Blockchain in Record Management and Public Administration

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Abstract

A good comprehension of the blockchain technology is very important for stakeholders and employees in governments as it facilitate their decisions and helps in accomplishing objectives. The technology is often seen as a fault-tolerant and indestructible system that can be successfully used as the basis for digital transactions in various areas. Blockchain is a distributed database that stores information about all transactions of system participants in the form of a chain of blocks (thus the name Blockchain). All users of the blockchain have access to the registry, acting as a collective notary who confirms the truthfulness of the information in the database. Blockchain can be used for financial transactions, user identification, creation of cybersecurity technologies, etc.

Apparently, the strongest advantage of blockchain technology in public administration and record storage is the ability to store data permanently and, in a tamper-evident manner. In fact, it is extremely hard to tamper the data stored in data services based on blockchain technology due to its decentralization and cryptography.

The article aims at revealing the potential applications of the blockchain technology and highlighting the challenges and possible directions of blockchain research in the public and private sector.

Keywords: *blockchain; public administration; record management; public records; blockchain application.*

1. Introduction to Blockchain and its use Cases

At the beginning of July 2020, the consulting company Deloitte summed up the results of a global survey and concluded that blockchain is turning from an experimental technology into a strategic priority for organizations (Deloitte 2021) (See figure 1).

Nearly 1,500 senior executives across 14 countries participated in the survey, with 39% of companies already moving their blockchain pilots to production, up from just 23% in 2019. What's more, 83% of respondents in a Deloitte survey believe they will lose competitive advantage if they don't use blockchain. In 2019, only 77% of respondents thought so (Deloitte 2021).

At the end of February 2019, the Hired service, which allows job seekers to find vacancies and respond to employers' offers, reported a huge surge of interest (by 519%)

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from companies in programmers with experience in developing blockchain technologies (Hired 2020).
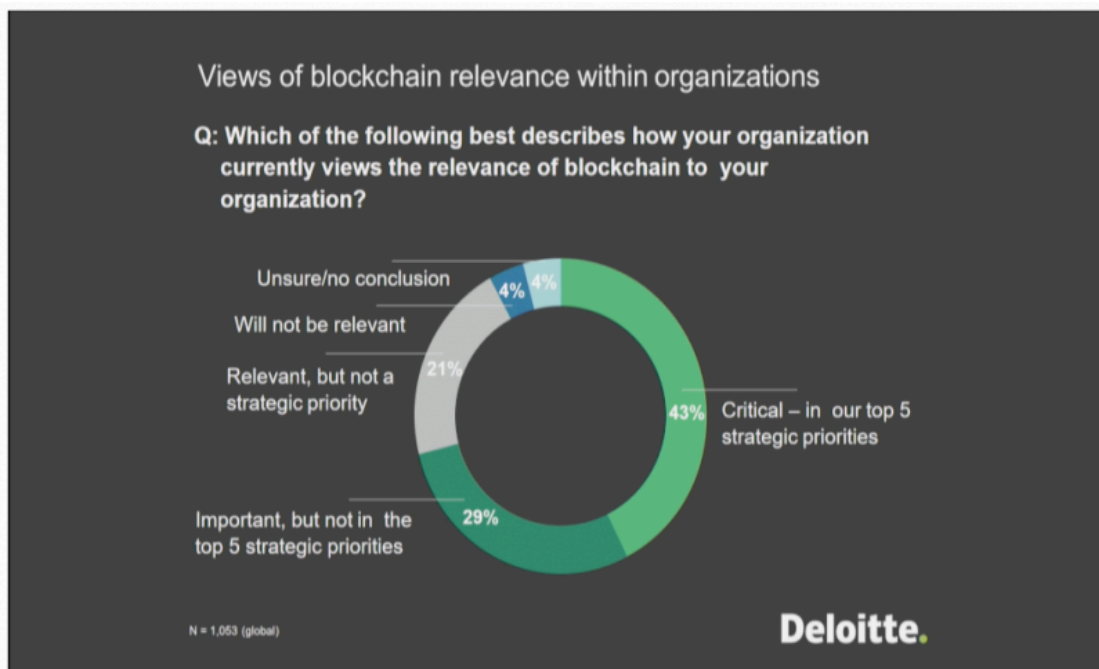

Figure 1. Blockchain relevance within organizations. Source: Deloitte Global Blockchain Survey

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Apparently, the strongest advantage of blockchain technology in public administration and record storage is the ability to store data permanently and, in a tamper-evident manner. In fact, it is extremely hard to tamper the data stored in data services based on blockchain technology due to its decentralization and cryptography. Data can be fully and permanently recorded, saved and be auditable in the blockchain system. Data stored on blockchain can be submitted to a general purpose and publicly available hash function whose output serves as a "fingerprint" or "timestamp" of the document or comments' contents at that time. The hash output can be stored on a blockchain ledger in a manner that is very difficult to remove. While hash functions are by no means dependent on the use of blockchain technology, their records on blockchain ledgers are indisputable and challenging to remove (World Economic Forum 2020).

Of course, it is possible for non-blockchain-based databases to employ cryptography, such as public-key cryptography, to also create record-keeping systems where document or record modifications would be difficult and evident. However, in such systems, it is impossible (or at least very difficult) to guarantee that a central administrator has not deleted records entirely – a function that is possible with blockchain technology

and is very relevant to public procurement process integrity and transparency. Further, compared with centralized database systems, blockchain technology also entails a very high degree of embedded public transaction transparency and censorship resistance, where transactions (e.g. a vendor's bid offer submission) are visible in real time, difficult to block, and undeniably sent to and from a specific address that can be known to be associated with particular actors (World Economic Forum 2020).

Other evident advantages of the blockchain include transparency, trust, high transaction speed, which, it would seem, meets the solution of traditional management problems (in particular, low-dynamic bureaucracy and corruption). One of the first studies on distributed ledger technologies noted the large role of a common ledger in "unifying" a shared source of reference data (government agencies across the country will work with the same reliable information), which reduces the likelihood of inconsistencies (Distributed Ledger Technologies 2017). On the other hand, in the case of the use of blockchain technology in public administration, its use may be controversial, in contrast to its use in the private sector. For example, one of the advantages of the blockchain - the immutability of records - does not always satisfy lawyers and GDPR.

Another quality of the blockchain that worries lawyers is anonymity. It is the anonymity of bitcoin transactions that underlies its long official rejection and even opposition from the state. But this fear has largely lost its relevance, because during the mass testing of the technology, it became clear that the blockchain is not as anonymous as it was commonly believed. Indeed, the blockchain system serves as a virtual record of all transactions on the network, available to all users of the blockchain. The "transparency" and public availability of the blockchain means that any user with a sufficient level of computer literacy is able to trace the digital footprints of anonymous traders. Since a complete record of all transactions is kept, including information about who added the data or transactions to the blockchain, then in the case of fraudulent data, it is possible to establish who provided this data. According to the EU Commission, a number of private firms have already emerged that specialize in deanonymizing bitcoin transactions.

Generaly, blockchain technology has become famous with the appearance of Bitcoin, created by a person (or group of people) with the alias of Satoshi Nakamoto. Nowadays, blockchain can be applied beyond financial transactions, for example, the Ethereum platform, which uses Blockchain, allows for a secure ledger to enable decentralized and generalized transactions (Wood, 2014). In this concept, various types of transactions can be executed, from the creation of tokens or currencies for each venture to making smart contracts, more complex transactions secured by Blockchain properties.

2. Cases of blockchain application in public and record administration

Some states are either already using blockchain in their governmental structures or seriously considering doing so. As an example, at the beginning of September 2020, the Danish Ministry for Development Cooperation published a report acknowledging blockchain as an effective tool in the fight against corruption, especially in refugee camps. Blockchain provides increased oversight of businesses, governments, and stakeholders, thereby cutting off many corrupt ties.

The report identifies blockchain technology as one of four ways to fight corruption. One of its main consequences is considered to be "corrosion of trust", and the Danish ministry believes that the blockchain will help restore the public's trust in government. Secure and transparent data recording is actively used in Denmark to entitle

refugees to aid, land and cash benefits, and to prevent fraud. The benefits of using blockchain include the low cost of money transfers, the reduction or even elimination of intermediaries such as banks, and the possibility of electronic identification.

However, linking identity to data raises privacy concerns and "right to be forgotten" concerns. The European General Data Protection Regulation (GDPR) provides an individual with the right to have their data deleted. However, the very nature of blockchain technology does not allow changing or erasing the entered data. Ministry officials said in the report that they understand this problem and are already studying how to solve it.

On February 27, 2019, the consulting company Booz Allen Hamilton presented an overview of possible ways to solve bureaucratic problems in government agencies using blockchain technologies.

Booz Allen Hamilton experts argue that blockchain can bring undeniable benefits to the government. Thanks to a transparent and decentralized system, data verification can be carried out by any participant, which will strengthen the relationship of trust between government agencies and citizens. In addition, the use of blockchain for some services will allow independent verification of complaints. Another potential benefit is the protection of sensitive data such as social security numbers, dates of birth, addresses, and driver's license numbers. According to analysts, civil servants are the main targets of hackers. But cyberattacks can be mitigated or prevented with blockchain technology deployments.

Government agencies are certainly interested in the prospect of using blockchain. The diversity of government functions provides an incredibly wide field for blockchain technology and keeps interest and investment flowing. Examples of blockchain use cases in government include voting, automated data entry, record keeping, transactions and account reconciliation, social and humanitarian assistance, asset markets, and giving individuals control over their sensitive data and medical records.

According to analysts, blockchain can increase the efficiency of decentralized processes. For example, the use of blockchain technologies can speed up the collection of documentation from several government agencies that do not have common systems or close organizational relationships. Such use can solve the problem of dispersed processes such as permits and registrations.

Sharing information between government agencies and the private sector about emergency assistance, insurance claims, medical claims, and other multilateral transactions can improve the alignment of these entities and greatly improve citizen attitudes.

Once the data is saved to the blockchain, it cannot be changed or deleted. This allows blockchain to be used as documentary evidence or confirmation of the transfer of digital assets (bitcoins or other digital currency). With the same success, it can be used to store information about the owner of the actual property - in 2017, the effectiveness of such a technique is being evaluated by the National Land Survey of Sweden. With the help of an experimental blockchain-based system, it is planned to digitize the processes in the field of buying and selling real estate. Immutability also allows blockchain to be used as a method of proving the compliance of processes with regulatory requirements - a record of all actions and results obtained in the block chain can serve as an audit trail for regulators.

In addition, the latter can access the internal blockchain of a financial organization almost in real time to view information. This innovation will allow regulators to play a more active role in exercising control and bring them closer to the status of participants in the process. And this, in turn, can significantly reduce the time and effort required by financial institutions to create regulatory reporting. That is, at a lower cost, the blockchain will provide higher quality, accuracy, and reliability of the process.

However, there is a gap between pilot testing and commercial launch that is not only technical - because the business has not yet fully understood the technology, which is still at an early stage of its development.

"Blockchain is 80% business. And I would venture to say that technological problems will be solved much earlier than non-technical problems" (Ledger Insights 2020).

Non-technical issues, for example, include government regulation. In turn, the analysts attribute integration with enterprise resource planning systems and the need for companies to find ways to interact with several blockchain platforms, the number of which is steadily growing, to technical problems (Ibid).

3. The Blockchain and National Security

At the end of August 2020, the consulting company PriceWaterhouseCoopers (PWC) published a report on the benefits of using blockchain in the complex supply chain of spare parts needed for defense production. The document focuses on three reasons why the use of blockchain in this industry is extremely important: increasing transparency, verifying suppliers, and improving security in cyberspace.

As an example that best illustrates the intricacies of the supply chain, PWC presented the F-35 fighter jet. Each aircraft is made up of around 300,000 components from over 1,900 suppliers. Some individual parts require components from multiple suppliers. The more layers in a supply chain, the more prone it is to disruption and cyberattacks. Consequently, PWC recommends that more attention be paid to supplier risk management.

According to PWC, blockchain performs very well at verifying every stage of the components' life cycle. The capabilities of the innovative solution allow you to control all levels of the supplier network, and do not manage to manage only one part. Blockchain also allows for the identification and qualification of individuals involved in the supply chain, which is especially useful when those involved in the process are those who are responsible for certain elements of the armed systems.

The US Department of Defense clearly recognizes the potential of blockchain, having awarded several contracts with blockchain companies over the past year. For example, the US Navy awarded blockchain company SIMBA Chain a $9.5 million contract to deploy a messaging and enforcement platform.

4. Conclusions

Blockchain can provide reliability and quality in the management of government data, as well as agility in the execution of public administration contracts, helping to inhibit bid fraud, and tampering with documents, payment notes, among others. In addition, it would enable an efficient mechanism for decentralized electoral processes, corroborating a more participatory model in public policy decisions, with agility and

anonymity. It would be also an important tool for logistics control of products that require state regulation. Even with results from Blockchain's government-led studies still being mostly at pilot and experimental levels, the expectation remains to deepen knowledge to identify solutions to problems that undermine democracy, such as corruption, bureaucratization and inefficiency.

Despite the demonstrated positive applications and impacts on the use of Blockchain in public administration, it should be noted that technology does not transform reality by itself but offers a new tool at the service of society. Blockchain, by providing data security, can improve efficiency in public administration services and strengthen the exercise of democratic participation. Such technology enables horizontality, transparency and reliability in information management, as long as its instrumentation is done in a way that serves social interests, becoming a means of achieving the development of constructive and participatory actions.

Blockchain may well represent a revolutionary technology that will continue to evolve in this decade due to mass digitalization, not least due to the COVID-19 pandemic. However, blockchain has some problems that have yet to be solved. The technology although already sucessfully used in many sheres of buisiness and public administration is still relatively young and requires more widespread adoption both in private buisinesses and governmanetal institutions to make a truly significant difference.

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