



BRIEFING: Books in Blockchains: How might the new technology affect libraries and their work?¹

The concept of property is a fundamental underpinning of modern economies. The exchange of this property, at least according to classical economics, is what allows the development of complex big economies, able to deliver progress that allows us to live longer, happier lives. This exchange – buying and selling – relies on proving two things: firstly that the people involved in a transaction own what they say they own; and secondly that the transaction has taken place legally. Without this, there cannot be the trust necessary for large-scale economies to work.

Traditionally, these tasks have been performed by a variety of institutions. As concerns money, banks certify how much we have in our accounts, while technology applied by central banks and mints aims to ensure that the cash in our pockets is real. In the case of other examples of property, we have title deeds for houses, and contracts to show that we have legitimately bought other goods or services.

Intermediaries play a key role in certifying ownership and the validity of transactions – banks exchange information when we make payments. Registries record property deals and land ownership. The private law system is there as a guarantee for contracts. However, there can be questions, both in theoretical and practical terms, about how efficient and effective these are. Can the ledgers of transactions they manage be trusted and how quickly can they operate? When there is a chain of exchanges, the risks posed by uncertainty and delay increase.

Blockchain aims to apply internet technologies to respond to this. In simple terms, it works by giving any exchangeable item (physical or virtual) a specific identifier, and attaching it to a 'chain' of information about previous transactions. This chain is stored on a large number of servers at the same time, creating a distributed ledger. If one player falsely claims ownership of something, this is easily found out because none of the ledgers around the network show them as the owner. Given that changing the ledger to assert ownership (falsely) would involve hacking many computers at the same time, cheating the system is nigh on impossible. Access to a Blockchain network can be controlled, as can the entry of goods or virtual goods into it.

The technology is of course still in development. Trust remains an issue, and as the technology spreads, it will make huge demands on computing power – imagine each coin in your pocket being attached to a record of all of the times it had changed hands in the past years, as well as the requirement to share and validate information on each transaction on each distributed ledger. It perhaps is not a surprise that the fastest current growing application of Blockchain at the moment is in restricted groups. Moreover, as anecdotal

¹ This is an informal briefing and does not represent any official position of IFLA.

evidence has already shown, there will be a continuous war between those looking to hack into the system and those seeking to undermine it.

A couple of examples. The best known is Bitcoin, the 'crypto' currency set up as a means of allowing people to buy and sell things globally, without recourse to currencies managed by central banks. The idea is that each 'coin', when it is used to buy something, comes attached with a 'history'. The seller of a product or service can then be sure, by comparing the given 'history' with that held elsewhere on the system, that the buyer does indeed have the right to use the bitcoins they have.

Given that bitcoin deliberately side-steps central and traditional banks, it has been associated with crime, although this is not to say that it could not be used in future, for example for managing complicated grant projects.

Some have proposed using Blockchain to prevent blood diamonds getting to market. Given that each diamond is unique, it can receive its own identifier, which is then entered into a Blockchain system. Each time the diamond is to change hands (from miner to broker to cutter to wholesaler to jeweller), it is possible to check whether the seller really owns it (the information is present across the distributed ledger). Once confirmed, the transaction is also recorded and becomes part of the 'chain' attached to the diamond's identifier. As such, when the diamond arrives in the shop, it is possible immediately to trace the path it has taken, getting around the problem of false certification along the way.

More relevant to libraries are recent steps to apply the idea to music. Ujo is just one example of the application of the ideas behind Blockchain to music. The Ethereum technology on which it is based, however, goes one step further. Not only is each work of music individually identifiable, but a 'micro-contract' is embedded into it, setting out terms of use and remuneration due. Once an artist has uploaded their song, they can trace how much it is being used and for what (other tools – MUSE and Bittunes – even look to add a crowdfunding element to it by encouraging people to buy into a share of the future success of an artist).

This also makes it possible to ensure that they receive the payment that is due, with Blockchain's anti-cheating devices as good as guaranteeing against piracy, and without the transaction costs and other problems associated with collecting societies. In addition, if there is a single portal for discovering this music, it also becomes easier for end customers (individuals, businesses, other creators) to clear rights.

The step from music to books is not so far. EBooks, journal articles, and other sources could also be incorporated in blockchains, providing useful data (and potentially revenue) to the original creator. A single global Blockchain could also ease user experience by giving access to all works through a single portal, far beyond what even the best endowed library could hope to offer.

Clearly this poses a challenge to libraries, at least insofar as they seek to respond to their users' demand for access to information and culture. Arguments against licencing (and in

favour of broad exceptions) based on the complexity of the current set-up would lose their strength if access could be instantaneous, and the application of contract terms automatic.

However, Blockchain is only a means, rather than an end. In particular, it does not impact on the fundamentals of exceptions and limitations to copyright, and indeed may make it all the more important to ensure that key principles are incorporated into the 'micro-contracts' which govern the use of materials. It is difficult to imagine an algorithm that could make a good (and legally sound) judgement of whether a use could count as 'fair'.

Moreover, those who suggest that Blockchain could facilitate licencing potentially forget that ease of finding and paying for works of science or imagination is not the same thing as making them affordable. Nor does it provide an obvious answer to challenges around orphan works either, where the original attribution of works is the key stumbling block.

More negatively, one of the key ideas behind Blockchain is transparency – in the context of public or university libraries, this could translate into an invasion of individuals' privacy as concerns what they are reading. On a political level, libraries may find themselves having to focus even more on the legal concepts that underpin their work, but in doing so could be seen as entering into direct competition with authors.

Blockchain is likely to shake up the rest of the information 'value' chain as well. Creators (at least those able to operate the technology and apply beneficial contract terms) could gain in strength. Publishers will be faced with a dilemma between opposing change, trying to continue to 'capture' the rights from creators and benefit from the Blockchain themselves, or simply revert to being service-providers to authors in exchange for a fee. Rights management organisations may face particular adaptation challenges, given that their business model is built on finding a solution to the complexity of the current system.

Blockchain is of course still young, but with growing reflection on its applications (including by governments), it is worth reflecting now on its implications, and what action may be needed to ensure that it works for the public good.

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