

BLOCKCHAIN: THE PROMISE OF SMART CONTRACTS

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Years ago, no one seriously considered computers capable of being more than work tools. Yet, technology has proven us wrong and today, many are sounding alarm bells about our jobs being done by computers. This article discusses what blockchain is, and its potential application in contract law.

I. WHAT IS BLOCKCHAIN?

The most well-known application of blockchain is the Bitcoin. As explained by the Wall Street Journal,¹ “it is a data structure that makes it possible to create a digital ledger of transactions and share it among a distributed network of computers. It uses cryptography to allow each participant on the network to manipulate the ledger in a secure way without the need for a central authority.” New entries can only be made if other network participants verify their validity. All users are involved in maintaining its integrity.

A. What makes it so different from current technologies?

The key difference is that blockchain is not managed centrally. To manage financial transactions, banks and credit card companies like Visa maintain a central group of servers to process all transactions on the system. If there is any issue, the owner of the system can take the initiative and implement changes. Blockchain is the opposite, with its pointedly anti-establishment

¹ Steven Norton, “CIO Explainer: What Is Blockchain?”, *The Wall Street Journal* (2 February 2016), online: <blogs.wsj.com>.

structure. There is no central authority who can make immediate changes. All users must agree before the blockchain can be modified or updated. Being a decentralised system, there is no one authority or owner of the system that can be pinpointed in the event of system outages.

B. How does it work? What are some of its uses?

Since the system does not operate from a central unit, or group of units, it promises increased resilience and security. That is why financial institutions are interested in the blockchain. Currently, blockchain is used largely by virtual currencies like Bitcoin and Ether. While some proclaim a detest of overreaching central banks, one key draw for users is increased privacy, leading to Bitcoin's popularity in online black markets. One example is Silk Road,² which in various incarnations has been shut down by the FBI for facilitating illegal drugs sales.

II. RELEVANCE TO CONTRACT LAW

While the legal questions surrounding Bitcoin and its exploitation for crime frequently feature on the news, the blockchain's innate recording function is often overlooked. From a legal perspective, this function can alter the application of contracts in the future, in particular, streamlining contractual transactions to minimise potential breaches

Ethereum is a blockchain that records "smart contracts" instead of currency transactions. Contracting parties can record their contracts in in the blockchain. These are "smart contracts" as they can be programmed to execute certain actions when conditions are fulfilled, such as making a payment to a supplier monthly. Ethereum is touted to automate contracts, since all contracts are created using a standard set of tools on the platform and can execute themselves without continual human input.

This standardisation and automation can sidestep interpretation difficulties while preventing unscrupulous parties from backing out and denying that a contract was ever agreed on. This will make the enforcing of contracts more straightforward, possibly at the cost of reducing the legal

² "Shedding light on the dark web", *The Economist* (16 July 2016), online: <www.economist.com>.

manpower required for contract work. This streamlining of contracts will incentivise parties to enter them, which is beneficial for business.

III. DRAWBACKS OF THE BLOCKCHAIN

Although there are real benefits of blockchain-based contracts, various drawbacks mean that drastic changes to the current situation are not likely to happen soon. Decentralising the blockchain across all members effectively increases the cost for them. Blockchain requires a significant amount of computing power, which used to be taken care of by a central authority's servers and data centres. Encoding fixed contracts into the blockchain also appear to be at odds with the free, flexible nature of contracts, which is essential for commercial decisions and transactions in the economy.

Furthermore, a common problem in blockchain implementations is while they are secure, they are often much slower than systems we have today. In the case of "smart contracts", the blockchain can only execute a contract after checking the entire database for the required information.³ Unlike other inventions like web search which can run concurrently, this means that contracts over the whole world can only be processed one at a time.⁴ This is abysmally slow when you compare it to Visa's processing capacity of 56,000 simultaneous transactions per second. Meanwhile, blockchain's average confirmation time has been anywhere from 25 minutes to 74 minutes per transaction for the first two weeks of December.⁵

Finally, blockchain has yet to prove itself as a truly safe platform. As blockchain is coded by humans, it is susceptible to bugs just like other software products.⁶ Hackers have exploited such

³ Gideon Greenspan, "Smart contracts make slow blockchains" (5 November 2015), *Multichain Blog* (blog), online: <www.multichain.com/blog/2015/11/smart-contracts-slow-blockchains/>.

⁴ David Gilbert, "Bitcoin's Big Problem: Transaction Delays Renew Blockchain Debate", *International Business Times* (4 March 2016), online: <www.ibtimes.com>.

⁵ "Average Confirmation Time", *Blockchain*, online: <blockchain.info/charts/avg-confirmation-time> .

⁶ "Not-so-clever contracts", *The Economist* (30 July 2016), online: <www.economist.com>.

bugs to steal large sums of Bitcoin from popular exchanges,⁷ creating unwanted volatility and confusion. As blockchains are designed to operate without modification after, this means that unlike software updates, bugs will in theory be irreversibly hardwired into the blockchain.

IV. CONCLUSION

“Smart contracts” are unlikely to take the world by storm and put lawyers out of their job anytime soon. More must be done to make this technology a viable and compelling alternative, such as addressing the drawbacks above. Similar to recent developments like ROSS automating legal research,⁸ new technologies are likely to be confined to an assistive role. For now, human judgement trumps computer efficiency in handling complex legal work.

⁷ Alex Hern, “A history of bitcoin hacks”, *The Guardian* (18 March 2014), online: <www.theguardian.com>.

⁸ Anthony Sills, “ROSS and Watson tackle the law” (14 January 2016), *Built with Watson* (blog), online: <www.ibm.com/blogs/watson/2016/01/ross-and-watson-tackle-the-law/>.