Implications of Expanding the Use of Information Technology Tools in Accounting of Finance Transactions

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Abstract

Blockchain is a technology that springs within its theoretical parameters from the conceptual frameworks of accounting that we encounter in the emerging of today's business . In this paper, in a simplified approach, we try to present a sketch of a set of aspects of the directions to be followed in the implementation of this technology and the likely impact on the accounting of operations in the real estate sector. Currently undergoing a rapid evolution, marked by the applicability to unprecedented levels of information technology (IT) tools on the accounting of entities, we consider it necessary to develop multidisciplinary approaches to the use of new technologies in accounting. Blockchain opens the door for new approaches to accounting information processing. It is now possible to perform multi-dimensional processing of financial - accounting information, processing that goes beyond and develops the traditional accounting paradigm.

Key words: blockchain technology, accounting, trends.
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1. Introduction

Information technology called generic blockchain is currently experiencing a real euphoria among the governing bodies of financial and credit sector entities, leading economic entities, public institutions and individual actors (www.hyperledger.org). The complex of related technologies called blockchain represents the software packages used for the circulation of cryptocurrencies found worldwide under the generic bitcoin label. The data on the situation existing until the financial year 2013 - inclusive - show us a spread of global investments in bitcoin used as an alternative currency, until the moment when there was a dramatic decrease in the price of bitcoin. This phenomenon has generated a phenomenon of abrupt increase in the interest rate on the blockchain. The global amount for the amounts allocated / invested in both bitcoin and blockchain reached in 2015 an amount that we can appreciate as a special threshold, worth 1 billion USD. Evolutionary data show that the blockchain is a turning technology, able to radically change the conduct of financial transactions, as they are now done, in the manner known by financial market players. Blockchain technology has been characterized as a tool with a striking novelty for a new Internet - we could rightly say. Can we place ourselves in the position of imagining - as a game of the mind - that we would have known about the immense power and benefits / dangers of the Internet a very short time before it appeared? What would have allowed such a set of information ? (www.hyperledger.org) F

inancial and credit institutions, very large non-financial institutions have seen the power of the blockchain to radically change today's society and business, have therefore decided to allocate millions of dollars or euros in start-ups related to the practical application of blockchain technology.

Starting from the current data on the capabilities of blockchain technology, we can say with conviction that we are, in fact, only in the early phase of blockchain applicability. Well-known entities in various fields of business, which intuit and implement blockchain technology, in a fast way, will be able to become the giant companies of tomorrow. Recently, billions of dollars have been allocated for research and development of blockchain technologies, being implemented various technical solutions for capitalizing on the potential of blockchain in various areas of business and

management of public entities. The adequacy of blockchain technology is being tested in various contexts in today's society. In the last quarter of 2017 alone, Initial Coin Bids (ICOs) raised more than $ 3 billion in capital for blockchain projects (www.hyperledger.org).

What is a blockchain? A blockchain is a decentralized register / set of registers in which data on transactions is stored, in a network of servers or computers. This network consists of nodes owned by independent entities that use a cryptographic protocol to validate the transactions that are performed. The instructions that make up the Blockchain protocol ensure the security conditions, having a high reliability, so as to ensure the protection of the data entered in the registers against errors of unauthorized input or modification. The register / registers in the blockchain network confer the attributes of permanence / non-modification, security and transparent accessibility for the users of the network (www.hyperledger.org).

Security. For hackers trying to access private information, a blockchain is the ultimate obstacle. A hacker should infiltrate countless servers and manipulate all the data in them to gain access to the information they are looking for. Fully decentralized and replicated to thousands of nodes, blockchain networks are really impossible to penetrate and manipulate by hackers or other dangerous entities (www.hyperledger.org).

Immutability and trust. Another defining feature of blockchain technology is the immutability of the data it contains. In simple terms, once the data is recorded and validated by the entire network, it cannot be changed. The resistance of data immutability in the blockchain takes place thanks to the synergy of the three technologies: cryptographic keys, a distributed register and a validation protocol. This means that records kept on a blockchain can be considered reliable as such, and no bank or regulatory agency can support them (www.hyperledger.org).

Cost reduction. Businesses can involve a lot of programs and databases, which sometimes present a problem even in a single company by accumulating commissions in complicated transactions. With enough successful implementations at the level of several independent businesses, blockchain can dramatically reduce transaction costs, increasing investor profit, which explains the investment of many institutional funds in blockchain (www.hyperledger.org).

Accuracy. Blockchain networks execute a protocol that rewards the accuracy of the information they contain. They also keep track of transactions and can be reliable in operating dynamic data at speeds that organizations have not known before. In the same way that people have not fully understood the possibilities of the Internet, the extent of the improvements that blockchain technology can bring is still unclear. However, even in the relatively infant stages, the blockchain offers a number of key benefits to organizations that are willing to accept it (www.hyperledger.org).

2. Theoretical background for the use of blockchain in accounting

To get into its current form, the Internet, which appeared in 1977 as a small number of interconnected computers that could carry a small amount of data, has undergone drastic changes. Currently, the amount of data that can be transported is limited only by the capacity of storage units, for interconnection there is no need for even a wire, and communication through it has become a necessity in everyday life. However, although this evolution opened up new opportunities, one problem intensified, namely, trust between people reached a critical level, being highlighted especially in the field of business (www.hyperledger.org).

We are about 7.6 billion people and we trade 100 trillion dollars annually. Each of these transactions involves trusting your partner. Trust is the basic currency of the trade, but nevertheless, instinctively, we start with the idea that the partner has something to hide or is trying to gain advantages from the transaction (www.hyperledger.org).

Thus, in order to be able to trust each other, it is necessary to check in advance the partner's transaction history or the existing data about him. The solution is to use intermediaries to store and find out data about these partners (www.hyperledger.org).

Ex. When purchasing a vehicle, the first thing that is checked is the history of accidents. It is necessary to investigate the history in order to determine the possible damage that the vehicle has suffered or to determine the level of care of the vehicle www.hyperledger.org).

Blockchain technology is a product created to resolve the elements of uncertainty and suspicion that arise in transactions / contracts concluded between the parties / business partners. The first activities in the development of technology were recorded in the financial year 1991, when 2 researchers - Stuart Haber and W. Scott Stornetta, first addressed the issues of building a network of nodes - a blockchain with encrypted access keys. (www.hyperledger.org). In the financial year 1992, the two mentioned scientists, together with Dave Bayer, integrated the Merkel type graphs in this model in order to optimize the system. The three did not know at the time how much they could change the concept on which they were based. (www.hyperledger.org).

As a result of the devastating effects of the 2008 financial crisis, a blockchain model was devised, representing a distributed database system. It was intended to advance a solution to change the technical, practical ways in which monetary transactions are carried out through various financial-banking and credit institutions. Through a peer-to-peer network and distributed servers, accessed for transactions between the parties, a blockchain database gains autonomy (www.hyperledger.org).

The first version of this concept was used in the development of Bitcoin, which appeared in 2009. Bitcoin's blockchain database reached an impressive size of 100 GB at the beginning of this year, with the total number of transactions being approximately 262,500,000, with a total amount of 50 trillion dollars, a single currency reaching a value of over $ 5,000, with an increase of over 750% (www.hyperledger.org).

Structure and implementation

In short, the concept of blockchain is simple, representing a distributed database that maintains a dynamic list of records. The association with other concepts such as transactions, smart contracts or cryptocurrencies, makes the concept itself more difficult to understand (www.hyperledger.org).

3. Research methodology. Evolution of real estate transactions - empirical aspects of research

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A _blockchain is a chain of interconnected blocks, each node containing the hash key of the previous node, except for the first block called genesis (www.hyperledger.org).

Normally, the structure of a block consists of two main components: a header and a body. The header includes the current version of the block, the hash key of the previous block, the hash key of the current block, a time signature, a counter and target bits, and the body consists of transactions (www.hyperledger.org).

A hash function applied to an object helps to obtain a sequence of characters, called a hash key, which represents the digital signature of that object. A hash key is unique and can only be reproduced if all the original components from which it was obtained are known.

The next solution is a PoC (Proof of Concept), being a simplified implementation of a blockchain made in Java, using the Lombok library to remove the _boilerplate code. For simplicity, the basic structure of a block can only consist of an index, a time signature, data content and the two hash keys (www.hyperledger.org).

To obtain the hash key of an object, it is necessary to transform the object using the SHA-256 encryption algorithm. The java.security package provides the classes needed to obtain it (www.hyperledger.org) :

```
private String getHashFromString(String decodedHash) throws NoSuchAlgorithmException {
   MessageDigest digest = MessageDigest.getInstance(SHA-256);
   byte[] hash = digest.digest((decodedHash).getBytes(StandardCharsets.UTF_8));
   return Base64.getEncoder().encodeToString(hash);
}
```

The fields used are:

```
//Verssion
   private int index;
```

```
//Time signature
private LocalDate timestamp;

// The hash key of the current block
@NonFinal private String hash;

//The hash key of the previous block
private String previousHash;

// The meter
@NonFinal private int nonce = 0;

// Transactions
private T data;

//Dificulty
private int difficulty;

// Mining time
@NonFinal private Duration miningTime;
```

And the key calculation function for a block is as follows:

```
public String calculateHash() throws NoSuchAlgorithmException {
    String decodedHash = String.valueOf(index) + this.timestamp + this.data + this.previousHash
+ this.nonce;
    return getHashFromString(decodedHash);
}
```

In order for each participant to be able to get in touch with the distributed data, the concept of mining was introduced. It is necessary to limit the number of block generations over a period of time as inconsistencies may occur. Also a very short generation time can help compromise a chain. As for Bitcoin, mining is used to generate new currencies, but the main purpose remains to provide consistency to the data. At a simplified level the following code is the equivalent of a more complex mining process. A difficulty level is set that aims to generate a number of 0s at the beginning of the hash key. This generation requires a long processing time. Different levels of difficulty can be used for testing. A transaction can be represented by a similar class containing details about the recipient, sender, the value of the transaction and an attached message (one can see the similarity with what a bank transfer means) (www.hyperledger.org).

4. Survey of the specific evolutions regarding the application of information technologies in the record of transactions in Romania

In short, each block represents a data entry written and dated by a unique, reliable and impartial entity representing a registry. Each piece of information in the block along with the information in the previous block represents components of the digital key. This creates a chain of trust, as every change can be verified, validated and impossible to compromise. Thus the concept of immutability is introduced. In the event of an attempt to compromise or alter the data, the system detects inconsistencies and performs a restore to the latest valid version known and owned by a network entity (www.hyperledger.org).

In order for each participant to have access to the data, they must be mined for a certain period of time. This mining is very expensive in terms of hardware resources. For example, the total computing power used to mine Bitcoin cryptocurrencies has exceeded up to 100 times the total computing power of the giant Google (www.hyperledger.org).

Each participant has access to this blockchain, but each block in the blockchain can in turn represent another blockchain, so there is communication between different areas and domains. The transactions made are transparent, questionable and incorruptible. Blockchain data can even

represent personal data, reaching a virtual identity that we can fully control and choose what data we distribute (www.hyperledger.org).

In Russia, the possibility of switching to a voting system is being investigated, politicians can be monitored by citizens and pay can be eliminated if systems using this technology are implemented. Every company that implements this concept becomes a reliable company.

Each company will have competition from a blockchain version of its own company. So the main 5 advantages that blockchain technology offers are (www.hyperledger.org) :

1. Protection of rights
2. Creating a distributed economy
3. Elimination of taxes
4. Data protection and control
5. Compensation for producers

Applications based on blockchain technology have been used in the first phase in the financial industry, data protection, IT, health and energy. Currently, the number of companies in different sectors using this technology is growing rapidly. This technology is increasingly used by carriers and logistics operators (www.hyperledger.org).

Blockchain technology can change the way companies operate, especially those that currently face a lack of transparency in the supply chain (www.hyperledger.org).

When it comes to an extended network, and we face such situations very often, it can be a real challenge to get a complete picture of the transactions made by suppliers, subcontractors and customers. The end user may therefore have a problem in following the path of the individual elements that make up the end product. Given the growing competition and advancement of technical products, a new technology is often needed. In the field of transport and logistics, industry standards for the use of blockchain technology have not yet been set (Transport Alliance specialists are working on this), but this does not mean that nothing is happening. FedEx Corporation, an American shipping company, is testing a large and valuable cargo tracking technology based on blockchain technology. This technology has a major impact on the supply chain, transport and logistics. This is a new frontier that will completely change global supply chains (www.hyperledger.org).

The idea was to provide shippers with a convenient solution for completing VGM (Verified Gross Mass) declarations, which are required for shipping as a result of the International Convention on Safety at Sea (SOLAS). Today, with the help of blockchain technology, Kuehne + Nagel serves approximately 800,000 monthly transactions, the VGM portal being constantly updated. All information entered by the portal is stored in bulk, which allows the use of internal blockchain interfaces to exchange data with third parties, so that there is no need to use additional communication channels. The list of promises related to the use of blockchain technology in the logistics sector is long, but its practical use is rare. The VGM portal, a solution designed by shipping specialists, allows us to gain sufficient practical experience in using blockchain technology in many transactions in the internal production environment. The technology benefits customers, providing a secure solution for the exchange of information with third parties, with increased efficiency and greater transparency (www.hyperledger.org).

According to market estimates, the costs associated with managing and archiving documentation account for one-fifth of the $ 1.8 billion spent annually on international freight. In the case of Maersk, they argue that the use of blockchain technology can not only facilitate, for example, the location of a particular container, but can also show the status of customs and transport documents. The technology can also be used by customs and border authorities, providing the information needed to carry out risk analysis. It thus helps to increase safety and increases the efficiency of customs clearance and customs controls (www.hyperledger.org).

5. A case study of the accounting records of real estate transactions

On January 1, 2019, an entity purchases a building whose acquisition cost is 12,000,000 m.u. (monetary units). The building has a useful life of 30 years and will be used for rent to third parties, thus being classified in the category of real estate investments. (Nicolae, 2010).

In accordance with its accounting policies, at the end of each reporting period the entity performs tests to determine whether there are any indications of impairment of the building. As of December 31, 2019, the entity finds that an impairment has occurred and the value of the impairment adjustment is 1,300,000 m.u.

As of December 31, 2020, the entity notes a reduction in the adjustment for impairment by 600,000 m.u.

On December 31, 2021, the entity decides to sell the building at the price of 18,000,000 m.u.

The recording accounts used (as proposed in the IFRS accounting plan) for the exemplification of these accounting records were selected based on the formulated assumptions (Nicolae, 2010).

Accounting data

(Making entries by the author)

1. Recognition of purchase:

Debit *Real estate investments recorded at cost* 12,000,000
Credit *Suppliers of fixed assets - real estate investments* 12,000,000

2. As of December 31, 2019, the entity registers the depreciation related to the period January 1 - December 31, 2019 = 12,000,000 m.u. / 30 years = 400,000 m.u.

Debit *Operating expenses related to depreciation of fixed assets, real estate investments and biological assets valued at cost* 400,000
Credit *Depreciation of real estate investments valued at cost* 400,000

3. Recognition of Depreciation of the building on December 31, 2019:

Debit *Operating expenses on adjustments for impairment of fixed assets, real estate investments and biological assets valued at cost* 1,300,000
Credit *Adjustments for depreciation of constructions* 1,300,000

4. Recognition of the amortization of the real estate investment related to the period January 1 - December 31, 2020

Annual depreciation = 10,300,000 m.u. / 29 years = 355,172 m.u.

Debit *Operating expenses related to depreciation of fixed assets, real estate investments and biological assets valued at cost* 355,172
Credit *Depreciation of real estate investments valued at cost* 355,172

5. Recording the partial resumption of the previously recognized impairment adjustment on December 31, 2020 :

Debit *Adjustments for depreciation of constructions* 600,000
Credit *Income from adjustments for impairment of fixed assets, real estate investments and biological assets valued at cost* 600,000

6. Recognition of the amortization of the real estate investment related to the period January 1 - December 31, 2021:

Annual depreciation = 10,544,828 m.u. / 28 years = 376,601 m.u

Debit *Operating expenses related to depreciation of fixed assets, real estate investments and biological assets valued at cost* 376,601

Credit *Depreciation of real estate investments valued at cost* 376,601

7. Registration of the sale operation:

Debit *Various debtors* 18,000,000
Credit *Income from the sale of real estate investments* 18,000,000

8. Recognition of asset disposal:

Debit *Depreciation of real estate investments valued at cost* 1,131,773
Debit *Adjustments for depreciation of constructions* 700,000
Debit *Expenses with the sale of real estate investments* 10.168.227
Credit *Real estate investments recorded at cost* 12,000,000

9. The financial result generated by the sale of the real estate investment :

Profit = 18,000,000 - 10.168.227 = 7,831,773 m.u

When implemented in practice, entities may also consider other accounting records alternatives as long as there is a fair presentation of the results in profit or loss statement or/ and in the statement of financial position.

6. Conclusions

In my opinion, the expansion of the use of blockchain technology by various companies ensures a positive trend in terms of the flexibility of accounting information.

In the context of other phenomena registered by the applicability of IT tools in accounting, including artificial intelligence applications, the blockchain will generate a new dynamic / transactional accounting system, made by autonomous applications, independently / automatically. In this new context, well-trained professional accountants will be the ones who interpret the data on the recorded values, making a real economic interpretation of blockchain records, thus combining the written record, electronically, with the reality and fair, economic values. As an illustrative example, blockchain IT applications can signal the existence of a customer for whom there are real guarantees, but the recoverable amount and the economic value are still debatable. Ownership of an asset could also be verified through blockchain records, but the physical condition of the asset, its geographical location and the fair market value of that asset will need to be verified on the spot by professional accountants with the required training and experience of the real context.

The certainty of eliminating reconciliations between bank account balances and entity records, eliminating reconciliations between suppliers 'and customers' balances, confirming certainty in the regularity of the accounting transaction history, allows the blockchain to increase the scope of accounting as well. Thus, there are currently several areas that are considered too difficult or uncertain to measure, such as the amount of information an entity has.

In the current context, of an economic, financial, social environment marked by major elements of unpredictability, the use of blockchain technology in the processing of accounting information on real estate transactions is a factor of economic stimulation.

The transformation of the financial and banking system by including blockchain distributed base network systems presents many opportunities, but also challenges, for professional accountants with an appropriate level of training in new technologies. Be aware! We do not consider here the skills only in the field of social networks, but we see the need for real skills in handling information technology tools, on a solid background of knowledge in accounting and taxation. Professional accountants are seen as top level specialists in accounting, applying complex rules of analysis and evaluation, using logical mechanisms in business, implementing the requirements of financial reporting standards, standards to which they have contributed. Professional accountants have the opportunity to lead and contribute to the technical ways in which the blockchain system is implemented and used in the future, developing blockchain-based solutions, tools and services.

The process of inserting Blockchain systems into the current financial and credit system requires, in a sustainable way, that the blockchain be developed as a set of software applications, being at the same time standardized and optimized. The process of gradually introducing the blockchain will take many years, it is twelve years since Bitcoin appeared on the market and there are many issues that need to be resolved. We can find many blockchain applications and start-ups in this field, but there are very few that have exceeded the study stage - concept or pilot study stage with low applicability. Professional accountants already have major involvement in blockchain research, but the accounting profession, through its bodies, is not yet a major player in the widespread implementation of the blockchain. We consider it necessary to put in the debate of accounting professionals some draft regulations and standards for the development of blockchain applications in accounting, auditing, taxation, business evaluation.

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