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Enhancement of the Scientific Nature of Accounting: Past and Future Are Time Illusions, the Present Is the Power of Accounting

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Abstract

By reviewing the critical evolution of accounting, especially accounting equations and double-entry bookkeeping, the researcher finds that double-entry bookkeeping has been praised by many notable authors in history. What advantage do they derive from the system of double-entry bookkeeping? It is among the finest inventions of the human mind. The principle of bookkeeping by double-entry is described as absolutely perfect, and it bears the same spirit as the system of Galileo and Newton. This research provides some thoughts and equations regarding accounting equations and double-entry bookkeeping, which enhance the scientific nature of accounting. The emergence of double-entry bookkeeping stems from the need to account for business transactions instead of predicting them. The evolution of double-entry bookkeeping increased the ability of potential accountants and others interested in the accounting discipline to make their judgments on a broader and more informed basis. It enabled them to establish a relationship between past accounting practices and present practices, and what practices ought to be. Critics of double-entry bookkeeping, including many accounting academics, claim that this system is not an absolute system that defies any extensions but rather is logically extendible to triple-entry bookkeeping by including a set of accounts called "force" in its third axis. Since the world has changed significantly, does the double-entry bookkeeping system still bear relevance today? Researchers believe that it is still quite useful in today's business environment. Pacioli's explanation of the form of a double-entry bookkeeping system is approximate to the form of its final development today. The theory underlying Pacioli's work is even more contemporary. Though his purpose was practical, double-entry bookkeeping was invented according to the laws of physics, indicating that the past and future are just thoughts happening in the present. Therefore, it is initially accepted that it is impossible to experience anything other than

the present moment. According to the findings of this research, historical cost and constant purchasing power are sound principles in accounting. They suit any time and place, and every treatment in accounting is true and accurate as long as it is based on the double-entry and accounting equation found in mathematics; moreover, the concept of time in accounting is only forward. It is wrong to go back to the past to revalue assets within the conditions of the present time, as past and present are equal. Double-entry bookkeeping is an honest system regardless of market forces and inflation. Besides, we cannot account for the time dimension as long as the laws of Physics argue that the past, present, and future occur at the same time.

Keywords

Scientific Nature of Accounting, Accounting Equation, Double-Entry Bookkeeping, Triple-Entry Bookkeeping, Historical Cost Accounting, Time in Accounting, Past, Present, Future in Accounting, Accounting and Physics, Accounting Philosophy

1. Introduction

Accounting is considered a discipline; it does not have its own philosophy or theory, so it is still regarded as a mere collection of techniques. Accounting has never had purely practical processes and techniques, but it has always been founded on rational reasons that serve as fundamental ideas and patterns of thought underlying the subsequent techniques and procedures.

Many contemporary accounting scholars believe that scientific accounting research involves the application of scientific research paradigms from related fields to the study of accounting practices. The epitome of this approach to accounting research is seen in the following statement: "The objective of accounting theory is to explain and predict accounting practice. By determining the type of accounting that suits a society, accounting has the potential of elevating the discipline to a higher order of intellect and, hence, in the arena of science as many academic researchers see." [1]

As a result, the question is, is it appropriate to apply Kuhn's theory of the evolution of scientific disciplines to accounting? [2] Specifically, if Kuhn's theory is based on the historical evolution of scientific disciplines, can it say anything pertinent about other disciplines supposedly not within its purview, such as accounting? Is it necessary to use a very broad definition that will not inhibit thinking about the possible future evolution of accounting? [3] A careful study of the structure of scientific revolutions to identify the essence of Thomas Kuhn's concept of a discipline's paradigm [4], might lead to the conclusion that the concept of accounting, which most closely resembles a paradigm, is the double-entry bookkeeping model. By exploring the implications of this insight, we might reach the following conclusions:

First, a brief examination of accounting history indicates that the double-entry model has been remarkably resilient. It has proven its capability of assimilating major changes in economic conditions and the patterns of commercial activity over four centuries.

Second, the advent of accounting standard-setting radically transformed the nature of accounting and precipitated a crisis in the accounting discipline. There have been three significant attempts to map out the philosophical and, by extension, methodological approaches in accounting research [5].

Many accounting researchers criticize Kuhn's theory from two points of view. First, they suggest that Kuhn's theory does not apply to accounting because it is intended to be applied only to sciences. They claim that accounting is not a science, but it is rather a service activity. Second, they argue that Kuhn's theory of the identification of the classical and decision-usefulness approaches as competing paradigms cannot possibly be correct because, under Kuhn's theory, there is little likelihood of an individual scientist accepting more than one conflicting (as contrasted with complementary) paradigm.

Various factors have influenced the evolution of the discipline.

of accounting. Many civilizations developed accounting theories based on the specific needs of their societies. One of these developments is the double-entry bookkeeping system. Accounting information, as a framework worked by Generally Accepted Accounting Principles (GAAP), is based on historical cost. This fundamental accounting practice, as it evolved over the years, has proved to be reasonably satisfactory during periods of relative price stability. However, in many accounting researchers' opinions, the absence of price stability, which is often the case in many countries, the value of accounting information as a practical language of economics could be lost and damage its quality as a relevant tool for decision making [6]. Several efforts to evolve these patterns of thought through theorizing, postulating, conceptualizing, and basing practiced corporate accounting on reasoning exist [7].

Historical cost accounting has enjoyed a very long-standing and successful career as one of accounting's cornerstones, whereas dealing with market values and revaluation has had a short and rocky history.

Moreover, concrete and substantial evidence supporting a shift away from the historical cost system is rarely documented, especially when compared to the persistence of maintaining this long-standing and widely accepted convention. Specific proposals for reform have been put forth by Mattessich and Sterling [8] [9]. They presented a set of eighteen basic assumptions that were asserted to be rigorous enough to form the key to a general theory of accounting. The real significance of double-entry bookkeeping compared to single-entry bookkeeping is not in the dual classification or the computational double-check but in the power of double-entry to make us look into the cause-and-effect relationships among the changes in the resources controlled by the entity [10].

The theory and practice of the double-entry accounting system of recording

and reporting economic events have been very successful in the last 600 years, despite flaws rate of syntax and confusion at the level of semantics. Academics believe that the final development of our discipline has not been reached. In this regard, the researcher sees that instead of proposing new accounting systems dealing with so-called accounting problems such as historical cost and inflation, we have to enhance the scientific nature of accounting by depending on other sciences like physics, mathematics, and social sciences to prove the logic and perfectness of accounting equation and double-entry accounting.

2. The Problem of the Research

Since the middle of the fifteenth century, double-entry bookkeeping has slowly replaced single-entry bookkeeping and is now used by all but the smallest firms. We address three questions about the evolution of double-entry bookkeeping.

1) What is the main benefit of double-entry bookkeeping?

2) How did double-entry bookkeeping emerge and evolve?

3) Why did individual firms and economies choose double-entry bookkeeping over single-entry bookkeeping?

4) Is time essential in accounting? Does time contain past, present, and future, or just the present moment?

Accountants use formulas, symbols, and rules, although they do not understand their meanings. They avail themselves of the assistance of knowledge, which individually they do not possess. They have developed these practices by building upon habits that have proved to be successful in their sphere, and which have in turn become the foundation of the civilization they have built. Nevertheless, the main critics in the accounting of historical cost, and financial statements prepared under inflationary conditions could be misleading. One of the most significant economic problems that has received broad attention from experts, economists, and researchers over many years is inflation. They say financial statements, without adequate adjustment to inflation, do not appropriately reflect the financial position and performance of business enterprises. In addition, the accounting financial reporting regime is nominal, assuming no changes to the purchasing power of money over time.

The effects of inflation on financial reporting received considerable attention during the late 1970s when inflation was relatively high; inflationary effects have been mostly ignored in the more modest inflationary environment since that time [11]. These critics attempt to prove that financial statements can be meaningless or even misleading under inflationary conditions. Besides, several countries have implemented different adjustment procedures, resulting in a lack of uniformity. A uniform solution to the problem of assessing the financial performance of enterprises in an inflationary environment has been long overdue [12].

As a result, several articles have been published, but the findings have not been conclusive and decisive. The fundamental arguments against accounting for price changes are that the orthodox view of conservatism and historical costs must be

the foundation for financial reporting. The so-called attribute of reliability derived from historical costs must be emphasized in various spectrums. The arguments supporting the account of inflation seek to further enhance the relevance attribute of accounting reporting to reflect the current economic values of assets more accurately [13].

Several efforts have also been made to base the practices of corporate accounting on reasoning. The questions have prevailed for more than a quarter of a century. Discussions and partial answers to some related questions on this double-entry problem have been published in many articles and monographs presenting a solution to half of the double-entry problems. Some of these questions are: Is double-entry bookkeeping "absolutely perfect" as it has been claimed? Would it not be possible to extend it logically to triple-entry bookkeeping? If so, what dimension is destined to become the third dimension in the triple-entry system?

Few studies have answered the previous questions by stating it is trivial to add an arbitrary third dimension and call it triple-entry bookkeeping. If anything can appear as the third dimension, there is no room for a theory, even if the resulting system is useful from a practical standpoint. In Accounting Literature, researchers argue about the mathematics of accounting equations and double-entry bookkeeping in two ways. Some researchers argue that accounting equations and double-entry bookkeeping need to be proved mathematically. Financial statements should provide information about the past, present, and future of companies. On the other hand, others claim that accounting equations and double-entry bookkeeping are the final situation; they are perfect without providing mathematical proof by scientific facts from other sciences, especially physics, mathematics, and social sciences.

At the same time, many accounting thinkers see that the essential requirement for a solution to the double-entry problem is that the third dimension must be logically deducible from the existing two dimensions, the debit and the credit of double-entry bookkeeping. *The researcher believes that instead of extending the double-entry to triple-entry bookkeeping, we can enhance the logic of accounting equations and double-entry by providing mathematical and scientific facts derived from other sciences, especially physics and mathematics. This is the contribution the research provides.*

Although mathematics and accounting go hand in hand, and accounting information consists of numerical data, the math tools used to record this data are very simple [14].

5) The questions of the problem:

a) Is the accounting equation correct and based on profound mathematics adequate for accounting?

b) Is double-entry bookkeeping perfect, and does it suit every time and place, providing a comprehensive framework for accounting?

c) Does the present time represent the power of accounting? Are both past and future times merely illusions in accounting for business transactions?

3. Problems with Historical Cost, Inflation, and Relevance of Accounting Information

We begin with the question that influenced the accounting literature:

"Should the accounting information in financial statements of companies reflect the past, the present, and the future?"

Critics have concentrated on the financial reporting system from the view of some researchers who describe it as "it is not perfect". Even though economic events and accounting entries do not correspond precisely, they diverge across the dimensions of timing, recognition, and measurement. Sterling confesses that accounting data are not the accountant's interpretations nor reflections of accounting-related reality [15].

The regulation of financial accounting today is far from being completed or simplified. Thus, it can be affirmed that, in itself, accounting information does not permit making true statements. Thus, the practitioner and/or regulator who wants to comprehend a reality should avail of broader theoretical frameworks from social sciences, similar to the work of Sterling [16]. Attempting to understand accounting at present without possessing a solid knowledge of its past may be challenging and would limit one's ability to contribute to this field. Accountants ought to possess a minimum level of understanding of the history of a chosen profession [17]. Mattessich's effort in the development of accounting as a distinct discipline is exhibited in the development of his theory. However, this represents only one side of the story.

Many studies have concluded that the information provided in financial statements has lost its value and relevance to equity holders over time. The critics of the monetary unit principle and inflation effects on accounting have amplified and warned that the failure of accountants to recognize, identify, measure, and report the effects of price changes could contribute to the measurement problem. This could also diminish the relevance attached to accounting information as a vehicle, as well as an infrastructure for financial decisions. Accounting information reported under historical cost reflects mere historical numbers of the past [6].

The debate about inflation accounting has been ongoing for many years in many countries. The majority of findings of previous studies have concluded that historical-cost financial statements prepared in inflationary conditions could be misleading. They reduce the financial accounting role as an input for decision-making. As a result, the need for adjustment of the historical cost approach to reflect current economic realities becomes, in some opinions, inevitable.

4. The Power of the Accounting Equation

The source of power comes from analyzing the accounting equation and the relationship between assets and claims on assets (liabilities plus stockholders' equity) based on the dual concept of monetary units. The method is rationalistic, analytical, and deductive, focusing on the implications that the dual concept has for the

accounting equation. In everyday practice, the double-entry bookkeeping system is the main way to register accounting transactions in financial statements. On the other hand, the dual concept is the recognition of the duality of monetary units; every monetary unit is an asset and a claim on an asset simultaneously.

The accounting equation can be rewritten to represent the double-entry system. One can consider the following conceptual distinctions: 1) The dual concept of monetary units (duality principle, duality concept, or duality assumption, as it is also known), is an assumption or axiom that expresses the assets' claims on assets equality. 2) The dual aspects of the accounting transactions are a convention and a consequence of the duality concept. They are also a definition in the axiomatic system. 3) The double-entry bookkeeping system is a set of rules governing the accounting practice.

Mathematics is related to accounting, but not as interlinked as many may believe [18]. The relationship between mathematics and accounting or bookkeeping is very old, and the first published treatise on the double-entry principle appeared in 1494 in a mathematics book by Luca Pacioli [19]. Ellerman pointed out that "Understanding what mathematical competence skills are required can assist individuals in business processes." It is vital to have basic mathematics and algebra skills to complete accounting tasks or activities, as they are full of basic and advanced calculations and report accurate financial information [20].

Few works introducing logic and axiomatic set theories into accounting have been carried. Mattessich is one of the authors who views the accounting system as a logical system [21]. He has delivered a consistent theory and formalization of the language of accounting. The developments made by Mattessich are impressive, and he has redefined accounting with logical and theoretical research foundations.

5. The Mathematics of the Accounting Equation

Using the perspective of mathematics [22], the accounting equation expresses the value of an entity instead of "past success" [23]. From a mathematical perspective, the accounting equation has a clear and straightforward structure. The equation expresses the relationship between assets (denoted as A) and claims (the sum of liabilities L and equity E).

If $L+E$ is a non-zero value, the equation $L(A-L)=2LE-E(A-E)$ has a solution:

$$A=L+E$$

Consider the given equation

$$L(A-L)=2LE-E(A-E)$$

$$LA-L^2=2LE-E(A-E)$$

$$LA+EA=L^2+2LE+E^2$$

$$(L+E)A=(L+E)^2$$

$$A = (L+E)^2 \setminus (L+E)$$

$$A = L+E$$

6. The Logic and Mathematics of Double-Entry Bookkeeping

It is first necessary to define what "accounting" means. At various times in the past, individuals interested in accounting may have been merchants, textbook writers, practicing accountants, teachers, scholars, or a mixture of these. If this definition of accounting is accepted, then Peasnell's contention that accounting is not a science, because it is a service activity, must be rejected [24]. Control doesn't always align with the desired outcomes, and sometimes, the more we understand reality, the more we need to humble ourselves in how much we should try to control it [25]. It is common for certain aspects of a theory to be lost in a generalization of the theory. The accounting community has accepted the failure of all these features of double-entry bookkeeping as the necessary price to be paid to generalize double-entry bookkeeping to incommensurate physical quantities. Yet when double-entry bookkeeping is mathematically formulated using the group of differences, the generalization of vectors of incommensurate physical quantities is immediate and trivial.

The idea that the double-entry bookkeeping system might be seen as a failed attempt at generalization, but ultimately accepted as a successful reformulation, touches on an interesting critique of accounting theory and its evolution.

Double-entry bookkeeping, traditionally attributed to Luca Pacioli in the late 15th century, revolutionized the way businesses tracked financial transactions by providing a more systematic, balanced approach to accounting. The model was based on recording each transaction in two accounts (debits and credits), ensuring that the accounting equation (Assets = Liabilities + Equity) is always balanced.

However, the critique suggests that the system's acceptance might not have been entirely based on its perfect generalization of financial processes, but more on its practicality and the way it simplified and standardized accounting. In essence, while the system might not have fully captured the complexity or nuance of every possible business transaction or financial situation, it was widely adopted because it provided a framework that was manageable and effective for most applications.

It could be argued that this acceptance happened despite limitations. For example, double-entry bookkeeping assumes a certain structure and symmetry in transactions, but many modern financial systems are more dynamic, and accounting systems today often require more complex models to reflect things like off-balance-sheet items, intangible assets, or financial derivatives. Yet, double-entry still serves as the backbone of modern accounting, even if it was initially a generalization that glossed over these complexities.

Due to this remarkable and intellectual insulation between mathematics and accounting, the successful mathematical treatment and generalization of double-entry bookkeeping (first published a quarter-century ago) will take many more

years to become known and understood in accounting.

A characteristic technical manner of operating double-entry bookkeeping systems is one of the peculiarities that has undergone no basic change over the passing centuries. Why is this so? Is this because double-entry bookkeeping is "absolutely perfect" in its internal logic, leaving no room for improvement or expansion ever since it was originally generated? If double-entry bookkeeping is perfect, it can be understood why there has been no extension of it into triple-entry bookkeeping. A hypothesis that may be called the perfectness hypothesis of double-entry bookkeeping (that double-entry bookkeeping is perfect and cannot be extended to triple-entry bookkeeping without destroying its internal logic) seems to have been accepted explicitly or implicitly over a long period [26].

The principles of bookkeeping by double entry constitute a theory that is mathematically by no means uninteresting (Arthur Cayley 1821-1895). It is, in fact, like Euclid's theory of ratios, a perfect one. It is only its extreme simplicity that prevents it from being as interesting as it would otherwise be. Mattessich has stated in his article [27], "I have tried to explore the historical development of accounting principles, emphasizing that the foundational aspect of accounting lies not in the double-entry technique itself but in the underlying logical structure, which he identifies as the duality or input-output principle. He traces this principle back to ancient record-keeping systems, suggesting that the concept of duality has been intrinsic to accounting practices since prehistoric times."

The duality of the double-entry accounting system is found in the notion of cause and effect, or simply that of change in something brought about by the observed event or occurrence. Yin-Yang polarity [28] and [29] still have balanced Chinese accounting, known as the charge and discharge system of bookkeeping, which originated in the Mediterranean Zone. The success in maintaining the two-sided accounts (debits and credits, the double-entry principle, and the trial balance in both cases) provides strong evidence that the formulation correctly captures the double-entry method in mathematical form.

Therefore, is accounting based on mathematical knowledge as codified in Luca Pacioli's book of mathematics? If the answer is yes, where is the mathematical foundation of double-entry bookkeeping? There is no need to develop the mathematical pillar in accounting; it develops faster than consistently, as many accounting researchers claim. It is just a tool to provide information, as it essentially is right now. As a result, there is no need for the addition of the elements of accounting equations, as well as new accounting topics developed mathematically.

7. Determinants of Economic Value

Accountants have become increasingly concerned with the choice of adopting one of the controversial concepts of asset valuation in the preparation of financial statements. Current value has been widely recommended as a means of improving financial information [30], and it is more useful in making predictions and decisions. One major criticism of current value accounting is that it might be subjec-

tive, and personal bias could be introduced, especially when there are no well-defined market prices. At present, conclusive empirical evidence relevant to this controversy seems nonexistent.

Many studies have empirically tested the reliability and predictability of appraisal techniques as a means of estimating current value as compared with historical value [31]. Current value accounting is evaluated on the grounds of not only its usefulness but also its predictability and objectivity. Perception of current value as an essential part of communication is also considered. It is perhaps the most helpful tool in achieving the objectives of financial statements. There are many alternative models and concepts of asset valuation. Supporters of each alternative claim it fulfills the objectives of financial statements because it presents useful information to users. The conventional or historical value concept has been the most common and dominant valuation method. An exception occurs when the market value decreases below historical costs in the valuation of certain assets, such as inventories.

Supporters of historical value defend this concept because:

1) It serves conservatism essential to accountants.

2) It is objective and provides a measure of protection.

3) It is less costly than other methods, and it is useful in making decisions.

Although historical value has objectivity and verifiability at the point of exchange, effective reporting in some opinions, takes place only if the report reflects the reality of the firm's financial position. Hence, Mautz has stated that historical value is a prime cause of confusion among accountants [32]. The question is the following: is the measurement process in accounting perfect or still imperfect, and is it considered the first step towards a long-awaited revolution in accounting? Although this revolution is not restricted to accounting, it has already taken place in other disciplines where measurement is crucial.

Many accountants confuse general price-level restatement and current value accounting; Some believe that the methods are incompatible alternatives, while others seemingly think that general price-level restatement is primarily a means of approximating current value or that current value accounting is primarily a means to compensate for inflation. In practice, there are three basic viewpoints in accounting literature as to how assets should be recorded. There are the adherents of historical cost at one extreme, and the adherents of value accounting at the other extreme. Somewhere in between the extreme positions are those accountants who adjust the cost for the price level.

The argument in support of accounting for changes on the general level of prices was examined in light of the following questions: What is entrusted to management? Is it a physical stock or a financial stock of capital? Does a firm seek to accumulate a physical stock or a nominal money stock? Are the suppliers of money capital concerned with physical flow prediction or with nominal money flow prediction? [33]

Recognizing the defects of financial reports in inflation situations, a lot of de-

bates, observations, reservations, and opinions were presented in economics. Efforts concentrated on financial reports that become confusing at best, and misleading at worst, because revenue is mismatched with differing historical cost levels as the monetary unit becomes unstable [34]. When determining the economic value in the market, the conflict of forces makes time at zero. These forces are: Product cost-utility and demand-competition in market-government and legal regulations-pricing objectives-marketing methods.

These forces change every moment, so we can take a photo of these forces every moment and the taken photo is always at a present moment in the past, at a present moment in the present, and at a present moment in the future.

8. Past, Present, and Future, and Accounting

Is time a dimension of the financial accounting system? Ijiri notes that "One common property of accounting measurements is that they are all functions of time and are recorded and reported as time series data, $x(1)$, $x(2)$, …, $x(t)$, rather than as isolated measurements at a single point in time" [35]. In his opinion, time is just the dates of transactions. However, Mattessich has introduced his second basic assumption, "The time measure". There is a sequence of relatively small time intervals (e.g., dates) that can be ordered, added (to longer periods), measured, differentiated, and so on using a number system. In this situation, both Ijiri and Mattessich tend to see time as a dimension external to the financial accounting system.

Whatever we do on any day depends not only on what we have learned in the past but also mainly on our plans for the future. I think everyone would agree that our goals are the driving force behind nearly every decision we make. If this is true for an individual, for businesses, it is a matter of thriving or disappearing from the market.

The past informs the future. What skills does a company have? What is the distribution of these skills? What are our strengths and weaknesses? What skills does the business need to develop? Twenty years ago, when everything was moving at a more predictable and steady pace, and the company was not that big, we would not have had trouble finding answers to these questions. The problem is that now everything is changing at a more rapid pace. What was normal yesterday becomes obsolete. Well-established professions are replaced with new capabilities and skills. Entirely new skills are emerging, but some of them evolve from other skills. Knowing the trends and understanding the composition of the skill set is not a recommended thing to possess. It has become a necessity. In this regard, the question is "Can other sciences explain the power of the present time in accounting?"

9. The Vision of Physicists Regarding Past, Present, and Future

Albert Einstein once wrote, "People like us who believe in physics know that the

distinction between past, present, and future is only a stubbornly persistent illusion" [36]. Time, in other words, is an illusion. Many physicists have since shared this view that true reality is timeless. However, a few physicists do not agree with them. They believe time is real and that the laws of physics may not be as permanent as we think they are. They claim that the laws of nature could evolve and change over time and the real existence of time might give us a better understanding of the universe.

Can we be certain that this thing called time exists? Is there any way to test that? If time is real, what does that imply about our past and future? Lee Smolin discusses these questions in his new book "Time Reborn: From the Crisis in Physics to the Future of the Universe" [37]. An alternate idea of how to perceive time is called eternalism. Instead of thinking of reality as three-dimensional, we can add a fourth dimension, time. After Einstein formulated relativity, Hermann Minkowski came up with the idea of four-dimensional Minkowski space-time [38]. In this four-dimensional space, simultaneity is no longer a problem. Rather than solely measuring the time between events, observers on Minkowski space-time would instead measure the space-time between events. This space-time distance should be the same for all observers.

This is the problem of "simultaneity," and it is one of the conclusions of special relativity. Different frames of reference may not agree on the order of events. What we call the "present" is subjective. Every moment that passes finds us traveling from the past to the present and into the future, with time always flowing in the same direction. At no point does it ever appear to either stand still or reverse; the "arrow of time" always points forward for us.

10. The Vision of Culture and Society Regarding Past, Present, and Future

To utilize the present moment, we can fully realize that the present moment is all we ever have. Therefore, we cannot control the past or future, only the present. Focusing on the present gives us a greater sense of control and serenity. The main idea works in the present moment. Eckhart Tolle believes that being present or living in the present moment is the key point [39]. No matter what we do, we cannot change the past. While we do not affect the past, our decisions can and do influence the future. Unlike the past, which we know very well, the future is entirely unknown, so we prepare for everything and, in turn, do nothing if we want to change, and these changes need to happen now. Looking too far back or forward keeps us distracted. We are not in the past nor the future. We are here and now. This is where our focus should be.

Have you ever experienced, done, thought, or felt anything outside the now? Do you think you ever will? Is it possible for anything to happen or be outside the now? The answer is obvious: it is not. Nothing ever happened in the past; it happens in the now. Nothing will ever happen in the future; it will happen in the now [40].

In the fields of physics, chemistry, and mathematics, something transfers from one stage to another with the whole contents. The past is present, and the future is present. The mechanism of judgment is based on the past and the future, which is the present, the moment now.

11. The Vision of Accounting Researchers about Time Effect on Accounting Past, Present, and Future

Ijiri has proposed the system of triple-entry bookkeeping; the question might be the following: "What kind of use might such a system have? What form of financial statements does such a system imply?" A triple-entry equation, which may be written as Future = Present = Past, forms a basis for constructing a triple-entry system. In the double-entry system, how far back in the past do accounts go for the present status of the enterprise? Regarding the inception of the enterprise, since the inception of the enterprise is certainly possible. Would this mean tracing "back" to the future when time flows in reverse? Present = Past does not mean accounting for the present by the entire history of the enterprise, but only by the events that occurred during the most recent year in the past. While the power of temporal triple-entry bookkeeping is significant in extending our horizon toward the future, the power of differential triple-entry bookkeeping is even more significant in extending our ability to reason to a higher level. It calls for "reasons for reasons".

Although Both Ijiri and Mattessich have tended to see time as a dimension external to the financial accounting system, they give time a value when they proposed to extend double-entry bookkeeping to triple-entry bookkeeping, they have ignored the fact that time is an illusion, and the past, present and future all exist at the same time.

12. Time and Accounting

We live in a world where time is important. Nanoseconds mark the difference between success and failure. Can we be certain that this thing called time exists? Is there any way to test that? If time is real, what does this reflect about our past and future? We think about the time of truth in different domains, such as mathematics, ethics, religion, and philosophy. In his book "A Brief History of Time," physicist Stephen Hawking reminded us that the increase of disorder or entropy [41] is what distinguishes the past from the future, giving a direction to

Entropy is one of the few quantities in physics that requires a particular direction for a time, sometimes called "an arrow of time". As one goes "forward" in time, the entropy of an isolated system can increase, not decrease. Thus, entropy measurement is a way of distinguishing the past from the future. There is no evidence that we can move backward in time or that "time tourists" from the future are with us. Nevertheless, the arrow of time does carry us forward, and humans have measured this time through the ages in different ways. The first man or woman who tried to structure the measurement of time will never be known.

The better measurement of time has been a human fascination for centuries. In the 18th century, the clock emerged as a scientific instrument in its own right. Notwithstanding its conventional role to mark the passing of the hours, to most of us, time is real; you have run out of time, or you do not have time. The formula of time is the following:

Time = Distance\Speed.

The increase in entropy in timekeeping might be related to the arrow of time [42]. It has been suggested that the reason time only flows forward, not in reverse, is that the total amount of entropy in the universe is constantly increasing, creating disorder that cannot be put in order again. Many studies give time a monetary value in the revaluation process without a physical change in an object or an asset, and a real change in value or materiality.

13. The Logic behind the Power of the Present and Its Usefulness in Accounting

Psychotherapists have long recognized the therapeutic power of the here and now, but few have attempted to account for this power or provided a rationale for its efficacy [42]. Does time contain the past, present, and future, or just the now?

If the theory is, in fact, a complete explanation of space-time, all 4 dimensions exist as a single block. This makes the time dimension as real as the space dimension and allows the past, present, and future to eternally exist all at once. Generations of physicists have claimed that time is an illusion. However, not all agree. In his book "Time Reborn: From the Crisis in Physics to the Future of the Universe", theoretical physicist Lee Smolin argues that time exists, and he says, "Time is the key to understanding the evolution of the universe" [37]. The more attention given to both what has gone and what is yet to arrive, the more the very essence of how those existed and will exist is neglected. The present, past, and future have no reality, but they are reflections of the present. This re-frame is to change from a time-focused to a presence-focused.

The essence of relativity is that there is no absolute time and no absolute space; everything is relative. Opinions are divided, but many physicists and philosophers now suspect that time is not fundamental. The alternative, of course, is our common intuition that time does flow. The present holds a unique significance as the only truly real moment, while the essence of reality itself lies in a constant state of becoming. But what exactly is the "now"? Though physics often regards it as an illusion, it remains a deeply intuitive concept. We typically understand it as the immediate instant, fleeting and without duration, yet central to our experience of time. If now were timeless, we wouldn't experience a succession of now as time passes. Neither would we be able to perceive things like motion. We could not operate in the world if the present had no duration. Hence, how long is it?

That sounds like a metaphysical question, but neuroscientists and psychologists have an answer. In recent years, they have amassed evidence indicating that it now lasts on average between 2 and 3 seconds. This is what you are now aware of. Every

difference between the past and the future can ultimately be traced to the fact that the entropy was lower in the past and is growing. The past is gone, the future is not yet here, only the present is now. Why does it always flow the way it does for us?

13.1. What Does It Mean When We Say Time Is an Illusion for Accounting?

We can start with the past. Does it exist? No, it does not. It is gone. Time cannot be found in something that itself does not exist. How about the future? The same story. It does not exist yet. Maybe time can be found in the present moment. Well, how long does it last now? Now, it does not have any duration; it is instantaneous. We cannot say that now lasts a second, and then the next now starts, can we? There is no time in the now.

Physics and philosophy tell us about the flow of time from the past to the future.

Note this explanation: When you place your hands in front of your eyes and measure the distance between your hands and eyes as D, and let C represent the speed of light, the time it takes for light to travel from your hands to your eyes is given by $T_1 = D \backslash C$ it refers to the time for light to transfer from your hands to your eyes.

T_2 = refers to the time to realize the picture. We need ($T_1 + T_2$) to complete this process. Thus, the total time for the entire process, from the light traveling to your eyes to your brain's interpretation, is Total = $T_1 + T_2$.

This means that when we observe anything, we're always perceiving the past light that takes time to reach us, and our brains take a short period to process the image. The result is that what we see is always a blend of moments from a few seconds earlier, creating the illusion of the present. Our perception is a delayed experience, with a lag between the actual event and our awareness of it.

We can never experience time directly. It is no more illusory than space is. However, it is also true that whether you think of the past or you think of the future, neither exists; these are just thoughts happening in the present moment. The same can be said about space; you perceive space, but you are always right here. It does not mean that it exists. It starts with realizing that the past and future are just thoughts, and they are happening in the present. Therefore, it is initially accepted that it is not possible to experience anything other than the present moment.

The question is whether past, present, and future exist simultaneously?. The answer is: yes. Linear time is a human construct. The theory of quantum physics theorizes that everything is dimensional; the past and the future are all happening concurrently in a different dimensional space, and everything is connected.

Past = Present = Future

Present moment in the past = present moment in the present = present moment in the future.

If we fully accept the two core axioms of Einstein's theories of relativity, namely, that the speed of light is constant for all observers and that the effect of acceleration is fundamentally equivalent to the effect of gravity, then we can argue that purchasing power remains constant in accounting terms.

This leads to the idea that time, in this context, does not impact financial transactions because the past, present, and future are treated as equivalent. Thus, financial values are independent of time, and the stability of purchasing power holds across all temporal frames.

If my present moment could be your past or future, and your present could be my past or future, then each "now" holds validity across perspectives. This suggests that the past and future are just as real as the present, meaning time is not a linear sequence but a coexistence of all moments. The distinction between past, present, and future is merely an illusion where each exists simultaneously.

The value of an asset in the past time = the value of an asset in the present time = the value of an asset in future time.

Time is viewed as cyclical, where the past, present, and future are interconnected and constantly repeating. This view is reflected in the idea that the "value" of an asset or experience doesn't change because all moments are seen as part of a continuous loop. In such interpretations, the past, present, and future are seen as equally significant, as shown in **Figure 1**.

The concepts of "The Past as an Extension of the Present" and "The Future as an Extension of the Present" suggest a nonlinear, fluid understanding of time, where the present moment is central and intimately connected to both the past and the future. These ideas contrast with more traditional, linear notions of time, where the past is something that is behind us, and the future is something that lies ahead.

13.2. To Understand the Purposes of These Concepts More Thoroughly, We Need to Break Them Down into Greater Detail

13.2.1. The Past as an Extension of the Present

This perspective posits that the past is not merely a collection of events that have already happened, but rather it exists in a continuous relationship with the present. It suggests that the past is not fixed or immutable; instead, it is constantly being reinterpreted, reshaped, and re-lived based on our current perspective, knowledge, and experiences [43]:

We can express the relationship between the present (P) and the past (Pa) using a dynamic equation that accounts for the evolving nature of history. A general formulation could be:

$$P(t) = f(Pa, \Delta Pa, t)$$

where:

$P(t)$ represents the start of the present at time t.

Pa represents the recorded or perceived past.

ΔPa represents reinterpretations, discoveries, or revisions of the past.

F is a function describing how the past and its reinterpretation influence the present.

A possible difference from capturing this evolution:

$$\frac{\mathrm{d}P}{\mathrm{d}t} = \alpha Pa + \beta \frac{\mathrm{d}Pa}{\mathrm{d}t}$$

where:

α represents the direct influence of the past.

β represents the rate of reinterpretation of the past.

If we consider history as an evolving narrative, we might introduce a recursive feedback loop:

$$Pa(t) = g\left(P(t), t\right)$$

where g accounts for how the present influences how we view and reconstruct the past.

13.2.2. The Future as an Extension of the Present

To express the future (F) as an extension of the present (P), we can frame it mathematically as an evolving rather than a fixed destination.

1) Future as a Function of the Present and Its Evolution

Since the future emerges from the present, we define it as:

$$F(t) = P(t) + \int_{t}^{t+\tau} G\left(P(t'), t'\right) \mathrm{d}t'$$

where:

$F(t)$ is the future start at time t.

$P(t)$ is the present state at time t.

$G(P(t'), t')$ is a function representing the potential growth, change, or trajectory of the present into the future over a time horizon τ.

The integral accumulates the evolving influence of the present over time.

2) Differential Equation Form: Future's Evolution Rate

The rate of change of the future can be expressed as:

$$\frac{\mathrm{d}F}{\mathrm{d}t} = \alpha P + \beta \frac{\mathrm{d}P}{\mathrm{d}t}$$

where:

α represents how the present directly contributes to the future.

β represents how the rate of change of the present affects the future.

3) Future as a Probabilistic Potentiality

Since the future is not deterministic but shaped by present choices, we introduce probability distributions:

$$F(t) \sim \sum_{i} p_i P_i(t)$$

where:

$P_i(t)$ are different potential present states leading to different futures.

P_i is the probability of these present states leading to a specific future.

4) Recursive Feedback Between Past, Present, and Future.

$$P(t) = f\left(Pa, \Delta Pa, t\right)$$

$$F(t) = h\left(P(t), \Delta P, t\right)$$

where ΔP captures the changes in the present that shape different future trajectories. In this view, the future is not something completely separate from the present, nor is it a predetermined event that will occur regardless of our actions. In-

stead, the future is seen as something that is deeply connected to the present. The actions, decisions, and mindsets we cultivate today play a significant role in shaping the future.

13.3. The Interplay between Past, Present, and Future

In both cases, what's crucial is the interdependency of the three temporal elements (past, present, and future). Time in this fluid framework is often non-linear, cyclical, or interconnected, which can be expressed in various ways.

To represent time as a nonlinear, interconnected network where the past, present, and future influence one another, we introduce recursive, feedback-driven equations rather than simple cause-and-effect formulas.

13.3.1. Time as a Coupled Dynamic System

We model the relationship between past(Pa), present (P), and future (F) as an interdependent system:

$$P(t) = f\left(Pa(t), F(t), t\right)$$

$$F(t) = g\left(P(t), Pa(t), t\right)$$

$$Pa(t) = h\left(P(t), F(t), t\right)$$

These equations indicate that:

The present is shaped by both memories and future expectations.

The future is influenced by present actions and reinterpretations of the past.

The past is not static; it evolves based on how the present and future unfold (e.g., historical reinterpretation).

13.3.2. Nonlinear Time Evolution (Feedback-Driven Differential Equations)

We incorporate feedback loops to capture time's interconnected nature:

$$\frac{\mathrm{d}P}{\mathrm{d}t} = \alpha Pa + \beta F + \gamma \frac{\mathrm{d}Pa}{\mathrm{d}t} + \delta \frac{\mathrm{d}F}{\mathrm{d}t}$$

$$\frac{\mathrm{d}F}{\mathrm{d}t} = P + \mu Pa + \nu \frac{\mathrm{d}P}{\mathrm{d}t}$$

$$\frac{\mathrm{d}Pa}{\mathrm{d}t} = \rho P + \sigma F + \tau \frac{\mathrm{d}F}{\mathrm{d}t}$$

where:

Each term represents mutual influence: e.g., αPa means the past influences the present.

The derivatives capture how time elements dynamically evolve.

Constants α, β, γ, … adjust the strength of these influences.

13.3.3. Time as a Network (Graph Representation of Temporal Influence)

We define time as a graph network where nodes are time states and edges represent influences

$$T = (V, E)$$

where:

$V = \{Pa, P, F\}$ (nodes: past, present, future)

$E = \{(Pa \to P), (PF), (F \to P), (F \to Pa), (Pa \to F)\}$ (edges: bidirectional influences).

Each influence can be weighted, forming an adjacency matrix A:

$$A = \begin{bmatrix} 0 & \alpha & \rho \\ \gamma & 0 & \lambda \\ \sigma & v & 0 \end{bmatrix}$$

where: Entry A_{ij} represents how much one time influences another.

A fully connected graph implies recursive intention.

13.3.4. Cyclic Time (Recursive Loop Representation)

A recursive feedback system captures cyclic and iterative influences between past, present, and future:

$$T(t) = \sum_{n-0}^{\infty} k_n f^n (T_0)$$

where:

$T(t)$ represents time at moment t.

T_0 is an initial state.

f^n represents repeated recursive applications of influence.

k_n adjusts how past, present, and future reinforce each other over time.

This network-based approach captures the fluid, nonlinear, and recursive nature of time by treating the past, present, and future as mutually dependent states rather than separate.

In this view, life is experienced not as a timeline but as a complex interplay of moments, continuously influencing one another.

Future moment in the past

|

|

Past moment in the past —Present moment in the present— Future moment in the future

|

|

Past moment in the future

Figure 1. Temporal perspective grid: relative moments across time.

where:

1) Past moment in the past → A historical moment that remains in the past.

2) Future moment in the past → A moment that was once the future but is now

in the past.

3) Present moment in the present → The current experience of time.

4) future moment in the future → A moment that is still ahead.

5) Past moment in the future → A moment that will become the past once the future arrives.

This layout reflects how time can be seen as interconnected rather than linear. It suggests that moments repeat, overlap, and cyclically influence each other.

When we talk about the past, we talk now, and when we talk about the future, we talk now. The past is the present; it is the extension of the present, for it is happening now. The future is the present; the present is an extension of the future, for it is happening now.

Both The Past as an Extension of the Present and The Future as an Extension of the Present, suggest that the "present" moment is central and fluid; it encompasses both the past and future. In this view, time is not a linear sequence of discrete moments but a continuous flow where the past and future coexist in a dynamic relation.

Minkowski's space [44] revolutionized our understanding of space and time, providing a powerful mathematical structure that accurately describes the behavior of objects in motion and the propagation of light in the relativistic regime. The unification of space and time into a four-dimensional continuum is a cornerstone of modern physics, influencing not only special relativity but also general relativity and the study of spacetime geometry, which describes how time passes at different rates for observers in relative motion. An observer moving with velocity relative to another observer will experience time passing more slowly. The time dilation formula from Einstein's theory of special relativity [45].

The time dilation formula arises from Einstein's theory of special relativity, where time is affected by motion. If an observer moves with velocity (v) relative to another observer, time appears to pass more slowly for the moving observer, as shown in Figure 2.

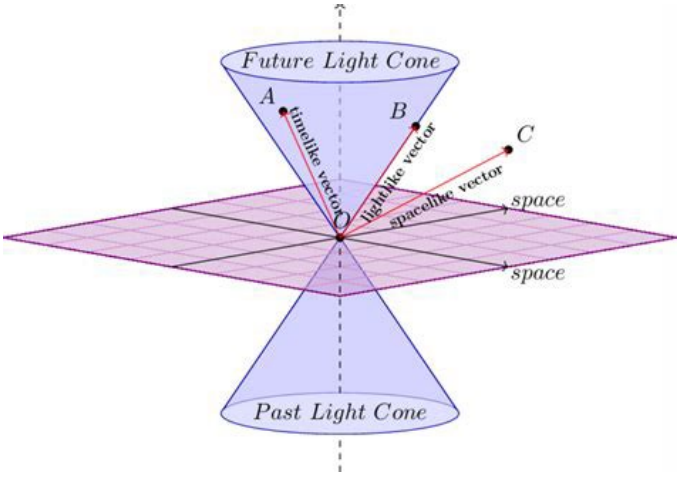

Figure 2. What is "Minkowski space"? The Present is Central [46].

13.4. Time Dilation Formula

The relationship between proper time Δt_0 (time measured in the moving observer's frame) and dilated time Δt (time measured by a stationary observer) is given by:

$$\Delta t = \frac{\Delta t_0}{\sqrt{1-\frac{v^2}{c^2}}}$$

where:

Δt_0 is the proper time (time interval for the moving observer).

Δt is the dilated time (time measured by the stationary observer).

It is the relative velocity of the moving observer.

c is the speed of light in a vacuum (Speed of light = 3.00×10^8 m/s).

The factor γ (Lorentz factor) accounts for time dilation:

$$\gamma = 1 \Big/ \sqrt{1-\frac{v^2}{c^2}}$$

Thus, the time experienced by a moving observer is always less than that experienced by a stationary observer.

13.5. Velocity-Dependent Time Dilation

If we rewrite time dilation using the Lorentz factor:

$$\Delta t = \gamma \Delta t_0$$

For small velocities ($v \ll c$), we approximate:

$$\gamma \approx 1 + \frac{1v^2}{2c^2}$$

This shows that at low speeds, time dilation is negligible, but as u approaches c, γ increases significantly, meaning time slows dramatically for the moving observer.

13.6. Minkowski Spacetime and Interval

In Minkowski space, spacetime is represented by a four-dimensional metric. The spacetime interval (s^2) is given by:

$$s^2 = c^2\Delta t^2 - \Delta x^2 - \Delta y^2 - \Delta z^2$$

where:

Δt is the time interval between two events.

Δx, Δy, and Δz are the spatial separations.

For purely time-separated events (no spatial motion, $\Delta x = \Delta y = \Delta z = 0$), the interval simplifies to:

$$s = c\Delta t$$

which represents a proper time Δt_0 confirm that time is affected by motion through

spacetime.

13.7. Application to General Relativity

In general relativity, time dilation also occurs due to gravitational fields:

$$\Delta t = \frac{\Delta t_0}{\sqrt{1 - \frac{2GM}{rc^2}}}$$

where:

G is the gravitational constant.

M is the mass of the gravitating body.

R is the radial distance from the mass center.

This shows that stronger gravity slows down time, known as gravitational time dilation (seen near black holes).

Time dilation illustrates that time is not absolute. It is relative and depends on velocity and gravity. This concept aligns with the philosophical idea of time as a fluid, interconnected experience, where the past, present, and future dynamically interact.

"Minkowski space" is a four-dimensional continuum used in the theory of relativity, specifically in special relativity, where the usual concepts of space and time are unified. Named after the German mathematician Hermann Minkowski, this framework integrates three spatial dimensions (length, width, and height) with a one-time dimension, forming a four-dimensional space-time continuum.

In "Minkowski's space", time is treated as a dimension similar to space, with the distinction that time behaves differently from the spatial dimensions. However, unlike the common perception of time as something that passes or moves forward. Minkowski space presents time as a dimension that is intertwined with space. This concept challenges our conventional understanding of time as a separate, linear progression and is central to the theory of relativity [47].

Figure 2 represents a light cone in Minkowski space-time, a fundamental concept in special relativity and causality. Here are the key details:

13.7.1. Structure of the Light Cone

1) Future Light Cone (upper cone): Represents all possible locations an event can influence in the future, assuming no faster-than-light travel.

2) Past Light Cone (lower cone): Represents all events that could have influenced the present event at the origin.

3) Horizontal Plane (Space): Represents a spatial slice at a given moment in time.

13.7.2. Vectors in Spacetime

1) Timelike Vector (e.g., A): Represents motion slower than light, meaning an object moves through time and space within the cone.

2) Lightlike (Null) Vector (e.g., B): Represents a trajectory of light, which always moves at the speed of light.

3) Spacelike Vector (e.g., C): Represents a separation in space where travel would require exceeding the speed of light, which is forbidden by relativity.

13.7.3. Meaning and Applications

1) The light cone defines causality: only events inside the future light cone can be affected by the present event.

2) Events outside the light cone (spacelike separation) are not causally connected to the present event.

3) This concept is crucial in Einstein's theory of relativity, black hole physics, and quantum field theory.

For a deeper explanation, the following are some possible directions for a particular aspect of **Figure 2** [48]-[52]:

1) Causality & Relativity: How the light cone determines what events can influence each other. The light cone is a fundamental concept in special relativity, defining how events influence each other and setting the limits of causality.

2) Types of Vectors (Timelike, Lightlike, Spacelike): How they define movement in spacetime.

3) Mathematical Representation: The equations behind the light cone in Minkowski spacetime. In Minkowski spacetime, the light cone is defined by the spacetime interval, which determines the causal relationship between events.

4) Black Holes & Event Horizons: How light cones relate to black hole physics. How Light Cones Shape Black Hole Physics. In general relativity, black holes are regions of spacetime where gravity is so strong that nothing—not even light—can escape. The event horizon is the boundary beyond which escape is impossible. Light cones play a crucial role in understanding why this happens.

5) Time Dilation & Special Relativity: The role of the light cone in understanding time travel and time dilation. In Einstein's theory of special relativity, time dilation occurs when an object moves at a significant fraction of the speed of light relative to an observer. As the object moves faster, time for the object slows down relative to the observer. This is because, according to special relativity, the speed of light is constant for all observers, no matter their motion. When an object approaches the speed of light, time effectively "slows down" for it compared to someone at rest.

Besides, **Figure 2** *is a fundamental tool in physics for understanding how events in spacetime are connected. It shows that not all events are causally connected, enforcing the speed of light as the ultimate limit. The light cone concept is crucial in relativity, cosmology, and quantum mechanics, helping us understand time travel, black holes, and the expanding universe.*

In the context of accounting, this concept becomes relevant when we question how we perceive time within financial practices, such as in the preparation of financial statements, valuation of assets, and recognition of transactions. Financial information is often categorized into "past," "present," and "future," but the question arises: Can these separations hold under the lens of Minkowski space, where

time and space are interconnected and non-linear?

Thus, by applying this concept to accounting, we can argue that traditional methods, such as historical cost accounting, adequately capture the simultaneity of the past, present, and future. Furthermore, accounting could benefit from integrating a more fluid, unified approach to time, similar to the one demonstrated in Minkowski space, to offer a more accurate, holistic representation of financial events.

The history of the Universe and the arrow of time always flow forward in the same direction and at the same rate for any observer. As a result, in accounting, focusing on the present moment will lead to success.

The concept of time as a cyclical, interconnected continuum offers a unique perspective that challenges traditional linear views of time in financial and accounting practices. The integration of Minkowski's space and its view of time as a dimension intertwined with space suggests that past, present, and future are not separate, fixed entities but part of a continuous flow. This could prompt changes in how we interpret financial information, where the present moment serves as a dynamic intersection of past and future events.

In practice, embracing this concept in financial systems would likely require a fundamental shift toward more fluid, adaptive models that see time as a dynamic factor influencing current financial decisions, asset valuation, and risk management.

14. The Conclusions

The introduction of double-entry bookkeeping is an important event that has marked a turning point in the history of accounting.

The usefulness and power of double-entry bookkeeping are testified by its survival since at least the 15th century and its continuing widespread use. A coherent theory of why double-entry bookkeeping evolved as it did may help us attain greater respect as an academic discipline. At worst, future entrepreneurs would better understand why double-entry is important for the success of their businesses, and that would be a good outcome too. After 600 years of creating accounting equations and double-entry bookkeeping, Laci Pacilio is accurate, and his work is sound and logical without the need for any change. In free-regulated markets and economies, double-entry bookkeeping becomes perfect.

If we consider the past and the future as an illusion of time, double-entry bookkeeping will be an important system for economic equilibrium, without financial and economic crises and high rates of inflation or stagflation. In the language of business, double-entry bookkeeping presents and proves itself.

The success in maintaining the two-sided accounts, debits, and credits, the double-entry principle, and the trial balance in both cases provide strong evidence that the formulation correctly captures the double-entry method in mathematical form. Double-entry bookkeeping illustrates one of the most astonishing examples of intellectual insulation between disciplines, in this case, between accounting and

mathematics. The accounting equation expresses the value of an entity instead of "past successes". From a mathematical perspective, the accounting equation has, on the highest level of abstraction, a very simple structure. It has the straightforward algebraic form (A for assets, (L + E) for claims). However, behind this equation lies a sophisticated world of layered connotations.

There is no need to develop the mathematical pillar in accounting to develop faster as many accounting researchers have claimed. It is just a tool to provide information, as it essentially is right now. As a result, there is no need for the addition of the elements of accounting equations, as well as new accounting topics developed mathematically.

Time is not precious at all, because it is an illusion. What you perceive as precious is not time but the one point that is out of time, the now. That is precious indeed. The more you focus on time, the past, and the future, the more you miss the now. The theory underlying Pacioli's work is more contemporary, though his purpose was practical. Since mathematical logic underlies double-entry, he has touched the roots of modern accounting theory. It is possible to see the past, the present, and the future at the same time. You will be able to see all that has happened (the past), all that is happening (the present), and all the possibilities of things that are going to happen (the future) simultaneously.

Limitations of the Research and Directions for Further Research

A key theme in the research involves the critique of historical cost accounting and its limitations in an inflationary environment. The research suggests that historical cost and constant purchasing power are sound principles. This study briefly introduces the idea of integrating insights from physics, mathematics, and social sciences to enhance the scientific nature of accounting. However, this interdisciplinary approach requires further development. Future research could delve into how methodologies and models from these other disciplines can be more deeply integrated into accounting practices. In conclusion, while this study opens up important avenues for exploring the scientific nature of accounting, the relationship between time, value, and accounting practices, and the potential for interdisciplinary applications, it is only the beginning of a more comprehensive investigation. Future research, both theoretical and empirical, will be essential to fully realize the potential of these ideas and their practical implementation in accounting practices globally.

Highlights

This research is conceptual and focuses on a review of existing literature on accounting, particularly the logic and mathematics behind the accounting equation and double-entry bookkeeping. The study highlights critiques of how financial statements fail to provide comprehensive accounting information about a company's past, present, and future. It also addresses issues related to the historical

cost and the challenges of accounting for inflation. The research aims to propose solutions to these problems by applying the laws of physics, which view time past, present, and future as interconnected and occurring simultaneously. According to this perspective, the past is not separate from the present but rather an extension of it, and similarly, the future is an extension of the present, all unfolding in the now.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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