of smart contracts, to be able to cause a shift from paper to digital databases, due to which these processes become a lot more effective and serve as a more reliable form of data storage.

Nick Szabo, along with others began trying to formulate cryptocurrencies (such as Bit Gold) using encrypted, secured online ledgers. However, on 31st October 2008 a paper was published with the heading “Bitcoin: A Peer-to-Peer Electronic Cash System”¹¹⁴, authored by an unknown identity using the alias “Satoshi Nakamoto”. On 8th January 2009, the first version of Bitcoin was announced, and soon after that Bitcoin Mining evolved.

Soon after the mining of bitcoin began, it proved successful as the first ever instance of mass usage of digital ledgers¹¹⁵, thereafter creating an effective foundation for the implementation of smart contracts. Thus the proposition that was made by Nick Szabo more than two decades before, was implemented on the basis of Blockchain Technology.

DECENTRALISED NATURE OF BLOCKCHAIN

From Richard Hendricks in the American comedy series 'Silicon Valley' to Sir Tim Berners Lee, 'the father of the world wide web'; there are countless individuals who believe that the problems we face in the world today with respect to monetisation of sensitive data, hacking, censoring or prioritising of data due to biased interests and lack of access to vital functionality, to mention a few, *can all be resolved by decentralising the internet*. As of today, no single entity owns the internet, but there are large centralised services that support critical components such as web hosting, cloud computing, DNS servers, social media, search engines etc. All these services require all their data to be on a limited number of physical and virtual servers.

¹¹³ Nick Szabo, *Formalizing and Securing Relationships on Public Networks*, 1/09/1997, available at <http://ojphi.org/ojs/index.php/fm/article/view/548/469> last seen on 26/12/2017

¹¹⁴ Supra 5

¹¹⁵ Max Raskin, “*Realm of the Coin: Bitcoin and Civil Procedure*”, 20 Fordham Journal of Corporate & Financial Law, Volume 20 Issue Number 4, (2015) available at - <http://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=1418&context=jcfl> last seen on 25/12/2017

We have however, given these companies too much power as the aforementioned problems can potentially have a drastic effect on the end users of these services. Blockchain technology has to this end achieved to a decent extent the decentralising of powers with respect to monetary transactions among other things. Blockchain technology, at its core, is a distributed ledger that allows the sharing of transactional information among parties *without trusting an information broker or any intermediary*. Countless companies today are using this technology to create decentralised versions of vital services to ensure minimum inconvenience and disruptions to the end user.

A decentralised internet may have its own obstacles¹¹⁶ as well as challenges but if robust , uncompromised services are going to be offered Blockchain technology will most likely be an integral part of this. ¹¹⁷

A) Decentralised Web Hosting

Hacking has in the 21st Century caused many companies that provide a multitude of internet services millions of dollars, and this continues to occur every year. Distributed Denial of Service attacks have become a favourable tool of hackers and cyber criminals who want to shut down websites. This is fairly easy to do in a centralised system, with enough firepower directed at the targetted website the company has to spend millions on servers to stay online, and this in the past as well in the world today been of great detriment.

Blockchain technology replaces centralised servers with thousands of nodes that act as separate parts of the website, thus, even if cyber criminals have enough firepower to take down a centralised server of the target website, the nodes which are now acting as separate entities and with no central server to hit renders the efforts futile regardless of the magnitude. This process could save millions of dollars in the world today and countless companies are already implementing networks like this to ensure that their server capacities are not concentrated in one place.

Gladius is an example of such a company which created a decentralised content delivery system and has “DDoS” mitigation system. Gladius uses blockchain technology to distribute assets and files across thousands of computers that share a network. Users rent out a computer's idle time, storage and bandwidth when they sign up with this company¹¹⁸. By decentralising storage locations, they are less

¹¹⁶ Securities and Exchange Commission v. Trendon T. Shavers and Bitcoin Savings and Trust, 416, U.S., 1469, (2014, United States District Court, Eastern District of Texas) stated:

“Bitcoin is a decentralized digital currency that may be used to purchase goods and services online, or traded on online exchanges for conventional currencies, including the U.S. dollar. Bitcoin was created by the pseudonymous developer (or developers) Satoshi Nakamoto; it has no single administrator, or central authority or repository.”

¹¹⁷ Ben Dickson, “*Can blockchain decentralize the internet?*”, available at <https://venturebeat.com/2017/10/08/can-blockchain-decentralize-the-internet/>, last seen on 21/12/17

¹¹⁸ Hunaln Naseer, Gladius ICO – “*Can a Blockchain-powered Anti-DDoS Solution Save the Internet?*”, available at <https://cryptovest.com/reviews/gladius-ico--can-a-blockchain-powered-anti-ddos-solution-save-the-internet/> last seen on 10/12/17

prone to hacking and also by using the blockchain technology they provide faster services as they bring cached content closer to the user. It also incentivises people to share their idle network and computing resources.

B) Decentralised DNS

DNS services are indispensable when it comes to accessing the internet. While trying to access a site, the DNS service converts that domain name to an IP address which then provides access to the host. Many companies have now adopted a distributed alternative to the centralised web server system to prevent hacking or other cybercrime. One infamous instance was when the servers of the company “Dyn” were hacked and users lost access to vital services such as Paypal, Github etc¹¹⁹. Nebulis is a company that uses the Ethereum blockchain to store, update and resolve domain records. A decentralised DNS on the blockchain would exponentially increase the difficulty of staging man-in-the-middle attacks or to manipulate DNS records for domain redirection.¹²⁰

C) Decentralised Data Storage

One of the most important reasons for decentralising internet services is to prevent hackers to manipulate sensitive data of countless users. But decentralising data storage mitigates more than just hackers. Many private companies have access to your data which they might use in their own business interests, share with the government, or sell off to third parties without your consent. The greatest benefit that Blockchain technology provides you is the access to all vital services while retaining ownership of your data. To use centralised internet services today, the respective company must be trusted with sensitive data, but this is giving them too much power and many things can potentially go wrong in this model. In 2013, Yahoo was breached by hackers and data of three million accounts were leaked¹²¹. More recently, a credit reporting agency Equifax was breached and sensitive information belonging to a hundred and forty-three million people was leaked¹²². There are countless other examples as well which point out that data decentralisation can ensure that sensitive information as in the above examples isn't leaked.

Google Drive and Dropbox provide a centralised storage service. Storj, however provides a decentralised storage system by using blockchain technology to split the files into small bits and further

¹¹⁹ Scott Hilton, “Analysis of Friday 21st October Attack”, Vantage Point, available at <https://dyn.com/blog/dyn-analysis-summary-of-friday-october-21-attack/> last seen on 15/12/17

¹²⁰ Ben Dickson, “How blockchain can help fight cyber attacks”, available at <https://techcrunch.com/2016/12/05/how-blockchain-can-help-fight-cyberattacks/> last seen on 15/12/17

“One of the main characteristics of the blockchain is its immutability. The use of sequential hashing and cryptography, combined with the decentralized structure, make it virtually impossible for any party to unilaterally alter data on the ledger.”

¹²¹ “Yahoo data breach hits all three billion accounts”, BBC News, 3/10/2017 available at <http://www.bbc.com/news/business-41493494> , last seen on 17/12/17

¹²² Equifax Hack, Fox Business, 27/12/2017 available at <http://www.foxbusiness.com/markets/2017/12/27/equifax-hack-what-learned.html>, last seen on 30/12/17

encrypting them and distributing them to different participating nodes all over the network. The people that provide their own storage are remunerated in cryptocurrency. Storj not only prevents hackers from having access to centralised sensitive information, it also speeds up the access to the files on the storage system as it enables users to download the files at very fast speeds from different locations all at once¹²³. Other examples of companies that use blockchain technology to distribute and encrypt their data range from email service providers such as Cryptamail and Swiftmail¹²⁴; which encrypt the data on an email and provide the decryption key only to the receiver of the email, to social networking sites such as Indorse which store their data on a blockchain and run their services through a smart contract to ensure user privacy. Users are also given cryptocurrency rewards if they add value to the network and get to choose how they want to show their data with the network.

Legal Aspect and Significance

Before delving into the legal issues that arise out of the use of blockchain technology and smart contracts, we have to understand that, the rate of innovation in the world today is exponentially on the rise, while the legislative backing that is supposed to accompany it, lags helplessly behind.

But it isn't enough to say, that bringing in accompanying legislation is a long drawn out process, because there are countless socio-economic changes that the legislation isn't able to keep up with. With Blockchain technology and smart contracts, there are involved laws and jurisdictions of multiple territories, and thus the task at hand which initially bordered on herculean, now borders on impossible. There are a multitude of issues that the authors wish to focus on, which they believe need to be looked into before this technology can be used to its full, desired extent.

A) Comparison between Smart Contracts and Traditional Contracts

Now, prior to begin with the comparisons in the characteristics and legal implications of traditional and smart contracts, it is important to elucidate on the concept of a contract. A legally binding contract is one which formalises an agreement between parties, for performance of any particular act for a consideration.¹²⁵ Similar to a traditional contract, even smart contracts include a consideration for intended performance of terms of the contract to be carried out.

¹²³ Digital income, “*Storj Open Source Blockchain Review*”, Icoin Blog, 27/09/2017, available at <https://icoiblog.com/storj-open-source-blockchain-storage-review/> last seen on 21/12/17

¹²⁴ Julio Gil-Pulgar, “*Its time to switch to decentralized email*”, 18/12/2016, available at <https://news.bitcoin.com/blockchain-based-email-systems/>, last seen on 22/12/17.

¹²⁵ Tara Naughtner, “*Smart Contracts v Traditional Contracts*”, ContractWorks Blog, 17/03/2017, available at <https://www.contractworks.com/blog/smart-contracts-vs.-traditional-contracts>, last seen on 30/12/2017

“The core of a contract is that it formalizes an agreement between one or more parties. The parties to the agreement usually commit to performing some action in exchange for something of value, which in contract language, is called consideration.”

One of the primary differences between a traditional contract and a smart contract is the lack of paperwork involved in smart contracts. Usually, when two parties enter into contracts with one another, there is involvement of attorneys and paperwork. Smart contracts however, operate using online databases, thus eliminating the use of paper, due to their sole reliance on information stored on the Blockchain.

As defined by Nick Szabo in 1996, “Smart contracts are digital protocols for information transfer that use mathematical algorithms to automatically execute a transaction once the established conditions are met and that fully control the process”¹²⁶

Hence, due to the fact that smart contracts are automated through the use of coding, there is far less ambiguity¹²⁷ in their wordings as compared to traditional contracts, which are written using human languages. When contracts are written into code, there is far less chance of ambiguity than in natural human language because natural human language is infinite, while computer codes are by definition, absolute and predefined.¹²⁸

When we talk about voidable nature of certain smart contracts, the conditions are quite similar to those that render a traditional contract void or voidable. For example, entering into a contract whose object or consideration is unlawful. For instance, the sale of alcohol or cigarettes to minors.¹²⁹

In the case of traditional contracts, an express or implied acceptance is required, however, in a smart contract, the acceptance of the contract is given by initiating performance of the terms of the contract. This is since the contract is carried out by an automated system. Technically speaking, the issue of non-performance of the terms of a contract is avoided when entered into a smart contract, due to the fact that smart contracts can rarely be altered or deleted. However, this can become a disadvantage in a situation where a legal authority wishes to alter or modify the contract.

Traditionally, a contract can always be modified, if a governing legal authority issues the relevant orders. However, a smart contract, is one which may to allow modifications even under orders from legal authorities. Here, the question of legality arises. If the performance or non-performance of a smart contract cannot be intervened into by any formal legal authority, how can the legal legitimacy of a smart contract be established?

¹²⁶ Supra 2

¹²⁷ Supra 1

“Ambiguity is celebrated in human language. It is a central feature of literature, poetry, and humor. Ambiguity is anathema to computer language. An ambiguous computer language is a nonsensical concept because the predictability of computers is what gives part of their value.”

¹²⁸ C.A. Gunter, *Semantics of Programming Languages*, 4, (1992)

“Perhaps the most basic characteristic of the distinction is the fact that an artificial language can be fully circumscribed and studied in its entirety”

¹²⁹ *Modern Cigarette, Inc. v. Town of Orange*, 774, 969, 970–71 (Supreme Court of Connecticut, 2001)

There may be numerous situations in which a smart contract may be required to be modified. For instance, if circumstances render the performance of a contract impossible or impractical, or if the performance of the terms of the contract are established as illegal after the creation of the contract.

The authors feel that to cater to such situations, smart contracts need a way to be modified. However, programmers would argue that such a change in the working of smart contracts could decrease security, since one of the most attractive features of a smart contract is its very ability to remain unaltered. Thus, the most viable solution for such a problem would be to allow modifications to be made to smart contracts, only under the issuance of orders from governing legal authorities.

At this point, due to their increasing popularity, it feels as though smart contracts will gradually replace their traditional counterparts. However, due to the unclear nature of legal intervention into smart contracts, it seems unlikely that large firms would be willing to risk putting their faith in smart contracts while forgoing the “legal recourse” that traditional contracts make available to them. However, having said that, it could be possible for smart contracts to gradually adopt certain characters of their traditional counterparts, hence providing a digital approach to contract making while retaining the opportunity for legal and judicial intervention.¹³⁰

Lack of a Regulatory Framework Law has just begun to accept the use of the Bitcoin in select territories, the use of Blockchain or the use of other crypto currencies has not been explicitly spoken about. This could, again, be potentially problematic for someone who is not as well versed with the technology. There exists, plenty of ambiguity with respect to application of laws to these transactions. When a transaction takes place between two individuals from different parts of the world, there is no clarity about which country's law should prevail. A potential solution to this must be a universal regulating authority and framework which could adjudicate on the matters, but since we have absolutely no hindsight as to the working of this technology, and the potential impact and problems it could lead to in the future, the formulation of such a framework is a bit arduous. There is also a question of who will frame this set of rules and how many countries' views and opinions will be taken into consideration. The authors believe that a drafting committee with zonal representation is the most viable solution, but as this concern potentially millions of individuals in the future, this representation may not be adequate and hence the authors are sceptical about even the most viable solution.

In status quo most people have taken a 'wait and see' approach as to how to resolve disputes that may arise out of this. Although this does not stifle innovation and allows the regulators to see how this

¹³⁰ Supra 33,

“It would not be surprising to see some kind of melding of the two agreements, allowing for faster, simpler arrangements to be established digitally, yet also providing an avenue for judicial review.”

technology would potentially affect us, it leaves a lot unsaid and presents a grey area of uncertainty and ambiguity for businesses looking to invest in this and to the blockchain innovators.¹³¹

B) A Smart Contract Cannot Account for Subjectivity

C) The first question that needs to be answered is whether all the essential elements of a traditional contract can be fulfilled. Coders who encode these smart contracts will have a great deal of difficulty trying to account for subjectivity and unforeseen circumstances such as force majeure events.¹³²

As a smart contract is self-executing, the next question we need to ask ourselves, is whether a contract which becomes illegal to execute or against common business sense, will automatically be executed by this technology. Programming this code into a contract will again be a very arduous task as an exhaustive list of events, that may potentially happen or not happen, is infinitely large. There are also several contracts that are required to be in written form (for example, transfer of land), and computer code does not fall within the ambit of a written contract. Thus, the issue of legislation not keeping up with socio economic change comes up yet again.

D) Compliance with Data Protection

The distributed nature of the data which Blockchain technology uses, is what ensures privacy and protection of the users'. However, different territories have different data compliance laws in force. This is potentially problematic as a lot of interaction between users occurs between different countries. There needs to be a mechanism to ensure that cross-border transfers of data are compliant. For example, the Europe-United States Privacy shield ensures that all transfers are compliant to laws of both countries and similar such framework must be implemented with other countries as well.

The New General Data Protection Regulation will formalise an obligation on data processors to pseudonymise data¹³³ and a right to request erasure of their personal data. Pseudonymisation seems like

¹³¹ Hayley McDowell, "ESMA takes 'wait and see' regulatory approach to blockchain", 24/01/2017 available at- <https://www.thetradejournal.com/FinTechQ/ESMA-takes--wait-and-see--regulatory-approach-to-blockchain/> last seen on 24/12/17

"The European Securities and Market Authority (ESMA) has stated blockchain technology has not reached a point where regulatory action is needed, so has taken a 'wait and see' approach towards it."

¹³² Antony Lewis, "A gentle introduction to smart contracts", 1/02/2016, available at- <https://bitsonblocks.net/2016/02/01/a-gentle-introduction-to-smart-contracts/>, last seen on 24/12/17

"Force majeure is present in many contracts to allow for wiggle-room for the parties involved. In a smart contract environment, how does one party call that without abusing it or referring to a human arbitrator. So many grey areas, so many things to figure out."

¹³³ 'Anonymisation and Pseudonymisation', available at - <https://www.dataprotection.ie/docs/Anonymisation-and-pseudonymisation/1594.htm> last seen on 25/12/17

"it is important for organisations which process personal data to be cognisant of this right. When carried out effectively, anonymisation and pseudonymisation can be used to protect the privacy rights of individual data subjects and allow organisations to balance this right to privacy against their legitimate goals."

a very viable option as it goes hand in hand with blockchain technology whereas, the right to be forgotten presents more of a challenge considering the immutability of records on a block chain.¹³⁴

E) Liability and Responsibility

Another poignant question right at the crux of Blockchain technology is whether a self-programmed, self-executing code without human intervention is considered to be a legal entity. If there is an ambiguity in the nature of the Decentralized Autonomous Organisation (DAO)¹³⁵, does unlimited liability fall upon the Blockchain operators?

It is difficult to determine the nature of a DAO and this difficulty brings about other issues about ownership and liability. If the nature of the DAO cannot be determined then ownership and control cannot be determined. A viable option is contribution of crypto currency can be deemed to be an ownership stake similar to shares in a company, but it has to be noted here that most crypto currencies do not attach ownership rights to their tokens. DAO's, as they have no legal personality, cannot enter into contracts. Here, the DAO members contracting in their own name, or setting up a business entity to operate the system and deal with customers and supplies is a viable solution.

Legal culpability at times of fault has also raised many eye brows as there is no concrete solution as to how deal with the faults in a smart contract. Whether the culpability would fall on the coder or the manager of the DAO is still uncertain, and with no legal hindsight, only experience can guide how to handle these situations from a legal standpoint. But the authors feel, that culpability can be interchangeable based on a number of factors (such as, how the code is used or the reason for the establishment of the DAO etc.), and on a case to case basis.

F) Litigation, Dispute Resolution and Issues of Jurisdiction

Jurisdiction in the cases of cross border transactions and in the case of an adjudication requirement, poses many questions. Assuming that it isn't explicitly stated in advance, there is an ambiguity as to what laws will prevail at times of adjudication. Assuming there occurs a transaction with conflicting laws, adjudication on such a matter will become very tedious. The authors feel a viable solution to this is pre determining which laws would apply to the transaction, but this leaves great scope for

¹³⁴ Antony Lewis, "Immutability of block chains", 29/02/2016, available at- <https://bitsonblocks.net/2016/02/29/a-gentle-introduction-to-immutability-of-blockchains/> last seen on 25/12/17

"once data has been written to a Blockchain no one, not even a system administrator, can change it."

¹³⁵ Toshendra, "What are Decentralized Autonomous Organizations DAO in Blockchain", 10/05/2017, available at - <https://www.toshblocks.com/solidity/decentralized-autonomous-organization-dao-blockchain/> last seen on 25/12/2017

"DAO are just the digital version of the above arrangement(organization structure) where all rules & regulation are written in the source code rather than the piece of paper. They are executed by thousands of people/computers together through some consensus-based algorithm. The platform where the DAO runs is called Blockchain."

manipulation and exploitation. Other than this considering other forms of remedies, such as arbitral awards instead of court awards can prevent issues regarding jurisdiction from coming up.¹³⁶ Making the users of this crypto currency sign a 'terms of use' clause while signing up can also prevent a great deal of confusion, but this solution works better on paper than in a pragmatic situation.¹³⁷

Can the courts in the present day with technical matters of this sort? In England as well as other countries, courts can cater to technological disputes, but with reference to blockchain technology, the judges would require a lot of time to adjust and completely understand the working of this technology to able to appropriately adjudicate on the matter. Another issue at hand is the recovery of stolen cryptocurrency. There are legal theories that could help recover stolen cryptocurrency such as unjust enrichment, but this isn't a tried and tested system. When courts can adjudicate on these matters, big questions as to whether crypto currency is actual property that can be 'owned' will be answered. But as of right now, speculation and anticipatory formulation seems like the only solution that can be viable.

It a known fact, that public law will always override private law. For example, a minor may enter into a contract for buying alcohol from a vendor. In this example, both parties would be satisfied with the terms of the contract. However, public law calls for review of such a contract, since alcohol should not be permitted for use by minors.

Similarly, smart contracts require legal regulation to be able to be formally accepted into contract law. But as of now, as mentioned before, very few countries had a legitimate legal framework in place for the use of blockchain technology, and smart contracts.

Maltese Law, now governs a few aspects of smart contracts under the "Electronic Commerce Act".¹³⁸

The issue arises of jurisdiction arises however, because one jurisdiction may recognise a particular law or statute, which another jurisdiction does not, for example in the case of property laws.

This serves a problem to blockchain users, since the implication here is that any transaction occurring within the blockchain community, must conform to a ridiculous number of regulations from the various jurisdictions it may concern.¹³⁹ If this happens, all Blockchain transactions would more or less come to an abrupt halt, simply due to the impracticality of this proposition.

CONCLUSION

Nick Szabo had a vision, and an idea, all the way back in 1996, for the implementation of Smart Contracts, however, at the time the required technology had not been invented. Now, although the

¹³⁶ Jean Murray, "*Arbitration vs. Litigation - What is the Difference?*", 17/09/2017, available at- <https://www.thebalance.com/arbitration-vs-litigation-what-is-the-difference-398747> , last seen on 25/12/17,

"Arbitration, on the other hand, involves two parties in a dispute who agree to work with a disinterested third party in an attempt to resolve the dispute. In arbitration, there may be one or more arbitrators who hear both sides of the issue and who make a decision."

¹³⁷ Supra 33

¹³⁸ Chapter 426, of the Laws of Malta

¹³⁹ Camilleri Preziosi, "Blockchain: Dissecting the Legal Issues", Lexology, 30/09/2017, available at- <https://www.lexology.com/library/detail.aspx?g=710a9468-fbe5-4d90-ba5e-411697269828> last seen on 14/12/2017

supporting technology for smart contracts exists, its implementation should be as gradual and deliberate as possible, so as to ensure that it can be put to its full use all over the world.

As of now, sufficient legislative support does not exist around the realm of smart contracts due to the fact that the concept is so new. To avoid issues of different jurisdiction, in an ideal scenario, there should be one single, central, international authority, which could govern and cater to the needs of these smart contracts. However, this is possible only sometime in the future, since it will require time for countries all over the world to come together to form this singular authority.

Smart Contracts have the potential to facilitate orderly, efficient, and affordable transactions. Their goal is facilitate contractual agreements between businesses, or even individuals, without a large cost or any of the formality. Having said that, these qualities can only be enjoyed across the world if the concept is applied gradually alongside the formulation of adequate legislative backing.

The future for smart contracts looks promising, provided they can retain certain qualities that traditional contracts have. If smart contracts are to be successful in everything they hope to achieve, adaptation is of utmost importance. Adaptation of the legislature, the judiciary, the executive, and most importantly, - the people.

CRYPTOCURRENCIES, IN NEED OF REGULATION: A PRIMER TO BITCOINS REGULATION IN INDIA

Deepanshu Poddar & Advik Rijul Jha¹⁴⁰

“The root problem with conventional currency is all the trust that’s required to make it work. The central bank must be trusted not to debase the currency, but the history of fiat currencies is full of breaches of that trust. Banks must be trusted to hold our money and transfer it electronically, but they lend it out in waves of credit bubbles with barely a fraction in reserve. We have to trust them with our privacy, trust them not to let identity thieves drain our accounts. Their massive overhead costs make micropayments impossible.”

—Satoshi Nakamoto, 2009

ABSTRACT

Cryptocurrency has induced anticipation among investors, who are increasingly posing questions in order to unravel its complexities. Such anxiety seeps into institutions that govern world economies. Nonetheless, their attempts at understanding it are at best modest. This paper is one such effort to simplify the concepts and processes, which surrounds Cryptocurrency.

The paper utilizes Bitcoins, an atypical and most popular form of Cryptocurrency, in order to explain it’s working. By adopting a descriptive strategy, it analyzes the various regulatory responses to Bitcoins adopted by various countries. Further, the paper also aims at extrapolating the trend for Bitcoins exchanges and popularity by clearly demarcating its limits (both as an alternative to fiat money and equity asset creation). The unregulated currency has facilitated various illegal activities, resulting in a dire need of regulation. Keeping the above in mind, the paper discusses the challenges faced by regulatory authorities across the globe to govern cryptocurrencies. Finally, by placing the conversation in a purely Indian context, it extends a few suggestions for institutions to regulate this abstracted commodity in the financial market. The suggestions entail developing a nexus and symbiotic relationship between various organizations like the Reserve Bank of India and the Income Tax authorities to reach an enforceable framework which meets the objectives and goals of the authorities and the market players for fruitful growth and sustainability of this nascent virtual currency regime.

INTRODUCTION

The digitalized currency, being the perfect confluence of equity risk and technology, has grasped the world by a wind of enigma and skepticism. By entering into deep analysis, this paper aims to extend ideated solutions to make Cryptocurrency a viable mechanism for not only exchange but also as an asset. For the same, the paper suggests that a balanced view ought to be taken for its regulations.

A currency gains validation by way of institutional and popular acceptance as a medium of exchange. In India, the digital currency makes a complex case as a medium of exchange as even though it has not

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been formally accepted, it has not been illegalized. On the contrary, people are increasingly engaging in transactions involving Cryptocurrency.

What makes Cryptocurrency stand out is its ability to work on a system of payments, which is independent of the 'third party' institutions such as banks and government. This assures that the payer can deliver the agreed upon funds directly to the payee without any intermediary. Rather, it imbibes trust in an inviolable, decentralized computer program that is 'supposed' to be incapable of defrauding people.

When, Satoshi Nakamoto created Bitcoins¹⁴¹, one of the most popular form of digital money, and first of its kind, it was transacted merely to satiate investor's curiosity and not for serious investment.¹⁴² However, today, Bitcoins is gaining acceptance as an Internet Asset.¹⁴³ Interestingly, many major retailers have begun accepting electronic currency as payments through their websites.¹⁴⁴ Such a trajectory can be lucidly illustrated - the digital currency had advanced over 1,600 per cent to \$17,040 on December 15 against \$1,000 in January 2017.¹⁴⁵

This paper utilizes Bitcoin as a lens to analyze the wide ocean of Cryptocurrency. It commences with a brief on the *characteristics of a Bitcoin* and the ways in which it functions in the market economy. **Part II**, illustrates its *impact on the economy* and consequently its unviability to exist as the only currency in the world. In **Part III**, the paper discusses the *illegal uses of cryptocurrency* which is a central concern fueling the debate for the need for regulations to be put in place. **Part IV** ventures into the *regulatory response to Cryptocurrencies*, wherein it discusses the attempts of various countries like the United States of America, The United Kingdom, Germany, and Brazil. **Part V** of the paper elucidates upon the *regulatory attempts made by India* and puts forth *suggestions for further regulations* to be put in place. The paper finally concludes that *Cryptocurrency* needs to be regulated and India can show its prowess and nudge ahead of other countries in this field.

CHARACTERISTICS OF CRYPTOCURRENCY

A successful analysis of regulations on Bitcoin can only be carried forward by way of a deep discovery into its nuts and bolts. The Bitcoin can be understood as a string of computer-generated code.¹⁴⁶ This particular line of code can only be utilized by the coin's owner, who has a unique passcode that allows the user to either "spend" that coin with someone who will trade it in exchange for goods, or give the coin to another user in exchange for some other form of currency.¹⁴⁷ In this way, Bitcoins operates on the market much like a currency would. In other words, Bitcoins can be traded for goods from sellers who will accept it as payment or exchange it for other forms of currency. There are two ways to get Bitcoins - mining it and obtaining it through exchange for a different currency with other Bitcoins users.

¹⁴¹*Who is Satoshi Nakamoto?*, CoinDesk, available at <http://www.coindesk.com/information/who-is-satoshi-nakamoto/>, last seen on 17/10/2017.

¹⁴²*Should You Invest in Bitcoin?*, WALL ST. J., available at <http://online.wsj.com/articles/SB10001424052702304607104579212101356897382>, last seen on 14/10/2017.

¹⁴³*How to Use Bitcoin to Shop at Amazon, Home Depot, CVS and More*, Forbes, available at <http://www.forbes.com/sites/clareoconnor/2014/02/17/how-to-use-Bitcoins-to-shop-at-amazon-home-depot-cvs-and-more/>, last seen on 17/10/2017.

¹⁴⁴*Overstock to Allow International Customers to Pay in Bitcoin*, N.Y. TIMES DEALBOOK, available at <http://dealbook.nytimes.com/2014/08/19/overstock-to-allow-international-customers-to-pay-in-bitcoins/>, last seen on 18/10/2017.

¹⁴⁵*Finance Ministry said to form panel to frame response to the bitcoin issue*, Economic Times, available at <https://economictimes.indiatimes.com/markets/stocks/news/finance-ministry-said-to-form-panel-to-frame-response-to-the-bitcoin-issue/articleshow/62081651.cms>, last seen on 16/12/2017.

¹⁴⁶*How the Bitcoin Protocol Actually Works*, DATA-DR, available at <http://www.michaelnielsen.org/ddi/how-the-bitcoins-protocol-actually-works/>, last seen on 19/10/2017.

¹⁴⁷*How Does Bitcoin Work?*, ECONOMIST, available at <http://www.economist.com/bitcoinexplained>, last seen on 21/10/2017.

The process of mining is simply creating Bitcoins. All Bitcoins transactions are monitored and recorded into an ongoing log called the "blockchain," which verifies that the coins being traded actually belong to that particular owner and can be traded in the way being proposed.¹⁴⁸ This process of recording Bitcoins transactions onto the block chain is known in the cryptocurrency community as "mining"; this is also the way that the currency itself comes into being.¹⁴⁹ A currency has no value if it is available in infinite amount, without any cap. One the similar lines, when the quantity of bitcoin reaches to 21 million the process of mining stop. The solving sequences encryptions and earning Bitcoins then stops.¹⁵⁰ As a result the process mining becomes more and more complex over time and less Bitcoins are awarded with each successful attempt. Despite this, Bitcoins can be further broken down into smaller denominations called 'Satoshis'.¹⁵¹ Consequently, a single Bitcoin can be split into 100 million smaller units.

The second method of obtaining a Bitcoin is by way of exchange. By now, we know that there is no central authority that governs the transaction of Bitcoins or any virtual currency for that matter. However, there are certain procedural measures taken to ensure security in transactions. These measures are not regulatory *per se*; rather a way of ensuring safe transactions between the parties. First, any individual who wants to transact in Bitcoins needs a digital wallet or an application that he downloads on his computer or gains access through the internet.¹⁵² This digital wallet provides the user with a unique two-part address. One part of the address contains information about the user and is kept private, while the other part of the address is publicly viewable and contains information pertaining to when the transaction occurred. This means transactions keep the parties anonymous, but publicly show that a transaction has occurred.¹⁵³

Once a user participates in transacting Bitcoins by using a digital wallet, additional security measures are put in place. The time and public wallet address of each party is recorded when they take part in any exchange.¹⁵⁴ To put in perspective, each Bitcoin which has been transacted carries on it a history of its past transactions, time when the transaction happened, and the public addresses of the parties involved as well.¹⁵⁵ This has twin benefits in the long run. Firstly, the same Bitcoin cannot be used twice, as it is not possible for two transactions to take place at the same time. Secondly, it also preserves a record of past transactions while keeping the identities of the parties involved secret.¹⁵⁶

Even though Bitcoins *prima facie* works as a currency, there exists an inherent lacuna for it to become a perfect currency. Compared with conventional payment systems, Bitcoins lack a governance structure other than its underlying software. This has several implications for the functioning of the system. First, Bitcoins impose no obligation for a financial institution, payment processor, or other intermediary to verify a user's identity.¹⁵⁷ Second, Bitcoins impose no prohibition on sale of any item; in contrast, for example, banks typically disallow all manner of transactions unlawful as per the law of a country. Finally, Bitcoins payments are irreversible as the protocol provides no way for a payer to reverse an

¹⁴⁸ *How the Bitcoin Protocol Actually Works*, Michael Nielsen.org, available at <http://www.michaelnielsen.org/ddi/how-the-bitcoins-protocol-actually-works/>, last seen on 21/10/2017.

¹⁴⁹ *Ibid.*

¹⁵⁰ *Who Needs Paper Anyway?*, BUSINESSLIFE.CO, available at <http://www.businesslife.colFeatures.aspx?id=who-needs-paper-anyway>, last seen on 22/10/2017.

¹⁵¹ Susan Hely, *Pay Your Way with Bitcoins*, available at <http://connection.ebscohost.com/clarticles/89450156/pay-your-way-bitcoins>, last seen on 12/11/2017.

¹⁵² Derek A. Dion, *Note, I'll Gladly Trade you Too Bits on Tuesday for a Byte Today: Bitcoin, Regulating Fraud in the E-Conomy of Hacker-Cash*, 2013 U. ILL. J.L. TECH. & POL'Y 165, 167 (2013).

¹⁵³ *Ibid.*

¹⁵⁴ *Ibid.*

¹⁵⁵ *Ibid.*

¹⁵⁶ *Ibid.*

¹⁵⁷ Rainer Böhme, *Bitcoin: Economics, Technology, and Governance*, Vol. 29, No. 2, *The Journal of Economic Perspectives*, pp. 213-238, 2015, available at <http://www.jstor.org/stable/24292130>, last seen on 30/10/2017.

accidental or unwanted purchase, whereas other payment platforms, such as credit cards, do include such procedures. As discussed in subsequent sections, these design decisions are intentional—simplifying the Bitcoin platform and reducing the need for central arbiters, albeit raising concerns for some users.¹⁵⁸

I. IMPACT ON THE ECONOMY

In recent years Bitcoins is slowly becoming a popular mode of exchange for goods and services. In its capacity as a form of virtual currency, it forms an alternative to the fiat currency discussed earlier. This characteristic of this technology leads to the necessity of considering the impact it has on the economy since in principle it is tapping into the revenue and resources which were traditionally reserved for fiat currency. Different aspects of the impact of the advent of cryptocurrency have been looked at in this paper to understand the implications which this technology could possibly entail for the economy of a country.

Adopting a Keynesian Lens is only appropriate to gather what the libertarian model of crypto currencies has for the financial world. Consider this Thought Experiment – *The existing Medium of Exchange gets limited to Cryptocurrency*. Merits of such an ideology lies in its capacity to extrapolate the viability of the cryptocurrency as the only currency sustaining world economy. Such an analysis fosters better investment decisions and lends states a pragmatic lens from which they can build or unbuild threat perceptions.

Few consequences flow from such a Thought Experiment – *First*, Complete denationalization of currency, which breaks the regime of foreign exchange; *Second* debacle of government spending and welfare state and *Third* uncontrollable market behavior.

Denationalization of Currency and Breaking of Foreign Exchange Regimes:

Many postulate that Bitcoin is already a *de facto* global currency. There are merits of having a global currency such as price stability, reduction in costs for trade and permeability of international services and commodity markets. However, the Euro model explains grave pitfalls of such a system. The absence of parity in growth and spending in nations represent that a global currency like Bitcoin is susceptible to crisis, akin to the Euro Debt Crisis.

The resource asymmetry, which guides geopolitics is another reality which questions the viability of a global currency. Bitcoins have an upper cap of 21 million, which makes the currency free from inflation. With the above assumptions it is easy to presume that oil-producing nations would experience inflow of the crypto currencies while the rest of the world will be left with no means to create new money supply. Fiat money curbs this from happening as the governments have hold over the money supply.

Lastly, inflation (or deflation) depends upon real demand and supply. However, Cryptocurrency does not have the capacity to respond to real markets.

Implication on Welfare State

Bitcoin is an expression of extreme technological libertarianism. This school of thought goes by many names: anarcho-capitalism (or ancap for short), libertarian anarchy, market anarchism. Central to the philosophy is a distrust of states in favor of individuals. Its adherents believe society best facilitates individual will in a free-market economy driven by individual property owners—not governments or corporations—engaging in free trade of that private property.

Ordinarily, money would be sufficient. But currency troubles market anarchists. The central banks that control the money supply are entities of the state. Financial payment networks like Visa are corporations, which aren't much better. That's where Bitcoin and other cryptocurrencies enter the

¹⁵⁸ Ibid.

picture. They attempt to provide a technological alternative to mastercard and banking that would avoid tainting the pure individualism of the ancap ideal.

This makes Bitcoin design different from other technology-facilitated payment systems, like PayPal or Apple Pay. Those services just provide a more convenient computer interface to bank accounts and payment cards. For anarcho-capitalism to work in earnest, it would need to divorce transactions entirely from the traditional monetary system and the organizations that run it. Central banks and corporations could interfere with transactions. And yet, if individuals alone maintained currency records, money could be used fraudulently, or fabricated from thin air. To solve these problems, Bitcoin is backed by mathematics instead of state governments.¹⁵⁹

Uncontrollable Market Behavior

Bitcoins have the tendency of getting into deep cycles of deflation as there is an upper cap to the money supply. In the absence of any financial regulator, there will be no scope for supervising such market risks.

Another peculiar characteristic of Cryptocurrency is its capacity to exist as a Store of Value as well as Medium of Exchange. In situations of inflation, which is plausible only due to an eventual lack of faith in the currency, it can be the case that the value of the Bitcoin as a Medium of Exchange is lower than its store of value.

The systems can be recreated to a manner we dreamed of, by using the power of the digital commons and internet. Through cryptocurrency the economic power of the state economic system gets deposed welcoming a new digital one. This is just the starting stage of an era where the power shift takes place from the hands of the state to the citizens. This can be a challenge to the state and their control on every level of life. This deposition sways away the economy from its current state, which is corrupt and controlled by the political system. Currently, the percent of Bitcoins when compared to the fiat money is very negligible but that might change the fact that we can anticipate.

ILLEGAL USE OF CRYPTOCURRENCY

The fact that Bitcoins are anonymous in nature comes with both disadvantages and advantages. This comment puts forth the premise that the disadvantages of criminal activity and susceptibility to hackers outweigh the advantage it offers like privacy and transparency because of the distributed ledger amongst other things. From time to time, hackers have taken advantage of flaws within Bitcoin software code. In 2010, a group of hackers fraudulently obtained 184 billion Bitcoins by exploiting a flaw in the code, triggering a security breach.¹⁶⁰ It is pertinent to note however that this error was reversed within a few hours and the code was modified to prevent similar flaws in the future¹⁶¹.

One of the biggest security breach for Bitcoin investors occurred in 2014 when an estimated 850,000 Bitcoins¹⁶² went missing from Tokyo-based Mt. Gox, a trading platform that once accounted for 80% of Bitcoin transactions.¹⁶³ This theft which had taken place involved 6% of the Bitcoins then in circulation.¹⁶⁴ Mt. Gox in a statement has said that “A flaw in the Bitcoins software allowed transaction

¹⁵⁹*Cryptocurrency Might be a path to Authoritarianism*, The Atlantic.com, available at <https://www.theatlantic.com/technology/archive/2017/05/blockchain-of-command/528543/>, last seen on 24/10/2017.

¹⁶⁰ Winklevoss Bitcoin Trust, Registration Statement (Form S-1), at 26-38, available at <http://www.sec.gov/Archives/edgar/data/1579346/000119312513279830/d562329dsl.htm>, last seen on 27/10/2017.

¹⁶¹ Ibid.

¹⁶²*Mt. Gox Could Follow Japan Bankruptcy with U.S. Case*, WALL ST. J. BANKRUPTCY BEAT, available at <http://blogs.wsj.com/bankruptcy/2014/02/28/mtgox-could-follow-japan-bankruptcy-with-u-s-case/>, last seen on 18/11/2017.

¹⁶³*Shutdown of Mt. Gox Rattles Bitcoin Market*, WALL ST. J., available at <http://online.wsj.com/news/articles/SB10001424052702304834704579404101502619422>, last seen on 20/11/2017.

¹⁶⁴ Ibid.

records to be altered, potentially making possible fraudulent withdrawals¹⁶⁵.” Customers were not able to withdraw funds during this time.¹⁶⁶ Mt. Gox was initially unable to recover its customer’s money or Bitcoins and filed for bankruptcy in Japan days after the theft.¹⁶⁷ Hours after filing, a U.S. customer filed a class action lawsuit asserting numerous allegations, including fraud, in order to recoup millions of dollars of losses linked to a hacking attack¹⁶⁸. Bitcoin’s anonymity makes it difficult to track transactions, and therefore difficult to reverse and recover fraudulent transactions which have taken place.¹⁶⁹

In the past two and a half years Bitcoins has been synonymous with criminal use on an underground website known as the Silk Road.¹⁷⁰ This website was run through The Onion Router (TOR) network, which is a series of virtual tunnels on the "deep-net" that provide privacy and anonymity to users by concealing the true IP address of each computer within its network.¹⁷¹ The anonymity of the TOR network, coupled with the fact that transactions were paid exclusively in Bitcoins, meant that Silk Road transactions were almost entirely untraceable and anonymous.¹⁷² In September 2013, however, the FBI brought an action against the alleged creator and operator of the Silk Road, Ross William Ulbricht, and shut down the website itself.¹⁷³ The federal government seized 3.6 million Bitcoins, worth approximately 1.6 Billion USD.¹⁷⁴

Bitcoin user did not waste time finding a replacement website operator who announced the revival of the Silk Road publicly via his Twitter account.¹⁷⁵ The Silk Road continued selling the same illegal drugs and merchandise, but with enhanced security measures and "insurance against users losing their Bitcoins."¹⁷⁶

Bitcoin-based investments have also been subject to white-collar crime through Ponzi schemes. In 2013, the SEC charged Trendon Shavers with operating a Ponzi scheme through his investment vehicle Bitcoin Savings and Trust (BTCST).¹⁷⁷ Since 2011, Shavers offered a weekly 7% interest rate from this trust, where he obtained more than 700,000 Bitcoins (amounting to more than 4.5M USD) from

¹⁶⁵*Could Your Holdings Survive the Failure of the NYSE?*, The Conglomerate.org, available at <http://www.theconglomerate.org/2014/02/could-your-holdings-survive-the-failure-ofthe-nyse.html>, last seen on 28/10/2017.

¹⁶⁶ Ibid.

¹⁶⁷*Mt. Gox Could Follow Japan Bankruptcy with U.S. Case*, WALL ST. J. BANKRUPTCY BEAT, available at <http://blogs.wsj.com/bankruptcy/2014/02/28/mtgox-could-follow-japan-bankruptcy-with-u-s-case/>, last seen on 18/11/2017.

¹⁶⁸*Mt. Gox Sued in United States over Bitcoin Losses*, REUTERS, available at <http://www.reuters.com/article/2014/02/28/Bitcoins-mtgoxlawsuit-idUSL1NOLX1QK20140228>, last seen on 11/11/2017.

¹⁶⁹EUROPEAN CENT. BANK, VIRTUAL CURRENCY SCHEMES, available at <http://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf> (noting that Bitcoin's theoretical roots stem from the theory of Austrian Economics), last seen on 21/11/2017.

¹⁷⁰*Feds Nab Alleged Leader of "Silk Road" Online Drug Market*, WALL ST. J. DIGITS, available at <http://blogs.wsj.com/digits/2013/10/02/feds-nab-alleged-leader-of-silk-road-online-drug-market/>, last seen on 24/11/2017.

¹⁷¹Derek A. Dion, Note, *I'll Gladly Trade you Too Bits on Tuesday for a Byte Today: Bitcoin, Regulating Fraud in the E-Conomy of Hacker-Cash*, 2013 U. ILL. J.L. TECH. & POLY 165, 167 (2013).

¹⁷² Sealed Complaint at 4-5, 6, 9-11, United States v. Ulbricht, No. 13 MAG 2328. *Overstock.com Is Going To Accept Bitcoin in 2014*, FORBES, available at <http://www.forbes.com/sites/amitchowdhry/2013/12/21/overstock-com-is-going-to-accept-bitcoins-in-2014>, last seen on 30/10/2017.

¹⁷³ Ibid.

¹⁷⁴*Bitcoin Prices Continue To Fall Following Silk Road Raid in U.S.*, FIN. TIMES available at <http://www.ft.com/intl/cms/s/0/27ca2d60-2b89-11e3-alb700144feab7de.html#axzz2hulNDRdJ>, last seen on 30/10/2017.

¹⁷⁵*Silk Road 2.0 Rises from the Ashes-with Improvements*, NBC NEWS TECH, available at <http://www.nbcnews.com/tech/internet/silk-road-2-0-rises-ashes-improvements-f8C11545412>, last seen on 2/11/2017.

¹⁷⁶ Ibid.

¹⁷⁷Winklevoss Bitcoin Trust, Registration Statement (Form S-1), at 26-38, available at <http://www.sec.gov/Archives/edgar/data/1579346/000119312513279830/d562329dsl.htm>, Last seen on 11/11/2017.

investors.¹⁷⁸ In response to this case and numerous other occurrences of questionable Bitcoin investment offerings, the SEC issued alert cautioning investors about the risks inherent in these investment vehicles.¹⁷⁹

Moreover, tax evasion has resulted from the anonymous nature of Bitcoin use.¹⁸⁰ Because Bitcoin transactions take place between two willing parties and never pass through a financial intermediary, the tax regulatory authorities have no simple way of tracing the transaction.¹⁸¹ Given its untraceable and therefore difficult to tax nature, opponents have labeled Bitcoins as a ‘digital Cayman Islands.’

REGULATORY RESPONSE TO CRYPTOCURRENCY

In order to regulate Cryptocurrency there were a series of failed attempts. Many states and government agencies have already undertaken to try and regulate Bitcoins. The first step involves determining what exactly the asset is that is being regulated. However, the existing efforts to classify Bitcoins have led to a confusing regulatory divergence as to which asset category cryptocurrencies should belong.¹⁸² As a result, there have been various experiments by different countries to regulate virtual currencies by treating them as currency, security instrument, property, etc. USA has been a major player in the history of developing regulatory strategies of Cryptocurrency. To analyze the problem of regulating Cryptocurrency, it is necessary to look into the efforts made by different countries across the world. However, more emphasis is given on the efforts made by USA since it has been one of the front-runners till now.

USA

The United States of America engaged almost every regulatory body for the purpose of regulating cryptocurrencies including the Securities and Exchange Commission, the Commodities Futures Trading Commission, the Consumer Financial Protection Bureau. This was done in a belief that regulation may be needed to protect consumers and the wider financial system due to growth of Bitcoins and other cryptocurrencies. Owing to this understanding, a few steps have attempted to be taken in this direction, but the regulators still have a lot of ground to cover in order to come up with a concrete set of regulations. A number of fundamental questions arise when laws are attempted to be framed or existing laws are sought to be juxtaposed for this new technology. A few of these instances are discussed here. These may help to gain inspiration and help to enhance the existing progress with fundamental changes in law that would be able to regulate Bitcoins and other cryptocurrencies to the best extent possible.

The preliminary question is whether the online currency is legal, given the federal government’s monopoly on issuing legal tender. The answer to this is in the affirmative as the US Constitution only prohibits the states from coining money.¹⁸³ This restriction, which is imposed upon the states is not applicable to private individuals as long as it does not resemble the US Dollar. Therefore, many local currencies are in circulation provided the issued currency does not resemble the legal tender. A case which sheds light on this is of Bernard von NotHaus, who was convicted in 2011 after printing and

¹⁷⁸ Ibid.

¹⁷⁹ Ponzi Schemes Using Virtual Currencies, SEC Investor Alert, Pub. No. 153 (7/13) (2013), available at <http://www.sec.gov/investor/alerts/ia-virtualcurrencies.pdf> last seen on 04/11/2017.

¹⁸⁰ *Digital Currency: A New Worry for Tax Administrators?*, TAX ANALYSTS, available at www.taxanalysts.com/www/features.nsf/Articles/C1A7ED502DD2B84685257AAF0056A2A2, last seen on 06/11/2017.

¹⁸¹ *FBI Raid Heralds Campaign Against Tax Evasion*, Soc’Y TR. & EST. PRAC., available at <http://www.step.org/fbi-raid-heralds-campaign-against-Bitcoins-tax-evasion>, last seen on 08/11/2017.

¹⁸² Evan Hewitt, *Bringing Continuity to Cryptocurrency: Commercial Law as a Guide to the Asset Categorization of Bitcoin*, 39 Seattle U. L. Rev. 619, 640 (2016).

¹⁸³ Jerry Brito and Andrea Castillo, *Bitcoin: A Primer for Policy Makers*, MercatusCenter, George Mason University, available at <https://www.mercatus.org/publication/bitcoin-primer-policy-makers> last seen on 05/11/2017.

distributing a gold-backed currency called the Liberty Dollar. His crime was not that he issued an alternative currency, but that it was similar in appearance to the US dollar and that von NotHaus attempted to spend his currency into circulation as dollars and encouraged others to do so as well.¹⁸⁴ In contrast, Bitcoins is in no danger of being confused with US currency. Once the legality of the currency is established, a attempt would be made to look at the regulations which currently attempt to govern the same.

In 2014, a US Court in *SEC v. Trenton T. Shavers*¹⁸⁵ gave a landmark ruling which recognized that Bitcoins is a currency and that transactions using Bitcoins are akin to currency transactions and that the Courts have jurisdiction to hear the cases involving Cryptocurrency transactions. As held by Judge Mazzant, “Cryptocurrency (expressly Bitcoins) can be used as money (it can be used to purchase goods and services, pay for individual living expenses, and exchange for conventional currencies), it is a currency or form of money. This ruling allowed for the SEC to have jurisdiction over cases of securities fraud involving Cryptocurrency. It was a case where the owner, Trenton Shaver had solicited funds from his investors on the false notion that an interest of 7 percent a week would be provided to them. In pre-trial motions, the court looked at the issue whether the interests in BTCST were investment contracts under the federal securities law. Because investors paid for the interest in Bitcoins, Shavers argued that Bitcoins were not currency and the interests did not result an investment of money. The court held that the investments in BTCST were in fact securities. This judgment has changed the way Bitcoins or Cryptocurrency is perceived in the US.

In the case of *Faiella*¹⁸⁶ the court held Bitcoins is money during a case which sought to assess whether Charlie Shrem, CEO of defunct Bitcoins exchange Bit-Instant, allegedly acted with Robert Faiella to supply Bitcoins to Silk Road users. The two were charged with two counts of operating an unlicensed money transmitting business, one count of money laundering conspiracy and one count of willful failure to file a suspicious activity report. The Judge rejected Faiella’s reasoning that Bitcoins are not money and that his money transmission charges should subsequently be cleared, saying “*Money in ordinary parlance means ‘something generally accepted as a medium of exchange, a measure of value, or a means of payment.’ It was further noted that, Bitcoin clearly qualifies as ‘money.’*” The trial culminated in both defendants pleading guilty to the charges, ultimately agreeing to pay nearly \$1 Million in fines.

IN 2013 The Financial Crimes Enforcement Network (FinCEN) of the US government classified Bitcoins as a convertible decentralized virtual currency.¹⁸⁷ FinCEN subsequently issued guidelines for cryptocurrencies in 2014. The issued guidelines contain an important caveat for Bitcoins miners: it warns that anyone creating Bitcoins and exchanging them for fiat currency are not necessarily beyond the reach of the law. It states, “*A person that creates units of convertible virtual currency and sells those units to another person for real currency or its equivalent is engaged in transmission to another location and is a money transmitter.*”¹⁸⁸ Furthermore, US Internal Revenue Service (IRS) in the same year had clarified that Bitcoins will be treated as ‘property’ for tax purpose as opposed to ‘currency’. This means Bitcoins will be subject to capital gains tax. One positive aspect of this ruling is that it puts to rest the varying debates revolving around the legality of Bitcoins. No longer do investors need to worry that

¹⁸⁴ *Protecting Us From A 'Terrorist' Who Made Pure Silver Coins: The Bernard von NotHaus Case*, FORBES, available at <https://www.forbes.com/sites/georgeleef/2014/12/09/protecting-us-from-a-terrorist-who-made-pure-silver-coins-the-bernard-von-nothaus-case/#60c771df64f3>, last seen on 09/11/2017.

¹⁸⁵ *Securities and Exchange Commission v. Trenton T. Shavers and Bitcoin Savings and Trust*: Civil Action No. 4:13-CV-416, (E.D. Tex. Sept. 18, 2014)

¹⁸⁶ *United States of America v. Faiella et al*, Criminal 14 Cr.243 (JSR).

¹⁸⁷ Financial Crimes Enforcement Network. (FinCEN). 2013. available at https://www.fincen.gov/news_room/testimony/html/20131119.html, last seen on 15/11/2017.

¹⁸⁸ *FinCEN Declares Bitcoin Miners, Investors Aren't Money Transmitters*, CoinDesk, available at <http://www.coindesk.com/fincen-bitcoin-miners-investors-money-transmitter>, last seen on 18/11/2017.

investments or profit made from Bitcoins are illegal or the processes to follow in order to report them to the IRS if the need arises.¹⁸⁹

While there have been several judgments in US courts in favor of and against recognizing Cryptocurrency, until a Supreme Court ruling arrives, the States would have to comply with the rulings of their respective courts. However, the US Legislature needs to improve their laws regulating Bitcoins and other Cryptocurrency in order to bring about clarity and disentangle the existing cloud created by various rulings and Anti-money laundering as well as Tax Laws.

These varying outlooks add fuel to the fire regarding the debate whether crypto currencies like Bitcoins ought to be seen as a form of legal tender in which transactions can take place along with punishment for breach of such contracts or not. Moreover, the actions discussed above make it evident that most the existing laws do not have any provisions to regulate cryptocurrencies. Even the attempt of applying existing laws have brought upon more debates which would need to be resolved. The legislative authorities specifically in the USA have a Herculean task before them as Bitcoins and other virtual currencies gather popularity. Not having a specific statute dedicated to this new technology can be detrimental to the financial and legal players.

GERMANY

BaFin, the German Federal Financial Supervisory Authority had issued a communication on Bitcoins in 2013 which is the first noted step towards regulation of cryptocurrency there¹⁹⁰. In Germany Bitcoins have been classified as a financial instrument but not of a currency¹⁹¹. The Federal Ministry of Finance discussed briefly the tax treatment of Bitcoins in a statement as well. The ministry has discussed the possibility of levying value-added tax liability for Bitcoins transfers, lack of long term capital gains liability for Bitcoins that are held for more than a year.¹⁹² No specific nomenclature has yet been ascribed to crypto-currencies though till date.

BRAZIL

Law No. 12865, enacted by Brazil on October 9, 2013, indicated the possibility for creation of electronic/virtual currencies, including Bitcoins, was introduced. *Inter alia* the law laid down the kind of payment systems and payment arrangements that are included in the Brazilian Payment System (Sistema de Pagamentos Brasileiro, SPB).¹⁹³“Payment institution” is defined as a legal entity that, by adhering to one or more payment arrangements, has as a principal or secondary activity, alternatively or cumulatively, one of the activities listed in Article 6(III). “Electronic currency” is defined as resources stored on a device or electronic system that allow the end user to perform a payment transaction.¹⁹⁴ These steps however have not yet culminated in a final resolution regarding the same.

United Kingdom

The Bank of England has published no statement clarifying its position on Bitcoins. Although, Bitcoins has been expressly excluded in the latest quarterly reports published.¹⁹⁵It has been indicated by the HMRC (The UK customs and tax department) that Bitcoins will be considered as ‘single purpose

¹⁸⁹3 *Reasons The IRS Bitcoin Ruling Is Good For Bitcoin.*, NASDAQ. available at <http://www.nasdaq.com/article/3-reasons-the-irs-bitcoin-ruling-is-good-for-bitcoin-cm339333>, last seen on 24/11/2017.

¹⁹⁰Kreditwesengesetz [Banking Act] (updated Sept. 9, 1998), Bundesgesetzblatt I at 2776, as amended, See <http://www.gesetze-im-internet.de/kredwgl/index.html> (Ger.), last seen on 07/12/2017.

¹⁹¹Deutschland erkennt Bitcoin als privates Geld an [Germany Recognizes Bitcoin as Private Money], Frankfurter Allgemeine Zeitung, <http://www.faz.net/aktuell/finanzen/devisen-rohstoffe/digitale-waehrung-deutschland-erkennt-bitcoin-als-privates-geld-an-12535059.html>, last seen on 07/12/2017.

¹⁹²See, <http://www.skatteetaten.no/no/Radgiver/Rettskilder/Uttalelser/Prinsipputtalelser/Bruk-av-Bitcoin--skatte--og-avgiftsmessige-konsekvenser/>), last seen on 07/12/2017.

¹⁹³Lei No. 12.865, de 9 de Outubro de 2013 [Law No. 12,865 of October 9, 2013], available at <http://www.receita.fazenda.gov.br/Legislacao/leis/2013/lei12865.htm> (Braz.), last seen on 09/12/2017.

¹⁹⁴Ibid.

¹⁹⁵“UK Eliminates Tax on Bitcoin Trading, Publishes Official Guidance”, CoinDesk, available at <http://www.coindesk.com/top-uk-tax-agency-eliminate-20-levy-bitcoin-trading/>, last seen on 09/12/2017.

vouchers'.¹⁹⁶ This classification will render a levy of VAT extending up to 10-20% on the sale of Bitcoins. This move has been vehemently criticized by those involved in the sale of Bitcoins alleging that this would lead to a tremendous slowdown in the UK Bitcoins industry.¹⁹⁷ This move is indicative of the intent to treat Bitcoins as a tax instrument.

INDIA – A WINDOW OF OPPORTUNITY

Currently there are no laws laid down by the Central Government, which regulate the use of Bitcoins and other cryptocurrencies in India albeit coupled with the fact that this digital currency is not considered legal.¹⁹⁸ However, the Indian government has been working on creating a legal framework for Bitcoin and other digital currencies.

One of the prime reasons for this is that Bitcoins trading in India has been steadily increasing to become over US\$3.5 million recently in September of 2017, following a steady rise in domestic usage. While a monthly trading volume of US\$3.5 million may seem insignificant in juxtaposition to global trends – the U.S. Bitcoins trading volume for the same month exceeded US\$36 million – the figure demonstrates India's growing interest in Cryptocurrency.¹⁹⁹ Another reason which can be attributed to the rise of Bitcoins in India is due to the Modi-led government's demonetization of 86 percent of paper currency which took place in November 2016.

The reason for this is twofold²⁰⁰:

First, demonetization forced many Indians holding onto large amounts of untaxed, black money to quickly find new, novel ways of laundering money in order to avoid both taxation and government scrutiny. Bitcoin became an ingenious way to hide money from the purview of the state: would-be money launders could simply purchase large quantities of Bitcoins with old rupee notes, then sell them back later for newly minted, legal currency.

Secondly, and more importantly, demonetization showed Indian citizens that they could not trust the government to uphold the value of money. As journalist and novelist John Lanchester explains in an essay on Bitcoins, *"The value of fiat money is an act of faith"*. By turning the vast majority of India's fiat currency into valueless paper overnight, the Indian government broke that faith.

For tech-savvy Indians, Bitcoin, became an attractive alternative to government controlled currency. However, the popularity and the usage of this currency has not been much till now. Despite the demonetization-driven spur in Bitcoins purchases in India, Cryptocurrency usage remains peripheral. Though its price is volatile in nature, Bitcoin is consistently more expensive in India than rates on the international market – by 5 to 10 percent. This is largely because India lacks Bitcoins 'mining' capacity, the excruciatingly slow and energy intensive means of generating new Bitcoins through the verification

¹⁹⁶*The Challenge of Being a Bitcoin Trader*, Financial Services Club Blog (Nov. 13, 2013), The Finanser.co.uk, available at <http://thefinanser.co.uk/fsclub/2013/11/the-challenge-of-being-a-bitcoin-trader.html>, last seen on 14/11/2017.

¹⁹⁷ Stan Higin, *Proposed US Law Calls For Five-Year Moratorium on Bitcoin Regulation*, CoinDesk, available at <http://www.coindesk.com/proposed-us-moratorium-bitcoin-regulation>, last seen on 09/12/2017

¹⁹⁸*Government doesn't recognise bitcoin as legal: FM Arun Jaitley*, Economic Times, available at <https://economictimes.indiatimes.com/markets/stocks/news/government-doesnt-recognise-bitcoin-as-legal-fm-arun-jaitley/articleshow/61873558.cms> last seen on 30/10/2017.

¹⁹⁹*"Cryptocurrency in India: Usage and Regulation"*, Indiabriefing.com, available at: <http://www.indiabriefing.com/news/cryptocurrency-bitcoins-india-usage-regulation-15343.html/>, last seen on 11/11/2017.

²⁰⁰ Ibid.

of sophisticated algorithms. Furthermore, Indian nationals struggle to buy Bitcoins from foreign exchanges due to government restrictions on cross-border currency flows.²⁰¹

However, a growing domestic Cryptocurrency ecosystem and favorable government regulations could make Bitcoins more accessible to middle class Indians, setting the stage for a digital gold rush.²⁰² This is also in consonance with the objectives of the Prime Minister of launching the Digital India campaign. The aim of demonetization and propagation of cryptocurrencies has also been the attempt to shift the economy to a paperless system along with the other objectives which have been laid down above.

The Reserve Bank of India (RBI) has not exactly been shy in recognizing and even regulating technological advances in the financial sector as is evident from their detailed guidelines on Internet Banking²⁰³, Prepaid Payment Instruments²⁰⁴ Account Aggregator Regulations²⁰⁵, and the consultation paper on proposed regulations for P2P lending platforms²⁰⁶, etc. However, though the RBI has acknowledged the existence of Bitcoins (it issued a note cautioning the public against dealing in virtual currencies including Bitcoins way back in 2013²⁰⁷ and again in 2017²⁰⁸), there have been no clear guidelines regarding the same. Nevertheless, Bitcoins has come a long way since its inception and a consensus is emerging amongst the more technically inclined individuals that Bitcoins is in fact here to stay.

However, a small step in this regard was an attempt by the government of India to finalize as of early August 2017, the draft proposal recommending how to regulate the use of digital currencies in the country effectively. The plan was already submitted by the intergovernmental panel that was formed in April 2017 for said purpose to the Indian Ministry of Finance. The contents of the draft proposal are relatively unknown, but based on earlier reports, some of the members of the panel have proposed that the Indian government should introduce some kind of a tax policy for the cryptocurrencies.²⁰⁹

Many observers assume that Cryptocurrency will come under the gambit of the RBI, though Digital Currency Exchanges may also have to register under the Securities and Exchange Board of India (SEBI). The Indian government will most likely make Cryptocurrency taxable and create guidelines for Initial Coin Offerings (ICO) in which Cryptocurrency ventures raise funds in Bitcoins and other digital monies.

A central concern for the Bitcoins community in India, however, is how the government will define Cryptocurrency. Though referred to in terms of currency, given its slow transaction times and volatile value, Bitcoins operates more like an asset. A decision to classify it as a currency instead of an asset would necessitate a large regulatory apparatus – constituting a serious discouragement for Bitcoins usage in India.

²⁰¹ Ibid.

²⁰² Ibid.

²⁰³ <https://www.rbi.org.in/scripts/NotificationUser.aspx?Id=414&Mode=0>

²⁰⁴ <https://rbi.org.in/scripts/NotificationUser.aspx?Id=10799&Mode=0>

²⁰⁵ https://www.rbi.org.in/scripts/BS_ViewMasDirections.aspx?id=10598

²⁰⁶ <https://rbi docs.rbi.org.in/r docs/content/pdfs/CPERR280416.pdf>

²⁰⁷ https://rbi.org.in/scripts/BS_PressReleaseDisplay.aspx?prid=30247

²⁰⁸ https://rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=39435

1. ²⁰⁹ ***‘INDIA COMPLETES DRAFT PROPOSAL FOR CRYPTOCURRENCY REGULATIONS’***, COINTELEGRAPH.COM, AVAILABLE AT [HTTPS://COINTELEGRAPH.COM/NEWS/INDIA-COMPLETES-DRAFT-PROPOSAL-FOR-CRYPTOCURRENCY-REGULATIONS](https://cointelegraph.com/news/india-completes-draft-proposal-for-cryptocurrency-regulations), LAST SEEN ON 16/11/2017.

Though there is still no clarity on who, how and what the law relating to crypto currencies passed by the Indian Government would entail, previous reports and speculations are present which give us some indication of what to expect. Hence, if Bitcoins are legalized in India, there is probability of the following framework being made applicable²¹⁰:

- Bitcoins could fall under the purview of RBI's 1934 Act.
- Bitcoins investors could be taxed under Goods and Services Tax.
- RBI could issue guidelines regarding investment and purchase of Bitcoins.
- If any foreign payment is made through Bitcoins, it could fall under the purview of FEMA.
- Returns from investment in Bitcoins would be taxed (Capital gains tax).

Apart from this, the debate surrounding crypto currencies in India is also a buzz with the possibility of the Indian Government creating its own form of digital currency to compete with the Bitcoin called 'Lakshmi' (named after the Hindu goddess of wealth and fortune). If this speculation does become a reality it would add a whole new dimension to the debate in India. However, in order to make this a reality the government will have to overcome a herculean task of alleviating the concern of the critics who are of the opinion that this would be a largely unproductive strategy, given that the appeal of crypto currency is its independence from governments.

Suggested regulatory framework for India

The search for a regulatory framework for Bitcoins has become pertinent in recent times. Owing to this, the viability and legality of making Bitcoins come under the purview of taxation is garnering support. The form of taxation i.e. direct or indirect is a conundrum which is yet to materialize into an applicable regulatory framework. Bitcoins may not qualify as currency or money as it is not a legal tender for Indian indirect tax laws, therefore, VAT (value-added tax) or GST implications may arise.²¹¹ However, the possibility of GST being made applicable to buying of Bitcoins is not there. But the transaction fee for purchase or sale of Bitcoins or the underlying transaction for which it is used will be liable to GST. Owing to GST (indirect tax) implications not being distinct, subjecting Bitcoins to direct taxation is suggested for India. Gains from Bitcoins would attract taxation, depending on categorization of the gains either as business income or capital gains. Applying capital gains tax should be the preferred framework to follow with regard to Bitcoins especially on the tax front. Long-term capital gains tax at 20% would be levied if Bitcoins were held for at least 36 months. In all other cases, short-term capital gains tax at 30% would be applicable.²¹²

It is pertinent to note that tax is only one aspect of the regulatory issue. While applying taxation policies to profits, it is also imperative to regulate the Bitcoins operating framework holistically too which is a role which the RBI could handle. Since Bitcoins is a decentralized Cryptocurrency, it is impossible to regulate it through one single centralized point for all transactions. Neither is it practically possible to regulate each and every Bitcoins user. A pragmatic compromise between these two extremes is

²¹⁰ "Indian Government Mulling Legalising Bitcoin Cryptocurrency In India", available at <https://inc42.com/buzz/Bitcoins-cryptocurrency-india-government/>, last seen on 18/11/2017.

²¹¹ *Tax Dept Starts Probe Into Bitcoin Exchanges To Ascertain Rate They Can Be Taxed Under GST*, Economic Times, available at <https://economictimes.indiatimes.com/news/economy/policy/tax-dept-starts-probe-into-bitcoin-exchanges-to-ascertain-rate-they-can-be-taxed-under-gst/articleshow/62090482.cms>, last seen on 16/12/2017.

²¹² *See Mega bitcoin gains come with megabyte tax*, Economic Times, available at <https://economictimes.indiatimes.com/news/economy/policy/mega-bitcoin-gains-come-with-megabyte-tax/articleshow/62014373.cms>, last seen on 16/12/2017.

suggested to regulate the points at which fiat currency or valuable goods enter the Bitcoins system, i.e. the Bitcoins exchanges where people may buy and sell Bitcoins for fiat money, or websites which offer Bitcoins as a mode of payment. Such an approach would reduce the number of intermediaries and lead to effective enforcement of the regulations. The regulations may require any entity providing services such as buying and selling of Bitcoins for actual money, trading in Bitcoins (such as non-cash exchanges) or providing other Bitcoins related services (such as Bitcoins wallets, remittance facilities, etc.) to be registered with a central government agency, preferably the Reserve Bank of India.

One legal issue stemming from the regulation of companies transacting in Bitcoins is whether the RBI has the authority or jurisdiction to regulate Bitcoins in the first place. Without getting into whether it is a dangerous trend or not, an easy way in which the RBI could ensure it has the authority to regulate Bitcoins would be to follow the path that the RBI adopted while regulating Account Aggregators under the Non-Banking Financial Company - Account Aggregator (Reserve Bank) Directions, 2016 wherein the RBI declared Account Aggregators as Non-Banking Finance Companies under section 45-I(f)(iii) thereby getting the authority to regulate and supervise them under section 45JA of the Reserve Bank of India Act, 1934.²¹³

The Regulations, once issued by the Reserve Bank of India, can prescribe mandatory registration, capital adequacy provisions, corporate governance conditions, minimum security protocols, Know Your Customer (KYC) requirements and most importantly provide for regular and ongoing reporting requirements as well as supervision of the Reserve Bank of India over the activities of Bitcoins companies.

Any proposed Bitcoins regulatory framework would seek to address certain issues out of which the three mentioned here are central points of concern:

- Security of the consumer's property and prevention of fraud on the consumer. In the technology sector this translates into specific emphasis on increased security (against hacking) for accounts that the consumers maintain with the service provider.
- India has robust exchange control laws and the inherently decentralised and digital nature of Bitcoins can enable transfer of value from one jurisdiction to another without any oversight by a central agency, potentially violating the exchange control laws of India.
- Bitcoins has for long been associated with criminal and nefarious activities, in fact many believe that the famous black-market website "Silk Road" played a big role in making Bitcoins famous²¹⁴ and therefore preventing Bitcoins from being used for illegal activities (or creating a mechanism to ensure a digital trail to help investigations post facto) would be a major issue that the regulations would seek to tackle.

If the regulations provide for minimum capital adequacy requirements as well as registration by the RBI or some other central agency, then the chances of consumers being duped by "fly-by-night" operators would be significantly reduced. The Regulations can also provide for minimum security protocols to be maintained by the companies. Critics may point to the hacking of various Bitcoin exchanges in the recent past, including that of MtGox, discussed earlier in the paper, and argue that the security protocols may not be enough to prevent future instances of hacking. But that is true even for the

²¹³ Section 45JA of the Reserve Bank of India Act, 1934.

²¹⁴ See generally, Nathaniel Popper, "Digital Gold: Bitcoin and the Inside Story of the Misfits and Millionaires Trying to Reinvent Money", Harper Collins, 2015., last seen on 08/12/2017.

current security protocols for online banking; and that has not prevented a large number of banks from providing online banking facilities and the RBI regulating the same. The other vital issue that legally mandated security protocols would address (and potentially solve) is the issue of liability in case of hackings. Regulations may provide clarity on this issue and protect innocent customers from negligent companies while at the same time protecting entrepreneurs by defining and limiting the liability for *bona fide* and vigilant companies.²¹⁵

The other issue that may be of major concern to the authorities is exchange control. India has extremely specific exchange control laws, and if any person in India wants to transfer any amount to any person overseas, the only legal way to do so is through a bank transfer, which requires filling paperwork giving the reason for the transfer. This means that all transfers outside India are done through proper banking channels and are therefore under the supervision of the RBI. However, the decentralized nature of Bitcoins enables individuals to transfer money outside the borders of India without going through any banking channels and hence stay completely outside the purview of the RBI's supervision. Such a system which lets users transfer money beyond national borders outside legal banking channels could be easily misused by nefarious actors and this is exactly what happened as international drug cartels turned to Bitcoins and other digital currencies to move their ill-gotten wealth beyond the borders of various countries.²¹⁶ Regulating the entities which provide Bitcoins wallets and Bitcoins exchanges will ensure that the RBI can exercise its supervisory jurisdiction over Bitcoins transactions of individual customers even though these transactions do not go through the regular banking channels. The Regulations could impose an obligation on the companies to provide information on any suspicious activities or information about accounts which see very high volumes, etc. to ensure that Bitcoins is not used to finance organized crime. Thus, the regulations could have provisions that would require the companies providing the Bitcoins wallets or exchanges to flag and monitor customers whose trading accounts or Bitcoins wallets have transactions of an amount greater than a specified limit. This would provide the RBI with the ability to enquire as to the reasons for such high volumes and weed out illegal transactions while at the same time allowing *bona fide* transactions to continue.²¹⁷

Thus, a taxation regime synchronized with overall regulation of the Bitcoins eco-system through a symbiotic relationship between the tax authorities and the RBI, can aid the government to deal with the perplexities of the labyrinth of issues which the rise of Bitcoins has thrown up more so in the last year than ever.

CONCLUSION

The need to regulate draws from the observations, which prove that Cryptocurrency is prone to serious frauds and ought to be limited in terms of usage as it possesses the capacity to destabilize economies. Owing to the forgoing, the institutions in India ought to take on the responsibility of regulating Cryptocurrency, even though at its very core, Cryptocurrencies aim to be free of government

²¹⁵*Regulating Bitcoin in India*, CIS-India.org, available at <https://cis-india.org/internet-governance/blog/regulating-bitcoin-in-india>, last seen on 05/12/2017.

²¹⁶*Are Bitcoins the Criminal's Best Friend?*, Bloomberg.com, available at <https://www.bloomberg.com/view/articles/2013-11-18/are-bitcoins-the-criminal-s-best-friend->, last seen on 09/12/2017.

²¹⁷*Regulating Bitcoin in India*, CIS-India.org, available at <https://cis-india.org/internet-governance/blog/regulating-bitcoin-in-india>, last seen on 05/12/2017.

intervention. The dilemma regarding the regulation of Cryptocurrency has been prevalent for quite some time now.

There have been divergent views present globally which have been discussed earlier in this paper on not only how to regulate this new technology, but which arena of the financial and legal sectors does this new currency conform to. This is evident by the dilemma the United States of America is still grappling. While the Internal Revenue Service is keen on putting Cryptocurrency under the garb of property and making it taxable, the SEC is of the opinion to consider this currency as a security and subject it to its own framework of regulation. The example of the United States of America is substantive enough to put into perspective the complexities which surrounds not only the framing of regulations but also the organization which would be entrusted with this task.

However, there are critics who believe that regulation or 'overregulation' of crypto-currencies would defeat the sole purpose of creating Cryptocurrency. These individuals believe that Cryptocurrencies should remain part of an unregulated free market in which supply, and demand attach a value to Bitcoins and any price fluctuation should work themselves out and stabilize through market forces. The argument for no regulation ignores the reality that the price of Cryptocurrencies is too volatile in the free market to compete with other stable national currencies. If the goal were to create a localized and specific hobby market that does not aim to trade and compete with other national currencies in the foreign exchange markets, no regulation would be necessary. However, this is not the case.

The need for regulation is becoming more of a necessity from being an option in yester years especially in light of what is being considered as the first case of Bitcoins fraud in India.²¹⁸ India in its attempt to become a global superpower in the times to come needs to make rapid progress in every sphere of development including technology intertwined with the financial sector. The advent and increasing popularity of Bitcoins is a golden opportunity for India to harness and be the torch bearer for this technology. It can look at the mistakes made by other countries and develop its own regulatory framework from the experience of other nations. This paper suggests a few policy considerations and methods to overcome challenges, which the regulatory authorities in India may face in their journey to regulate Cryptocurrency while at the same time maintaining the novelty of the same. The government should not shy away from this herculean task but instead take it as a spoke in the wheel of overall development and take it to a successful conclusion. This is becoming more imperative day by day since Cryptocurrency, specifically Bitcoins rocketed to a lifetime high well above \$16,000 quite recently in the beginning of December 2017.²¹⁹

²¹⁸*This may be the first Bitcoin scam in India*, Gadgetnow.com, available at <https://www.gadgetsnow.com/tech-news/this-may-be-the-first-bitcoin-scam-in-india/articleshow/62078523.cms>, last seen on 18/12/2017.

²¹⁹*Bitcoin blows past \$16,000, alarm bells ring louder*, Gadgetnow.com, available at https://www.gadgetsnow.com/tech-news/bitcoin-blows-past-16000-alarmbellsringlouder/articleshow/61974398.cms?utm_source=toiweb&utm_medium=referral&utm_campaign=toiweb_hp_widget, last seen on 15/12/2017.

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