

Considerations Regarding the Use of Information Technology in the Creation of Current Models of Entities' Accounting

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Abstract

In this paper, in a simplified manner, we are approaching the digitalization of accounting - a booming process, similar to other industries, some of which have been massively disrupted by technological advances. The digitalization of a company's accounting comes with a multitude of benefits, and more and more entrepreneurs are adopting this model to streamline processes. Through digitization we have managed to bring accounting to the business requirements of the 21st century, which means that entrepreneurs now have control of their business even from the mobile phone. Digitization does not mean that people, the accounting experts, disappear from the conversation and everything is just technology. On the contrary, online accounting brings benefits because behind the technology is always a professional accountant who checks and advises entrepreneurs - this expert is relieved by technology of repetitive tasks, time consuming.

Key words: blockchain technology, accounting, trends.

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1. Introduction

Blockchain or Distributed Registry Technology (DLT) is fundamentally a technology related to the discipline of accounting. The old way of doing accounting is changing day by day and the role of the accountant is also changing. The penetration of technology in the field of accounting also brings opportunities such as streamlining the business, but also the ability to serve a larger number of customers. Thus, any repetitive activity specific to the work of an accountant can now be taken over and executed by software. But, like any other newly implemented strategy, the digitalization of accounting also comes with challenges of all kinds. (www.hyperledger.org)

The field of accounting takes place in an area where 97% of activities are suitable for digitization, and in an economy based on digitization, information means power, and more and more companies are interested in streamlining this segment in the hope that they will reach higher competitive market. Thus, the digitalization of accounting brings benefits to both smaller firms and large corporations. (www.hyperledger.org)

But how do traditional accounting services combine with technologies such as Spring Boot, Node.js, GraphQL, Angular, OpenCV, MongoDB, PostgreSQL or Redis? The combination is successful. This is demonstrated by the growing number of clients of the entities that have submitted everything on time, have reports and documents on the phone or online, on the platform. The internal challenge is a cultural one, first and foremost. We meet mixed teams of professional accountants and computer programmers. In the meetings of the mixed teams, at the same table are understood some who talk about the accounts 5121, 411, 401, 2131, 704, 691, about databases, about Node.js and Angular. (www.hyperledger.org)

2. Theoretical background for the use of the IT tools in entities's accounting

Accounting digitization is also based on state-of-the-art technologies such as Robotic Process Automation (RPA), Machine Learning or Artificial Intelligence (AI), which can provide companies with new opportunities to improve performing business processes. It takes a lot of technology to effectively turn a picture taken with your mobile phone into a correct accounting note in just a few seconds. Software robots have been built that manage to automatically count all the documents for which he was trained using automatic pattern recognition. Robot training involves history and a lot of algorithm work. Fuel receipts from large operators were only automatically recorded after tens of thousands of images were processed. The same is true for other documents that fall within a template. In the end, one of the professional accountants visually validates the accuracy of the data. (www.hyperledger.org)

The changes that are taking place as a result of the phenomenon of digitization are also a major risk to which companies are exposed, given the scale of cyberattacks in the current context of business internationalization, globalization and the development of information technology. However, at the level of modern companies, data protection measures have been taken. Data is in the cloud, in Microsoft Azure, or similar systems. This ensures system availability, back-up, recovery, security, data compliance. (www.hyperledger.org)

Digitization, represented by new technologies, robotics, cloud services, intelligent systems and Big Data, has quickly entered the area of accounting, being the main factor that can contribute to increasing the efficiency of the activity carried out. The accounting profession takes place in an area where 99.99% of the activities are suitable for digitalization, being necessary to adapt to the new reality and to reconfigure the activity of the professional accountant. (www.hyperledger.org)

IT has penetrated virtually all the activities we know today and, moreover, has managed to capture the basic tasks in all areas. In the current context, the accounting profession is under the impact of the digital revolution, in the sense that many of the activities carried out by professional accountants are and will be taken over by modern information systems that are constantly evolving.

At the moment, it is no longer enough for a professional accountant to know in detail only the accounting techniques, the legislative and calculation aspects of taxes and fees or to have the necessary knowledge to perform economic-financial analysis and those related to performing internal control or audit, but must have in-depth knowledge of the use of new advanced information technologies and digital connectivity, the strategic benefits that the company can gain through their implementation, and how they can be turned into a profit for the entity. (www.hyperledger.org)

3. Research methodology - evolution of IT tools in entities's accounting systems - empirical aspects of research

The research methodology used in this article consists of the empirical research of a data set available on the Internet and the construction of models of accounting records.

Blockchain is also known as Distributed Registry Technology (DLT) - which is probably a simple definition of blockchain technology. (www.hyperledger.org)

Encryption, in its most rudimentary form, has been around for over 2,000 years, at least if we look at more or less accurate historical details. The best example is Caesar's cipher. It's also quite simple: reverse the position of some letters in the alphabet and write the message with the new alphabet created this way.

But this cipher is an excellent example of what cryptography means: you have the encrypted message that others can see, but if you don't have the key to decrypt it, you don't understand what's there. However, Caesar's figure is extremely simple and, in the modern world, does not offer any protection. A slightly more modern application of it is ROT13. Take the first 13 characters of the alphabet and put them after the other 13 characters. The report is in 26 characters, because that is the Latin alphabet. The Romanian one uses the same 26 characters, but it has 31 letters - the diacritics are added.

The somewhat modern encryption started in 1917 and 1918 with Edward Hebern, an American, and Arthur Scherbius, a German. (www.hyperledger.org) The first one created an electro-mechanical machine whose purpose was to encrypt a message by changing the characters. Conversations are thus

hidden from the public, just as encryption works now: you can see that messages are being sent, but you can't read them. Or at least that's how it should work, because every company that implements encryption, in one form or another, does it the way it wants.

In the world of those who are somewhat interested in technology or specialize in its development, from programmers to engineers, encryption was not a new topic, because they already knew its potential, usefulness and types of implementation.

What happened in 2021, stronger than ever, is that WhatsApp has changed the terms of use of the platform. In short, users who would interact with businesses through the app agree that those conversations can be shared with Facebook (the company that controls WhatsApp). From here, things get trickier, and this is where the true meaning of life begins. The Telegram application, which already has hundreds of millions of users, and the Signal application stood out. (<https://www.pcworld.com>)

However, WhatsApp also offers end-to-end encryption. The change now is that encryption is not available for all messages. Those with friends, those in groups, will be encrypted, those with business are not. WhatsApp has been encrypted for more than four years. And from the very beginning, a researcher specializing in cryptography and security has shown that the protocol has serious breaches. (<https://www.pcworld.com>)

WhatsApp encryption is end-to-end, only it uses a public and a private key. The first key is used to encrypt the message, the second key to decrypt it. Public keys are stored on the company's servers and the first breach can be fixed there on the server. Then it's about how the app uses the public key. If you change your phone or reinstall the app, a new key is generated. To make the conversation more secure, you should validate that the other person is one and the same with your person through a unique code. It's just that WhatsApp automatically validates the key and the messages could be redirected to another user. (<https://www.pcworld.com>)

Another key moment in increasing the attention for encryption and the general public, not only in specific scenarios or in the military field, was the recommendation of the European Commission to those of its staff to use the Signal application. Part of the motivation for the recommendation was that it was open source. The stronger motivation, however, was that members of EU structures are careless when it comes to the security of conversations.

The ransomware threat has become the negative character of encryption. In the case of ransomware, the encryption technique is the same. Use a combination of public-private key and symmetric encryption. If he didn't rely on it, he wouldn't be able to encrypt the huge amount of data in a short period of time. What is interesting, however, is that one of the ransomware booms was this: the exchange of public-private key pairs via the Internet, from a central server, so that the ransomware is no longer vulnerable to brute force. guess the key. Growth began in 2014 and now exceeds \$ 4 billion annually in business. (<https://www.pcworld.com>)

Regardless of the most problematic cyber threat, the growing interest in cryptography is justified by several factors that lead to attracting talent in this area.

The first and most obvious is the cryptocurrency area. Bitcoin has grown so much that in Romania there are many people involved in launching cryptocurrencies or working in blockchain startups, where the interest is even higher than for currencies.

On the other side of the barricade, the growing interest in cryptography has either been the result of ransomware threats, ie they have been successful as a threat in the financial area, and is developing a lot in cybercrime, or is the increased interest of governments in cracking cryptographic algorithms to expose information to which they no longer have access.

And when it comes to governments, the resources are even greater. In their case, for most states, switching to end-to-end encryption meant that classic interceptions could no longer be performed. Currently, over 80% of global internet traffic is encrypted. This means that governments no longer have visibility. And then a lot goes into cryptographic analysis (analyzing encryption protocols to find a vulnerability), through brute force, using supercomputers to guess which key is the pair of a private key, or developing exploits. There are companies that have decided to take another path: break into the phone, where the messages are unencrypted. It's a huge market for exploits, with prices of almost 1 million euros per iPhone vulnerability, for example. (<https://www.pcworld.com>)

One last idea about security looks at a future defined by quantum computers. For now, we are talking about them only at the level of experiments and a huge potential to be discovered and explored. One of the important worries in their case is that they will break the encryption very easily. (www.hyperledger.org)

An ordinary computer today would take billions of years to break the RSA-2048 standard. A quantum computer could do it in less than a day. Not now, but when it would reach both stability and higher capacity. For example, a quantum computer with 4,099 qubits would be able to crack the RSA-2048 in 10 seconds (https://en.wikipedia.org/wiki/RSA_Security). However, most of the quantum computers developed today have a few tens of qubits, and they are not in a perfectly stable state. Their stability determines both the speed and the quality of operations. There are exceptions, of course, such as the D-Wave system announced in 2020 with 5,000 qubits (<https://www.dwavesys.com>). However, it can only solve optimization problems, which reduces its usefulness, but shows that there is room for development. (www.hyperledger.org)

4. Findings. Survey of the specific evolutions regarding the application of IT in the accounting of transactions in Romania

Each user participating in a Distributed Registry Technology software system will archive their own copy of the database, an instance of the transaction values recorded in the history, which have been stored in the registry. By comparing the instances of other users, it is memorized synchronized to the transactions carried out through a process of agreement of the users. Unlike the traditional system of accounting records, there is no entity, an owner of the accounting data having special rights to edit or delete economic and financial transactions. In fact, there is no central register at all, which is an element of major difference from the classical system of double-entry classical accounting. (www.hyperledger.org)

Blockchain has the potential to enhance the capabilities of the accounting profession by reducing the cost of accounting and reconciling accounting records. This ensures absolute security over the ownership of the patrimony and the historical records of the entity's assets. (www.hyperledger.org)

Blockchain is able to support professional accountants in getting a fair picture of their own funding resources and lending opportunities that can be accessed by their entities. Thus, it is possible that the working time of professional accountants may be relieved of accounting, being available for advisory activities, accounting consulting, interpretation of accounting data describing the financial position and financial performance of the entities. (www.hyperledger.org)

Along with other tools for introducing information technology tools into the accounting profession, such as machine learning, blockchain will lead to accounting through a set of automated procedures. Instead, professional accountants will work on issuing audit reports on the reality of accounting records, combining accounting records with financial accounting evaluation. Blockchain accounting can provide data on the existence of a secure customer, but it is necessary to verify the recoverable amount of the claim. It is possible to verify ownership of assets through blockchain records, and it is necessary for professional accountants to verify, in the field, the physical condition, location and actual value of assets. (www.hyperledger.org)

By eliminating reconciliations and ensuring certainty in the transaction history, the blockchain could also expand the scope of accounting, taking into account several areas that are currently considered too difficult to measure, such as the amount of accounting information that an entity holds. (www.hyperledger.org)

The application of blockchain technology in accounting is a replacement for traditional accounting and reconciliation accounting work. This phenomenon changes the activity of accountants in the accounting records of transactions, leading at the same time to the amplification of the activities of professional accountants who provide added value to accounting information. We consider here: the activities of professional accountants in mergers and acquisitions, the activities of professional accountants for analysis and the issuance of professional judgments for key figures describing the financial performance of entities. (www.hyperledger.org)

Blockchains also allow for a greater degree of transparency than traditional accounting works. This is attractive in cases where corruption or misappropriation of property is in jeopardy. For example, spending could be provided in a blockchain-based asset; from there the final beneficiary of

the funding could be easily identified. (www.hyperledger.org)

At present, business-to-business transactions lead to accounting with four sets of data, in which each company makes its own double-entry accounting and, in theory, the two sets of accounting records have a set of data of equal value. This model could be substantially modified by a computerized blockchain-based accounting system. By simplifying the barriers around the internal accounting of each company and making entries directly in blockchain IT systems, the accounting records allow the transaction to be recorded faithfully, verifiable and identical by each party. This system can be applied, for a start, to accounting for the transactions of groups of companies. Over time, the system may be applicable to more and more entities, creating a universal record system. (www.hyperledger.org)

Basically, any kind of asset register will have to be designed around the limits of privacy that a blockchain creates. While the data in each transaction can be encrypted, if the source or ownership of the assets is at stake, then previous transactions must be public to verify this. Finding a way to balance the competing priorities of decentralization, confidentiality, and security is a current area of research among blockchain specialists.

There are several areas that can affect the blockchain. When paired with a robust digital identification system, an identity block could store credentials for individuals, simplifying customer knowledge and other identification processes, allowing organizations to share identification activities. Similarly, a database of intellectual property rights could be distributed to simplify the process of identifying owners' Internet Protocol addresses, claiming and paying royalties. (www.hyperledger.org)

Blockchain information systems have applications in financial audit - statutory, external. Confirmation of a company's financial condition would be less necessary if some or all of the transactions underlying that status were visible on the computer network. This approach would mean a profound change in the way professional financial audit services are performed. (www.hyperledger.org)

A blockchain IT solution, when combined with proper data analysis, could help with transactional assertions involved in a financial audit, and the auditor's skills would be better used, given the ability to address professional, higher-level judgments. (www.hyperledger.org)

5. A case study of the accounting of set of transactions

Table no. 1 Table of transactions related to the case study

Transactions	Textual description of the transactions
Initially	On January 1, 2021, a real estate business entity purchased a housing complex, for which the fair value of 4,800,000 m.u. (monetary units). The housing complex has an estimated useful life of 30 years and will be used for rent to third parties, thus being accounted for in the category of real estate investments. (Nicolae, 2010).
December 31, 2021	In accordance with its accounting policies, at the end of each reporting period, the entity shall perform tests to determine whether there are any indications of impairment of the housing complex. The company's accounting specialists exercise their professional judgment; they estimate that there has been a depreciation of the present value of the asset group, and the value of the adjustment for impairment to be recorded on expenses is 400,000 m.u.
December 31, 2022	The company's accounting specialists note the increase in the current value of the asset and, implicitly, the reduction of the adjustment for depreciation by 200,000 m.u.
December 31, 2023	The entity decides to sell the housing complex at the price of 5,600,000 m.u.

Source: Case study data proposed by the author

Accounting data
(Making entries by the author)

Table no. 2 Recording of the purchase of the housing complex

Account - Debit	Account - Credit	Amount
Tangible fixed assets - Real estate investments recorded at fair value	Providers of tangible fixed assets in the category of real estate investments	4,800,000

Source: Calculations and records made by the author

Table no. 3 Calculations for amortization for year 2021

Calculations and records
As of December 31, 2021, the entity calculates and records the amortization for the period January 1 - December 31, 2021 = 4,800,000 m.u. / 30 years = 160,000 m.u.

Source: Calculations and records made by the author

Table no. 4 Record for amortization for 2021 year

Account - Debit	Account - Credit	Amount
Operating expenses related to the amortization of real estate investments valued at fair value	Depreciation of real estate investments valued at fair value	160,000

Source: Calculations and records made by the author

Table no. 5 Recognition of expenses of the depreciation of the current value of the building as of December 31, 2021

Account- Debit	Account - Credit	Amount
Operating expenses related to adjustments for impairment of real estate investments valued at fair value	Adjustments for property impairment	400,000

Source: Calculations and records made by the author

Table no. 6 Calculations for amortization for year 2022

Calculations and records
Annual depreciation = 4,400,000 - 160,000 - 400,000 = 3,840,000 m.u. / 29 years = 132,414 m.u.

Source: Calculations and records made by the author

Table no. 7 Record for amortization for 2022 year

Account - Debit	Account - Credit	Amount
Operating expenses related to the amortization of real estate investments valued at fair value	Depreciation of real estate investments valued at fair value	132,414

Source: Calculations and records made by the author

Table no. 8 Recognition of transfers to income of reduction of depreciation at December 31, 2022

Account- Debit	Account - Credit	Amount
Adjustments for property impairment	Revenue from adjustments for impairment of real estate investments valued at fair value	200,000

Source: Calculations and records made by the author

Table no. 9 Calculations for amortization for year 2023

Calculations and records
Annual depreciation = 3,840,000 - 132,414 + 200,000 = 3,907,586 m.u. / 28 years = 139,557 m.u.

Source: Calculations and records made by the author

Table no. 10 Record for amortization for 2023 year

Account - Debit	Account - Credit	Amount
Operating expenses related to the amortization of real estate investments valued at fair value	Depreciation of real estate investments valued at fair value	139,557

Source: Calculations and records made by the author

Table no. 11 Registration of the sale of the housing complex valued at fair value

Account - Debit	Account - Credit	Amount
Operating expenses related to the amortization of real estate investments valued at fair value	Depreciation of real estate investments valued at fair value	5,600,000

Source: Calculations and records made by the author

Table no. 12 Recognition of the transfer - removal from recordings of the housing complex

Account - Debit	Account - Credit	Amount
Depreciation of real estate investments valued at fair value	Tangible fixed assets - Real estate investments recorded at fair value	431,971
Adjustments for real estate investment depreciation	Tangible fixed assets - Real estate investments recorded at fair value	200,000
Expenses from the sale of tangible assets - real estate investments	Tangible fixed assets - Real estate investments recorded at fair value	4,168,209

Source: Calculations and records made by the author

Table no. 13 The financial result generated by the sale of the real estate investment - housing complex

Revenues	Costs	Financial Result - Profit
5,600,000	4,168,209	5,600,000 - 4,168,209 = 1,431,791 m.u.

Source: Calculations and records made by the author

In order to implement the proposed accounting model in practice, companies may consider implementing alternatives to the accounting model. This will ensure a fair presentation of the financial impact of transactions in: *Statement of profit and loss and other comprehensive income*, *Statement of financial position*, in financial reporting - summary accounting documents prepared by entities.

6. Conclusions

In my opinion, the application of new, innovative tools and techniques that have emerged as a result of the development of information technology (IT) information capabilities provides the necessary foundation for multi-item, multi-dimensional processing of accounting information.

The practical application of new technologies and up-to-date IT tools ensures a constant flow of accounting data to the various entities, to the users of the summary accounting statements or documents. This creates the instrumentalization of a real-time interaction between the need for accounting data in the decision-making process of entities and spatially and temporally delocalized data sources.

One of the most important issues is to provide a wide range of tools for the increased security of financial and accounting data. This requirement is imposed by the current conditions in which we encounter an external environment with multiple challenges and threats from business entities, competitors or parastatals.

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