

Blockchain

An introduction to one of the most significant technological developments in recent years.



Introduction to blockchain



Blockchain could be the most important digital innovation since the creation of the internet itself. Its ability to bypass traditional payment systems promises to disrupt businesses and even government in a revolutionary way.

In this article we briefly explain what blockchain is and its potential, before looking at some of the legal issues that could arise from its use.

What is Blockchain and why is It so important?

Blockchain is a revolutionary technology which, although very young, could transform many aspects of our world – from payments, to the holding of medical records and, according to its cheerleaders, even the nature of business and work itself. Its potential cannot be overstated.

Its genesis was in the field of “cryptocurrencies”, digital currencies based on computer code. Cryptographers struggled with the problems of forgery and hacking inherent in computer-based currencies, until they were solved in 2008 by someone using the name Satoshi Nakamoto when he created the peer-to-peer cash system Bitcoin. For a while, the focus has been on Bitcoin itself, together with other cryptocurrencies. More recently, industries have been looking at the technology that underpins Bitcoin: blockchain.

Put simply, a blockchain works by linking together a database or ledger through a

chain of computers to create a network, and every computer regularly “talks” to every other one, and creates a snapshot of the database. This is called a block. Each block also contains a representation of every previous block – a chain of blocks, or a blockchain.

Everything is underpinned by reliable, proven cryptography, making it secure. But the real genius is that information – a record of ownership of currency, assets or any other sort of data – is held on every computer in the network.

This is, in the jargon, a “distributed ledger” and is protected from hacking through cryptography and through its distributed nature.

The blockchain creates a secure environment that will never go offline, is (today at least) immune to fraud, and cannot be tampered with.



Smart contracts: when code is law

A distributed ledger in itself is a useful tool. However, in 2013 a 19-year-old Russian programmer called Vitalik Butyrin launched an advanced version of blockchain called Ethereum, which took the technology one powerful step further. Ethereum allows applications to run on the blockchain, without any third party input. These applications are called "smart contracts". If the blockchain

can be compared to a distributed public spreadsheet, smart contracts are like the macros that are embedded within that spreadsheet.

The idea, put simply, is that one action automatically triggers another, without a time lag.

When one event occurs, another one follows, and nothing can stop it.



EXAMPLES OF SMART CONTRACTS

- You have an operation, and when the surgeon logs that it is complete, a follow-up appointment is automatically created.
- Voters cast their ballot on a blockchain-based system, which triggers a benefit – for example, a tax rebate.
- When a product is delivered, an alert goes out to a factory to produce another to ensure that stock levels are maintained.
- A smart car logs information about a driver's behaviour and location, which it sends to their insurance company. Its algorithms then judge what level of premium to charge.
- A contract for the rental of a house could be set up so that money is automatically taken from a tenant's account on a set day.
- When the ownership of a property is changed on the ledger, a payment is automatically triggered. There is no need for escrow accounts or legal fees.

It is worth emphasising that smart contracts are not contracts. The use of jargon here is confusing. However, a smart contract can lead to the formation of legally binding contract, if that smart contract (ie that application) executes a series of automatic actions that fulfils the necessary legal requirements for contract formation.





The future of Blockchain: from banking to blood diamonds

Blockchain might sound esoteric, but it is quickly being adopted. The World Economic Forum has said that blockchain could become the “beating heart” of the banking system. In a poll run by the European Payments Council, 90 per cent of respondents said that they believe blockchain will change the way the payments industry operates by 2025. Some examples follow.

In early 2017, the Bank of England announced that it will work with San Francisco-based company called Ripple to create a blockchain-based technology to speed up cross-border payments.

Estonia is creating a blockchain-based system to hold the medical records of over a million of its citizens. Sweden plans to put its land registry on the blockchain, and France is experimenting with using a blockchain system to prove ownership of property, and to transfer it. A company is setting up a register that tracks the ownership of diamonds, to crack down on blood diamonds being illegally introduced to the market.

Many banks are setting up private blockchains to enable them to move money more efficiently. Perhaps the most mind-bending possibility is that decentralised autonomous organisations (DAOs) code-based governance potentially working with no human oversight – could work on the blockchain. Already a DAO has raised capital from investors, and invested them in other blockchain-based businesses.

Blockchain as a registry

One of the benefits of a blockchain is that it functions as an excellent proof of ownership. Because it is impossible to alter, the entire audit chain of an item – a share, a property, or a painting – is absolutely verified. This could make blockchain-based registries very attractive and, it is argued, could eliminate disagreements over whether someone is the legal owner of an asset, or whether it was transferred effectively.



Blockchain and the law

Several countries are looking closely at the legal issues around blockchain, and the UK, Canada and Singapore have all set up sandboxes to give firms a test environment for new blockchain-based financial products, so that legal issues can emerge in a safe space.

But several issues are baked into the use of blockchain. One arises from its non-jurisdictional nature. If an offence is committed, where was it committed, and which court has jurisdiction?

Also, could property legally be transferred via blockchain? What happens if the transferor did not have the legal capacity for the purported transfer of the asset. Or if the transfer breached sanctions regulating the seller or the buyer? In English law, a property transfer deed must be signed in a certain way and witnessed. Would a smart contract for a property purchase be legally binding in every jurisdiction? Not currently.

In other forms of contracting or of title registration the rules applicable to the transaction are often provided by rules that are not set out in the main legal document. If I buy an apple from a market trader I benefit from a warranty implied by law relating to the quality of goods that I can enforce against that known person. If I transfer shares using a transfer instrument, the rules applicable to the validity of the transfer come through constitutional documents (such as the articles of association of a company) or by the terms of a multilateral contract (such as the rules of the stock exchange or clearing house). Any workable blockchain solution needs to be similarly buttressed by comprehensive contractual terms. And the more complex the transactions the more complex these terms need to become.

Another problem can arise where the blockchain is used to provide anonymity – if there is an infraction of some kind, how do you track down the person responsible?

Also consider the immediacy and irreversibility of blockchain payments. Regulators and banks need the ability to unwind accidental so-called “fat-finger” trades made by traders if they could cause damage to the financial system.



Areas of legal concern

Crypto-currency

Regulators have been watching the emergence of cryptocurrencies with interest, and so far have declined to intervene in their workings. However, the situation could change quickly. The most significant area where legal issues could emerge for blockchain is where the regulation of old-style currencies is incompatible with cryptocurrencies.

American case-law recently defined Bitcoin as “money”, which places it within the remit of regulators. Meanwhile, the EU’s directive on money-laundering mentions Bitcoin. Knowing the identity of customers is vital for banks to comply with money-laundering rules and to convert currency. This could be a problem for Bitcoin users.

Legal challenges

- What is the position in terms of forming a contract with an uninformed individual?
- What is the legal status of obligations sent via commands on the blockchain?
- What counts as the signing of a contract, or consent, on the blockchain?
- If a contract is made on a blockchain under duress or in error, but it is not possible to change it, what recourse does the wronged person have against the other?
- Must contracts made on a blockchain comply with the usual contract consent conditions – e.g., is the person mentally capable to form a contract?
- If a smart contract is poorly written or executed and the outcome is not as expected, who is responsible?
- If a smart contract has illegal consequences, who is responsible?
- A decentralised autonomous organisation (a bot working on the blockchain) does something illegal. Who is to blame?
- Who pays taxes on income generated on the blockchain? How is it collected? And where is it paid? Which states can tax blockchain-based activities?





What are the obstacles to the adoption of blockchain?

It is young

The technology is still in its infancy and there have been several high-profile thefts of Bitcoins. These have been due to hacks on wallets, not generally the blockchain itself, but some might be wary. Although the first major DAO was found to be vulnerable to a raid that drained from it a large proportion of its digital currency.

Anonymity

By its nature, the blockchain allows users to be anonymous, but in many cases it is necessary for the user's identity to be known, for example banks have to know who their customer is in order to meet money-laundering regulations.

States may have to step in to regulate in this area. Already several private companies (Aeternum, uPort and Prove It) have developed solutions, which might become the future standard.

Where the use of a blockchain requires a user to disclose his or her identity, there will be issues around privacy. The use of personal data is heavily regulated in many jurisdictions (including the EU) and in the case of the blockchain, if an individual is identified as part of a transaction, the use of such data could be subject to a complex matrix of global privacy regulations

Fitting blockchain into the current law

With the law as it stands it can be difficult to fit blockchain based activity into legal definitions. When does a smart contract create a legal contract? Does a blockchain transfer work if the transferor is solvent? Should a DAO be regulated as a partnership or an investment fund? However as blockchain becomes more prevalent the law will need to adapt.

Lack of regulation

The current lack of regulation on the blockchain is preventing many large firms from launching projects. This is especially the case with financial firms which are heavily regulated and therefore unable to embrace an unregulated technology.

Until there is clarity, where a blockchain operates across borders, there is a question around which country's law will govern the terms of the chain.

Many big actors are likely to wait until the legal and regulatory position around blockchain becomes clearer before launching products. This could have the effect of allowing new, disruptive firms to steal a march on the incumbents, potentially getting a head-start.

Liability

The very nature of the blockchain is that it is a decentralised system, which is not run by any individual or organisation. By its design, it is run by 'miners' (people who add transactions to the blockchain), developers, programmers and users who are locked into a complex web of relationships. That is its strength. However, it also means that if anything goes wrong with the blockchain, it can be hard to identify who is to blame. Liability can be hard to prove. And perhaps more importantly, it is not clear who would be responsible for fixing the problem.

Adoption

From our experience, people don't sit on the fence when expressing views on blockchain technology. There are those that evangelise, claiming that blockchain will be as big as the Internet itself. There are others that believe that the use of blockchain has been significantly over-stated.

The big technology players are scrabbling around, looking for user-cases, the Internet equivalent of being the first to launch an Amazon or an eBay.

Whilst we have seen some credible examples of early implementation, wholesale adoption is not here yet.



About Fieldfisher

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Beijing, Birmingham, Brussels, Bologna, Düsseldorf, Hamburg, London, Manchester, Munich, Milan, Paris, Rome, Shanghai, Turin, Venice and Silicon Valley.

Fieldfisher is a leading provider of legal services to the tech sector and is at the cutting-edge of blockchain technology. In particular the firm is highly experienced in cryptocurrencies, proof of existence and smart-contracts, advising significant industry players and ensuring they have the law on their side when exploiting the many commercial opportunities that blockchain presents. We can help you to understand how blockchain may impact on your business and industry and key risks to consider.

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