

KUHN'S THEORY OF SCIENTIFIC REVOLUTIONS IN ACCOUNTING ARTICLES

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Abstract

The aim of the article is to verify the insertion of Kuhn's Theory of Scientific Revolutions in articles in the accounting area. The focus of the analysis is the possibility of inserting and using the Kuhn's ideas in theoretical and empirical research on Accounting Science. Documental analysis was done on articles published in journals of the accounting area that make reference to Kuhn's Theory of Scientific Revolutions and that are available at CAPES Journals Portal. Sixty-two articles with at least one reference to Kuhn's work were found in fifty-six journals, concentrated in seventeen journals. Kuhn's Theory of Scientific Revolutions is present in scientific articles in the accounting area and authors in this area appropriate related ideas to base their researches on.

Keywords: Interdisciplinary Study, Insertion, Kuhn's Theory, Scientific Revolution, Appropriate, Ideas, Articles, Journals, Accounting, CAPES Journals Portal

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1. Introduction

Analyzing the process of development and evolution of a science is possible to refer to various approaches to the study. Scapens and Roberts (1994), Scapens (1994), Burns (2000), Burns and Scapens (2000), Guerreiro, Pereira and Frezatti (2006), Guerreiro, Pereira and Frezatti (2007), for example, have used multidisciplinary approaches in order to try to explain the evolution of managerial accounting, focusing on Institutional Theory.

The process of accounting evolution can also be analyzed based on philosophical theories about the development of the science. Gendron and Baker (2005) tried to understand interdisciplinary movements, focusing their investigation on the processes in which a network of support surrounds Michel Foucault's ideas, originally developed in the sociological and organizational stream of accounting research. This article investigates the support that Thomas Samuel Kuhn's Theory of Scientific Revolutions lends to establish a parallel between

scientific revolutions and the processes of change in accounting.

The ideas of Thomas Samuel Kuhn regarding to the evolution of a science have been discussed since 1962 when his book "The Structure of Scientific Revolutions" was first published. Kuhn (1992) asserts that there are moments in history when there is a rupture in the evolutionary process of the sciences and at these moments some paradigms are left behind in order to make room for others. His conception of the development of science is that it has periods of stable growth punctuated by revisionary revolutions, to which he added the controversial "incommensurability thesis", that theories from differing periods suffer from certain deep kinds of failure of comparability.

Kuhn (1992) believes that a regular science has a set of beliefs that form its foundations, its disciplinary roots. These basic concepts guide the operability of the science. When anomalies and news are presented, they are eliminated to avoid undermining these foundations and thereby strengthen the science. The typical standard of science development implies

successive transitions from one paradigm to another, in a process of revolution. When an anomaly threatens the basic concepts of a science, there is a change in pre-established order, which he calls a scientific revolution. As the paradigm changes, it faces a reconstruction of the concepts and a review of past events.

In Kuhn's vision, the linear evolution of science defended by some philosophers of science does not represent the truth. Kuhn, as set out in his "The Structure of Scientific Revolutions", became one of the most influential philosophers of science of the twentieth century. His contribution to the philosophy of science marked not only a rupture of several key positivist doctrines but also inaugurated a new style of philosophy of science that brought it much closer to the history of science.

Kuhn (1992, p. 219) was criticized because of the use of the term paradigm, which is described as "what the members of a community share and, conversely, a scientific community consists of men who share a paradigm". The second edition of "The Structure of Scientific Revolutions" was published in 1969, including an important postscript in which Kuhn clarified his notion of paradigm and explicitly gave his work an anti-realist element by denying the coherence of the idea that theories could be regarded as more or less close to the truth.

Researchers in many areas found his explanation comfortably fitted their understanding of how knowledge was established in their disciplines and many of Kuhn's notions were incorporated into their explanations, for example, the notion of discontinuous knowledge creation, paradigms and revolutions. Often Kuhn's notions were adopted superficially and overlooked the problematic nature of some of them. In addition, some of his notions were insufficiently appreciated by those attempting to use his explanations in other areas.

The main motivation for this research comes from the interest in the interdisciplinary study of sciences, specifically in the study of philosophy and accounting, subjects that are important when discussing accounting matters. The focus of the analysis is the possibility of inserting and using Thomas Samuel Kuhn's ideas, as set out in his "The Structure of Scientific Revolutions", in theoretical and empirical research on the accounting evolution and development.

Kuhn was performing researches in the so-called hard sciences and didn't intend to have his work used in the social or human sciences. However, when analyzing well-known international journals, was found out that accounting writers have mentioned Kuhn in articles published by these journals. Thus, the question that guides this research is: How does the appropriation of Kuhn's Theory of Scientific Revolutions ideas happen in articles published in the accounting area?

The general objective of this work is to verify the insertion and use of the Kuhn's Theory of Scientific Revolutions in articles in the accounting area. The first step in achieving this objective was to investigate references to Kuhn in articles published in both national and international accounting journals that were accessible at CAPES Portal for Journals. Then, the articles selected were researched in order to identify how their authors referred to Kuhn's Theory of Scientific Revolutions.

This research is justified as a wider perspective of study is done, aiming the analysis and quantification of the insertion of authors from other areas of knowledge in articles in the accounting area. More specifically, it's goal is to verify how Kuhn's Theory of Scientific Revolutions is considered in scientific articles published in the accounting area.

The current article is organized in seven sections, beginning with this introduction, followed by a discussion on Kuhn's Theory of Scientific Revolutions. Following, a discussion on the appropriation of one author's ideas by another is presented according to Chartier. Then, the article presents the research methodologies and procedures; a discussion on results, emphasizing the insertion of Kuhn's work in accounting journals as well as the editorial focus of the journals, the themes of the articles identified and the modalities of appropriation of the Kuhn's Theory of Scientific Revolutions. At last, the conclusions of the study are presented.

2. Kuhn's Theory of Scientific Revolutions

The philosopher Thomas Samuel Kuhn was born on July 18th, 1922, in Cincinnati, Ohio. In 1949 he received his Ph. D in Physics from Harvard. His most famous work, *The Structure of Scientific Revolutions*, was first published as a monograph in the *International Encyclopedia of Unified Science*, being published later as a book by the University of Chicago Press in 1962.

Science, in Kuhn's vision, is a set of beliefs that, after a certain phase, strengthens the science itself. As a result of the several phases in the development of these sciences some questions arise (changes and paradigms) that revolutionize science. For Kuhn (1992), as doubts and discussions about them arise science tends to develop. In the author's opinion, this development doesn't happen in a linear way because even when well known concepts are discussed the necessity of replacing some of them by others so far not so far considered appears. It's in this phase that the ruptures in the development of science take place, facing the breaking of some paradigms.

To Kuhn (1992), science develops through small researches that, upon acceptance by the scientific community, modify the way of observing and analyzing certain facts. It's during these periods that what he calls scientific revolution happens, in which

some paradigms until then widely accepted are left aside for others to take their places.

Kuhn (1992) uses several concepts for the word paradigm. Many times he relates the word paradigm to some known standard or model that provides, for a certain time, scientific support for clearing doubts. The author addresses the development of a paradigm as the construction process of a scientific basis, where presuppositions are unified in order to allow evolution to take place.

After a paradigm arises, scientists focus their studies to develop it. Kuhn (1992) points out that in most cases the constitution process of a paradigm is based on restricted number of 'pioneer' works. From this point, several studies are developed, making the paradigm gain strength, gradually increasing the number of followers.

For Kuhn (1992), during this period, known as normal science, the developed researches instead of questioning the paradigms defend and improve the concepts on which they are based. In this phase occurs what he calls as "the cleaning" of the paradigm. According to the author, this task begins at the moment the paradigm is established. In this phase of the science, a set of methodologies, instruments and theories that orient researchers becomes invigorated. Kuhn (1992, p. 44) affirms that:

Examined closely, whether historically or whether in the contemporary laboratory, this achievement seems to be an attempt to force the nature to fit within pre-established and relatively inflexible limits provided by the paradigm. The objective of normal science is not to bring new species of phenomena to light; in truth, those that do not adjust to the limits of the paradigm are often not seen. Scientists also are not constantly seeking to invent new theories; often they show themselves to be intolerant of things invented by others. Instead of this, normal scientific research is directed towards the articulation of those phenomena and theories already provided by the paradigm.

Kuhn (1992) emphasizes that despite of the period that normal science presents rigid characteristics due to the limits imposed by the paradigms, the progress of the science is not affected since these same limits force researchers to deepen their researches in a specific field of study. According to the author, this fact contributes to the development of the science to proceed at greater speed, thus contributing to extend the range and precision of the paradigm and the consequent increase in the degree of paradigm application.

However, due to the development of humanity, new problems end up appearing. Science is not always able to find solutions to these problems based on existing paradigms. According to Kuhn (1992), these situations are called anomalies. Over time, these anomalies multiply and, as a consequence, the paradigm goes through a process of theory

weakening, generating what the author calls as paradigm crisis.

In this stage, the science is pressured to find a solution. According to Kuhn (1992), in some cases the answer can be found through a reformulation of the concepts that serve as basis for the paradigm, thus avoiding its abandonment. On the other hand, there are situations in which science does not find answers in the existing paradigm and is forced to abandon it in favor of a new paradigm. In that case, a paradigmatic rupture occurs, in which traditional concepts need to be left behind, fomenting what Kuhn (1992) calls scientific revolution.

According to Kuhn (1992, p. 116), "change from one paradigm to another [...] is far from being a cumulative process obtained through an articulation of the old paradigm. It is first a reconstruction of the area of study based on new principles".

In the phase in between the beginning and the end of the paradigmatic crisis arises a variety of theories that, in some cases, differ from each other. In this period there is practically no uniformity between concepts and the science evolves little. Kuhn (1992) reminds us that in this period occurs a type of competition among researchers to ensure that their conceptual models be accepted in order to continue the researches in a particular area of study. However, the author asserts that since this objective common to a great number of researchers it results in a period in which there is a great waste of researchers' time and efforts.

At a certain point, some theories begin to stand out more than others. According to Kuhn (1992), it is common for these theories to be strengthened by the adhesion of other researchers, establishing a new paradigm and thus initiating a new period of normal science. Viera and Fernández (2005, p. 3) assert that: "The success of Kuhn's explicatory scheme is not just due to the fact that his ideas explained the evolutionary process of the natural sciences very well, but also because it was able to instigate the interests of members from other sciences, especially those that defended minority points of view in their disciplines."

Oriented mainly towards the natural sciences, but with possible interpretation in other areas, Kuhn's work can be useful especially for researchers that, through the science, try to disseminate their studies through the innovation and knowledge that is ready to be evaluated and analyzed.

Therefore, researchers in the accounting area can use the model of the development of science presented by Thomas Samuel Kuhn in his work *The Structure of Scientific Revolutions* to understand and guide their own studies. This perspective is what consolidates the current research regarding the use of Kuhn's work in scientific articles published in the accounting area.

3. Appropriation of One Author's Ideas by Another, According to Roger Chartier

The word appropriation has several meanings. In linguistics, appropriation "is understood to be the practices of reading and comprehension, i.e. it is associated with the deciphering of codes and messages. They are activities by means of which the reader interprets the text and at the same time dislocates it; inserting the reader into the text" (Fantin, 2007, p. 8).

In Chartier's (1996, p. 26) opinion, appropriation "has as its objective a social history of interpretations, remitted by its fundamental determinations (which are social, institutional and cultural) and inscribed on the specific practices that produce them". Fantin (2007, p. 12) wrote:

Appropriation is a set of internal and external actions of the group. Based on this identification, which is also a negotiation, mechanisms that assimilate, incorporate and are internalized and externalized through new actions are processed. They are practices and processes that experience extreme tension between different ways of being, thinking, living and analyzing the world, often forged by a rupture that signals the search for alternatives.

When interpreting a text, the reader uses not only what is written but also his or her social, institutional and cultural background. Thus, a text read by two people can be interpreted in two different ways.

Chartier (1996, p. 136) affirms that appropriation "allows us to think about differences in division because it postulates a creating invention in the very heart of the processes of reception". Furthermore, according to the author, it emphasizes the "contrasting manner in which groups or individuals make use of motives or forms that they share with others".

In scientific texts, appropriation becomes visible when the ideas of one author are adopted by another with the objective of supporting an idea or point of view. According to Fantin (2007, p. 11), "we only appropriate a certain thought when we make it *ours*".

The conceptions of Chartier (1996) are based on the understanding of reading as a concrete act that manifests itself in the relation existent between appropriation and different uses that readers make of a text. He also points out that upon reading a text, a reader is able to appropriate the ideas of the author according to his interests and objectives. Thus, the influence of an author's ideas can be more or less intense.

Different categories of appropriation can be used to analyze and understand the various levels of influence of one author on the texts of another. Working with the category of appropriation implies understanding it in the process of the construction of sense in a new text (Chartier, 1996).

When verifying the influence of an author in texts of other areas of knowledge it is necessary to take in

consideration the background of the authors in this area, as well as the focus adopted by them. The use of this type of analysis can contribute to the understanding of a determined theory applied to another area of knowledge.

4. Research Methods and Procedures

The present research can be classified as descriptive, done through documental research and using both quantitative and qualitative approach to the data, in longitudinal cross section. According to Gil (1999), the principal objective of descriptive research is to describe the characteristics of a determined population or phenomenon, or establish the relation between variables.

In the documental analysis, it was necessary to identify a list of journals that are internationally recognized for the quality of their articles. Due to the great number of publications from several countries, data base with prestige in the scientific community was selected. In this study, journals in the accounting area that were listed on the CAPES Journals Portal in December 2006 were analyzed; CAPES is the agency responsible for the Coordination and Continuing Education of People in Higher Education, maintained through the Foundation of the Ministry of Education in Brazil.

The research was performed in four phases: a) identification of the journals in the accounting area available at the CAPES Journals Portal; b) selection of articles published in accounting journals that contain the name "Kuhn" in their content; c) verifying whether the name "Kuhn" found in the second phase of research refers to Thomas Samuel Kuhn; and d) checking the form of appropriation of Thomas Samuel Kuhn's Theory of Scientific Revolutions by the authors of the articles identified.

In the first phase, a research was done at CAPES Journals Portal to select articles in the accounting area. Since accounting journals are classified as journals of the applied social sciences it was necessary to make a manual selection, only looking for accounting journals. In order to do this, among the journals in the applied social sciences area were select the ones that deal with administration and accounting, whose titles contain the terms "accounting", "accountability" or "cost". A total of 2,422 journals in the applied social sciences area were found and, among them, 56 were identified as having one of the above related terms in their title.

In the second phase of the research, the websites of each of these journals were accessed in search for articles that contained the word "Kuhn" in their content. In order to proceed with this search, the search mechanism available on the website was used. It is necessary clarify that in some journals the research was restricted to the title, the abstract and the key words of the article, while in other journals the

research was extended to the content of the article. At the conclusion of the second research phase, the articles that attended the defined criteria were selected and filed for later analysis. In the final phase, the file contained 66 articles, being 64 from international journals and 2 from national ones.

The third phase of data collection consisted of verifying whether the name “Kuhn” found in articles was used as a reference to the work of Thomas Samuel Kuhn. This procedure led to the disqualification of four articles published in international journals that did not fit the criteria of this research. These articles were excluded from the data base. So, the data base used in the analysis necessary to reach the goal of this research consisted of 62 articles.

In the fourth phase, the analysis of the content was made in order to identify how the authors of the articles appropriated the ideas of Thomas Samuel Kuhn in their texts. According to Bardin (1979), the analysis of content comprises a set of investigative techniques designed to analyze communications. In this stage, three categories of appropriation of ideas by authors were considered, according to the proposition made by Chartier (1996), whose strategy was adopted by Catani, Catani and Pereira (2001) to identify, by performing a textual analysis, how the

ideas of Pierre Bourdieu were used by researchers in the Brazilian educational field.

The main limitation of this study was that the results of the research do not involve other data bases that have international accounting journals available. Another limitation is related to the terms used to identify accounting journals at the CAPES Journals Portal. Therefore, the set of analyses is limited to the accounting journals identified in the data base referred to.

5. Description and Analysis Of Data

In this section, a description and analysis of data is made, with the intention of meeting the indicated objective of the research. In order to make the text more fluent, the approach was divided into five integrated parts.

5.1 Insertion of Kuhn’s Work in Journals from The Accounting Area

Out of the 56 journals researched, 62 articles that made at least one reference to Kuhn in their content were identified. These articles are concentrated in only 17 journals. Table 1 shows the distribution of the articles by journal and by period of publication.

Table 1. Articles published in accounting journals listed at the CAPES Journals Portal that make reference to the work of Thomas Samuel Kuhn

Name of Journal	1965 to 1970	1971 to 1976	1977 to 1982	1983 to 1988	1989 to 1994	1995 to 2000	2001 to 2006	Total number of articles
ABACUS - A Journal of Accounting Finance and Business Studies	3	2	3	6	5	-	1	20
Accountancy Ireland	-	-	-	-	-	1	-	1
Accounting and Finance	-	-	-	-	-	-	1	1
Accounting Forum	-	-	-	-	-	-	2	2
Accounting History	-	-	-	-	-	-	2	2
Accounting Technology	-	-	-	-	1	-	-	1
Accounting, Auditing & Accountability Journal	-	-	-	-	2	9	2	13
Contemporary Accounting Research	-	-	-	-	-	-	2	2
Critical Perspectives on Accounting	-	-	-	-	-	1	-	1
Journal of Accounting Education	-	-	-	-	-	1	-	1
Journal of Accounting Literature	-	-	-	-	1	1	2	4
Journal of Accounting Research	-	-	-	-	-	-	1	1
Journal of Business Finance & Accounting	-	-	-	-	-	1	2	3
Journal of Management Accounting Research	-	-	-	-	-	2	-	2
Review of Accounting Studies	-	-	-	-	-	-	1	1
Review of Quantitative Finance and Accounting	-	-	-	-	-	2	3	5
Revista Contabilidade & Finanças	-	-	-	-	-	2	-	2
Totals	3	2	3	6	9	20	19	62

The articles identified in the research are distributed between the years 1966, when the article "Operational Analysis of Traditional Accounting" by Robert R. Sterling was published in *ABACUS – A Journal of Accounting Finance and Business Studies*, and 2006, when the article "Bury Pacioli in Africa: a bookkeeper's reification of accountancy", was published in the same journal.

Analyzing Table 1, it can be observed that the greatest number of articles is concentrated in the Australian journal *ABACUS – A Journal of Accounting Finance and Business Studies*, where 20 articles, representing 32.26% of the total number of articles identified as making reference to Thomas Samuel Kuhn.

Out of the 62 articles in the sample, 39 (62.9%) were published in the period from 1995 to 2006. A curious fact observed in the research is that in this

period, when the highest concentration of articles with this profile appeared, *Abacus* presented the least number of published articles with this characteristic, although it is the journal that published most of the articles that mentioned Thomas Samuel Kuhn's work.

5.2 The journal's editorial focus

In order to try to explain the concentration of articles in certain journals it was necessary to relate Kuhn's Structure of Scientific revolutions to the definition of the focus area of the publications, expressed in the editorial of each journal. Table 2 shows the amount of journals published in each country that have as their editorial focus some reference to the interest in articles that deal with themes related to the evolution of Accounting Science.

Table 2. Journals identified *versus* editorial focus of the journals

Country of origin	Number of journals identified	Journals that evidence interest in themes related to the evolution of Accounting Science in their editorial focus	
		Quantity	% of the amount of journals identified in the country
United States	7	3	42.9%
United Kingdom	4	3	75.0%
Australia	2	2	100.0%
Canada	2	2	100.0%
Brazil	1	1	100.0%
Republic of Ireland	1	0	0.0%
Totals	17	11	64.7%

It can be seen in Table 2 that 11 of the 17 journals identified in the research mention in their editorial their interest in publishing articles that deal with subjects related to the evolution of accounting.

Furthermore, it can be verified that out of the 7 American journals identified in the research, only 3 (42.9%) explicitly state in their editorial the interest in articles on the development and history of accounting. This percentage overcomes only the result of the Republic of Ireland, which has no journals with this characteristic.

All of the Australian, Canadian and Brazilian journals identified in the research, on the other hand, evidenced an editorial interest in studies that analyze the Accounting Science process of evolution.

Out of the 4 journals edited in the United Kingdom, 3 mentioned interest in publishing articles on the history and development of accounting.

5.3 The themes of the identified articles

The articles were also classified according to their principal theme. In order to run this classification, seven categories were defined to group up the texts. The definition of each category is based on the study made by Borba and Murcia (2006), in which authors tried to define *clusters* for the classification of accounting journals published in English and listed at the CAPES Journals Portal. The categories used in this study are shown in Table 3.

Table 3. Categories of classification of articles according to their principal theme

Order	Categories	Themes approached in articles
1	Evolution of Accounting Science	Development, history and evolution of accounting, future tendencies.
2	Financial Accounting/ Outside Users	Principles, practices and accounting statements, capital markets, finances, economy, econometric models.
3	Managerial Accounting/ Comptrolling	In-house users, management, budgets, costs, prices, performance evaluation, management methodology, BSC, ABC, TQM.
4	Accounting Education	Undergraduate and Graduate programs and curricula, teaching methodologies, background and critical spirit of the accountant.
5	Technology	Information systems in support of management, specialist systems, intelligent systems, technology, internet information technology, websites.
6	Public Accounting	Public accounting and budget, practices, standards and governmental accounting principles, governmental management.
7	Auditing	Internal and external auditing, the profession of auditor, new technologies in auditing, standardization, ethics in auditing.

Source: adapted from Borba and Murcia (2006).

In the first phase of the classification was done an analysis of titles, abstracts and key words contents to classify the articles in each of the categories presented

in Table 3. The result of this analysis is presented in Table 4.

Table 4. Distribution of articles by category

Journal	Categories							Total number of articles
	1	2	3	4	5	6	7	
ABACUS - A Journal of Accounting Finance and Business Studies	12	4	3	-	-	-	1	20
Accountancy Ireland	-	-	-	-	1	-	-	1
Accounting and Finance	-	1	-	-	-	-	-	1
Accounting Forum	1	-	-	1	-	-	-	2
Accounting History	2	-	-	-	-	-	-	2
Accounting Technology		1	-	-	-	-	-	1
Accounting, Auditing & Accountability Journal	8	-	1	3	-	1	-	13
Contemporary Accounting Research	1	-	-	1	-	-	-	1
Critical Perspectives on Accounting	1	-	-	-	-	-	-	1
Journal of Accounting Education	-	-	-	1	-	-	-	1
Journal of Accounting Literature	3	1	-	-	-	-	-	4
Journal of Accounting Research		-	1	-	-	-	-	1
Journal of Business Finance & Accounting		1	1	-	-	1	-	3
Journal of Management Accounting Research	2	-	-	-	-	-	-	2
Review of Accounting Studies		-	1	-	-	-	-	1
Review of Quantitative Finance and Accounting		1	3	-	-	1	-	5
Revista Contabilidade & Finanças	2	-	-	-	-	-	-	2
Total	32	9	10	6	1	3	1	62

Categories: 1 - Evolution of Accounting Science
 2 - Financial Accounting/ Outside Users
 3 - Managerial Accounting/ Comptrolling
 4 - Accounting Education
 5 - Technology
 6 - Public Accounting
 7 - Auditing

Observe that the main focus of the 32 articles (45.16%) selected for the research is related to the Evolution of the Accounting Science, while the other articles (54.84%) are focused on other themes. It can be noticed that the greatest concentration of articles whose focus is on the Evolution of the Accounting Sciences is published in the journal *ABACUS - A Journal of Accounting Finance and Business Studies*, from which 12 out of the 32 articles classified in this category were collected.

5.4 Modalities of appropriation of the Kuhn's Theory of Scientific Revolutions

Articles were analyzed based on a methodology originated from the content analysis, which categorizes texts according to the modality of appropriation of one author's ideas by another.

Catani, Catani and Pereira (2001) published an article entitled "Appropriations of the work of Pierre Bourdieu in the field of Brazilian education, through journals in the area". In the article, the authors try to identify, by performing textual analysis, how Pierre Bourdieu's ideas were applied by researchers in the field of Brazilian education. The authors based themselves on Chartier's (1996) work and used three modalities of appropriation of one author's ideas by another in the production of scientific texts.

The first category used by Catani, Catani and Pereira (2001) is called 'incidental appropriation'. In this category, the ideas of an author are used by another in a very superficial way. The authors affirm that in this modality of appropriation of ideas it is

common for the author to be included in the references, although not mentioned in the body of the text, or that a reference to the author's work is made among other authors in the area, serving only to complement the idea being transmitted: "In incidental appropriations, it is not possible to establish relation between the argumentation presented in the text and the reference, or the mention has a very tenuous relation with the developed argument" (Catani, Catani and Pereira, 2001, p. 65).

In another category, called 'topical conceptual appropriation', mentions to the author are used to reinforce arguments or obtained results. In this category, it is also common to have more than one work of the author mentioned, increasing his importance and participation in the conceptual construction of the study.

The third modality used by Catani, Catani and Pereira (2001, p. 65) was called 'appropriation of the work stile'. In this modality, the 'revelatory appropriation of the systematic use of the author's notions and concepts [...] as well as showing a central preoccupation with the *modus operandi* of the theory" is observed.

This strategy of textual analysis was already used in an article published in 2005 by Riccio, Mendonça Neto and Sakata. In this occasion, the authors of that article verified the insertion of Michel Foucault's work into the accounting area.

Table 5 shows the amount of articles classified by modality of appropriation of one author's ideas by another in the production of scientific texts.

Table 5. Modality of appropriation of the ideas of Thomas Samuel Kuhn

Order	Category	Modality of appropriation of ideas of an author by another			Total number of articles
		Incidental	Topical conceptual	Mode of work	
1	Evolution of Accounting Science	13	17	2	32
2	Financial Accounting/ Outside Users	8	0	0	8
3	Managerial Accounting/ Comptrolling	10	1	0	11
4	Accounting Education	5	1	0	6
5	Technology	1	0	0	1
6	Public Accounting	3	0	0	3
7	Auditing	1	0	0	1
	Total	41	19	2	62

When analyzing Table 5, is evident that 41 (66.13%) of the authors of the selected articles appropriated the ideas of Thomas Samuel Kuhn in an incidental form, i.e. they made references to Kuhn's work, relating the text to the author in a subtle way. In many cases it was possible to observe that, in spite of using Kuhn's work in the references of the article, the work was not mentioned in the text.

In the articles classified in this modality, mentions to Kuhn's 1992 work are not essential, if reference to Kuhn's Theory of Scientific Revolutions was subtracted from the text, the results and/or conclusions of the author would not be damaged.

In 19 articles (30.65%), Kuhn's works are used in the 'topical conceptual' form. In this modality, as explained above, the articles' authors refer to Kuhn's

work in order to reinforce arguments or results obtained in the research. This modality of appropriation denotes the preoccupation in using Kuhn's ideas in the characterization and contextualization of the research.

Mentions to Kuhn's work in texts classified in the second modality of appropriation could not be extracted from the text without damaging its content. Therefore, the results and/or conclusions of the articles could be explained or based on other philosophers of the science such as Popper (1980). In these articles, questions related to the evolution of the science are related to philosophy but not specifically to Kuhn's (1992) vision.

Following, the results of the analysis of the articles in which the appropriation of the Thomas Samuel Kuhn's ideas had greater importance, where the references to the work correspond to the categories 'Topical Conceptual Appropriation' and 'Appropriation of the Work Style'.

5.4.1 Topical conceptual appropriation

In an article entitled "An Operational Analysis of Traditional Accounting", published in one of the 1966's journal *ABACUS - A Journal of Accounting Finance and Business Studies*, Robert R. Sterling made an operational analysis of the traditional accounting. The author pointed out the need for accounting to be ready to adapt to the new situations resulted from changes in companies. Sterling (1966) affirmed that some paradigms need to be left behind in order to Accounting Science evolve. In this article, the work of Thomas Samuel Kuhn is used to exemplify and define the term paradigm.

In 1969, W. P. Birkett published an article in *ABACUS - A Journal of Accounting Finance and Business Studies* entitled "A Medieval Controversy about Profit and Loss Allocations". In this article, Birkett (1968) analyzed the allocation of profits and losses matter. The author used Kuhn's Theory of Scientific Revolutions (1962) to reaffirm the need for changes in the theories and concepts of a science in order to be able to satisfactorily respond to the questions imposed upon it.

In "The Methodology of Early Accounting Theorists", published in 1987 in the journal *ABACUS - A Journal of Accounting Finance and Business Studies*, J. R. Gaffikin used Kuhn's ideas to evidence the diversity of methodologies, concepts and theories of researchers in Accounting Science area. In the article, Gaffikin (1987) points out that the theories accepted by a large number of researchers are highlighted, making them, over time, paradigms accepted by the scientific community.

In 1988, M. J. R. Gaffikin wrote another text on the methodology used by accounting researchers. In the article, "Legacy of the Golden Age: Recent Developments in the Methodology of Accounting",

published in *ABACUS - A Journal of Accounting Finance and Business Studies*, Gaffikin (1988) he highlighted the principal methods used by researchers on accounting, as well as the contributions of these methods to the development of the Accounting Science.

Gary John Previtts, Lee D. Parker and Edward N. Coffmann also wrote two articles in which they used the appropriation of Kuhn's Theory of Scientific Revolutions. The articles were published in the journal *ABACUS - A Journal of Accounting Finance and Business Studies*, in 1990. In the first article, entitled "Accounting History: Definition and Relevance", the authors relate the principal conceptual changes that occurred in the Accounting Science to the principal impacts of these changes on accounting research. In the second article, entitled "An Accounting Historiography: Subject Matter and Methodology", Previtts, Parker and Coffmann (1990) point out the changes in research methodology used by accounting researchers due to the principal conceptual changes in Accounting Science. In both articles, the authors appropriate the ideas of Thomas Samuel Kuhn in order to exemplify the process of evolution of a science, as well as to describe the principal phases of this process.

In an article published in *ABACUS - A Journal of Accounting Finance and Business Studies* in 1991, Dan Subotink called attention to the need for studying the evolution of Accounting Science. In "Knowledge Preservation in Accounting: Does It Deserve to Be Preserved?" Subotink used Kuhn's Theory of Scientific Revolutions to support the importance of knowing the fundamentals of a science as well as the principal facts and changes that have influenced the evolution of this science.

In 1991, the article "The Impact of Non-Serial Publications on Research in Accounting and Finance", published in the journal *ABACUS - A Journal of Accounting Finance and Business Studies*, Vivien A. Beattie and Robert J. Ryan presented the results of a study on the importance of manuals in research in the accounting and financial areas. In this research, the term manual is based on the work of Kuhn (1962). To Kuhn, manuals – books used as basic references of a particular science – describe the principal existing paradigms and are used as a base in most researches developed by the scientific community. The authors of the article list works with the greatest number of citations in scientific research and make an analysis of the evolution of each of these works.

In "The Importance of History for Accounting Research" published in *ABACUS - A Journal of Accounting Finance and Business Studies* in 1991, Robert J. Bricker calls the attention to the relevance of knowing the history of Accounting Science for the development of research in this area. In this article, the author turns to the work of Thomas Samuel Kuhn

to present a model of evolution of a science. Bricker (1991) points out that as the researchers know how and why a science evolved they acquire a theoretical basis that allows them to develop a research that will contribute to the development of the science.

In 1992, Tom Mouck published an article entitled "The Rhetoric of Science and the Rhetoric of Revolt in the 'Story' of Positive Accounting Theory" in the *Accounting, Auditing & Accountability Journal*. In this article, the author exposed some changes in the positivist approach applied to the Accounting Science. Mouck (1992) used Kuhn's work to present a science evolution model.

In "Methodological Themes Theories and Case Studies of Organizational Accounting Practices: Limitation or Liberation?", published in 1996 in the *Accounting, Auditing & Accountability Journal*, Christopher Humphrey and Robert W. Scapens discussed the use of case studies as a research methodology in accounting. The authors presented the advantages and disadvantages of using the case study method in the study of changes in accounting that resulted from organizational changes. Humphrey and Scapens (1996) used the appropriation of Kuhn's Theory of Scientific Revolutions ideas in order to describe the term 'paradigm', as well as the process of substitution of one paradigm by another.

In the article "Standards for field research in management accounting", published in the *Journal of Management Accounting Research* in 1998, Anthony A. Atkinson and William Shaffir presented research standards for managerial accounting. The authors described the principal lines of research in managerial accounting, and the predominant research methods in each line of research. The work of Thomas Samuel Kuhn is mentioned to disclose the evolution process of a science, as well as the evolution process in some specific lines of research.

In 1997, Charles A. Francalanza published the article "Accounting Education and Change in Financial Accounting" in the *Journal of Accounting Education*. The author tried to identify the changes in accounting education resulting from changes that occurred in the Accounting Science. Francalanza (1997) described the processes of substitution and crisis of a paradigm and the effects of these processes on the educational practices in accounting courses. Kuhn's Theory of Scientific Revolutions is used to conceptualize the term paradigm and to describe the evolution process of a science.

In 2001, in the article "Accounting History and Accounting Progress", published in *Accounting History*, Christopher J. Napier describes the history of accounting and the principal events responsible for the progress of this science. In the article, the author uses Kuhn's work to highlight the importance of knowing the evolution of a science, as well its principal existing paradigms.

In 2002, the *Journal of Accounting Literature* published the article "Alternative Perspectives on the Development of American Management Accounting: Relevance Lost Induces a Renaissance" by Laura D MacDonald and Alan J. Richardson. In this article, the authors presented some alternative perspectives on the development of managerial accounting in the United States, as a result of the critiques made on the informational capacity of managerial accounting, proposed by Thomas H. Johnson and Robert S. Kaplan in the article "Relevance Lost" published at the end of the 1980's. Kuhn's work was used to describe the evolution process of a science and the moments of crisis it had experienced.

In the article "A Framework for Conducting and Evaluating Research" published in the *Journal of Accounting Literature* in 2003, the authors DeWayne L. Searcy and John T. Mentzer proposed a structure for conducting and evaluating research in the accounting area. The authors referred to the Theory of Scientific Revolutions in order to conceptualize the term paradigm.

In 2003, the journal *Accounting Forum* published the article "The A Priori Wars: The Modernisation of Accounting Thought", written by Michael J. R. Gaffikin, in which the author presented evidences of modernization in accounting thinking. Gaffikin (2003) turns to Kuhn's Theory of Scientific Revolutions to describe the evolution process of a science and the need for reformulating it or substituting some paradigms in the sake of modernization and adaptation of a science to its surroundings.

In 2004, Edward P. Swanson published the article "Publishing in the Majors: A Comparison of Accounting, Finance, Management, and Marketing" in the journal *Contemporary Accounting Research* presenting the results of a research that compares the publication of articles in the areas of accounting, finance, administration and marketing in specialized journals. The author uses Kuhn's work to justify the importance of disclosing researches results for the development of a science. In the article, Swanson (2004), pointed out that publishing the result of one's research in a known and respected journal in the scientific community gives the researcher the possibility to test new theories and concepts related to the science.

In the article "Archival Research and the Lost Worlds of Accounting", published in 2005 in *Accounting History*, Aida Sy and Tony Tinker presented a retrospective of the history and evolution of Accounting Science. The authors highlighted the principal lines of researches in accounting and important events that made the accounting science evolve. The article makes reference to Kuhn's work in order to present the concept of breaking of a paradigm and his vision on the evolution of a science.

In 2006, *ABACUS - A Journal of Accounting Finance and Business Studies* published another article by Aida Sy e Tony Tinker, entitled "Bury Pacioli in Africa: a Bookkeeper's Reification of Accountancy", in which the authors did a research on the evolution of the Accounting Science, taking into consideration the social panorama lived by Pacioli at the time the work considered to be the basis of Accounting Science was published. In this article, Kuhn's work is used to provide an overview of how a science evolves and the importance of breaking paradigms to evolve.

5.4.2 Appropriation of the mode of work

In 1975, an article entitled "Profit Measurement, Capital Maintenance and Service Potential: A Review Article" was published in the journal *ABACUS - A Journal of Accounting Finance and Business Studies*. The author, R. J. Chambers, analyzed the effect of organizational changes on profit distribution programs in organizations. Chambers (1975) tried to establish a relation between the crises experienced in accounting and the Theory of Scientific Revolutions. His study was based on changes that had occurred in the entrepreneurial environment and the problems experienced by accounting in adapting itself to these changes. In this article, the author made an analogy between the process of change in organizations and the moments of crisis experienced by the sciences, described by Kuhn in his Theory of Scientific Revolutions. According to Chambers (1975), when accounting is not able to respond to a problem that it is confronted to, it is necessary for researchers to develop new theories and concepts capable of resolving such problem. In these periods of uncertainty, where new theories and concepts are still not totally accepted by the scientific community, a questioning process takes place and researchers try to show the validity and applicability of their proposals.

Thomas Samuel Kuhn's work is used by Chambers (1975) as basis for comparison between the moments of changes experienced by accounting, due to organizational changes, and the moments of crisis experienced in a science when an existing paradigm is not able to respond to the new questions it faces.

In the article "Managerial accounting research: The contributions of organizational and sociological theories", published in 1996 by the *Journal of Management Accounting Research*, the authors, Mark A Covaleski, Mark W Dirsmith and Sajay Samuel discussed the contributions of organizational and sociological theories in research on the development of managerial accounting. The authors mentioned that in certain periods of history, accounting needed to abandon some paradigms that were no longer able to respond to new needs of users. The concept of paradigm used by the authors was based on Kuhn's Theory of Scientific Revolutions.

In this text, the authors turn to Kuhn's work in order to explain the problems faced by managerial accounting when facing organizational changes. The phases of science evolution, according to Kuhn, are used by the authors to compare situations experienced by the accounting science to the new challenges presented by the organizational environment.

7. Conclusions

The objective of the present article was verified the insertion of Thomas Samuel Kuhn's Theory of Scientific Revolutions in articles in the accounting area. To do so, descriptive research was made through documental research, using a quantitative and qualitative approach and longitudinal section. A research was done on articles at the CAPES Journals Portal, where 62 articles that made reference to the work of Thomas Samuel Kuhn were identified, concentrated into 16 international and national journals.

The research results show that the articles identified were published within the period from 1966 to 2006. It can be stated that the greatest number of articles is concentrated in the Australian journal named *ABACUS - A Journal of Accounting Finance and Business Studies*, in which 20 articles, representing 32.26% of the identified articles, were found. On the other hand, the period of greatest concentration occurred from 1995 to 2006. A total of 39 articles were identified in this period, which represents 62.9% of the articles identified.

Following, the article made efforts to identify how authors appropriated Thomas Samuel Kuhn's ideas in their articles. For this purpose, content analysis and a modality of articles categorization were used in order to verify how the authors of scientific texts appropriate themselves of another author's idea. This modality of categorization is based on the work of Chartier (1996) and was adopted in a study made by Catani, Catani and Pereira (2001).

In the classification of the articles 3 categories were considered. In the first category, called 'incidental appropriation', 41 articles were classified. Texts within this modality of appropriation used Kuhn's Theory of Scientific Revolutions in a superficial way. In these texts, the relation between the article analyzed and Kuhn's work is very tenuous and, generally speaking, the Theory of Revolutions is used to complement the idea that the author intends to transmit.

In the 'topical conceptual appropriation', second category, 19 articles were identified. In this category, references to the Theory of Scientific Revolutions have greater importance as it is used to reinforce arguments or obtained results. The third category, 'appropriation of the mode of work', was used to classify the authors whose articles had Kuhn's Theory

of Scientific Revolutions as the basis for their research. Two articles in this category were identified.

The results of the research show that the majority of the authors that made reference to Thomas Samuel Kuhn's work, published in accounting journals available at the CAPES Journals Portal, appropriated the Theory of Scientific Revolutions in a subtle way. On the other hand, 30.65% of articles appropriated the work of Thomas Samuel Kuhn in order to reinforce arguments or results of their research. Furthermore, it can be stated that the Theory of Scientific Revolutions was used as the theoretical basis for just two articles identified in this research.

In conclusion, Kuhn's Theory of Scientific Revolutions is present in scientific articles in the accounting area and authors in this area appropriate related ideas to base their researches on. Given the limitations of the research, it is recommended that other resources, including both international and national accounting journals, be researched and that the amount of terms used to search journals be expanded.

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