

Blockchain applications in the public sector

“The most efficient way to produce anything is to bring together under one management as many as possible of the activities needed to turn out the product.”

Peter Drucker

The public sector is a complex machine – centralised in respect of its responsibility for governance and public service delivery, yet fragmented and often disconnected in terms of its organisational structure and ability to share data.

The effects of long-running austerity cut deep – reductions in departmental budgets offer a stark choice to central and local government bodies alike: sweeping cuts, shrinking headcount and reduced services on the one hand or wholesale transformation of service delivery on the other.

Blockchains could be used to address inefficiencies in current systems and increase the effectiveness of public service delivery. For example, a blockchain could serve as the official registry for government-licensed assets or intellectual property owned by citizens and businesses, such as houses, vehicles and patents. A blockchain could facilitate voting in elections, ensuring that each eligible person uses only one vote. A blockchain could also help in back-office functions, to coordinate and streamline tendering and purchasing across departments, agencies, and other arms-length bodies. In all cases, a blockchain could reduce fraud and error while delivering big benefits in terms of efficiency and productivity.

While interest in the technology appears to be growing, public sector applications using the blockchain are, as yet, rare. The government in Honduras, for example, kicked-off a project last year with Factom to reduce fraud in its public land registry by moving data onto a distributed ledger, but this project has apparently stalled.¹ And BitHealth, a US start-up, is investigating use of the Bitcoin blockchain to store and transmit healthcare records securely to make it easier for patients to receive treatment wherever they are in the world.² These are early days, though, and almost every part of the public sector could benefit in some way from blockchain technology.

Example: Asset registry

What are the current bottlenecks or issues?

All land or property must be registered with the appropriate public sector body if it is bought, gifted, inherited, mortgaged or received in exchange for other property.³ In November 2015, the number of residential property transactions in the UK exceeded 100,000, and the number of non-residential transactions was nearly 9,000.⁴ Across the financial year 2014-15, the total number of residential property transactions completed with a value of £40,000 or above was over 1.2 million.⁵

The size of the housing market makes it costly to keep track of the many property transactions that accumulate over time. And for buyers and sellers, information about the ownership of properties can only be accessed or updated via the central register held by the public sector.

High property prices also make houses attractive to fraudsters who may use forged documents to transfer someone else's property into their own name or to raise a mortgage on someone else's property. Once they have raised money by mortgaging the property without the owner's knowledge they disappear without making repayments, leaving the owner to deal with the consequences.⁶

Current measures to prevent property fraud have stopped fraudulent applications on properties worth more than £74 million.⁷ The challenge, though, is that property fraud is not easily detected so the responsibility falls on all parties, including home owners, the government, solicitors and mortgage lenders. And with interest rates likely to rise in the future, the level of fraud may increase – leaving more people to pick up the bill.⁸

How the blockchain could help

Property transactions could be handled on a blockchain in a similar way to how payments between parties are handled using digital currencies like Bitcoin. However, instead of assuming that each 'coin' is the same, it would be possible to associate a unique house or piece of land with a particular coin, or fraction of a coin, and exchange it just like in any other transaction using digital currency. The entire transaction history of the property could then be followed through the blockchain. This concept is known as 'coloured coins' because the coins are 'coloured' to represent a specific asset, such as a house.⁹

In the blockchain, assets are held by the owners of private keys, the cryptographic 'identity' created when a user first registers for the blockchain. The title deeds and identity documents proving ownership do not themselves need to be stored on the blockchain. Instead, they can be 'hashed' – a mathematical transformation that converts long documents of text and other characters to a much shorter, fixed-length string of text and numbers. The hash is unique to the original document and can be stored with the coloured coin on the blockchain in much less space.

Using smart contracts, asset exchange could also follow specific instructions encoded as part of the transaction to be executed automatically once agreed criteria have been met.

Implications

A blockchain-based approach to registering property titles could increase the efficiency of transaction processing and reduce, if not entirely prevent, property fraud.

A property registry could be delivered via a centrally administered public blockchain, which, although replicating large elements of the current registration process, would simultaneously provide enhanced security against fraud, increased resilience and improved transparency – since the historical transaction records could be read by the public. A blockchain could also help in resolving disputes over property ownership since each transaction would be verified and stored in the distributed ledger.

For the registration authorities, a blockchain thus provides a way of combining many processes and systems into one, increasing efficiency through distributed processing and thus reducing cost.

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Endnotes

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