The blockchain impacts in accounting auditing

Os impactos da cadeia de bloqueios na auditoria contábil

DOI:10.34117/bjdv7n9-263

Recebimento dos originais: 07/08/2021
Aceitação para publicação: 16/09/2021

Fernando Rode
- Bachelor in Accounting Sciences
- São José University (USJ)
- Jaír Viêira Street, 2-68 - Kobrasol, São José – Santa Catarina - Brasil.
E-mail: galaxy.w712@gmail.com

Paulo de Moura Bastos
- Master in Sciences- São José University (USJ)
- Jaír Viêira Street, 2-68 - Kobrasol, São José – Santa Catarina - Brasil.
E-mail: psmbastos33@yahoo.com.br

Alcides J. F. Andujar
– Master in Production Engineering - São José University (USJ)
- Jaír Viêira Street, 2-68 - Kobrasol, São José – Santa Catarina - Brasil.
E-mail: alcidesandujar@gmail.com

Ednaldo de Souza Vilela
- Master in Production Engineering - São José University **(USJ)**
- Jaír Viêira Street, 2-68 - Kobrasol, São José – Santa Catarina - Brasil.
E-mail: ednaldovilela@gmail.com

ABSTRACT
This paper aims to identify the main impacts of Blockchain as accounting audit as well the advantages and disadvantages facing future challenges to auditing. The methodology used was basic qualitative research, and review topics with exploratory aims, such as technical procedures. The data collection was in CAPES (Coordination for the Improvement of Higher Education Personnel) and ICAEW (The Institute of Chartered Accountants in England and Wales) websites and the data analysis and interpretation consisted in classifying and deducting. It was identified that Blockchain is little related to accounting auditing. Results show that the number of financial institutions and organizations that invest in Blockchain is rising, considering that it is related to a distributed ledger that provides a major transparency in the financial transactions of the organizations, which suggests that in the very near future financial institutions and organizations will use Blockchain to interact with each other and in this context internal and external auditing might be continuous, having in mind that in Blockchain financial transactions are available in real time for the auditors and available to auditing. In addition, the distributed ledger enables auditors to access information in new formats, and consequently changes in work roles will occur. In this way, corporative reports will have more consistent and reliable information. However, many countries do not know how to regulate Blockchain or do not offer any legal environment to it.

Keywords: Accounting Auditing, Continuous Auditing, Blockchain.

RESUMO

Este documento visa identificar os principais impactos da Blockchain como auditoria contábil, bem como as vantagens e desvantagens enfrentadas pelos desafios futuros da auditoria. A metodologia utilizada foi a pesquisa qualitativa básica, e rever tópicos com objetivos exploratórios, tais como procedimentos técnicos. A coleta de dados foi feita nos sites da CAPES (Coordination for the Improvement of Higher Education Personnel) e ICAEW (The Institute of Chartered Accountants in England and Wales) e a análise e interpretação dos dados consistiu em classificar e deduzir. Foi identificado que a Blockchain está pouco relacionada à auditoria contábil. Os resultados mostram que o número de instituições e organizações financeiras que investem na Blockchain está aumentando, considerando que ela está relacionada a um livro contábil distribuído que proporciona uma grande transparência nas transações financeiras das organizações, o que sugere que num futuro muito próximo as instituições e organizações financeiras utilizarão Blockchain para interagir entre si e neste contexto a auditoria interna e externa pode ser contínua, tendo em mente que na Blockchain as transações financeiras estão disponíveis em tempo real para os auditores e disponíveis para a auditoria. Além disso, o livro razão distribuído permite que os auditores acessem informações em novos formatos e, conseqüentemente, ocorrerão mudanças nas funções de trabalho. Desta forma, os relatórios corporativos terão informações mais consistentes e confiáveis. Entretanto, muitos países não sabem como regular a Blockchain ou não oferecem nenhum ambiente legal para ela.

Palavras-chave: Auditoria contábil, Auditoria Contínua, Blockchain.

1 INTRODUCTION

Technology is generating many changes in the way we live, work and interact and it is essential that the role of the auditor follows that change and be proactive in the comprehension of how new technological tendencies can transform the auditing approach. The external auditing continues being carried annually, in which auditors analyse reports associated to historical data, in a way that the audited financial demonstrations are not used to decision-taking in global economy in real time and evolution, whereas internal auditing remains being conducted monthly, and not in real time. In order to continue relevant, the accounting auditing needs a suitable, proactive and noticeable methodology, since most users need an auditing of the accounting statements in a continuous form, and it is of extreme importance that the accounting audit acquire new technologies, as technological advance offers meaningful impacts and big opportunities along.

The concept of distributed *ledger* named *Blockchain* provides safe information on a platform that is able to represent and exchange tangible and intangible assets, without

the necessity of a financial institution. Blockchain also supplies unchanging records where all distributed ledger transactions are available for any network user. (OBERHAUSER, 2014).

According to Iansiti e Lakhani (2017), in the Blockchain, all the transactions added to the network are updated simultaneously, so the value records and traded assets are entered permanently in all account books, which makes ledger replicated in a large identical database. Therefore, Blockchain has a public and deployed ledger with a full inventory of all the transactions that can impact in the way auditing is carried out currently, which means that instead of waiting until the closing of the fiscal period and/of monthly closing of the management accounting reports to see the impact of the transactions of an entity in its financial statements, the auditing will occur as the transactions are originated.

In this context, this study aims to answer the following question: What are the impacts of the Blockchain in accounting auditing? To answer this research question, it is necessary a systematic bibliographic research to identify the main impacts of Blockchain as a tool in accounting auditing, as well as its advantages and disadvantages facing future challenges to auditing.

We reinforce that this research justifies itself by the need of analysis and investigation related to the future of the auditorship profession, considering that it operates according to rigid and regulatory structures. It is of great relevance an active and continuous debate regarding Blockchain use in auditing processes, as well as capitalizing the advantages and disadvantages that Blockchain brings to internal and external auditorship professionals. Subsequently, it is known that as it relates to a disruptive technology and breaking uncountable, technological, governmental, organizational and social paradigms, it is believed that this study can clearly contribute to auditing professionals, students, professors, researchers, entrepreneurs and investors

Considering the above, this study is limited in terms of the temporal aspect, as it only uses data from the years 2008 to July2018 in the systematic bibliographic analysis. For a better understanding, this research will be presented in five sections, starting with this introductory section, secondly, the theoretical framework that serves as a guiding basis for the reader will be presented, then, the methodology used, the presentation and analysis of the results and final considerations, and finally the references.

2 THEORETICAL FRAMEWORK

In this section, the necessary theoretical background for the understanding of this study is presented. At first, it is essential to define accounting audits segregated in internal and external, as well as to present their techniques and work papers. Besides, it brings comprehension towards the advent and evolution of Blockchain, in order to introduce its impacts in the audit accounting.

2.1 FINANCIAL AUDITING

In thesis, the advent of the audit accounting took place on account of the economic development of countries through the growth of companies of different sectors, in which it generates the necessity of confirmation of accounting demonstrations concerning the financial and economic reality of the patrimony of the companies (ATTIE, 2010). The expression "Financial Statements" is a reference to the accounting information that, in Brazil, encloses the balance sheet and the demonstrations of the result, changes in the net asset value and working capital, that along with subheading notes, forms a database and basic information on which the auditor emits its report. (PEREZ JÚNIOR et al., 2015).

Attie (2010) complements that auditing account is responsible for the tests of efficiency and effectiveness in the patrimonial controls of the entity. Considering this context, auditing prevents situations that can provide frauds, embezzlement and bribes through regular processes in the specific internal controls of each organization (CREPALDI, 2009).

Therefore, for one better agreement of this specialization of the accountant, it becomes necessary the division in two ramifications of performance: the internal auditorship and external auditorship, or also known as operational and independent.

2.1.1 Internal auditorship

Internal or operational auditorship is exerted by a professional of the proper company, who although having an employment contract, has his functions exerted with absolute independence, which means without the interference of the administration. Moreover, he must exert his functions with total fulfilment to the norms of auditorship (FRANK, MARRA, 2009, P. 219). Almeida (2010) argues that the internal auditors do not have to get involved in any activity that can one day come to examine.

The internal auditorship is an instrument of verification of the operational activities of an organization, in which its approach is of the one in the evaluation of the

controls of the activities and administrative and operational proceedings, inquiring the possible weaknesses and existing risks, aiming at the protection of the entity (OLIVEIRA et al., 2008). According to Brazilian Norm of Countability (NBC) TI 01, the internal auditorship embraces analysis and evaluations, with surveys and evidences, structuralized for the evaluation of the integrity of the systems of information of the internal controls, integrated to the environment and the management of risks, in order to assure the administration of the entity and to promote the prevention of frauds and errors.

Zavatieri (2019) clarifies that the purpose of the audit is to increase the degree of confidence in the financial statements by users, according to NBC TA 200 approved by CFC No. 1203 of 11/27/2009 and published in the Official Gazette of the Union – D.O.U.

In this direction, the term fraud is applicable to omissions or manipulations of transactions and operations, also the document adulteration and register of the countable demonstrations being in physical or monetary terms. About the not intentional act of carelessness, unfamiliarity or harm interpretation of facts elaborated in the registers the term is called error (LINS, 2012). On the other hand, the procedures of the internal auditorship enclose the substantive tests of observance and substantial tests. The observance tests consider to analyze the internal controls established by the administration, in which application must be considered the following procedures:

- ✔ Inspection – Verification of the registers, documents, and assets;
- ✔ Comment - Verification of the execution of the processes and execution of procedures;
- ✔ Inquiry and Confirmation - Detection of the transactions and operations of the physical or legal people, inside or outside the entity.

The substantive tests aim at the attainment of the efficiency and effectiveness or the validity of the data produced by the systems of information. The report of the internal auditorship must allude, at least, the aspects regarding the objectives and extension of the works technician, eventual limitations to the reach of the auditorship procedures, in addition to the description of the evidenced facts and the joined evidences (LINS, 2012).

2.1.2 External auditorship

The external auditorship is carried by a professional who does not possess any employment bond with the auditorship entity. The independent auditor has a major independence in relation to the internal auditor, considering he aims to objectify the emission of countable reports, to give accounts to a third party (FRANK, MARRA, 2009).

Lins (2012) adds that the intention of the external auditorship is to give credibility to the countable demonstrations to assure that these had been elaborated in compliance with the norms of accounting and the specific applicable legislations.

This professional, according to Crepaldi (2009), consists of an uneven figure for giving services to the shareholders, bankers, as well as governmental public agencies, amongst others. According to Law nº 6,404/76 that gave origin to Corporate Law, this determines that the countable demonstrations of the public company, that is, those that negotiate its operations in Stock exchange, had obligatorily passed to be audited for independent auditors with a register in the Commission of Movable Values **(**CVM). Regarding the register, it also implies the external auditors in relation to the implicit requirements in the Instruction nº 308/99 of CVM (PEREZ JÚNIOR et al., 2015).

The Instruction nº 308/99 of the CVM determines for ends of register in the category of Independent Auditor, if Individual Person the requirements are the following:

- Not having an inferior period of five years, being consecutive or not, counted from the date of the register in the CRC in the category of Accountant and exerted activity of auditorship of countable demonstrations, inside of the domestic territory.
- Approval in the qualification examination.
- To get permanent and updated knowledge on the branch of activity, the businesses, countable and operational praxis of its customers, as well as possessing enough resources to its operational structure and adequate to its size.
- To be registered in CRC, in the category of accountant.
- To have exerted activity of Independent Auditor, legalized professional office, in proper name, as well as installations adjusted with the exercise of the activity, in conditions that guarantee the guard and the secrecy of documents and the information, as well as the privacy in the relationship with its customers.

Amongst the requirements of the instruction number and for the alterations of the 308/99 instruction nº 591/2017 of the CVM for the category of Independent Auditor Legal entity, is distinguished the following ones:

- All the partners are accountant, and that the half of the same ones are registered in registered as responsible technician;
- Constituted in the form of simple society for exclusive rendering of services the inherent auditorship and other services to the accountant profession;
- That constituent act or social contract consists in how much the repairing for

damages that come to cause third, for guilt or deceit, in exercise of its activities, and that, ahead of this must answer limitlessly for the social obligations;

- ✔ Keeping the technical personnel always up to date about the requirements of its customers, in the areas of knowledge, practical businesses and the countable ones.

How much to the duties and responsibilities of the independent auditors, in accordance with the instruction nº 308/99 of the CVM, fits to keep the guard for the minimum stated period of five years, or superior stated period in cases of administrative inquiries, all the documentation, papers of work, reports and related to the exercise of its functions. The Independent Auditor, is it natural person or Legal, according to instruction nº 308/99, will not be able to exactly give to services for the one customer, for superior stated period of five counted consecutive years from the date of this instruction, as well as keeping a minimum interval of three years for the rehiring.

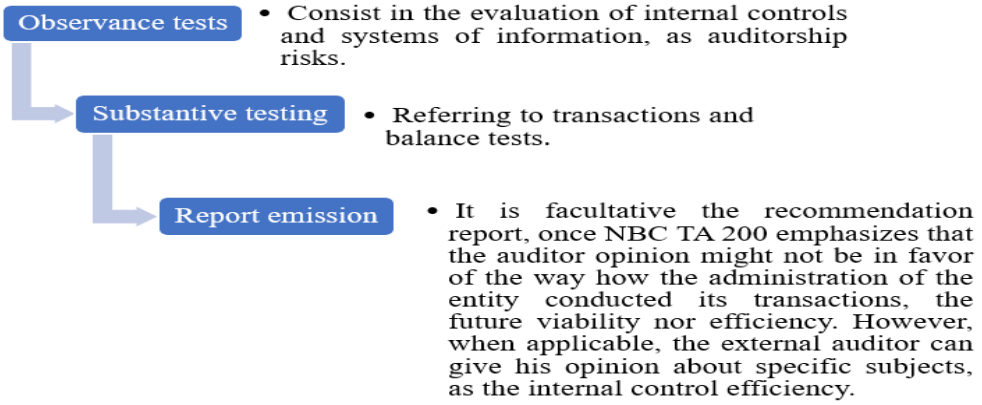
Still, the work of the Independent Auditor, aims at procedures how much its execution, to denote clarity and transparency, in way that all the mentioned items can be verified, tracked and proven. Moreover, these evidences are materialized in the *Work Papers* (WPs). The information contained in the WPs are the basis for the emission of seeming of the auditor (LINS, 2012).

The countable demonstrations audited by the external auditors are those obligated by legislation, financial statements, demonstration of the mutations of the equity, as well as the demonstration of income statement for the year, year-end results of the working capital, demonstration of the added value and finally the demonstration of the including result. The explicative notes complement these demonstrations making these information clearer (LINS, 2012).

In short, the processes for emission of report of the external auditor are sufficiently extensive, imply great stages, as planning, procedures of auditorship for attainment of evidences and emission of report (LINS, 2012) (figure 1).

In addition, the internal control aims at the security of the administrative and operational activities, in order to reduce the possibility of deviations of the assets, disobedience to the internal and external norms of the organization, as well as unintentional errors. The points observed by the external audit are the information generated and the safeguarding of the assets.

Figure 1 - Processes for issuing the external auditor's opinion



Source: Adapted of Lins, 2012

Information systems (IS) are important for any entity, as it is considered a facilitating tool in conducting any type of business. At the same time, confidential information circulates on internal and external networks, being considered a fundamental point for the entities and for the audit, the security and reliability of this information. Obviously, the level of countable complexity of one IS for auditorship will depend on the volume of transactions, of the availability of these data, such as probatory document-source and documentations for the accomplishment of the work of the auditor. It must also consider the type of applicatory program used and its security regarding the trustworthiness in the calculations effected by the generated reports (LINS, 2012).

In the planning and evaluation of one IS, one also considers the auditorship risks, as uniformity of the effected transactions, allegiance, and physical security of the information, but still, the logical security and reliability of the information (LINS, 2012).

Moreover, the tests of transactions and balances are linked, thus the examination of the documentation, in set, supports the countable launchings and balances. The transaction tests are in obtaining the documents of those who make up the balance of the balance sheet accounts. As for what will be the object of verification of such accounts, the selection is made at random and for this the external auditor uses electronic means for the analytical selection of the data, where many of the audited organizations have their own *software* selection. After selecting the data, the auditor proceeds to the analysis and shows the audit procedures performed in the WPs (LINS, 2012).

2.1.3 Audit in the face of technological changes

The audit has been facing a period of profound changes as companies and society undergo technological changes (ICAEW, 2017). In this way, business environments are

evolving at a faster pace in relation to the audit profession, given the fact that timely extra-accounting information is generated after the occurrence of events and is readily available for consumption and processing *online* among the investors (HUMPHREY et al., 2009). It is, in this context, that auditors must prepare to deal with new challenges, since technologies can transform audit approaches, such as data collection, processing and incorporation of new information systems and be properly prepared to deal with large volumes of data, many of which started to demand from auditors the knowledge and application of sophisticated technologies (ICAEW, 2017).

Economic, legal and political systems are defined through contracts, transactions and records. It is through these means that nations, governments, communities, organizations, and individuals interact with each other. However, the critical and bureaucratic tools formed to manage them have not kept pace with the digital transformation of the economy, which is why in a digital world, the way we regulate and maintain administrative control must change (IANSITI; LAKHANI, 2017).

The International Federation of Accountants (IFAC) through its program "Developing the Future of the Profession", in which it has the objective to capture global perspectives on the impact of the technology in the financial scope and implications for the auditorship, tells that the processing of widely automatized more standardized transactions tend to be each time more patterned to a tax of very fast transaction in many organizations, and that the constant development of the Blockchain is that would allow to the full visibility of these transactions since the initial point of the general ledger (IFAC, 2018).

2.2 BLOCKCHAIN

The currency, for many centuries, obtained different denominations. Gold and silver, for example, if related to a *commodity*, assume the same monetary function, that is, regardless of the nomenclature, both use the same essence (ULRICH, 2014). The author also mentions that currency diversification promoted free trade, thus traders contributed to the economic calculation, promoting restrictions on the powers of governments. However, with the creation of the currency itself in the twentieth century, central banks together with banking cartels raised the power of governments through currency depreciation, as society's goods and services over valued while the currency went the opposite way. Therefore, with the withdrawal of market forces, the population was financed by indebtedness backed by the use of the banking system to print money, to

the step where the banking governments and cartels were benefited of this system. The attempts of formularization of the currency as *NetCash* (1993) and *NetCents* (1998), had been ignored.

In November 2008, the pseudonym Satoshi Nakamoto introduced to the world a payment system called *peer-to-peer* (point-to-point), through a digital currency called Bitcoin, making possible the task of payments *online* between a party and another without the need for a financial institution (NAKAMOTO, 2008). The document creates a *ledger* distributed and called Blockchain (OBERHAUSER, 2014).

Blockchain is a public ledger where all Bitcoin digital currency transactions are recorded. The technological structure of the Blockchain can be considered as if it were another layer of the Internet, despite containing the architecture of a new transaction system, acting in a decentralized way and this is the main starting point. The *ledger* distributed is considered a disruptive technology, as it can be programmed to register all types of assets, and it is literally an accounting system capable of reconciling on a global scale all forms of assets held in the world including the economic and financial areas (SWAN, 2015).

However, Iansiti and R. Lakhani (2017), professors at Harvard Business School, based on their experiences in technological innovations, claim that for there to be a mass adoption of Blockchain, many technological, governmental, organizational, and social paradigms would have to be overcome. The authors further argue that it would be a mistake to rush into Blockchain innovation, and that the *ledger* distributed could not attack a traditional business model, simply by offering a low cost and surpassing already established companies. Still, they consider Blockchain's impact to be of great relevance, but it will take decades for Blockchain to reach our economic and social infrastructure.

The evolution of Blockchain is constant and is already in three levels of application: Blockchain 1.0, 2.0 and 3.0.

- **Application 1.0:** Is where digital currencies are implemented, as well as the Bitcoin cryptocurrency, that is, the Blockchain records all digital currency operations in a public ledger distributed throughout the Bitcoin users' computer network, containing all the history of currency transactions (SWAN, 2015);
- **Application 2.0:** Unlike 1.0 which is used to implement digital currencies and decentralize payments without the need for a financial institution, Blockchain 2.0 is the decentralization of different types of asset and market records in general, such as transactions financial assets, intangible assets, patents, trademarks and

copyrights, mutual fund bonds, loans, contracts, as well as land and property title registrations, notarized documents, and even driver's license identification, identity, signatures and wills (SWAN, 2015);

- ✔ **Application 3.0:** Would be applications of the protocol in addition to currency, that is, segments as diverse as government, health, science and economic development (SWAN, 2015).

Due to the diverse applications and the impacts that the Blockchain provides in the different areas of performance, the Institute of Chartered Accountants in England and Wales - ICAEW through its program of innovation and impact of the technologies of information in the countable profession (*AuditFutures*) of century XXI, approaches which are the premises for the future of the professionals of auditorship and accounting. Defining that Blockchain is not a technological solution but a cultural and governance solution (ICAEW, 2017), so that the mechanisms of the Blockchain guarantee auditability and immutability in order to promote security about your information generated there, that is, once an information is recorded in the distributed ledger it cannot be changed (NAKAMOTO 2008).

According to ICAEW (2017), Blockchain provides accounting with greater efficiency in the process of accounting for transactions as well as assets and it operates as a universal bookkeeping system, which, in turn, would make it possible for the audit task to expand its scope to a continuous audit, thus, getting closer to the economic and financial reality of the entities' underlying transactions.

Aithan and Svetinovic (2016) mention that the alignment of the blocks (where information is recorded) in a chronological form does not allow the transactions to be adulterated, therefore, the Blockchain consists of a commanded chain of blocks protected by proof-of-work resolution (work test that consists of the decoding blocks). The chaining of blocks where the information is recorded occurs chronologically and is interconnected through a hash (encoding) of the prior block to the current one. For example, for a rogue proof-of-work to be able to modify an old block, they will have to redo all the subsequent blocks, which means that such a hypothesis is unfeasible due to the necessary and yet ineffective technological effort. Therefore, it is necessary the knowledge of the characteristics of Blockchain, which is different from the current accounting books:

- **Propagation:** As transactions occur, the ledger is replicated in an identical and equivalent way for all users, which makes everyone to have access to a complete copy of the book (ICAEW, 2017);

- **Accuracy:** Transaction records are recorded and verified by consensus, in other words, dishonest information is audited and automatically deleted from Blockchain. Consequently, only reliable information prevails in the ledger (DELOITTE, 2017);
- **Decentralization:** Blockchain is not controlled by any central entity, it operates in a distributed manner and has the ability to reconcile records and transactions among users located any place around the globe, relying exclusively on the internet (SWAN, 2015);
- **Programmability:** Blockchain is allowed to be programmed and applicable in what it will be pertinent, nowadays, it is used for payments and liquidations, database and invariant accounting (DELOITTE, 2017).

Accordingly, Blockchain can be defined based on its data access, participation of the consensus mechanism and behavior on the proposal changes in its ledger, as mentioned following:

- **Public Blockchain:** The public Blockchain does not demand special permission to be accessed, so all users can remain anonymous in the net, as well as participating in the consensus process, reading and to sending transactions. An example of application of public Blockchain is the Bitcoin cryptocurrency (DELOITTE, 2017);
- **Private Blockchain:**They are based on access permissions, because private Blockchain is controlled for an organization which determines which users will have access to reading, sending transactions or to participating in the consensus process. Besides, in private Blockchains, privacy is greater because it is possible to know who the participants are, and for this reason, they are the most suitable for entities (DELOITTE, 2017);
- **Semi-private Blockchain:** They are used more for B2B (business to business), that is to say, business among legal entities as well as government applications. In these cases, access is granted to any user who meets the pre-established criteria (DELOITTE, 2017).

2.3 RELATED RESEARCHES.

With intention to identify the impacts of the Blockchain in the audit accounting, knowledge of similar researches on the subject becomes essential. In summary, table 1 shows the results found in research related to the theme of this study.

Table 1 - Related Research

Authors/ Year	Title	Research Objective	Results
ICAEW (2017)	*Blockchain and the future of accountancy*	Learning about the technology of Blockchain and its possible impacts in the companies and on the accounting profession.	Based on its analysis, this article concludes that the Blockchain will take some years to be fully developed and standardized, however, with its implementation in accounting systems, accounting will become more efficient due to the reliability of the available information and the reduction of time spent on reconciliations.
Hugh Rooney, Brian Aiken and Megan Rooney (2017)	Q&A. Is Internal Audit Ready for Blockchain?	Verifying if the internal auditing is ready to face the challenges and the opportunities of Blockchain.	The authors state that the use of Blockchain will have a major impact on internal auditing, and professionals will need to work collaboratively since the information will be continuous and in a new format. They conclude that Blockchain has great potential for the challenges to face, but some measures are needed to be taken in order to ensure high standard in the future.
Felipe de Oliveira Simoyama, Ian Grigg, Ricardo Luiz Pereira Bueno and Ludmila Cavarzere de Oliveira (2017)	Triple entry ledgers with blockchain for auditing	Presenting a new structure for system improvements in auditing, highlighting the opportunities of Blockchain in the face of auditing and public agencies control.	The research says that Blockchain provides a great evolution, being the most important feature for auditing the decentralization of public ledger allowing a more transparent structure with shared visualization of transactions, making auditing more effective and cheaper.

Source: Authors

3 METHODOLOGY

In this session, the methodology used to fulfill the objective of this research is presented. This is divided into methodological framework and procedures for treatment and data collection.

3.1 METHODOLOGICAL FRAMEWORK

With the objective to verify the impacts of Blockchain in the audit accounting, the present research is characterized, concerning its purpose, as a basic research that, according Andujar (2018), has the intention to produce new knowledge that serves as base for science without a foreseen practical application at first. For presenting a current synthesis of available knowledge on Blockchain audit accounting, the nature of this study is characterized as qualitative and of subject reviews.

The objective of this research is exploratory for clarifying the advantages and disadvantages of Blockchain in the audit accounting. In terms of technical procedures, it is characterized as a systematic bibliographic search, as it is developed based on scientific research on the subject, which, according to Koller, Couto and Hohendorff (2014), is a method that aims to enhance the results of a search, making possible to find the greatest possible number of results in an organized way.

3.2 PROCEDURES FOR COLLECTION AND DATA TREATMENT

In order to achieve the intentions of this research, initially, a systematic bibliographical search was carried through the journal site of the Coordination of Higher Education Staff Development (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES) and of the ICAEW, where related scientific research aimed a the Blockchain key-word.734 results were obtained by CAPES and 42 publications by ICAEW, which were mapped according to the following criteria, for exclusion:

- Duplicated journals;
- Journals in MS PowerPoint presentation format;
- Not being in the time period between 2008 and 2018;
- Paid content;
- Journals that had different titles from the research problem;
- Different summary from the research problem.

After this mapping, the following characteristics that guided the interpretation of the results were analyzed:

- Good understanding of the articles;
- Relation with the objective of this research;
- Relation with the subject.

After extracting the data, only 3 CAPES journals and 2 ICAEW journals were used for the result of this research, which served as a basis for the construction of the fundamental concepts of this result, as shown in Table 2.

Table 2 - Systematic Mapping

Systematic Mapping		
Bases consulted	CAPES	ICAEW
Keyword Search	Blockchain	Blockchain
Time Dependency	2008 to 2018	
Results Found	**734 articles**	**42 articles**
Exclusion Criteria		
Duplicated journals	12 articles	02 articles
MS PowerPoint	2 articles	Not Applicable
Paid Content	16 articles	09 articles
Different Headings	659 articles	25 articles
Summary	42 articles	04 articles
Results after exclusion criteria	**03 articles**	**02 articles**
Quality criteria		
Good understanding of articles	03 articles	02 articles
Relation with the objective and subject of this research	03 articles	02 articles
Final mapping	**03 articles**	**02 articles**

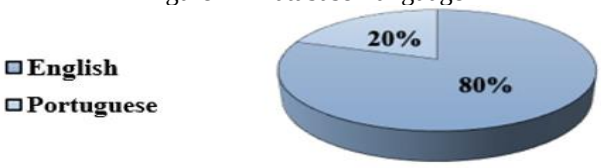
Source: Produced by the authors based on methodological research

After systematic mapping of the data, a confrontation of the studies was carried out, which objective was to verify the impacts of Blockchain in the audit accounting, and the necessity to verify which the advantages and disadvantages were observed, since the Blockchain offers opportunities that imply in new activities to be performed that need to be identified.

4 PRESENTATION AND RESULTS ANALYSIS

Based on the systematic bibliographical mapping, 5 journals where found and it is pointed out that most of publications about Blockchain, related the audit accounting, are written in English. As shown in figure 2, only one periodic is written in Portuguese, which can be justified by the low index of scientific exploration of Blockchain in the audit accounting area in Brazil.

Figure 2 - Database Language



Source: Authors

It is important to highlight that even existing a low a representation in the scientific publication number of Blockchain directed the audit accounting, it has been scientifically gaining force since 2017, containing 100% of the total number of journals used for finding this result. A fact that can be explained by the high appreciation of the Bitcoin cryptocurrency in 2017, which prompted investors and companies to explore its features and attributes. As impact of this event, Blockchain - responsible for registering all the operations of the Bitcoin cryptocurrency - began to be object of studies. Table 3 shows the journals with the greatest representativeness in this study, which were identified by H01 to H05 for a better understanding:

Table 3 - Most Representative Journals

Identification	Year	Article
H01	2017	Blockchain and the future of accountancy
H02	2017	Systematic Mapping Study on Blockchain Trends and Challenges
H03	2017	Is Internal Audit Ready for Blockchain?
H04	2017	Triple entry ledgers with Blockchain for auditing
H05	2017	Future of Blockchain

Source: Authors

The fact that Blockchain provides to transparency and financial efficiency in the accounting of the assets and transactions, and because its information is available to all the interested parts, made organizations, countries and financial institutions invest in studies and pilot projects on the possibility of carrying our their financial operations through Blockchain. It is worth mentioning that the Central Bank of Brazil (Banco Central do Brasil) - one of the main members of the Brazilian National Financial System (Sistema Financeiro Nacional Brasileiro) - published tests, in August 2017, in which Blockchain would be a substitute system, in case its main system were to collapse completely. Accordingly, the Brazilian Federacy of Banks (Federação Brasilieira de Bancos - FEBRABAN) emphasizes the great interest of financial institutions on this new technology, which is pointed out on its 26th research of Banking Technology, showing that 75% of banks invest in Blockchain.

Although the interest has been on it has been increasing, many legal countries and authorities consider the Blockchain a threat to the economic structures, or they do not know how to implement regulations and offer a legal environment to it. In contrast, Malta, through NRU.45, establishes the duties and responsibilities of companies and users of

Blockchain, being the first country to promote a legal environment and contribute with a new basis for the future economy.

According to the H02 study, the increasing number of organizations investing in Blockchain supports the fact that, in the very next future, the financial institutions and organizations will start using distributed accounting technology to interact among themselves and, consequently, it will have an excellent impact on audit accounting.

The function of audit accounting has always been responsible for offering guarantees so that the corporate reports contain reliable information and the real economic-financial situation of organizations. However external auditing continue being executed annually and due to the fact that they analyze the financial operations for sampling, in many cases, the reports generated by the auditors are not used for decision-making. Yet, we are living at a time in which technological globalization and advances are offering an opportunity for the auditing profession to become innovative.

The H04 study affirms that the internal and external auditing could be executed in real time, because in a Blockchain environment, the financial transactions of the organizations will be available in real time for the auditors, making them eligible for auditing. Consequently, misactions derived from frauds and errors could be interrupted before occurring, making auditing continuous and not an annual event related to the previous year. This way, it makes corporative reports more transparent and precise concerning their information.

Considering the fact of the information to be contained in distributed ledgers, the auditors - internal and external - will need to access information in new formats. In this sense, the H03 study reports that since the information is contained in a new technical environment, auditors will need to be trained to become familiar with the new accounting records systems, as well as to assist in the process of implementing Blockchain-based applications. And it is essential that auditors participate in the implementation process since the beginning, so that it is possible to identify the problematic variables in their initial stages, since it is easier to architect them from the beginning than to reformulate them after a problem is identified.

In addition to this, the H05 study points out that there are three types of Blockchains: public, private or semi-private, and it is in this perception that the H03 and H01 studies claim that changes in working roles will occur. For internal auditing, the H03 study evidence that each Blockchain will have its proper organizational structure, such as the semi-private Blockchains that connect some interested people of a same organization,

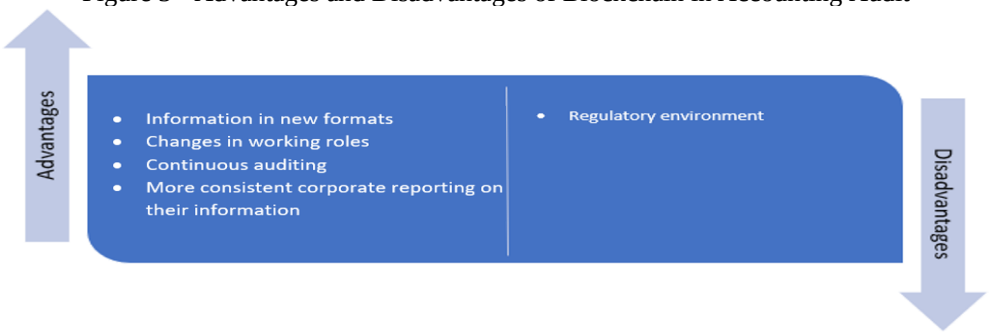
enabling the internal auditors to act in a collaborative way in order to guarantee that both have their requirements fulfilled in their organizations. It will also allow compliance and substantive tests to be carried out more effectively and efficiently, where the terms of fraud and errors will be verified as soon as they are generated, that is to say, regardless of the emission of monthly reports, the internal auditing will remain continuous.

Besides, H01 study demonstrates that the time spent by the external auditor in reconciliations and confirmations of all or some of the financial demonstrations would be less necessary, since the transactions that underlie the real financial situation of the organizations would be concentrated in the Blockchain. This way, the external auditor will have more resilience in confirming the real economic-financial situation of the organizations, due to the fact that its technical qualities would be focused on analyzing the origin of the transactions, as well as they may have impact on the financial health and which are the future perspectives of the organizations, instead of having to verify the way they had been carried, aiming at an increasing credibility to the audit accounting demonstrations.

However, with exception of t of Malta, innumerable countries do not offer any legal environment regarding the use of Blockchain. This means that the adoption of technology is no longer explored by a large number of users, considering the fact that the regulators need to work in narrow contribution with the organizations, in order to understand the technological advances and be adapted to its prescribed requirements. Based on this, figure 3 shoes the advantages and disadvantages found in this result.

For the accounting audit profession to remain relevant and advance into the future, it is necessary to make use of new technologies. The constant development of Blockchain provides more transparency in the transactions, this makes the auditing - internal and external - evolve towards a continuous auditing, raising the level of corporate reports, in a way that generated information became more used in decision-making processes.

Figure 3 - Advantages and Disadvantages of Blockchain in Accounting Audit



Source: Prepared by the authors based on methodological research

In this sense, it is up to Auditing Professional Boards to facilitate the dialogue so that it is possible to adopt new technologies, guaranteeing the requirements of professional training, and that this development reflects the changes in skills required to face the impacts of the Blockchain. Based on that, there is a risk of that the potential of the technology is not reached. In addition, in order to move into this future, audit firms, regulators, organizations and investors will need to take action to ensure that Blockchains are subject to the same standards as current information systems.

5 FINAL CONSIDERATIONS

The objective of this study concludes that there is a significant time gap concerning to the fulfilment of internal and external auditing, since the necessity of the profession to rethink the way auditing is executed nowadays is increasing, due to the fact that we are facing an economy that has been using technological advances to innovate.

In the face this context, it is observed that the profession of audit accounting operates on strict regulatory structures and this causes the competent agencies to be cautious in the approach of new technologies, however, the number of organizations and financial institutions that they invest in the Blockchain has been increasing. This means that in the near future, Blockchain will demand a regulatory environment and new accounting standards, in order to assure the validation of the financial transactions of new accounting books.

It is observed that Blockchain creates the need of a continuous audit accounting, and not a monthly or annual event that consists of analyzing given historical data. Blockchain allows financial transactions to be audited in real time, so that fraud and error misactions are eliminated as soon as they are generated. As a result, Blockchain makes corporate reports to contain more reliable information in order to guarantee the real economic and financial situation of organizations, and it is through these more innovative, suitable and relevant financial reports that the audit profession will continue to be relevant in the decision-making process.

We highlight that the biggest risk for auditing accounts is not getting an active and continuous dialogue with the regulators while new technologies emerge, and that the use of the Blockchain will make auditors of the future to play a more important role in the society, providing a foresight reliable vision and a qualified human judgment, but not substituted by the technology.

Finally, it is suggested for future research, that the knowledge about auditing in face of the impacts of the Blockchain are further investigated, presenting the perception of the auditors and the impact in the management of the organizations, facing real-time information.

REFERENCES

AITZHAN, Nurzhan Zhumabekuly; SVETINOVIC, Davor. Security and Privacy in Decentralized Energy Trading through Multi-Signatures, Blockchain and Anonymous Messaging Streams. Available in:
< https://ieeexplore.ieee.org/document/7589035/>. Access April 26, 2018.

ALMEIDA, Marcelo Cavalcanti. Auditoria: Um Curso Moderno e Completo. 7. ed. São Paulo: Atlas S.A, 2010.

ANDUJAR, Alcides J. F. Estruturação da Metodologia de um TCC. Notas de aulas V.8 - Florianópolis, 2018.

ATTIE, William. Auditoria: Conceitos e Aplicações. 5. ed. São Paulo: Atlas S.A, 2010.

BRASIL. Lei nº 6.385, de 07 de dezembro de 1976. Available in: <http://www.planalto.gov.br/ccivil_03/Leis/L6385.htm>. Access April 10, 2018.

_____. Lei nº 6.404, de 15 de dezembro de 1976. Available in: <http://www.planalto.gov.br/ccivil_03/leis/l6404compilada.htm>. Access April 12, 2018.
_____. Decreto Lei nº 9.295, de 27 de maio de 1946. Available in: <http://www.planalto.gov.br/ccivil_03/decreto-lei/Del9295.htm>. Access April 10, 2018.

_____. Instrução CVM nº 308 de 14 de maio de 1999. Available in:
< http://www.cvm.gov.br/legislacao/instrucoes/inst308.html>. Access April 17, 2018.

_____. Instrução CVM nº 591 de 26 de outubro de 2017. Available in:
< http://www.cvm.gov.br/legislacao/instrucoes/inst591.html >. Access April 17, 2018.

CONSELHO FEDERAL DE CONTABILIDADE – CFC. Norma brasileira de contabilidade - NBC TA 200 - Objetivos gerais do auditor independente e a condução da auditoria em conformidade com normas de auditoria. Disponível em: < http://www1.cfc.org.br/sisweb/SRE/docs/RES_1203.pdf> Acesso em: 30/09/2017.
_____. Resolução CFC Nº 986/03. Aprova a NBC TI 01 – Da Auditoria Interna. Disponível em: <http://www1.cfc.org.br/sisweb/SRE/docs/RES_986.pdf>. Acesso em 11 de abr. de 2018.

_____.Resolução CFC Nº 1203/09. Available in: <http://www1.cfc.org.br/sisweb/SRE/docs/RES_1203.pdf>. Access April 11, 2018.

CREPALDI, Silvio Aparecido. Auditoria Contábil: Teoria e Prática. 5. ed. São Paulo: Atlas S.A, 2009.

DELOITTE ACCESS ECONOMICS. The Future of Blockchain: Applications And implications off Distributed Ledger Technology. Available in:

<https://www2.deloitte.com/content/dam/Deloitte/au/Documents/Economics/deloitte-au-economics-future-inc-caanz-blockchain-010217.pdf >. Access April 10, 2018.

FERREIRA, Juliandson Estanislau; PINTO, Filipe Gutemberg Costa; SANTOS, Simone Cristiane dos. Estudo De Mapeamento Sistemático Sobre As Tendências E Desafios Do Blockchain. Available in: <https://periodicos.ufpe.br/revistas/gestaoorg/article/viewFile/231244/26094>. Access April 21, 2018.

FRANCO Ernesto; MARRA, Hilário. Auditoria Contábil. 4. ed. São Paulo: Atlas S.A, 2009.

HUMPHREY, Christopher; LOFT, Anne; WOODS, Margaret. The Global Audit Profession and the International Financial Architecture: Understanding Regulatory Relationships at a Time of Financial Crisis. Available in: <http://isiarticles.com/bundles/Article/pre/pdf/52.pdf>. Access April 20, 2018.

IANSITI, Marco; Lakhani, KARIM R..The Truth About Blockchain. Harvard Business Review. Available in:
< https://hbr.org/2017/01/the-truth-about-blockchain>. Access April 21, 2018.

INSTITUTO DOS AUDITORES INDEPENDENTES DO BRASIL. IAA Brasil. Available in: <https://iiabrasil.org.br//iiabrasil>. Access April 5, 2018.
INSTITUTE OF CHARTERED ACCOUNTANTS IN ENGLAND AND WALES. Audit insights: data analytics. Available in: < https://www.icaew.com/-/media/corporate/files/technical/audit-and-assurance/audit-insights/audit-insights-data-analytics.ashx>. Access April 10, 2018.

INSTITUTE OF CHARTERED ACCOUNTANTS IN ENGLAND AND WALES. Blockchain and the future of accountancy. Available in: <https://www.icaew.com/en/technical/information-technology/technology/blockchain/blockchain-and-the-accounting-perspective>. Access April 10, 2018.

INSTITUTE OF CHARTERED ACCOUNTANTS IN ENGLAND AND WALES. Data Analytics for external auditors. Available in: < https://www.icaew.com/international-accounting-and-auditing/international-auditing-perspectives/data-analytics-for-external-auditors >. Access April 10, 2018.

INSTITUTE OF CHARTERED ACCOUNTANTS IN ENGLAND AND WALES. Growth, development and accounting: seeing the bigger picture. Available in: <https://www.icaew.com/-/media/corporate/files/technical/financial-reporting/information-for-better-markets/growth-development-and-accounting.ashx?la=en>. Access April 10, 2018.

INTERNATIONAL FEDERATION OF ACCOUNTANTS. Developing a Future- Ready Profession. Disponível em: <https://www.ifac.org/system/files/publications/files/Developing-a-Future-Ready-Profession.pdf>. Access April 5, 2018

KOLLER, S.H.; COUTO, M.C.P.P.; HOHENDORFF, J.V. Manual de Produção Cientifica. Porto Alegre: Penso, 2014.

LINS, Luiz dos Santos. Auditoria: Uma Abordagem Prática com Ênfase na Auditoria Externa. 2. ed. São Paulo: Atlas S.A, 2012.

MALTA. Nru.45. L-ħiliet ta 'l-Awtorità ta' l-Innovazzjoni Diġitali ta 'Malta u proprjetajiet oħra relatati ma' l-innovazzjoni tat-teknoloġija, inkluża teknoloġija distribwita u deċentralizzata. Available in: <https://parlament.mt/media/94210/bill-45-malta-digital-innovation-authority-bill.pdf>. Access April 29, 2018.

NAKAMOTO, Satoshi. Bitcoin: A Peer-to-Peer Electronic Cash System. 2008.

OBERHAUSER, Alex. Available in: <https://www.alex-oberhauser.com/papers/blockchain_gift_economy.pdf>. Access April 25, 2018.

OLIVEIRA, Luís Martins de et al. Curso Básico de Auditoria. 2. ed. São Paulo: Atlas S.A, 2008.

PEREZ JUNIOR, José Hernandez et al. Auditoria das Demonstrações Contábeis. 2. ed. Rio de Janeiro: Editora FGV, 2011.

ROONEY, Hugh; AIKEN, Brian; ROONEY, Megan. Is Internal Audit Ready for Blockchain? Available in:
<
http://timreview.ca/sites/default/files/article_PDF/Rooney_et_al_TIMReview_October2017.pdf >. Access April 16, 2018

SIMOYAMA, Felipe de Oliveira et al. Triple entry ledgers with blockchain for auditing. Available in: <http://iang.org/papers/TripleEntryLedgersWithBlockchain2017.pdf>. Access April 16, 2018.

SWAN, Melanie. Blockchain: Blueprint for a New Economy. Sebastopol: O'reilly Media, 2015.

ULRICH, Fernando. Bitcoin: a moeda na era digital. 1. ed. São Paulo: Instituto Ludwig Von Mises Brasil, 2014.

ZAVATIERI, I. M. (2019). Gestão condominial: uma abordagem contemporânea sob a óptica da contabilidade e auditoria no Brasil/Condominium management: a contemporary approach under the optics of accounting and audit in Brazil. Brazilian Journal of Development, 5(12), 31251-31264.