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Blockchain and the impossibility of triple-entry accounting

Nepomuceno, V.
Masters degree in Financial Accounting, Universidade Federal de Uberlândia (UFU)

Abstract
Researchers have generally presented blockchain technology as an alternative to producing new accounting records for companies, based on triple entry (Petrovic, Tanasic and Jovicic, 2024; Grigg, 2024, 2005; Calderon, 2021; Cai, 2019; Faccia and Mosteanu, 2019; Carlin, 2018; Gröblacher and Mizdraković, 2018; Ward and Lundkvist, 2016; etc.). From an accounting perspective, this article presents criticisms of alleged triple entry accounting record keeping models, also seeking to clarify possible conceptual errors in the field of accounting based on centuries-old literature. To this end, the aim was initially to rescue the history of the double entry accounting concept and its derivations (simple, triple), which has been overlooked by many works. The purpose is also to distinguish the conceptual difference between double-entry bookkeeping and input/output system. Then, the concept of blockchain and its functions were established, in addition to clarifying its impossibility of applicability to the bookkeeping process as if it were a linguistic-accounting component. The method used aims to recover historical aspects through bibliographical research in the accounting field and in the area of information technology, which contributed to verifying the value judgment in the accounting context and in concrete knowledge (accounting praxis). The results achieved show that the concepts of triple entry and triple-entry bookkeeping are inappropriate and unfeasible for the purposes proposed. In the end, a possible application of blockchain technology to the accounting field was suggested.
Keywords*: Blockchain. Hash. Double entry. Triple entry. Accounting.*

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I. Introduction

Accounting is the linguistic process that records commercial transactions between two people, the guiding instrument for this process being, as a rule, the double-entry method. There are facts that occur only within the scope of a legal entity (depreciation, for example) and that are also recorded using the same method. This type of accounting is the exclusive responsibility of professional accountants.

The history of accounting points to at least three unique methods of accounting: the double-entry method (most common), the single or simple entry method and, in some cases, the triple or quadruple entry method (national accounting). There are also those who accept, albeit theoretically, the input/output system as a method for recording accounting facts (matrix accounting, by Mattessich, 1995). All of these methods are relevant for the purposes of this article, as they contribute to the understanding of how blockchain technology can be applied to accounting. It is important to understand these methods, especially their construction processes, their historical meanings, and their linguistic and representational objectives.

Although Accounting has moved closer to computer technology, seeking to revitalize its instrumentalism, it has not gone beyond the limits of the double-entry language that has existed for more than six centuries in the West. Despite technological advances since the second half of the 20th century, Accounting is still tied to the beginnings of the Second Industrial Revolution, whether from a conceptual point of view, from the point of view of the presentation of structures (statements), or from their scientific definitions. Currently, Accounting remains under the aegis of normative accounting that defines it as an "information system" (set of systematized standards, IFRS, 2024).

Possibly, one of the explanations for this lethargy in the technological, scientific and, above all, structural fields is the rhetorical dominance of International Financial Reporting Standards (IFRS) over national accounting standards. These standards are hermetically drafted by organizations such as IASB/IFAC, which have transformed accounting into a practical information system, operated by standards and rules established by accountants themselves, in accordance with their peers. Due to the hegemony of accounting organizations, this system is far from scientific research, "intellectual ferment or genuine progress" (Beyerstein, 1996, p. 31). For example, what we see in the Conceptual Framework proposed by the IASB (2010), according to Richard (2016), is an attempt to return to the past through the single-entry method, thus abolishing double-entry. Historically, for the Anglo-American world, the single-entry method seems to be more improved for its corporations than the double-entry

method (Richard, 2016). Thus, accounting concepts and standards are under the control of the IASB (García, 2013; Sunder, 2001).

Regarding accounting structures, there is also nothing significant recorded in the literature. In this sense, the language of accounting has made little or no progress in relation to demonstrative structures, such as the balance sheet, income statement, cash flow statement and others. The first two genuinely use the double-entry method and have remained practically the same format for over a century (Lev and Gu, 2016).

As for the cash flow statement, this is not even a statement, but a section of the balance sheet, a simple financial analysis between two points in time. And it is not a flow either, because they are static, not dynamic, points. Furthermore, this "statement" does not have a grouping of genuine and specific accounting accounts as occurs in the balance sheet and the income statement. Remember: the balance sheet has equity or integral (real) accounts, and the income statement has differential or result (nominal) accounts, and all follow the accrual accounting principle.

In this sense, accounting researchers have not been able, or have not been sufficiently motivated, to develop new groups of accounts beyond the balance sheet and income statement, nor have they been able to develop new methods that allow triple, quadruple or even multiple entries, if they are actually possible. Some researchers have tried to add new interpretations to the structures of the statements, such as matrix accounting (Mattessich, 1964) and triple-entry accounting (Ijiri, 1982, 1986), but neither of these theses has come to fruition.

As for the technological aspects, a new concept initially applied to crypto currencies, called blockchain, has recently emerged, initially applied to crypt currencies, which has revolutionized certain areas of knowledge such as economics, finance, law and technology (Carlin, 2018), in addition to being applicable to smart contracts, or dApps (data storage in virtual games) (Teruel, 2019). Some authors (Grigg, 2005; Simoyama et al. 2017; Carlin, 2018; Cai, 2019; Gomaa, Gomaa and Farag, 2019, etc.) have directed this technology to the field of accounting in an attempt to develop, through triple entry, a more transparent and secure accounting system. However, there seems to be a lack of clarity about what blockchain can mean for accounting, in particular for triple entry accounting. Triple entry, or triple entry bookkeeping, has generally been understood as the addition of an additional entry to validate and guarantee the recording system, for example, a public ledger (Hood, 2017).

For this reason, it was deemed necessary to review the historical foundations of the double entry method and its developments for triple entry (in the accounting case), in addition to its possible relations with the dynamics of the blockchain. Reviewing these fundamentals will allow us to perceive a gap between accounting concepts and blockchain technology, which has led accounting to dubious and often inappropriate conceptual paths.

In this sense, the research problem presented is: does blockchain technology innovate in the field of accounting and make accounting records using triple entries possible? Objectively, this question will be addressed based on the history of the terms double entry, single entry and triple entry and by exercising the effective applicability of blockchain technology to accounting as if it were a linguistic-accounting object. In this sense, the qualitative approach method based on the available literature was used, the purpose of which is to provide evidence about the reality of accounting records and, comparatively, the practical influence of blockchain technology on these records.

The following topic then deals with the history of accounting from the point of view of double, single and triple entries; and the concept of blockchain as well as its operationalization as an accounting novelty.

II. Theoretical references

2.1. The double entry method: historical elements

The double entry method, or double entry method, has had many names throughout history, such as "principle", "method", "rule", "law", "debit and credit entry", etc. In the West, one of the first to publish and popularize the double entry method was Luca Paccioli (1494), in his work *Summa de Arithmetica*, *Geometria, Proportioni et Proportionalità*, in which he teaches how to debit and credit in the Journal and Ledger books (Esteve, 1994).

However, long before this period, according to Schmandt-Besserat (1996), symbols appeared around 8,000 BC, coinciding with the first signs of agriculture, which allowed accounting to emerge. The degree of complexity of social organization determined the function of counting. According to Schmandt-Besserat, around 8,000 B.C., there were two main functions of counting: computing (calculating) and accounting. Computing consisted of making calculations. Accounting, on the other hand, required keeping records of the input and output of goods [...]; symbols constitute the first evidence of accounting. They were not a corollary of simple agricultural exploitation, but rather of *social structures* that derived from agriculture (Schmandt-Besserat, 1996, pp. 103-104, emphasis added).

Although some authors claim that accounting has its beginnings between 3,000/4,000 B.C., Schmandt-Besserat (1996) points to times much further back. It is therefore not frivolous to conjecture that accounting, as an appropriate system for recording quantities produced and sold, predates writing itself. Mattessich (1995)

highlights that the most revolutionary thinkers assume three theses: i) accounting has existed for thousands of years before writing and abstract calculation; ii) accounting became an impetus for the creation of writing and abstract calculation; iii) a type of double-entry record, which can be called a 'prototype', already existed 5,000 years ago" (p. 15).

What Mattessich called the double-entry prototype, existing for thousands of years, is something that has permeated all times of accounting, all generations, from the Mayans, the Aztecs, the Incas, to the Egyptians, the Mesopotamians and the Phoenicians; from the Hindus, the Arabs to the Europeans. There is no record of any civilization on the face of the earth, since the emergence of the spirit of interested exchanges between humans (Tinker, 1985), having dispensed with the use of something similar to the double-entry method. Lall Nigam (1986), for example, maintains that the Bahi-Khata double-entry system preceded and inspired bookkeeping in Renaissance Venice:

The Bahi-Khata is a double-entry bookkeeping system that predates the Italian method by several centuries. Its existence in India, which predates the Greek and Roman empires, suggests that Indian traders brought it to Italy... it is difficult to fix the precise period of the advent of the Bahi-Khata... the traditional way of Indian teaching... [was] through orality (Lall Nigam, 1986, pp. 148-150).

Although some authors disagree with Lall Nigam's (1986) position, such as Nobes (1987) and others, the historical evidence seems to reinforce his position. At least two relevant historical elements can be associated with the arrival of the double-entry method in Europe.

The first is the important aspect related to Indian mathematics, with the creation of negative numbers. The Indians used negative numbers to characterize debits and positive numbers to characterize credits. And the person who brought negative numbers to Europe was Leonardo of Pisa (Nepomuceno, 1999), also known as Leonardo Fibonacci. He absorbed the advanced mathematics of the Arabs and Hindus and spread them throughout Italy in 1202, through his book Liber Abaci [Book of the Abaci]. Fibonacci also brought to Europe a vast knowledge of mathematics (rule of three, rule of five) after long incursions into the East. It was he who also brought the well-known Arabic (or Hindu-Arabic) numerals, which initially met with strong resistance from the Italians, especially the Florentines.

Many European Renaissance mathematicians still considered negative numbers to be "absurd" or "impossible". Mattessich (1995) states that, in the search for a real manifestation of negative numbers, Indian mathematicians observed – almost a millennium before the Europeans – that debts (undoubtedly a social reality) are a kind of negative assets (i.e., negative "accounts receivable"). In this way, accounting, together with legalistic notions such as assets, debts and others, facilitated the acceptance of negative numbers in mathematics (Mattessich, 1995).

The second relevant fact is the discovery of the book Arthaśāstra by Kautilya (300 B.C.) by Dr. Shama Sastry in 1904 in Mysore. Kautilya's work reveals how advanced accounting, internal controls and auditing procedures were at that time. The Indian Kautilya, also called Vishnugupta and Chanakya, was a contemporary of Aristotle. In his work, he addresses issues of administration, economic organization and services, relations between states and diplomacy, civil and criminal laws, etc. Mattessich (1995, p. 35) reports that Bhattacharyya (1988) presented strong evidence that the Arthaśāstra treatise operated with some modern concepts of accounting, costs, auditing, using not only various types of expenses and revenues, but also numerous concepts of results, distinction between results and the current concept of "maintenance of earnings". Ramaswamy's work (1994) also provides ample evidence in this regard.

The notion of debit and credit in India already had a more complex meaning than just the concept of duality. Add to Hindu accounting knowledge the profound mathematical knowledge they had, including the elaboration of the first systematic treatise on negative numbers and zero, in addition to the definitive rules for multiplying positive and negative numbers and for multiplying and dividing by zero, all of this in the 5th century AD, with Bhramagupta. All of this allows us to infer the broad reflective and practical capacity of the Indians, especially when dealing with accounting, particularly with costs.

Therefore, the thesis that double entry was conceptually conceived by Europeans in the 15th century (Petrovic, Tanasic and Jovicic, 2024, p. 11), or at the end of the 13th century (Lee, 1977), is no longer accepted, despite the efforts to the contrary by some researchers, particularly English ones (Yamey, Hamilton, Sangster, de Roover, etc.). It can be inferred that the cultural, scientific and religious influences of the Hindu-Arabs allowed Europeans to absorb vast knowledge, including that of double entry, which was later popularized by the book by the Franciscan monk Luca Pacioli (1494).

2.2 Objects used to record double entry

Throughout the history of humanity, an infinity of instruments (artifacts) were used to record commercial transactions between people. All of them have an intrinsic relationship with the foundations of double entry, or with the concept of ambivalence (relationship between opposites) developed here. Among them, the following stand out:

• symbols engraved on clay containers;
• quipus (a clothesline made of string widely used by the Incas);
• negative and positive numbers (representing debit and credit for the Hindus);
• Chinese sticks (the red ones represented debit and the black ones, credit);
• abacuses (which made it possible to calculate and record transactions);
• tally sticks (carved pieces of wood).
• debit and credit accounts, recorded in the Journal and Ledger books (which are the semantic and representational abstraction of transactions between two people).

Therefore, before the double entry method became popular in the West (1494), humanity had historically already expressed itself through instruments (physical artifacts) whose role was to represent commercial transactions between two people. This allows us to infer, based on Matttessich's (1995) convictions, that, for accounting, it is not the method (technique) of double entry that is relevant, but its intrinsic representational meaning: the ambivalence between two people (relationship between opposites with a single purpose). There is no other way to express the representation of the transaction between two people other than through double entry (ambivalence). The intrinsic logic of this representation cannot be broken or added to. For this reason, it deserved the praise of the English mathematician Arthur Cayley (1894, Preface): "double entry is, in fact, like Euclid's theory of proportions, absolutely perfect". Sombart (1902) also states that few imagine capitalism without double entry.

Matessich (1995), based on historiography, developed the principle of duality (input-output principle and symmetry principle), which seeks to universalize the idea of "logical relationship of structure" with the transaction. Mattessich (1995, p. 39) states: "the crucial event in accounting is not double entry – which is a mere technique – but the logical structure behind it", which, to a certain extent, contributes to culturally explaining the use of different objects to represent the same thing (commercial transactions between people).

2.3 The double entry method, according to Pacioli

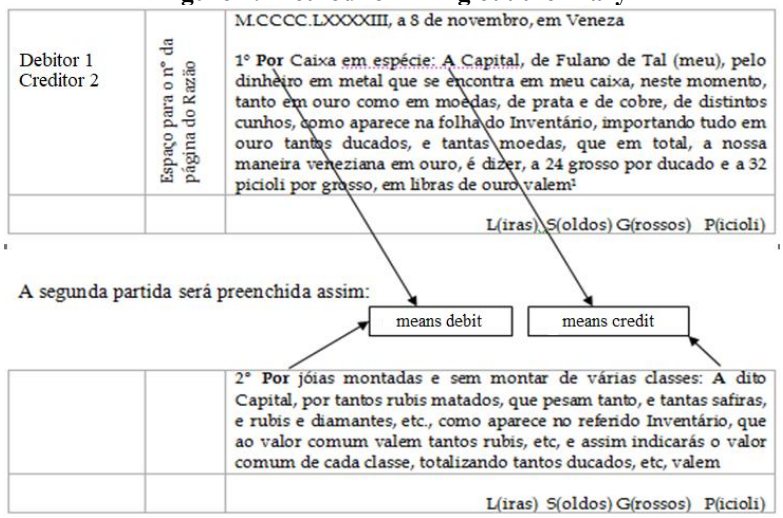
The popularization of the Venetian method by Pacioli (1494) is one of the relevant aspects for European accounting, especially because of the advancement of Renaissance commercial activities. Esteves (1994) made a Spanish translation of the Summa de Arithmetica, whose details on the double entry method in the Journal can be seen in its chapter XII:

Chapter XII

On the way to record and arrange debit and credit entries in the Journal, with many examples and other expressions used in the General Ledger, one called cash and the other, capital, and what should be understood by them.

And after this, you may now begin, in the name of God, to write in the Journal the first entry of your inventory, that is, the actual amount of money you have. To transfer this Inventory to the General Ledger and to the Journal, you need to know two other expressions, the first is called Cash and the second Capital. By Cash we mean your own, that is, your purse or purse; by Capital we mean all the assets you have up to the present. At the beginning of all the Ledgers and Journals, this Capital should be put in the credit, while the Cash is always put in the debit. And never, at any time during your business activity, may the Cashier be a creditor, only a debtor, so that if in the balance sheet of the General Ledger it appeared as a creditor, this would indicate that there was an error in said book, as will be remembered later. The said cash entry will be recorded in the Journal in the following manner:

Figure 1: Method for filling out the Diary



Source: ESTEVE, E. H. *De Las Cuentas y Las Escrituras – Luca Pacioli*. Madrid: AECA, 1994.

The two entries in the Journal (figure 1) refer to the Cash/Capital and Inventory/Capital accounts in an ambivalent way: when one account is credited, the other is debited, and vice versa, for the same amount. In this way, it explains the nature of the Capital (creditor), Cash and Inventory (debtor) accounts, as well as their correspondences in cash as a representation of the amounts contained in each account.

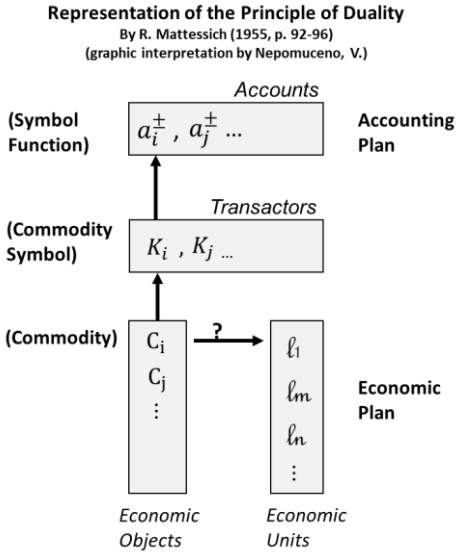
In summary, the essential elements of the Venetian method are: i) the debit and credit accounts, which represent the transaction between two people (with an ambivalent meaning); ii) the transaction history; iii) the transaction value; and iv) the transaction date (figure 1). These four elements aim to represent the actual transaction between two people, or internal operations, as is the case above. They are essential to verify and control the transaction between the parties (social relations).

Mattessich (1995), like few other researchers, was concerned with giving a logical-mathematical interpretation to the double-entry method. He sought to dissect its underlying elements and made a logical analysis of the method. It should be noted that the double-entry method has endured for over six hundred years. As previously pointed out, the logic of ambivalence (debit/credit), called by Mattessich (1995) the "principle of duality", is contained in all objects of representation of commercial transactions throughout history.

2.3.1 Mattessich's interpretation of the double-entry method

Mattessich (1995, 1964) seeks to express the social relations of the double-entry method. When explaining the empirical foundations of debit and credit (to justify, among other things, the supremacy of Input/Output), he didactically starts from the premise that concrete business environments must be perceived according to two distinct planes: the economic and the accounting (Figure 2). In the economic plane, Mattessich (1995) presents two elements of correlation: economic objects (physical objects) and economic units (monetary value), which are associated with the empirical phenomenon called economic transaction. On the other hand, in the accounting plane, Mattessich (1995) defines accounts as elements integrated into the economic transaction. This integration occurs through the presence of another element called the equivalence class, or transactor.

Figure 02: Representation of the Principle of Duality



Source: author's own

$a_i^{\pm}$, $a_j^{\pm}$ … = Accounts *i* , *j*… where ± represents debit or credit;

k*i* e K*j* = *Negative Transactor* and *Positive transactor*, or equivalence class of the economic object that connects to the accounting accounts;

O_i = Economic object (commodity *i*);

$\ell 1$ = Value of economic object 1.

"Transactors" emerge at the time of an economic transaction and enable the representation of accounting transactions. They can therefore be considered as a type of catalyst that enables the emergence and visualization of representations of accounting transactions at the time of an economic transaction. The transactor is the instrument that allows the perception of the recording of the transaction, through accounting accounts. For

example, clay artifacts, quipus, Chinese sticks, etc., are all transactors. Transactors, therefore, are historically human inventions, the result of the intellect of each era and each culture.

The principle of duality allowed Mattessich (1995) to establish the Double Classification Theorem:
"T-1. Double Classification Theorem: If there is any accounting transaction (T), it assigns a value (v ou v_{ij}^{r}) to a three-dimensional vector. This vector consists of an account to be credited (a_i), an account to be debited (a_j) and a point in time (t^r)":
where:
T = Accounting transaction
(a_i), (a_j) = accounting accounts, where i, j = 1,…, n (n = number of accounts)
(t^r) = time (moment) of the transaction
V_{ij}^{r} = Transaction value

Mattessich (1995, 1964) is one of the few accounting researchers to admit culturality and historicality (concrete facts) as processes of explanation: i) of the logic of the social relationship between two negotiating parties; and ii) of the existence of culturality as a way of perpetuating commercial practice. His theorem as a way of translating historical logic into mathematical rules is acceptable, in this case, because this is how history (social context) is observed and explained. The theorem can be improved, but it is a good indicator of how facts occur concretely.

On the other hand, expressions such as duality and input/output do not seem to represent the facts. These expressions seem like a didactic attempt to guide the construction of matrix accounting. I suppose that more in-depth studies should be carried out, especially regarding the matrix relationship with the blockchain.

Therefore, there is no way to separate the record (representation of the act) from the act itself, although they are distinct things, because both are imbued with values, value judgments and inseparable subjective concepts. The record itself is an essentially subjective and socially objective human conception, based on cultural factors.

This is what the analysis of the historical process reveals. It does not matter how the representation is made: whether by clay objects or by a mathematical matrix. What matters is the binding intention of the linguistic representation. Therefore, the concept of debit and credit, in line with the history of humanity, is understood as something invariable in essence (in purpose) and variable in form (in record). It is necessary to keep this concept in mind to understand the real role that blockchain technology will play, which, in principle, has no relation to the accounting language analyzed here.

2.4 The single entry method, or simple entry method

England, probably for cultural reasons, more than other European countries, questioned the validity of the double entry method and even resisted accepting it, although it had become aware of it as early as 1543, through the translation of Pacioli's work by Hugh Oldcastle. Proof of this questioning are the discussions of Basil Yamey, Michael Chatfield and others on the validity of the double entry method.

Until the end of the 19th century, there was literature on the single entry method, the aim of which was to replace the existing double entry method. In this sense, Thomas Jones (1796) wrote the pretentious work English system of book-keeping by single entry or double entry. His criticisms of the double-entry method were scathing: "it is fragile in the appearance of correctness, and at the same time it is full of errors, or false entries" (Jones, 1796, p. 17). The Englishman Yamey (1964, p. 126), in defending Jones' method, states that "some joint-stock companies have operated for long periods without double entry, among them the Dutch East India Company, the Sun Fire Insurance Office of London, the Whitin Machine Company in the United States, and the Capital and Counties Bank in England".

His work was translated into numerous countries and influenced the field of accounting. By inventing his Ledger with ten columns (Figure 3), instead of two, Jones thought he had supplanted the double-entry method. For Chatfield (1977), Jones tried to combine the simplicity of single entry with the comprehensiveness of the Italian method. In fact, Chatfield (1977, p. 57) states, "the English system was never widely used in England (or anywhere else) and was later repudiated by its own author [Thomas Jones]."

In Reymondin's (1928) view, the enthusiasm for single entry was a transitory phenomenon, representing a partial solution to the problem faced by industrialists. For Boyns, Edwards and Nikitin (1997), single entry systems began to disappear as industrial accounting (*comptabilité industrielle*) began to develop.

Jones's single entry method (1796) admits the concepts of debit and credit, but does not accept reciprocal counterpart (ambivalence). Jones refuses to accept the mechanical counterpart of the account. For him, everything occurs on the plane of singularity. Jones's account operates according to a different language, an internal logic different from what is known today as input/output. The singularity of Jones's ledger lies in allowing only the input-output flow (figure 3), but without any connection or link between debit and credit.

The single entry method is a report of data inputs and outputs (statistical records). It is a compilation of classified and ordered data without taking into account the fundamental aspect of transactions: the social relationship (exchange between people). In this sense, the method seems to be illogical if viewed from the perspective of social relationships, as seen previously.

Therefore, Jones' method (1796) follows empirical logic, not interactivity, or the linking of transactions: debit is separated from credit. In Holland, Simon Stevin (1607), before Jones, correctly perceived the social meaning of double entry: "someone who gives; someone who receives; the thing that is given; and the thing that is received", thus, the transaction is an essentially social act (it has nothing statistical about it).

Figure 3: Model of the General Ledger page (excerpt from the Cash account), prepared by Edward Thomas Jones, 1796.

Jan. 1-Mar. 31		Apr. 1- Jun. 30		Jul.1-Sep 30	Oct. 1-Dec. 31	Debit	ABRAHAM BOLD, Cashier		Credit			Jan. 1-Mar. 31		Apr. 1- Jun. 30	
Jan.		Apr.					Cash inflow		Jan.	Cash outflow		Jan.		Apr.	
1	3000 . .	1	203 7 6				this month .	3100 . .		this month .	770 10 .	1	750 . .	1	. 15 .
17	50 . .	2	25 5 .				2329 10 0					2	20 10 .	23	400 . .
21	50 . .	4	32 15 .				Balance							27	175 . .
		7	49 10 .											29	400 . .
		11	75 . .			Feb.	Cash inflow		Feb.	this month	2 10 .	Feb.			
Feb.							this month . .	127 . .				2	2 10 .		
10	26 . .						2454 0 0								
15	51 . .						Balance								
25	50 . .														
						Mar	Cash inflow		Mar	this month	851 10 .	Mar			
Mar							this month . . .	395 7				1	1 10 .		
1	26 10 .						1997 17 0					27	850 . .		
	54 . .						Balance								
3	53 . .														
	27 10 .					Apr.	Cash inflow		Apr.	this month	975 15 .				
7	34 10 .						this month . .								
10	13 10 .						1407 19 6	385 17 6							
15	186 7 .						Balance								

Source: JONES, E.T. (1796). Jones's English system of book-keeping, by single or double entry, p. 43 (attachments). Reproduction of an excerpt from the Cash account (columns and lines are missing, however, the disconnection between debits and credits can be seen).

It should be noted, however, that the matrix method advocated by Mattessich (1964, 1995) is a classic form of input/output, as it allows for the linking of debit and credit. In a matrix cell (rows and columns), it is possible to make a single entry and link row (credit) and column (debit), unlike the method advocated by Jones (1796).

Another approach to single entry was proposed by the IASB in its first Conceptual Framework (2010). For Richard (2016), the IASB's proposed EC regarding the definition of capital, expenses and revenues is incompatible with the double entry principle, but would be compatible with the single entry method. Richard (2015) analyzes that this leads not only to a redefinition of capital, but to the death of the double entry system that they [IASB] may be considering.

According to Richard (2016, p. 7), for example, "when opening a company, an asset account is increased, which will indicate revenue [input]". Richard (2016, p. 7) states that "there is no need for a counterpart and, therefore, the use of double entry is unnecessary, since capital accounting is not necessary". Later, Richard (2016, p. 7) further explains that, when this asset is sold, a decrease in this asset (expense) will be recorded, followed, in the event of a counterpart, by an increase in another asset (income), etc. A simple tracking of assets with two columns + and – is sufficient for this management (Richard, 2016).

The French author considers these theoretical approaches of the CE of returning to single entry to be an advance. This proposal by the IASB, according to Richard (2015), "constitutes a considerable conceptual revolution in relation to the secular accounting tradition". This proposal also separates debit from credit in the ambivalent sense, but links input/output.

On the other hand, this example from Richard (2016), explaining the IASB's EC on capital, neglects the existence of one of the relevant pieces of information for the company's constitution: the articles of association (specific object) entered into between individuals. Hence the need to record it using the double-entry method; otherwise, a relevant accounting fact would be incomprehensibly omitted.

2.5 Triple-entry method, according to Ezersky and Ijiri

The first theoretical essay on triple-entry accounting was produced by the Russian Fedor V. Ezersky (1873), according to Platonova (2015). She is the only researcher to publish on Ezersky's work (in English and French). Ezersky presents triple-entry accounting as the culmination of a long evolution of accounting techniques that dates back to the dawn of civilization. Ezersky (1876) has a historical perspective on the evolutionary process of double entry, based on the chronology of events: first, the single or simple entry emerged, then the double entry and, finally, the triple entry, which would be the pinnacle of accounting (Platonova, 2015). However, from the

perspective of universal historicality of Schmandt-Besserat (1996) and Mattessich (1995), these events did not occur in that order. There is a significant primacy of representation of double entry throughout history, as seen previously, which did not prevent, at a certain point, the existence of both methods concomitantly.

For Ezersky (1876), the recording of transactions is based exclusively on three accounting books: the Capital Ledger (Table 1); the Ledger of Systematic Accounts (active debt accounts and passive debt accounts); and the Summary Ledger, which replaces the balance (Table 2). The only accounts used are the Cash, Capital and Securities accounts (Platonova, 2015).

Table 1: Capital Ledger

Month date	OPERATIONAL ACCOUNTS	Amount of the Operation	1) Inflows and 2) efectives outflow ($)								Income	
			CASH		VALUES		ACTIVE DEBTS		PASSIVE DEBITS		CAPITAL	
			In	Out	In	Out	Recived	To Recive	Pay	To Pay	Decreased	Increased
	Assets Cash Promissory Note Accounts Receivable Merchandise Liabilities Accounts Payable Total											

Source: Ezersky (1876). In: Bensadon, Praquin and Touchelay (dir.). (2016). Dictionnaire historique de comptabilité des entreprises, p. 394, (free translation).

Table 2: Book Summary

Accounts name	Inflow Efective			Outflow Efective			Sums realized	Income		Balance on Jan. 31st	
	Balance on January 1st Asset	Operations Sum	Total	Balance on January 1st Liability	Operations Sum	Total		Losses	Profit	Asset	Liability
I. Values II. Assets Debts A. Receivable Accounts B. Debtors III. Passive Debts A. Accounts Payable B. Creditors Cash Total Net Capital											

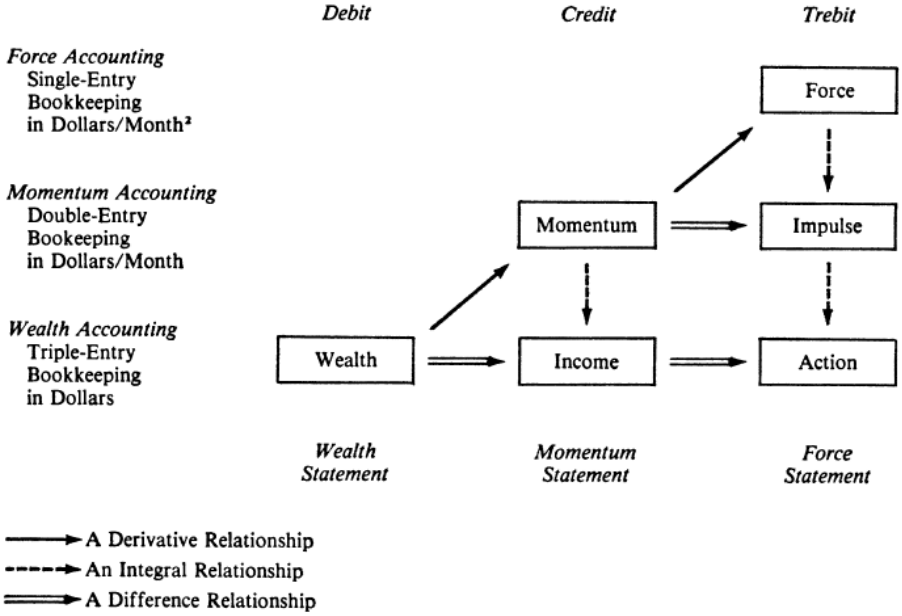
Source: Ezersky (1876). In: Bensadon, Praquin and Touchelay (dir.). (2016). *Dictionnaire historique de comptabilité des entreprises*, p. 394, free translation).

These elements, according to Platonova (2015), explain the name given to this accounting system [three accounts and three books]. Therefore, the preparation of triple-entry accounting is based on books that follow the entry/exit rule (tables 1 and 2). This is the information available on the triple-entry method established by Ezersky (1876). Therefore, there are no explanations on its operationalization. A more fruitful analysis would require more details on the Russian method.

On the other hand, after Jones (1796) tried to discredit the double-entry method, and failed, it was up to the Japanese with Anglo-American training, Ijiri (1982, p. 1), to pursue the same purpose and ask: "what is needed to show that double-entry accounting is imperfect and, in fact, extendable to triple-entry accounting?". Unlike Jones (1796), Ijiri (1982) argues that in order to achieve triple entry, one must follow the logic of double entry.

Ijiri's (1982) conception of triple entries is based on the extension of double entry, not from the representational point of view of the transaction (debit/credit), but from the point of view of the structural representation of the statement (equity result, income). The author does not do this in a conventional accounting manner. He uses physics (Newtonian mechanics, force, acceleration) and mathematics (differential, integral) to try to prove the extension of double entry into triple entry (figure 4), establishing something external to the concept of debit/credit (ambivalence), which is momentum. Therefore, he also did not develop triple entry, but interpreted and created another dimension of the representation of the accounting statement (force statement). Its physical-mathematical eccentricity can be compared to that of the sophisticated writings of Jean Dumarchey (Thèorie Positive de la Comptabilité, 1914; Comptabilité Moderne, 1925).

Figure 4: A framework for triple entry bookkeeping



Source: Ijiri (1986). *A framework for triple entry bookkeeping*, p. 749.

The logical development established by Ijiri (1982) is based on a new conception of the accounting balance equation and not on the double entry method (debit/credit). In fact, Ijiri (1982) develops, based on the double entry reasoning, another form of bookkeeping called triple entry statements (Wealth Statement, Income Statement, Action Statement) (figure 4). The expression trebit is not an evolution or consequence of debit/credit, as an ambivalent method (because this does not seem possible), but a new equational position from the point of view of the balance of forces in the company.

Among the critics of Ijiri's ideas (1982, 1986, 1989), Fraser (1993) stands out. He points out that Ijiri (1982), when extending the accounting structure (statement), did not specify, ex ante, the terms of the accounting needs and problems that this extension should help to solve or alleviate. Fraser (1993, p. 157) adds that "the incorporation of a third dimension based on force is likely to present significant practical difficulties". He comments that when the third dimension is applied to a system based on historical cost, it is likely to intensify the existing problems of empirical testability. On the other hand, Shank (1983, p. 656) claims that "[...] although the book is about accounting, no illustrative Journal entries are presented on the new system that it advocates".

On the other hand, when considering accounting as a social science, then Ijiri's thesis (1982, 1986), elaborated to resize triple-entry bookkeeping, based on physics and mathematics, seems not to be as applicable under the terms of Flyvbjerg (2001, p. 32): "in social science, the object is the subject". In the social case, the accounting object of study is not the accounts, but the subject that operates them in the social context. Accounts are linguistic objects that represent social facts (Matttessich, 1995), and are therefore cultural objects, far removed from physics and differential and integral mathematics.

Therefore, as Fraser (1993) states, the third dimension established by Ijiri (1982, 1986), after almost half a century, has problems representing the social contexts of transactions, especially in the application of historical cost, given the projection of force values and their acceleration.

2.6 Blockchain technology

This topic has dealt with the concepts and structure of blockchain technology in a generic manner and sufficiently so as to understand its relevance and its connection with accounting, in particular, with triple entry. Many researchers understand that this technology is disruptive to the contemporary accounting scenario, because it will allow a new type of accounting: triple entry (Grigg, 2024, 2005; Ibañez et al. 2021; Sharma, Joshi and Asha Sharma, 2021, etc.). However, there are those who view this stance critically (Schmidt and Vejzagiÿ, 2024; Fuller and Markelevich, 2019; Taylor, 2017; Rückeshäuser, 2017; etc.). Before these discussions, it is necessary to understand blockchain technology, which is an instrument applicable to any database (text, video, audio, etc.); therefore, blockchain is not an accounting concept.

The logical structuring of blockchain is based on the ability to maintain the confidentiality, inviolability and immutability of data stored in a distributed network (nodes), encrypted and based on consensus (protocols). Thus, transparency, immutability, decentralization and inviolability of a given database are, as a general rule, the objectives of blockchain technology. Satoshi Nakamoto (2009) is credited with inventing blockchain technology,

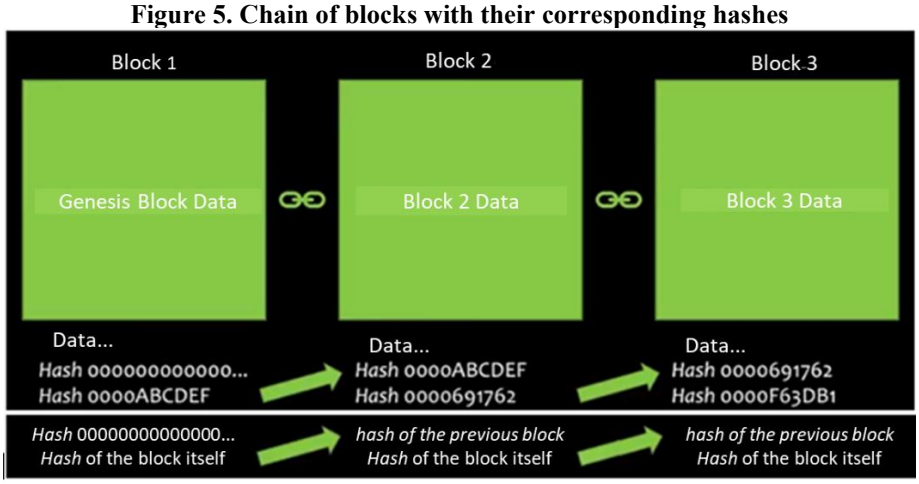
which has enabled, for example, security and credibility in the development of virtual currencies (cryptocurrencies). Therefore, blockchain is a shared and immutable ledger [block storage] that facilitates the process of recording transactions and tracking assets in a business network (IBM, 2025).

Teruel (2019) establishes some operational conditions (step by step) for the operation of Blockchain technology:

• every transaction initiated is signed with a private key of the issuer and transmitted to all nodes in the network that supports blockchain technology;
• this network groups these transactions into a block;
• the block is encrypted [hash] and validated by some actors in this network (miners - nonce) and added to the chain of blocks [ledger];
• the miner receives a reward for this work;
• transactions are immutable. (Teruel, 2019, 13:14 min.)

Any database (text, video, audio, etc.) can use blockchain technology to ensure data integrity. This process begins with the issuer signing the code using a key (code) called a hash. A hash is a kind of "digital fingerprint" (cryptography) for each block. This fingerprint corresponds to a data identification number with 64 hexadecimal digits (Passos, 2018, 5:45).

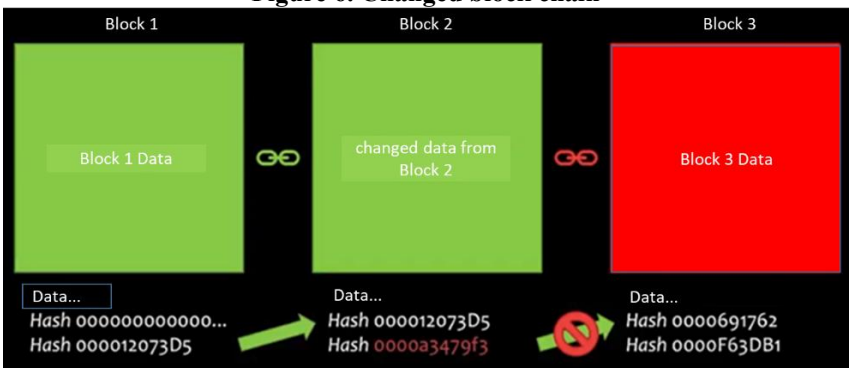
Figure 5. Chain of blocks with their corresponding hashes



Source: Adaptation of the General Concept of Blockchain. Passos (2018, 6:19; 9:01)

According to Passos (2018), the first block in the chain is called the "genesis block" (figure 5), and the pre-hash (sequence of the previous block) always starts with a sequence of zeros; then comes the hash of the block itself, and so on. The logic is that "if, for example, some data is changed in block 2 (figure 6), the hash automatically changes as well – which means that block 3 does not recognize the previous hash" (Passos, 2018, 9:08).

Figure 6. Changed block chain



Source: Passos (2018). YouTube. The P2P distributed network, 11:07

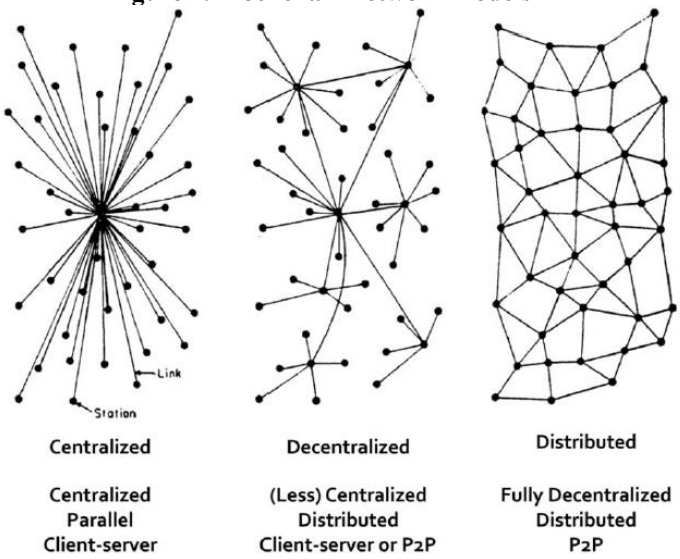
Since its own hash is recorded in the next block, a hash conflict occurs, thus discovering the change in block 2. If after block 2, for example, there are 30 thousand blocks, all of them will be changed. For this reason,

once the data is recorded in the block, it can no longer be changed. This is the essence of the blockchain: to guarantee the inviolability and immutability of the data.

In addition, there is another important device to guarantee that the hash is true: the nonce. The nonce (number used only once) is important for mining (finding the hash using the nonce). Mining involves solving "complex cryptographic puzzles to validate transactions and add new blocks to the blockchain", functioning as a process to validate and include new transactions in the blockchain (data network).

Data networks can be (figure 7): centralized, decentralized or distributed. The centralized model relies on a central controlling server, and thus, contact between nodes is prevented. The decentralized model has more than one server (nodes) and is a network that operates as a client-server; finally, the distributed model is completely decentralized (peer to peer), with all nodes connecting to each other. It is the most efficient, transparent and secure model, as everyone in the network is both a client and a server at the same time.

Figure 7. Blockchain network models



Source: Ibañez et al. (2017) Triple-entry accounting, blockchain and next of kin: Towards a standardization of ledger terminology, p. 6.

Each blockchain network model has its own practical applicability. For issues that require restricted access, the centralized network type (private network) should be the most suitable. However, if the system requires or allows completely open access (public network), then the distributed network (P2P) is the most suitable. It should be noted that blockchain technology is a technological structure whose purposes are not linked to or close to accounting as a business language. It is an autonomous structure that aims at the inviolability of databases (accounting, for example). Therefore, its structural concepts are in no way similar to those of accounting.

Of course, there are other operational and conceptual aspects that were not addressed here so as not to deviate from the established objective. However, it is possible that the elements presented are sufficient to reach the answer to the research problem.

2.7 Triple-entry blockchain technology

Having presented the concepts and historical dimensions of the double-entry, single-entry and triple-entry methods, in addition to addressing the concept and functionality of blockchain, the discussion now turns to how researchers have presented and argued in defense of the use of "triple-entry accounting". In this sense, some triple-entry concepts generally defended by IT researchers were presented. For Chordia and Bhanawat (2023, p. 58), the double-entry process can be replaced by blockchain technology, which will speed up and simplify transactions.

Grigg (2005), one of the first to formulate triple-entry, proposes creating a cryptographic server as an intermediary for all [commercial] transactions, producing and backing up a digitally signed receipt for each transaction. These transactions would be stored in a repository (figure 8). For Grigg (2024, p. 8), "functionally, this repository is similar to the classic double-entry accounting ledger [...], but its entries must be dynamic and shared". Petrovic, Tanasic and Jovicic (2024) clarify the relevant point on which Grigg (2024) builds his idea (figure 8). They state: "the essence of triple-entry accounting lies in the introduction of an additional component within the traditional system of debits and credits, serving as a connecting element between two separate entry systems" (p. 12).

Figure 8. Triple Entry Accounting

Self-auditing books - it's tough to lie when everyone is watching

Alice's Books

Debit	Credit
5	
	2
	9
10	

Bob's Books

Debit	Credit
	5
2	
9	
	10

Public Book

Alice	Bob
-5	5
2	-2
9	-9
-10	10

Source: HOOD, T. (2017, 26-43). *Blockchain Might Remake Accounting*.

In this way, a Public Book (similar to an accounting ledger) would store all data in two columns (positive/negative). Data access restrictions would be enforced through consensus protocols.

Thus, for Schmidt and Vejzagiÿ (2024, p. 22), Boyle and Grigg reinterpret triple-entry accounting based on a digitally signed and shared receipt as the central piece that connects the two ends of a transaction. Their mantra, say Schmidt and Vejzagiÿ (2024), is that "the receipt is the transaction", which has undoubtedly always been true in financial accounting [...].

However, warn Schmidt and Vejzagiÿ (2024, pp. 19-20), "Grigg's proposal does not address who would act as the trusted and neutral third party to control this shared ledger". Petrovic, Tanasic, and Jovicic (2024) also state that, although Grigg's concept was innovative, it faced practical challenges. The authors point out that critics, such as Chowdhury (2021), argue that the system requires a trusted and impartial third party, which can be difficult to guarantee in real-world scenarios.

Faccia and Mosteanu (2019) also understand Blockchain as a technology based on distributed ledgers. The authors add: "Ledgers consist of 'blocks' of information that are cryptographically hashed together. This allows multiple parties to view the content within the block while what is inside the block remains protected" (Faccia and Mosteanu, 2019). For Ibañez et al. (2021, p. 13), "triple-entry bookkeeping is a specific proposal for a shared transaction record (and therefore for 3D accounting)". It relies on receipts signed three times to reach an agreement on the content of the shared document (Ibañez et al. 2021).

In this process, to improve the attempt to build an accounting record based on triple entry, Petrovic, Tanasic and Jovicic (2024) rescue Faccia's idea of an X-Accounting, different from the T-account system of traditional accounting. According to Petrovic, Tanasic and Jovicic (2024), Faccia builds on the concepts of the REA [Resource-Event-Agent] model, incorporating blockchain technology and artificial intelligence. This model introduces an innovative "triple axis" system (figure 9), which aims to improve accountability, transparency and data integrity. In addition, it provides features for process automation and real-time analysis (Faccia, Moşteanu, Leonardo, 2020).

Faccia, Moşteanu and Leonardo (2020) seem convinced of the possibility of a conceptual symbiosis between accounting language and blockchain technology. They present X-Accounting as an evolutionary solution to the debit/credit language. For the authors, the hash (algorithm), unlike traditional accounting methods, forms a triple-axis structure, together with debit/credit, to record and track transactions, thus overcoming the limitations of double-entry accounting (Figure 9).

Figure 9. From T-Account to X-Account

Source: Faccia, Moşteanu and Leonardo, 2020, p. 3,
Adapted by Petrovic, Tanasic and Jovicic, 2024, p. 16

For the authors, the hash makes up the debit/credit structure, thus forming the triple axis that allows the recording and tracking of transactions. Thus, Faccia, Mosteanu and Leonardo (2024) understand that the need to add a new axis to the accounts seems to be a natural consequence and capable of cross-identifying (and shielding)

each transaction. This triple axis ensures the perfect mirroring of the transaction in relation to the external party with which the transaction itself occurs.

In summary, practically all models of adaptation of blockchain technology to accounting or to bookkeeping using the triple entry "method" follow a pattern: adding one more element to the double entry method. Therefore, it is important to emphasize that none of these models dispensed with the double entry method, and all of them present themselves not as a technological device controlled by algorithms, but as if they were the evolution of bookkeeping using debit/credit to triple entry.

3. Critical analyses and considerations

Those who read articles about "triple-entry accounting" supported by blockchain technology have the feeling that accounting reality will soon reach the peak of technological evolution and that disruptive accounting is already occurring. The statements by Carlin (2019), for example, make this idea clear: "The maturation of blockchain technology may represent a change in accounting as profound as the emergence and adoption of double-entry accounting". Grigg (2024, p. 10) also points to this direction: "triple-entry accounting challenges the five-hundred-year reign of double-entry; what double-entry did in the company, triple-entry does between companies; what double-entry did for the company, triple-entry does for the economy".

These apparent convictions about the ineptitude of double entry exceed their analytical perception capabilities of what accounting is or the intrinsic meaning of double entry as an instrument for representing commercial transactions (ambivalence). Schmidt and Vejzagiÿ (2024, p. 22) point out that "both Boyle and Grigg approach triple entry accounting from the perspective of a software programmer".

In this sense, what is happening is an anatropy (inversion of values), insofar as what produces "scientific knowledge" and conceptual innovations is not blockchain technology, but the science of accounting. Some criterion for observing what is an accounting object and a blockchain object is needed. This is the reason for the research problem. The relevant focus of this work, therefore, is to verify whether accounting supports triple entry bookkeeping, as generally developed by IT researchers, and whether this is a plausible novelty in the accounting field.

To answer the research problem, some points must be established and analyzed: i) accounting, from a historical-conceptual point of view, does not admit the existence of the triple entry concept, especially as a form of evolution of double entry; ii) blockchain technology is not an accounting technology, nor has it created a new form of triple entry bookkeeping; iii) this does not mean that blockchain technology cannot be applied to accounting like any other technological program. Bookkeeping is no longer done by hand, but by means of increasingly sophisticated computer programs. However, these programs do not take on the role of bookkeeping, nor do they create new accounting concepts; they simply follow its rites. Critical analyses and considerations regarding the three points raised are presented below.

i) Historically, accounting does not admit the existence of the triple entry concept to record transactions between people. It is impossible to record a transaction between only two people in triple entry. The semantic effect of double entry is always the following: one account represents the debit and the other represents the credit in the exchange relationship [economic transaction], as seen previously. This ambivalent relationship does not become trivalent, nor can it be "written down" in a third block bringing together the debit of company A and the credit of company B. Even if this impropriety of the double entry method were admitted, it would not create a triple entry, it would only repeat the debit/credit of the two companies in a separate block; therefore, there is no "triple debit".

It should be noted that all accounting (financial, public, national, etc.) is written using the double-entry language; there is no triple entry. In this respect, it is similar to binary computer language (0,1), which also does not allow for the "trinary", not even in quantum computing. Throughout history, all information about all administrative facts of entities has been written using the double-entry language, or ambivalence (clay, quipus, negative and positive numbers, debit/credit, etc.).

In this sense, it can be said that the models developed by Ezersky (1876) and Ijiri (1982, 1986) play semantically with the expression "triple entry" when they include other elements that do not genuinely belong to double entry, for example, another accounting structure (Ijiri, 1982). When they introduce other elements that are foreign to double entry, they break its historical semantics and transform it into something that does not exist in accounting, as is the case with triple entry. Thus, the intrinsic representational meaning of the ambivalence between two people doing business has been neglected by researchers who are enthusiasts of blockchain technology.

ii) For this same reason, it can be said that blockchain technology models did not invent triple entry as an evolutionary form of double entry. What these models did, as a rule, was to encapsulate double entry in a code called hash, which is responsible for guaranteeing inviolability and other security measures, but this did not change the structure of double entry, nor did it transform it into triple entry. Adding the hash to double entry (X-Accounting) does not transform this new structure into triple entry. Hashing is just an algorithm – it is not an

accounting concept. Accounting is not written using hashing, but using double entry (debit/credit). This is the language that communicates, that informs transactions. Therefore, the hash, like all other computational algorithms, only has the role of control, of protection against double entry. This is not triple entry, nor even triple entry bookkeeping. It is therefore inappropriate to construct the concept of triple entry from an accounting and technological point of view as if it were accounting.

Giongo and Balestro (2019, p. 9) also follow this line when stating that "the use of the term 'triple entry accounting' by blockchain enthusiasts is incorrect and strongly rejected by the accounting sector. Adding a public date and time record and a hash code does not equate to triple entry". Schmidt and Vejzagiÿ (2024) also reinforce that the concepts constructed are directed towards a data storage project for accounting books, but reveal a lack of basic accounting knowledge.

Schmidt and Vejzagiÿ (2024, p. 23) are more incisive when they conclude: "Therefore, the term 'triple entry' is misleading because it does not create a new entry, but simply links traditional double entries". They further add: cryptographic or blockchain-oriented methods for triple entry accounting serve more as marketing tools than as significant accounting innovations. Taylor (2017) also shares this conclusion when he states that "a common misconception has arisen that recording each piece of information on the blockchain is actually a third entry. It is not." The statements of Sharma, Joshi and Sharma, 2023 are no different: "The term 'triple entry accounting' is somewhat misleading because no new entry is being made; instead, double entry accounting is simply coupled with a third element—the Bitcoin network and its underlying technology: 'blockchain'".

ii.a The technological effort to hide fraud and corruption

If international accounting organizations (IASB/IFAC) are able to create sufficient rhetorical effects to keep under control what should be published by the corporation and what should be "confidential" (Murphy, 2017; Murphy and Staushholm, 2017), then this attitude does not seem to be different when the objective is to invent new technological mechanisms that do not expose this corporate "confidentiality". In this sense, there are those who defend public networks and those who defend, for the most part, the implementation of private networks (thus preserving corporate "confidentiality"). Secrecy (corporate secret), known since the 19th century as the "black box" (Canziani, 2007; Costa, 2021), is one of the veiled foundations of capitalism, and since the 19th century, the argument has been that it is necessary to preserve information from competitors. Capron states:

Accounting documents must be shown while they are hidden. They must show how the company behaves financially, since this function is legitimately required by investors, but at the same time, the competitive capitalist company needs to preserve certain secrets to maintain its competitiveness, which are commonly called "business secrets". Cost calculation is a secret jealously guarded by management accounting. (Capron, 2005, p. 119, our translation)

Well, here is a brief explanation of what commercial secrecy and the secrecy of companies' financial information are. The first refers to information that is a trade secret, for example: formulas, recipes, production secrets (intellectual property), customer data, employee data, personal information, restricted information protected by law, etc., which must be part of what is called "intangible secrets". These secrets are not within the scope of accounting, except when their economic evaluation is necessary. But evaluating them does not expose the secret. The second type of secrecy is controversial because it involves money (value), financial information, such as financial statements, accounting records, accounting books, etc. This is the exclusive responsibility of accounting. This type of secrecy is what this paper is about. It is also a concern for those who seek to create islands of financial secrecy with blockchain technology that can only be accessed by accountants, managers, and auditors.

On the other hand, along with financial secrecy, fraud, corruption, and corporate crimes of all kinds are also hidden. Thus, this corporate format that maintains financial "secrecy" along with crimes seems to be paradoxical with the purposes of the blockchain system, as it was developed to provide security and complete transparency to accounting information before society. For this reason, Rückeshäuser (2017) asks "Do we really want blockchain-based accounting?" Rathore, Mamodiya, and Soral (2023, p. 71) also point out that the privacy of trade secrets and transaction data is a cause for concern for companies.

Rückeshäuser (2017, p. 17) points out that "industrialists and academics who advocate blockchain in accounting seem to neglect the still present and well-known challenges of accounting itself, which is the involvement of senior management in accounting fraud". The author explains that "the seriousness of this topic becomes obvious when we look, for example, at the fraud that occurred in the United States, where accounting fraud conducted by management is equivalent to 89 percent of all cases of financial statement fraud in listed companies" (Rückeshäuser, 2017, p. 17). Therefore, blockchain technology opens up in two directions: first, it is inapplicable to companies; second, it can be adapted according to the interests of senior management (maintenance of financial secrecy).

Note that blockchain technology, when created by Nakamoto (2009), to ensure the security of bitcoin, required the system to be inviolable and immutable, and in this sense, the best alternative found was to create

something that could be seen by everyone, that was completely open, therefore, a distributed (public) network, without secrecy, in which everyone in the network had access to the information and guaranteed it (hash) to its users. Thus, the blockchain protection system of crypto currencies is effective because the code is open to everyone and has inviolable encryption (hexadecimal hash associated with the nonce).

However, blockchain technology, when applied to corporations, faces a paradox: its main virtue, which is transparency (public network), becomes its main defect because, as Hambiralovic and Karlsson (2018) state, a public blockchain would be unlikely, as companies would not want to share "their information" with the public. Thus, although public blockchains are more advantageous, this privacy issue has forced companies to opt for private blockchains instead of public blockchains (Rathore, Mamodiya s Soral, 2023, p. 71).

In this sense, solutions have been put forward to maintain the secular capitalist foundation, secrecy (financial secrecy). For example, Anderson (2016) suggests that in a blockchain, the original transactions can be replaced by hashes that will retain the public consensus mechanism for confirming transactions without any disclosure of real data to third parties. Note that Anderson (2016) is referring to transactions, not intangible secrets.

Rathore, Mamodiya, and Soral (2023) state that Dai and Vasarhelyi (2017), on the other hand, propose two separate blockchains: one blockchain will allow restricted access only to accountants, managers, auditors, and other parties necessary to verify transactions. Then, the verified transaction should be encrypted, grouped into blocks, and attached to the main blockchain (ledger), which is public. There, users can view the encrypted transactions and verify the consistency of the chain. This suggestion preserves the confidential parts of the corporation and discloses only the encrypted transactions. This is the best of all worlds for the company and the worst for society. Therefore, this would not be an acceptable solution if the purpose of creating the blockchain is the transparency of the company's financial data.

Thus, it can be concluded, disregarding the conceptual-accounting embarrassments about triple-entry bookkeeping, that there is already a technology that allows financial transparency for corporations. But the way it is being adapted to accounting is not constructive, nor even disruptive. On the contrary, it keeps the status quo of accounting information under suspicion, in addition to worsening and reducing the importance of the accounting professional (forced to hide the vices of senior management). Above all, because the concept of company productivity (a key indicator of efficiency) has always been compromised or biased due to the obscurantism of accounting information, especially in US corporations (89% of accounting fraud).

Therefore, reviewing the meaning and extent of corporate financial "confidentiality" (with its black boxes) is imperative to prevent adaptive arrangements of blockchain technology. Therefore, advances are suggested regarding the transparency and inviolability of companies' financial information. This is disruptive.

iii) Once the idea of applying blockchain technology to corporate accounting control is admitted, without the concept of triple entry, then it is possible to infer how to do this correctly. Of the models presented here, most seek to incorporate financial secrecy through blockchain technology. Since there is apparently no way to separate the wheat from the chaff, this incorporation also encapsulates fraud, corruption, etc. It should be noted that the effort to undo what is correct into something that is not correct just to satisfy the CEO and the investor, to the detriment of human society, is not acceptable from a practical, moral and ethical point of view. If the problem of financial secrecy in companies is solved through blockchain technology, the problem of escalating fraud and corruption is also solved, because they are usually juxtaposed (it should be noted that there have been no frauds in the blockchain model yet, so this idea is unlikely to please businesspeople, especially those in the United States). Furthermore, accounting auditing, in terms of open accounting records (public network), would also not be necessary.

In this sense, the discussion should then be about the imperativeness of "financial secrecy of the business". Obviously, this is not the time for discussions of this nature, because the subject would require time. However, to allow some reflection on the subject, we started from the assumption that all corporations do not have financial secrecy. All financial information is disclosed without restriction (costs, hidden income, tax havens, manipulations, tax evasion, etc.).

This hypothesis would be rejected by those who would say that the company is private and that, as a general rule, a legal entity does not have to open its accounting records. Raising the company to the category of "person" was one of the most crucial blows capitalism dealt to human societies, as it allowed it to create the fiction of a legal "person."

Thus, a company is an abstract legal entity with personality, a fictitious, immaterial person, with rights and obligations that "has no soul to save nor body to be imprisoned" (Baron Thurlow, undated, our translation). Those who created this fictitious person called a "legal entity," with the right to financial confidentiality of the business, are the same ones who maintain 89 percent of fraud and corruption in their balance sheets: the Americans.

Therefore, the discussion here is that the company model (legal entity, of a "private" nature), even if publicly traded, conveniently restricts the disclosure of its financial information, even with the approval of international accounting standards. Better yet, companies do not accept blockchain with a public network because it exposes all their financial "secrets." The questions we leave for further research are: what if all companies were

required to disclose their accounting records through a public network, would they go bankrupt? Would capitalism collapse?

III. Conclusion

In answering the research problem, we came to the conclusion that the claim of many researchers towards disruptive accounting, based on a new generation of principles built around "triple-entry bookkeeping," is not possible, unless I am mistaken. The inappropriate use of the expression triple-entry distorts its historical semantics and undermines accounting concepts without solving the problem, which is to produce more transparent and immutable accounting, the solution for which lies in blockchain technology.

The initial idea was to convert accounting data into encrypted blocks and place them on a public network. However, warnings were given about the dangers of this initiative, as "confidential" information would be exposed, which would be a risk for companies (which are private legal entities). In the public blockchain network, transaction details are available on the network, and several copies of the ledger are kept outside the company (Rathore, Mamodiya and Soral, 2023, p. 71). Therefore, access blocks and restrictions were created to "preserve" companies. This attitude of blocking what is "confidential" creates a barrier to revealing the most relevant accounting records: fraud, corruption, and illicit acts of all kinds. It is not without reason that blockchain faces resistance from regulators [IASB] alleging concerns about consumer data privacy, particularly in the European Union (EU) (Fuller, 2019).

In this sense, the models discussed here suffer from the following structural problems: i) triple entry, or triple entry bookkeeping, is not an evolution of double entry, nor can it be conceptually considered as "triple entry"; ii) in trying to adapt blockchain technology to the conditions of financial secrecy, all fraud and corruption that are hidden in accounting records were neglected. Thus, what was supposed to be the explicitness, the transparency of the company's financial and accounting information was compromised. Certainly, the idea of blockchain technology is acceptable and welcome in the accounting field, but not in the terms that have been presented by many works.

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