

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

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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:

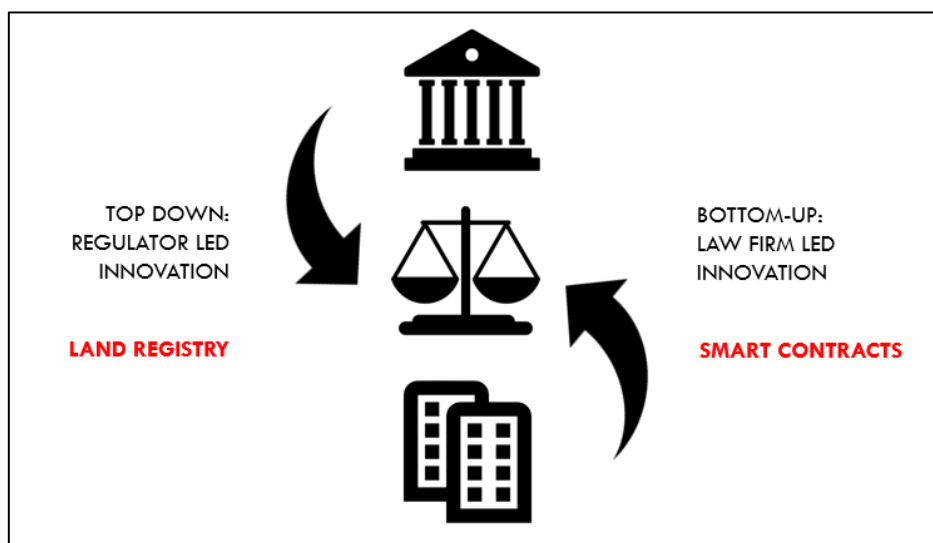
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² Rebecca Campbell, *Blockchain & Smart Contracts Could Spell Doom for Corporate Law Firms*, *cryptocoinsnews* (20/06/2016), available at <https://www.cryptocoinsnews.com/lawyers-prepare-for-driverless-ma-as-smart-contract-era-dawns/>, last seen on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

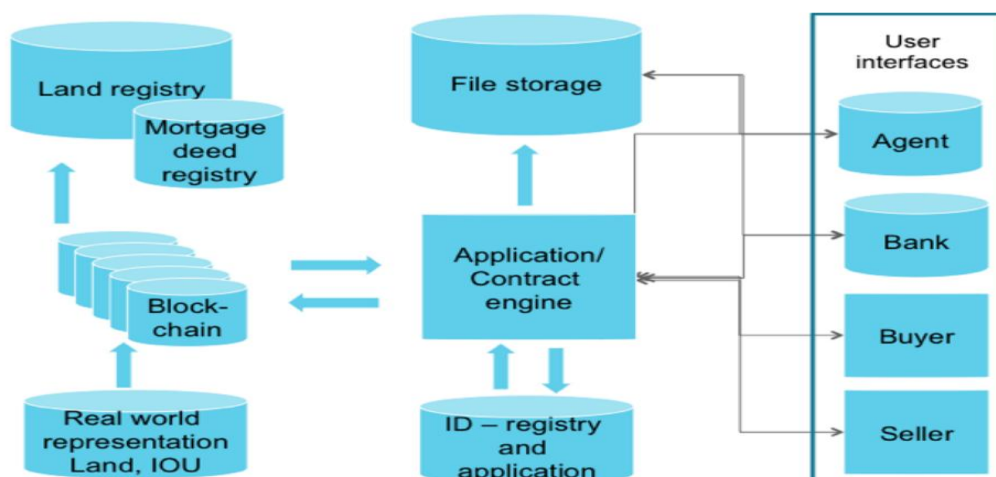
Below is a diagrammatic representation of the Lantmäteriet's blockchain solution.¹⁰

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).

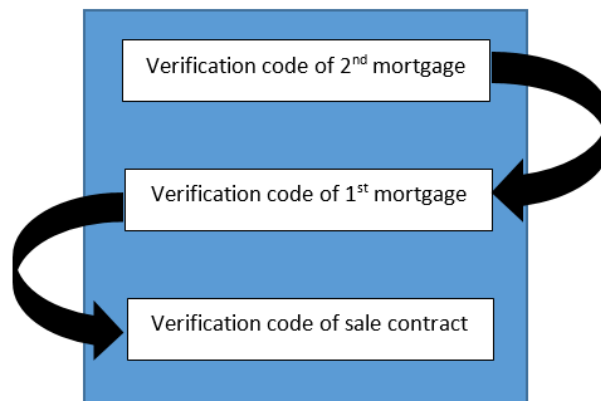
Reduces risk of property fraud

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.

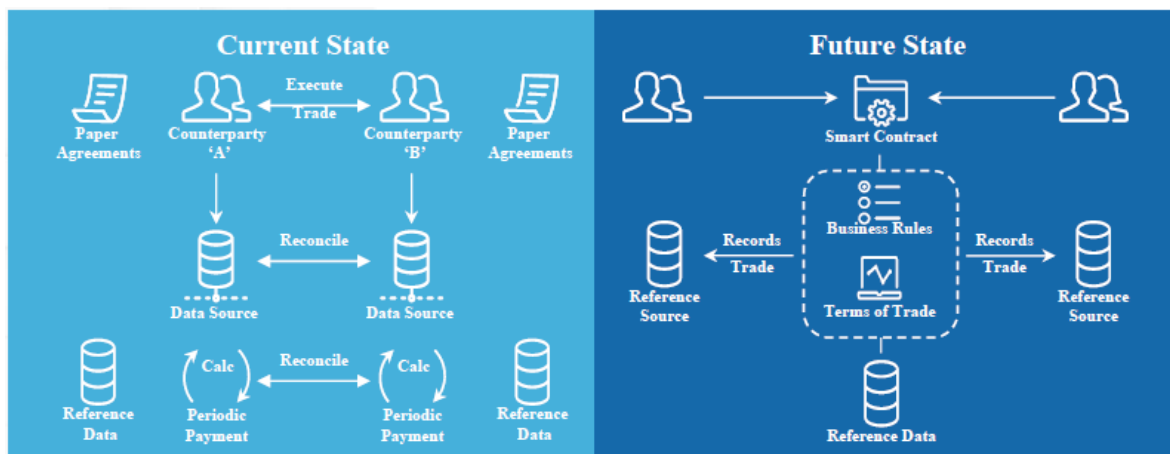
Potential Applications

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

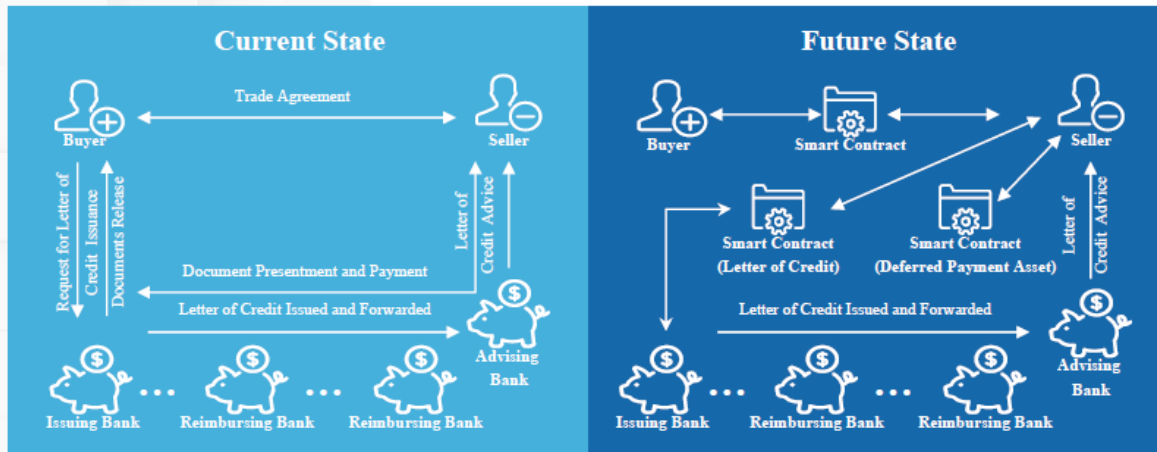
<http://www.the-blockchain.com/docs/Smart%20Contracts%20-%2012%20Use%20Cases%20for%20Business%20and%20Beyond%20-%20Chamber%20of%20Digital%20Commerce.pdf>, last seen on 05/12/2017

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

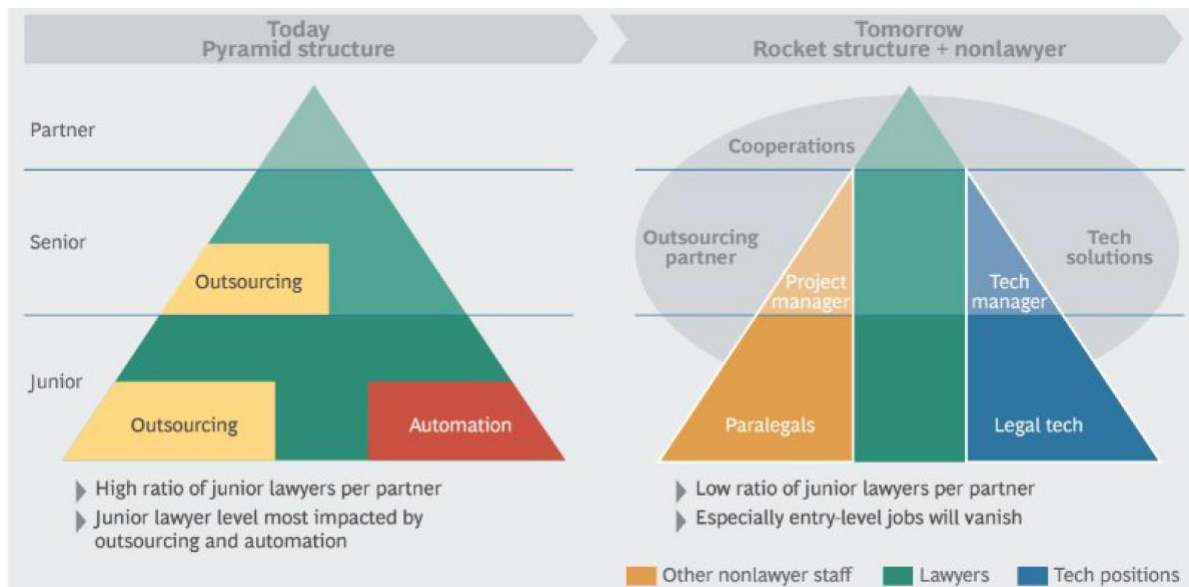
³¹ Frost Brown Todd, *Frost Brown Todd Creates Smart Contract App for Software Escrow Agreements*, Frost Brown Todd (22/05/2017), available at <http://www.frostbrowntodd.com/newsroom-press-frost-brown-todd-creates-smart-contract-app-for-software-escrow-agreements.html>, last seen on 05/12/2017

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)