

KUHNIAN PERSPECTIVE ON THE ACCOUNTING SCIENCE: FROM THE EMERGENCE OF PARADIGM TO THE PERIOD OF CRISIS

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ABSTRACT

The work aims to discuss accounting science from the point of view of Kuhnian theory. The study fits as a theoretical essay, in which, based on bibliographic research, to expose ideas and reflect on concepts. To this end, a brief historical context is presented to the reader on the development of accounting knowledge, showing the transformations that this field of study has undergone and its search for maturity as a science, whether normative or positive. The characteristics of the Kuhnian scientific process are also analyzed, addressing the phases of the formation of a science and its paradigms. Thus, a Kuhnian structure for accounting science is proposed, focusing on the 20th and 21st centuries, framing the work *A Statement of Basic Accounting Theory* (AAA, 1966) as the starting point of the (new) scientific accounting period. Still, aspects related to conceptual frameworks were analyzed, pointing out criticisms to the current framework. Finally, it is maintained that accounting is experiencing a period of crisis as a science, as its paradigm would be in “check” by no longer offering solutions to emerging issues in the field, opening up the opportunity for a new technology-based accounting paradigm. As a suggestion for future research, a multidisciplinary approach to accounting is indicated with the introduction of Big Data techniques in the production of accounting knowledge.

Keywords: Science. Paradigm. Kuhn. Conceptual framework. Big Data.

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1 INTRODUCTION

Chalmers (1993) explains that the philosopher Francis Bacon is considered to be one of the pioneers in the discussion of the topic of method in modern science. The author clarifies that the aforementioned philosopher, at the beginning of the 17th century, argued that science aimed to improve man's life, which would be possible through the collection of facts with organized observation and, from that, derivation of theories that explain the world. In this way, scientific knowledge would be the result, strictly, of obtaining data from an experience acquired through observation and experiment. This understanding became popular during the scientific revolution that started at the time, motivated by scientists like Galileo and Newton.

For Hopwood (2007), in the last century, accounting used a multidisciplinary orientation (finance, economics, statistics, psychology and social organization), and accounting would not be exactly a science, but a practice. Williams (2017) makes a parallel with the field of agriculture, in which there was the implantation of scientific methodology for the development of “better” plants and animals, in order to improve the practice of agriculture, which led to disciplines that are legitimately described such as agricultural sciences or agronomy. In this sense, the researcher believes that accounting may have developed in a similar way, although, perhaps, with greater difficulty.

Whitley (1986) explains that, after the Second World War, the strategy of scientifying a discipline focused on practice was to become a type of applied social science, although Chalmers (1993) argues that the general categories of science and scientific method are used improperly to exclude or suppress areas of study. In this way, Chalmers (1993) maintains, many areas of study are considered, by their “lawyers”, as science in an attempt to emphasize that the procedures and techniques employed are as proven as those of a traditional science such as physics. However, the researcher states that this understanding is inappropriate, and it is not appropriate to classify different areas of knowledge in a single model. Each field of study would need to be analyzed individually, considering its own objectives, the means used to achieve them and the results achieved.

For Kuhn (1962), the development of science occurs through revolutions, and not merely through the accumulation of knowledge. The key concept in the scientific development model proposed by Kuhn is that of a paradigm. The philosopher, with a primary education in physics, considered that the term “paradigm” represented scientific achievements universally recognized, in some period of time, when problems and solutions were proposed to a community of scientists. During the lifetime of a paradigm, science experienced cumulative growth. But when a paradigm stopped offering solutions to the emerging issues in the area, new paradigms emerged that replaced the previous one, but not without conflicts, which is why the author called this transformation a revolution.

Based on the Kuhnian theory, Mouck (1993) sought to explain the transformation that occurred in accounting with the evolution of financial reports, which migrated from an economic sphere to an informational sphere. For the author, the informational paradigm of accounting, in essence, would be an economic subparadigm. In this sense, explains the researcher, the Hypothesis of Efficient Market and the *Capital Asset Pricing Model* developed after the 1960s could be perceived as tools for expanding the economic paradigm in accounting, and not as a Kuhnian revolution.

In turn, Souza and Beuren (2008) researched the use of Kuhnian Theory in articles in the accounting area. The researchers located 62 publications from 1966 to 2006 (39 articles from 1995 to 2006) that mentioned Kuhn's (1962) work in the bibliographic references. However, for the authors, most works presented an “incidental appropriation” of the topic, since the mention of the Kuhnian theory was superficial and complementary.

In this context, the work aims to discuss accounting science from the point of view of Kuhnian theory. The research was constructed as a theoretical essay, based on bibliographic research, with logical and reflective exposition of ideas, seeking to discuss, within a

chronological line, accounting science from the Kuhnian perspective, specifically in the 20th and 21st centuries. Of course, the topic calls for greater depth, not being the scope of this research to oppose previous paradigms or studies, but rather to offer reflective considerations, whose limitations are clearly perceptible. Still, Iudicibus (2007, p. 10) is quoted: “It is not intended to redefine accounting science. In the same way that Economics is the science of scarcity, Accounting continues to be the science of equity (and therefore scarcity)”.

For this purpose, the text is divided into six sections, starting with this introduction. In the second, excerpts from the story that marked the development of accounting knowledge are presented. In the third, the characteristics of the scientific process are presented in Kuhn's view (1962). In turn, in the fourth section, aspects of accounting are discussed under the prism of the structure of the Kuhnian scientific revolution, pointing out the emergence of the paradigm and the current period of crisis. The fifth section deals with a new perspective for accounting with technology. Final considerations are presented in the last section.

2 ACCOUNTING KNOWLEDGE

Accounting knowledge emerged a long time ago. According to the *American Institute of Certified Public Accountants* (AICPA) (2012), there are accounting records that refer to Mesopotamian civilization. Studies point to the use of accounting techniques in ancient societies in Egypt, Babylon, Greece and Rome, two thousand years BC (Littleton, 1933 cited by Kam, 1990). In Williams' view (2017), accounting knowledge has developed over time. For the author, the accounting purpose was to follow the evolution of commercial activity and the growing number of relationships, pointing out who owes what to whom and what belongs to each one.

In the 14th century, with the expansion of commerce, the first commercial accounting books appeared using the double-entry method. Italian merchants Rinieri Fini & Brothers (from 1296 to 1305) and Giovanni Farolfi & Co (1299 to 1300) related profit to an increase in shareholders' equity and measured it for a specific accounting period. But it was with the publication of the book *Summa de arithmetica, geometrica, proportioni et proportionalitá*, in 1494, that the method of double starts was consolidated. Luca Bartolomeo de Pacioli's work had an initial circulation of two thousand copies and was an editorial success for its time, being the most widely read mathematics book in Italy for a century. In addition, it had translations, copies and adaptations in several languages (Gleeson-White, 2012).

A little later in history, in 1916, the *American Accounting Association* (AAA) appears in the United States, an entity created with the objective of discussing matters of interest in the accounting area (AAA, 2018). After the 1929 crisis, aiming to strengthen the image of the profession and reduce insecurity in the financial environment due to the tension in the North American stock market, the association published several Statements and manifestos. Basu (2012) explains that the accounting profession needed to seek principles that would maintain accounting practices, which led to the emergence of normative academic theories in the first half of the last century.

According to AAA (2018), one of the first documents published by that association was entitled *A Tentative Statement of Accounting Principles Affecting Corporate Reports*, of 1936, which aimed to issue a provisional statement of principles that should support and guide the preparation of corporate financial reporting. Subsequently, other works were edited and published, such as *An introduction to corporate accounting standards*, in 1940, by Paton and Littleton, and *Structure of accounting theory*, in 1953, by Littleton.

Pierson (1959) explains that, after the First World War, there was a greater demand for business and administration courses in the USA, a movement that was fostered by the institutions *Carnegie Corporation and Ford Foundation*. For the author, three pillars formed the basis for this development: human-social values, quantitative methods and behavioral aspects. Khurana, Kimura and Fourcade (2011) comment that the Ford Foundation sought to make North American

business schools more rigorous when it came to research and teaching, promoting economic and quantitative ideologies. Khurana et al. (2011) state that, in the period from 1956-1964, the Ford Foundation donated about US \$14.4 million to five schools of finance (Harvard, Chicago, Stanford, Columbia and Carnegie Tech's GSIA) to encourage research and the education. The authors explain that the foundation's objective was to finance research using statistical, quantitative and mathematical methods, which resulted in the recommendation to use economic knowledge as a way to improve the quality and raise the status of business schools.

It was noticed that schools responded by emphasizing statistical analysis and mathematical models, including skills of abstraction and decontextualization, which was reflected in the profile of publications in *top journals* (Chua, 1996). Basu (2012) points out that this initiative resulted in new approaches and some success in the 1960s and 1970s, including the creation, in 1963, of the *Journal of Accounting Research*, from The University of Chicago, to publicize the new research (quantitative) in accounting.

In this context of new quantitative research published by the *Journal of Accounting Research*, Ball and Brown (1968) can be mentioned, with a study relating to accounting information (especially profit) with the capital market by assessing the information content of annual accounting reports; and Beaver (1968), a researcher who studied how investors perceived the information value contained in profits, since there was questioning about the usefulness of profit in decision making in the capital market. For Mouck (1993), these works were essentially an extension of the economic field, demonstrating how accounting researchers could take advantage of the potential of the financial economy paradigm.

In Williams' view (2017), the sudden success of the *Journal of Accounting Research* was a reflection of the economic-positive doctrine that colonized the United States accounting academy at the time. Christenson (1983) explains that the Chicago School of Economics had a strong influence on accounting, especially at the *Rochester School*, an institution at which Watts and Zimmerman began studies on Positive Accounting Theory in the late 1970s (Watts & Zimmerman, 1986). Whittington (1987) explains that the quantitative bias was also present in the research by Watts and Zimmerman, emphasizing that these researchers were the founders of the journal *The Journal of Accounting and Economics*, a journal that focused on quantitative research in accounting.

Despite the understanding of Sá (2005) in the sense that it is possible to understand accounting phenomena as analogous to those of Physics, Chemistry and Biology, in the opinion of Whittington (1987), Whitley (1988) and Hartmann (2017), the academic articles in the field of accounting have become an incomprehensible product for most people, alienated by the excessive focus on mathematics, losing the identity of accounting and making it a sub-branch of mathematics. Such a picture would be aggravated by the fact that accounting is a social science, which uses abstract terms (in contrast to the natural sciences) and to which mathematics would have little to contribute.

Chalmers (1993) considers that there is no doubt that part of the researchers sees the world through mathematical figures, as if all areas of knowledge could be imprisoned by steel bars, with clear limitation to the (fruitless) methods that many strive to follow. In this sense, Basu (2012) argues that accounting has imitated a false model, with social scientists studying considerably more complex phenomena than physical ones, in which making predictions with accuracy similar to natural science is much more difficult.

Although a process of transition from normativism to positivism began in the 1960s, Silva, Niyama and Noriller (2018) state that during this period there were major changes with regard to accounting theory. For the authors, "AAA was responsible for issuing the main document produced by the accounting theory of the time, ASOBAT, in 1966" (Silva et al., 2018, p. 31). The researchers clarify that the *A Statement of Basic Accounting Theory* (ASOBAT) discussed some topics - for example, qualitative characteristics, uniformity and usefulness of the information - that ended up being absorbed by future documents, the normative period having an

important role for the evolution of the norms of the *Financial Accounting Standard Board* (FASB) and *International Accounting Standard Board* (IASB).

It is worth mentioning that the list of top journals has changed little in the last decades, as well as there has been no significant change in the published topics (earnings management, forecasting models, compensation, regulation, governance and budget), a scenario resulting from a disturbed incentive system to researchers, which favors quantity over innovation (Moser, 2012; Basu, 2012).

For Hartmann (2017), true accounting knowledge goes beyond what is produced and discussed in academic journals. The author points out that, although the last few decades have shown growth in the statistics of academic articles (quantitative and qualitative), the position of accounting in relation to other sciences is not favorable. According to the researcher, accounting borrows more disciplines from other areas than it offers knowledge to other sciences. Thus, the balance between accounting, economics, psychology, political science, sociology, neuroscience and other sciences would be negative, with loss of space in the academy, which would reflect the stagnation of accounting research.

3 KUHNIAN SCIENCE AND PARADIGM

Wray (2011) states that the idea of paradigm, a term popularized by Kuhn, was previously addressed by Bruner and Postman, who defined the concept, but limited the use of the term to the subtitle and short title of an article published in 1949. Still, that Robert K. Merton would have used the term in the 1950s in literary reviews and published articles. In other words, Wray (2011) maintains that the term “paradigm” had already been used before Kuhn started using it in his work.

In the view of Cushing (1989), the evolution of scientific knowledge, in the Kuhnian perspective, occurs in eight phases: i) pre-paradigmatic; ii) consensus development; iii) normal science; iv) crisis; v) emergence of new paradigms and debates; vi) revolution; vii) normal science; and viii) repetition of phases iv to vii. Kuhn (1962) explains that the pre-paradigmatic phase would be characteristic of the young sciences that were still establishing the knowledge bases in that area of knowledge, defining their rules of operation and research, although the debates produced served more to define schools than to produce an agreement.

The paradigm would be the constitution of a worldview, a systematized logical structure capable of explaining a certain set of phenomena that the paradigm itself would define as relevant. Although the paradigm did not explain in detail the facts confronted, it would be the best explanation at a given historical moment, being characterized as the most accepted understanding among field scientists (Kuhn, 1962).

According to the Kuhnian theory, with the emergence of a theory or set of theories that explained certain phenomena and that would guide scientific work in the area, a paradigm was created and, thus, the phase of normal science passed, in which the paradigm would serve as a guide for solving the problems (puzzles) of that field of research. As researchers identified relevant anomalies that did not fit the paradigm, they started to look for answers in other theories or set of theories. There was competition among theories, which would characterize the crisis phase, also called the extraordinary science phase, which would last until a new paradigm was reached to lead to a new phase of normal science.

Wray (2011) states that, at first, there were criticisms of Kuhn and his work, *The structure of scientific revolutions*, because the concept of paradigms was not very clear. However, the researcher points out that Kuhn clarified controversies and articulated a more precise understanding of the concept of paradigm throughout the 1970s with new publications, making his concepts about paradigms guide for future research.

The idea of Kuhn's cyclic scientific development process was represented graphically by Vieira and Fernandez (2006), noting that the crisis phase or extraordinary science would not

correspond to a point of contact or point transition between paradigms, but to a period of coexistence between different paradigm proposals.

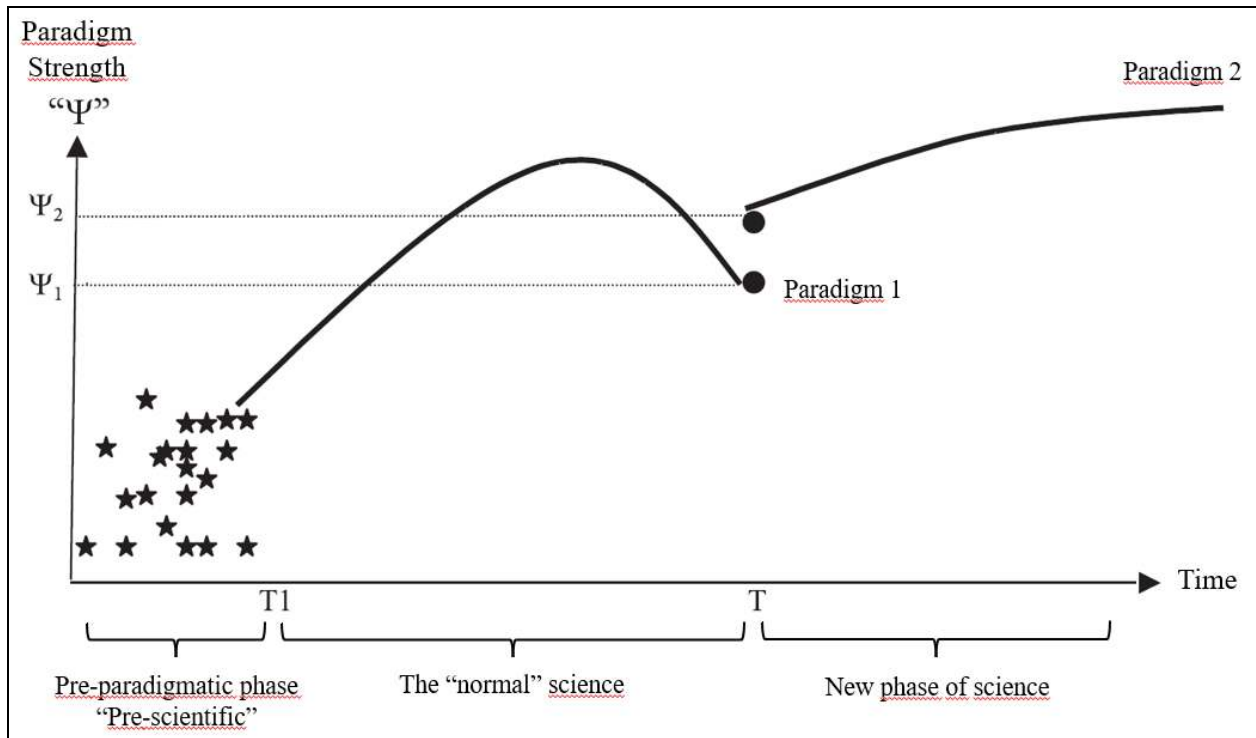


Figure 1. Kuhnian scientific development process.

Source: Vieira and Fernandez (2006).

Science advances with the deepening of studies within the scope of paradigms or, alternatively, by breaking paradigms (Kuhn, 1962). The capacity for deepening results from a recurring effort to articulate, update and apply the paradigm in new and more stringent conditions, expanding the scope and the explanatory capacity of normal science. This effort needs to be both theoretical and experimental. The paradigm break and its replacement by another occurs when the theory loses the capacity to provide convincing explanations for the studied phenomena and scientists are no longer able to avoid the search for alternative answers that the original paradigm was unable to offer.

Cushing (1989) argues that, although Kuhn apparently believed that his theory could not be applied in social disciplines, it would be possible to use the Kuhnian perspective to learn something useful about the evolution of accounting, not necessarily about methodology or status, but about accounting knowledge in itself.

4 ACCOUNTING PARADIGM AND CRISIS PERIOD

For Cushing (1989), the accounting paradigm came up with the double-entry model, which would have dominated science in the last four centuries. For the author, the double-entry model has evolved in a very similar way to what Kuhn describes as normal science, since there was, among other factors, the development of accounting books, the evolution and extension of the practice of debits and credits, the creation of methods alternative methods of measurement and the use of the model by different users. The author also understands that the period of crisis of science would have started in the twentieth century, in two stages. The first moment would be due to the distancing of accounting activity from the needs of users and its forced standardization/uniformity required by regulation (beginning of the century). The second and

worst stage of the crisis would have started with an attempt to make accounting more scientific with the positivist approach (after the 1970s).

Here we try to put another point of view, more focused on the 20th and 21st centuries. In our understanding, in the sphere of paradigms, the debates and publications from the 1920s to the 1960s indicate that knowledge bases were being established in the area of accounting knowledge, such as the works *Accounting theory* (Paton, 1922), *An introduction to corporate standard accounting* (Paton & Littleton, 1940), *Structure of accounting theory* (Littleton, 1953) and *The philosophy of auditing* (Mautz & Sharaf, 1961).

The advances that occurred in the 1960s can lead to the perception that a paradigm emerged at that time, which sought to solve problems and guide research in the future. One of the elements that maintain this thought was the publication by the AAA of ASOBAT in 1966, a document that took on the challenge of concentrating in a single Statement a guide for educators, practitioners and other actors interested in accounting.

It is interesting to note that, in the face of a conceptual gap, already in the introduction, ASOBAT (AAA, 1966) brought what would be “theory”, that is, a harmonic set of hypothetical, conceptual and pragmatic principles, which would form a knowledge base for a given field of study. Still, AAA (1966) also conceptualized accounting as the process of identifying, measuring and communicating economic information in scarce resource scenarios, which allows for well-informed judgments and decision-making by users of accounting information.

It is worth noting that, in 1970, AICPA launched *Accounting Principles Board (APB) No. 4* (1970), a document that was intended to further stimulate discussion on topics relevant to the accounting area. The purpose of the document was to provide a basis for a better understanding of the fundamentals of financial accounting and, furthermore, to serve as guidance for the development of this branch of accounting.

From the 1970s onwards, studies that related accounting information to the capital market through the evaluation of the information content of accounting reports, based on a positivist approach, continued to bring significant advances to accounting. However, Beaver (1981) states that this neoliberal bias was perceived only as a (non-Kuhnian) revolution in financial reporting, while Cushing (1989) argues that this period represented a serious indication of crisis in accounting science.

In the case of an evolutionary process, the conceptual frameworks of accounting must be mentioned. Gornik-Tomaszewski and Choi (2018) explain that conceptual framework is a logical system of interrelated objectives and basic concepts that prescribe the nature, function and limits of a financial report, with the function of guiding the consistent development of accounting, be it based on rules or principles.

Gornik-Tomaszewski and Choi (2018) clarify that the FASB published, between 1978 and 2000, a series of norms that constituted its initial conceptual framework. In turn, the IASB, at the time called the *International Accounting Standards Committee (IASC)*, published its conceptual framework in 1989, which was partially derived from the FASB's Concepts Statements. The authors claim that both conceptual frameworks were criticized for several reasons, among them the lack of internal consistency and little clarity in the presentation of ideas. Also, that the frameworks were outdated and did not fully reflect the accounting developed in recent decades.

Such evidence motivated, in 2002, the formation of a group with members of the FASB and IASB for the joint development of a new conceptual framework (*Norwalk Agreement*). The result of this work, according to Gornik-Tomaszewski and Choi (2018), was the publication, in 2010, of the *Statement of Financial Accounting Concepts (SFAC) No. 8* by the FASB and a revised version of the framework by the IASB.

Entities have since maintained that the purpose of the financial report is to provide financial information about the reporting entity, which information is useful for investors, lenders and other creditors, both existing and potential, in making decisions about offering resources to the entity. Such decisions would involve the purchase, sale or maintenance of

instruments, equity and debt, as well as the offer or settlement of loans and other forms of credit (FASB, 2010; IASB, 2010, 2018).

It is worth noting that, despite the current understanding of the Boards, in the past, it was signaled that the accounting had two large groups as users: external and internal. With regard to accounting information for external users, ASOBAT (AAA, 1966) highlighted the heterogeneous composition of the group, consisting of current and potential investors, creditors, customers, government, trade associations, regulators, among others. For this group, the focus of accounting should be on reducing information uncertainty (including uncertainties regarding the use of forecasts), since external users were more distant from the information source and did not have direct access to business data.

Additionally, ASOBAT (AAA, 1966) still dealt with, in a whole chapter, the use of accounting information for the internal management of organizations, being relevant to provide information to people inside the entities in order to allow informed judgments and effective decisions that favor organizational purposes.

However, the IASB (2018) understands that only current and potential investors, lenders and creditors are the primary users of financial reports, since they cannot demand that entities report information directly to them. The Board, in paragraph 1.7 of the Framework 2018, emphasizes that the general purpose financial report is intended to provide information that helps current and potential investors, lenders and creditors to estimate the value of an entity. In paragraph 1.9, the Board recognizes that the management of an entity is also interested in financial information, however it does not need financial reports because it can obtain this information internally. In addition, the IASB reinforces that financial reports, although they may be useful, are not directed to regulatory bodies and third parties that are not current or potential investors and creditors.

Although still premature, Framework 2018 has come under criticism. Barker and Teixeira (2018) state that the new Conceptual Framework has incompletely addressed the issue of accruals in accounting, providing little insight into the topic. For the authors, the document discusses how an asset or liability contributes to future cash flow and how to measure these equity elements, but does not address the informational potential of measuring income and expenses. Gornik-Tomaszewski and Choi (2018) highlight that the practical approach to issues involving measurement and the distinction among profit, loss and other comprehensive results generated an inappropriate mix of concepts and rules.

For Basu (2012), accounting research has been stagnant for decades. The researcher understands that the conceptual framework of 2010 acted as “blindness” for accountants, blinding academics for important accounting topics, especially those not included in the standard, since many researchers (especially those who do not have practical experience) believe that the conceptual framework solves all the fundamental problems of accounting.

Returning to Kuhnian thoughts and seeking to understand the evolution of accounting science, it is worth mentioning the research by Santos and Costa (2018) on the paradigmatic view in management accounting. The authors argue that, at the beginning of the 21st century, Zimmerman motivated, through his research, the discussion about paradigms and scientific development in management accounting. However, this motivation was not sustained, so there are few discussions on the topic in the accounting area, except for the works of Lukka, Malmi, Merchant and Modell published in *Management Accounting Research* in 2010.

Santos and Costa (2018) state that, in general, researchers understand, with conceptual limitations, that a multiparadigmatic, multiteoric or straddling paradigm view prevails, in contrast to the economic paradigm that guided accounting in isolation in the last century. Still, the authors conclude that managerial accounting is situated in a pre-paradigmatic period, with no paradigm in this area, with schools being economical and an alternative to references in the managerial field.

As a way of expanding the discussion, this work offers reflections regarding the accounting paradigm, suggesting that ASOBAT (AAA, 1966) is the starting point of the normal science period. The Statement 1966, the result of efforts by American researchers, was based on studies published in the 1920s and 1950s and aimed to offer solutions to the problems existing at the time, concatenating findings accepted in accounting and guiding the community on issues related to accounting science. Apparently, this work was received by most accountants, since several points of the AAA document were again treated by AICPA in APB nº 4 (1970). In addition, over time, the FASB and IASB frameworks also used part of the teachings of the Statement 1966, demonstrating the importance of this document for accounting science and, why not say, for the understanding of (first?) accounting paradigm.

Still, in line with Cushing's (1989) understanding, the hypothesis arises that accounting science is in a period of Kuhnian crisis, that is, when the paradigm fails to offer solutions to issues emerging in the field. This understanding is maintained by some findings, such as criticisms of frameworks (Barker & Teixeira, 2018; Basu, 2012; Gornik-Tomaszewski and Choi, 2018), as well as criticisms of the limitation resulting from the positivist approach in accounting research (Major, 2017). For Major (2017), the criticism of the positivist approach in accounting research and the current paradigm would be related to the numerous replication of studies that do not constitute effective contributions to science. Ribeiro (2014), for example, investigated the evolution of accounting research in 18 years of publications and highlighted that accounting research still has a lot to evolve. The author realized in his research that studies are limited to verifying compliance with current regulations, not reflecting on the reason for the existence of regulations and the need for evolution in the area.

That said, from the scheme of Vieira and Fernandez (2006) and based on the research exposed so far, a Kuhnian proposal for accounting science is offered to the reader, focused mainly on the 20th and 21st centuries, as shown in Figure 2. Although not foreseen by Kuhn (1962), it was decided to add an embryonic phase in the structure of the scientific revolution, a moment that would represent the beginning of the formation of accounting knowledge as we know it today, marked by the work of Luca Pacioli. In the last century, the pre-paradigmatic moment of accounting would have occurred in the 1920s and 1950s, with the paradigm being born in the 1960s, which guided studies and research, including the development of the conceptual frameworks (C.F.) of the IASB and FASB. Finally, it is believed that the current paradigm is in decline, which could lead to an accounting revolution and the emergence of a new paradigm.

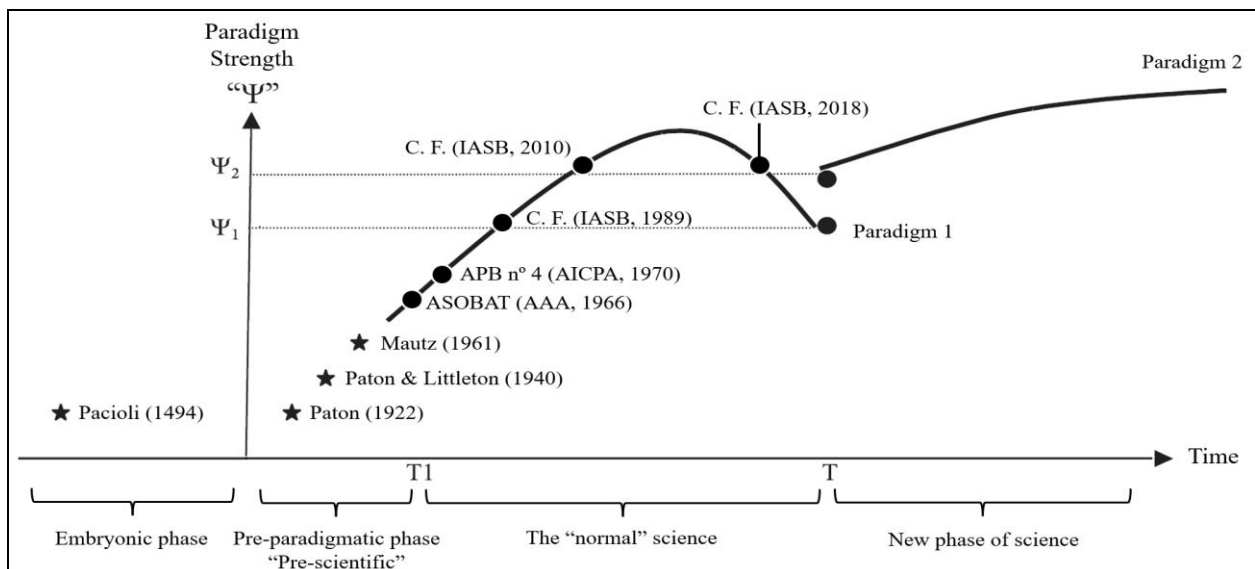


Figure 2. Kuhnian scientific development process in accounting.

Source: Adapted from Vieira and Fernandez (2006).

Nevertheless, it is important to mention that, in the view of Santos and Costa (2018), with regard to management accounting, there is no established paradigm, and the discipline would today be situated in a pre-paradigmatic period. For the authors, management accounting would still not find recognition from the community and would need further discussions in search of a paradigm, which are being fought by the economic and alternative schools.

5 NEW PARADIGM

Among the future perspectives, Cushing (1989) believed that greater flexibility in accounting is needed to reconnect with managers, moving away from mathematics and closer to managerial administration. Another important element mentioned by the author would be the focus on accounting systems, which would be essential to extract financial information for planning and control. Still, the (re)construction of the accounting paradigm would involve the implementation and availability of a corporate financial database, which could be accessed by external users and used for different company evaluations, expanding the empirical research and providing feedback on the fundamentals of accounting while science. For the author, the way of processing data could lead to valid methods of explanation and prediction of accounting phenomena of interest to users.

Today, the amount of data available for analysis is enormous, originating inside and outside the limits of companies. Bhimani and Willcocks (2014) explain that the term Big Data is related to the real-time recording of data generated internally and externally. For the authors, this includes data from regular accounting transactions, data from sensors on machines, chips in components, accesses on the corporate intranet, demographic maps, weather forecasts, social media publications, audio and video data, among others. Segars (2018) considers that the ability to access, decode, structure and disseminate data is the lifeblood of a modern company.

Complementing the reflections of Santos and Costa (2018) regarding management accounting, it is important to mention the research by Rikhardsson and Yigitbasioglu (2018) involved the topic Business Intelligence and Management Accounting. The researchers searched for articles published between 2005 and 2015 in the main international journals ("*A*" ranked journals) and concluded that the number of publications was low compared to what was expected in the technological age in which we live. For the authors, this finding has as possible causes: i) few accounting researchers focused on technology; ii) little exposure by academics to relatively complex technical issues in the technological field, reflected in low understanding and limited interest in seeking research on this topic; and iii) traditional academic structure that does not encourage a cross-functional approach, in which accounting and information technology could be associated. As for the last factor, Cabral, Siqueira and Siqueira-Batista (2011) warn that interdisciplinarity in the scope of accounting is practically restricted to the field of economics, law and education, although the multidisciplinary aspect is relevant to the development of science. Hartmann (2017) regrets the unfavorable position of accounting in relation to the other sciences, since it borrows more from what it offers in return.

Gepp, Linnenluecke, O'Neill and Smith (2018) claim that there is a gap between research and practice with regard to accounting and Big Data technologies. The authors point out that there is an initial cost of learning from Big Data analysis, its concepts, models and techniques, but emphasize that the benefits can be worthwhile. Gamage (2016) understands that processes maintained by Big Data will transform public organizations in the most diverse governmental activities, being essential to focus on Big Data tools and on the opportunities that arise with new technologies.

6 FINAL CONSIDERATIONS

This work aimed to discuss accounting science from the point of view of Kuhnian theory. The structure of the Kuhn scientific revolution (1962) was used to better understand the development of accounting knowledge, even navigating aspects of the normative and positivist periods. As a result, a paradigmatic perspective of accounting was offered to the reader, a reflection centered on the 20th and 21st centuries, with ASOBAT as its starting point. The conclusion was that the current paradigm would no longer meet the expectations of the community of scientists and, consequently, of society, since the current frameworks face criticism and are distant from the initial paradigm, especially with regard to accounting users.

In a period of crisis, it is necessary to consider new ways and solutions. In the 1960s, ASOBAT itself mentioned that accounting should be combined with other disciplines, resulting in new accounting aimed at the production and effective transmission of relevant information. It was anticipated that accounting information systems would be fed by data collected from internal and external sources, with the integration of different systems, in order to deal with the multiple characteristics and ramifications of all activities. In his research, Cushing (1989) pointed out that facing the crisis period would involve establishing and releasing access to corporate databases, fostering the development of accounting systems and related research. In this work, we propose to continue this understanding, suggesting that the path to a new paradigm goes through what is known today as Big Data.

However, accounting still does not seem to accept this alternative, making efforts in positivist research and maintaining resistance to a multidisciplinary approach. Thus, it is understood that there is an urgent need to leverage the process of joining accounting with disruptive technologies, starting a learning cycle in Big Data and Data Analytics techniques, with a view to training and giving experience to accountants in their more diverse areas of activity. Although Big Data concepts and algorithms are not innovative (many stem from long-known statistical knowledge), the current technological context allows advances never before achieved, which can reveal precious information and help accounting to (re)find itself as a science.

An opportunity for future research would be to relate accounting to data mining models, learning machines, neural networks, decision trees and other Big Data techniques. The improvement of the process of producing relevant accounting information with the use of technology is proving to be increasingly relevant and motivating, suggesting the alignment of practice and theory in the development of accounting science.

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