

# Behavior and Particularities of academic production on “Management Accounting” published in the database *ISI WEB of Science Core Collection* between 1985 and 2014

## Abstract

The objective in this study was to analyze the behavior and the particularities of the academic production on the theme Management Accounting published in the ISI Web of Science Core Collection from 1985 to 2014. Methodologically, this research used the bibliometric and sociometric analysis techniques. The main results were: evolution of the theme as from 2007; Accounting, Organizations and Society and Management Accounting Research, which were the journals that most published on the subject “Management Accounting”; Lukka, K. was the most prolific author; the University of Turku was the institution that stood out; and the United States of America was emphasized in the production on that theme. In relation to the co-authorship networks, their low degree density was observed, leading to a high degree centrality and betweenness. And the themes that were highlighted in this study were: education; accounting teaching and research; Cost management; Management control; strategic management; and management accounting system. It is concluded in a macro way that this study evidenced inherent and contemporary information on the subject “Management Accounting”, focusing on its nuances in the behavior and particularities of its academic production, published in ISI Web of Science Core Collection from 1985 till 2014.

**Key words:** Management accounting; Academic production; International journals; Bibliometrics; Sociometrics.

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## 1. Introduction

“Management Accounting” is a theme (Riccio, Mendonça Neto & Sakata, 2007) that involves support for the decision process and, consequently, decision making (Küpper, 2009; Beuren & Macohon, 2011) in the elaboration of planning and performance management systems (Wanderley & Cullen, 2012), and in providing competences related to economic-financial and control reports (Guerreiro, Fezatti, Lopes & Pereira, 2005), advising managers on the formulation and implementation of the corporate strategy (Lunkes, Feliu & Rosa, 2012). Thus, the role of management accounting is to focus on the strategic business process and thereby create value for the organization (Padoveze, 1999).

For Guerreiro, Cornachione Júnior and Soutes (2011), management accounting, at its present stage (its most recent stage up till now), identified since the beginning of 1985, focuses on the production and / or creation of value thro the effective use of resources, using value creation drivers for consumers, shareholders and consequently for the organization, making use of isolated information or combined with other resources to create new scenarios within the organization (Ribeiro & Espejo, 2013).

In their research, Ribeiro and Espejo (2013), to analyze the thematic options in theses and dissertations defended in the *Stricto Sensu* Post-graduation Programs in Accounting in Brazil between 1973 and 2010, highlighted that the main theme was the Balanced Scorecard (BSC), followed by the Economic Value Added (EVA) and the remainder with lower percentages. This result is understandable, considering the evolution that the BSC represented when it emerged and the fact that it is “contemporary”, that is, it is still consolidating (Ribeiro & Espejo, 2013).

In this scenario, research on the accounting area (Borba, Murcia, Rover & Souza, 2009), especially regarding the academic production on the theme “Management Accounting”, has been gaining a broader dimension in the Brazilian scientific literature context, as can be seen from the studies published in journals that highlight the theme “Management Accounting”, such as Barros, Schckaiban, Gomes and Felin (2008), Cruz, Espejo, Gassner and Walter (2010), Nascimento, Junqueira and Martins (2010), Tavares Araújo and Castro Silva (2010), Lunkes, Rosa, Gasparetto and Baldoino (2011), Lunkes, Feliu, Borba & Rosa (2012), Oliveira and Boente (2012), Ribeiro e Espejo Beuren and Hall (2014), Beuren and Nascimento (2014), Kremer, Da Luz, Suave and Lunkes (2014), Lunkes, Gasparetto, Schnorrenberg and Rosa (2014) and Da Silva and Beuren (2015), and through studies that also exalt management accounting, although not predominantly: Carvalho, Saraiva Junio, Frezatti and Costa (2015), Colauto and Almeida (2013), Ribeiro (2013), Brizolla, Chiarello and Lavarda (2014), Carmo, Xavier, Pereira and Martins (2014) and Cunha, Santos and Beuren (2015).

In the studies that focus on the predominance of the theme “Management Accounting”, the versatility of these issues is verified with regard to the scientific production on the subject, permitting the calibration of a large number of bibliometric and / or sociometric indicators. This entails interesting information on the nuances that make up the management accounting theme in the national and international context, contributing to its better understanding and its importance as an essential subject for the field of accounting knowledge.

Based on these studies, overall, the authors sought to know how the theme “Management Accounting” spread and evolved, through databases of national congresses, especially the National Meeting of the Association of Postgraduate Education and Research in Administration (Enanpad), of Brazilian journals ranked from B1 to A2 and of international journals ranked in Scopus, ProQuest, Science Direct and Accounting, Organizations and Society.

In view of the above, the current research, in addition to highlighting more recent studies on the theme “Management Accounting”, offering a clear contribution contribution, will also seek international papers through the ISI Web of Science database, which according to Guz and Rushchitsky (2009) is one of the largest and most important databases, as it involves several areas of knowledge, disseminating scientific studies. Thus, this database is often used to research the scientific production of topics in the global academic literature. In view of this other factor, another important and essential contribution of this study to the national academic literature is addressed.

The choice of the ISI Web of Science database is justified because several academic studies use it to carry out bibliometric studies as the main source of information. The studies by Bar-Ilan (2008) and Falagas, Pitsouni, Malietzis and Pappas (2008) used the aforementioned database in their respective studies.

Also in the ISI Web of Science database, studies were developed in health knowledge, by Zauber, Winawer, O'Brien, Ho, Gottlieb and Stemberg (2012) and management, especially on corporate governance (Ribeiro, 2014a) and on the same theme in sports (Ribeiro, Costa & Ferreira, 2015) and sustainability (Ribeiro, 2014b). Among other studies carried out in the Web of Science database, its importance is highlighted to compare content, themes and / or fields of knowledge in scientific literature available in the global academic context.

Thus, and knowing that the dissemination of the scientific production of academic research is one of the most important ways of disseminating and socializing scientific knowledge on a global scale (Murcia & Borba, 2008), the research question that will guide this study is: **What is the behavior and particularities of the academic production on the theme Management Accounting published in the ISI Web of Science Core Collection from 1985 till 2014?** In this context, the objective of this study is to analyze the behavior and the particularities of the academic production on the theme Management Accounting published in ISI Web of Science Core Collection from 1985 to 2014.

The start of the study in 1985 is justified because it is the year when the most recent evolutionary stage of management accounting emerged, which continued to date (Guerreiro, Cornachione Júnior & Soutes, 2011; Teixeira, Gonzaga, Santos & Nossa, 2011; Oliveira & Boente, 2012, Ribeiro & Espejo, 2013).

## 2. Theoretical Background

This section is focused on bibliometrics and sociometrics, beyond the theme management accounting.

### 2.1 Bibliometrics and sociometrics

Bibliometrics is a set of constantly developing research methods (Caldas & Tinoco, 2004). It is worth mentioning that bibliometrics is the study of the quantitative characteristics of scientific production (Ribeiro, Costa & Ferreira, 2015) and, consequently, of its dissemination and use of the information disseminated through mathematical and statistical methods (Spinak, 2013). It is a research technique that permits the assessment of the academic production on themes (Souza & Ribeiro, 2013) and / or areas of knowledge in order to contribute and socialize the contents on these subjects and / or fields of knowledge in the global academic literature environment (Hid, Nascimento & Oliveira, 2012).

Bibliometrics also focuses on counting authoring and co-authoring, through the analysis of publications, citations (Silveira & Bazi, 2010) and co-citations (Cronin, 2001). This permits showing what can happen at different academic levels, conjecturing on the quality of these publications (Glänzel, Debacken, Thijs & Schubert, 2006) and permeating the international scene (Smith & Hazelton, 2008). Thus, we can know which countries, territories, languages and areas of knowledge stand out in the diffusion of these publications in the international scientific context (Tsai, 2013).

Bibliometric studies allow for the constitution and socialization of scientific knowledge as evidenced previously, but Daim, Rueda, Martin and Gerdri (2006) emphasize that this type of research also admits the rapport and better apprehension of the past and the prediction for future research, including recent, emerging and / or mature themes, in line with Ribeiro (2013), besides tolerating a large number of bibliometric indicators that allow and assist students to judge and apprehend various themes, without them, embryonic, evolving or legitimized in the international academic literature.

The socialization of knowledge and the development of the theme that is to be understood depends on its exposure and circulation, through its publication and disclosure in books and, mainly, in scientific journals (Hoffman & Holbrook, 1993).

The scope of bibliometric research is to guide the researchers and put them in contact with what has already been produced and published previously on the research subject of interest (Padua, 2004). In this context, Cruz and Ribeiro (2003) emphasize that a bibliometric study can look at an element of studies carried out and disseminated previously on the same subject studied at the time. It can also identify and select the research methods and techniques to be used, as well as provide subsidies for future studies, like in the case of recent studies on the subject investigated.

Another advantage of using bibliometrics, according to Hayashi, Hayashi, Silva and Maycke (2007) is the fact of apprehending the number and frequency of publications chronologically, that is, temporarily permitting and contributing to the evaluation of groups of researchers, that is, of studies and their respective Higher Education Institutions (HEI).

For Michels and Schmoch (2014), there was a significant increase in the use of the bibliometric research technique with the purpose of measuring, investigating, evaluating and analyzing topics of interest in several areas of knowledge. This development was due to the fact that previous analyses on these subjects were merely subjective.

The impact of bibliometric analyses on the global scientific literature, according to Michels and Schmoch (2014), came from nations like Australia, Norway, the United Kingdom and Spain. These countries positively guided the change in the behavior of the students (Weingart, 2005; Bornmann, 2010), contributing to the better understanding and conception of themes, their respective scientific productions and, later, their concomitant propagation and socialization in the global academic setting.

El-Maamiry and Abid-Ghauri (2013) further point out that bibliometrics is much used by libraries and information science, but that it significantly influences other areas of knowledge, since these fields of knowledge use bibliometrics to expose the prominence of their respective activity area in the global scientific context.

In addition to bibliometrics, the present study also emphasizes and highlights social network analysis by understanding society as an objective structure of individuals and their consequent relationships, thus seeking principles that govern the functioning of groups and their partnerships (Moreno, 1992, 1993). Based on the understanding of these relations, it is better to understand the connection among them. This aspect is considered as “sociometrics”.

The first sociometric studies were conducted as from 1932 by Jacob Levy Moreno, who coined the term sociometrics in studies conducted with girls in Hudson, New York. Thus, Moreno (1951) defined sociometrics as an experimental method that is studied by mathematics, assessing the psychological attributes of society and the results obtained through the application of quantitative methods.

Moreno (1992, 1993) explains that, aiming at the organization and spontaneity of the human being and seeking to analyze the principles that govern the functioning of groups, he came to the conclusion that the set of sociometric choices made and perceived by an individual or a population constitutes what the author called a social atom, and can be influenced by individual and / or group preference.

Parts of these groups attach themselves to others and so on and constitute social or sociometric networks, which are responsible for transmitting their opinions publicly. Moreno (1993) also complements that this instrument permits investigating the links between people and to map them, so that they can be understood as a function of the group. It is concluded, therefore, that Sociometrics is the science of human relations measures (Moreno, Bouza & Karsz, 1962).

Thus, the study on the subject “Management Accounting” becomes relevant, since the subject is mature and legitimized in the national academic scenario. This study will jointly study, investigate and analyze articles on the subject though by searching the ISI Web of Science database, which is widely accepted and important in the international scientific context (Guz & Rushchitsky, 2009), thus dealing with a strong contribution to the Brazilian academic literature in the area, mainly due to the fact that the aforementioned study will address the current status of articles published on the research subject.

It is highlighted that, in Brazil, the studies on the subject "Management Accounting" have gained prominence and increasingly gained room in the academic environment through its relation with other subjects, as could be perceived earlier in this study. Another important justification for this study is that its findings guided themes and / or areas of knowledge that relate directly to its main subject, contributing to its better understanding and future development and greater diffusion in the Brazilian scientific scenario.

## 2.2 Management accounting

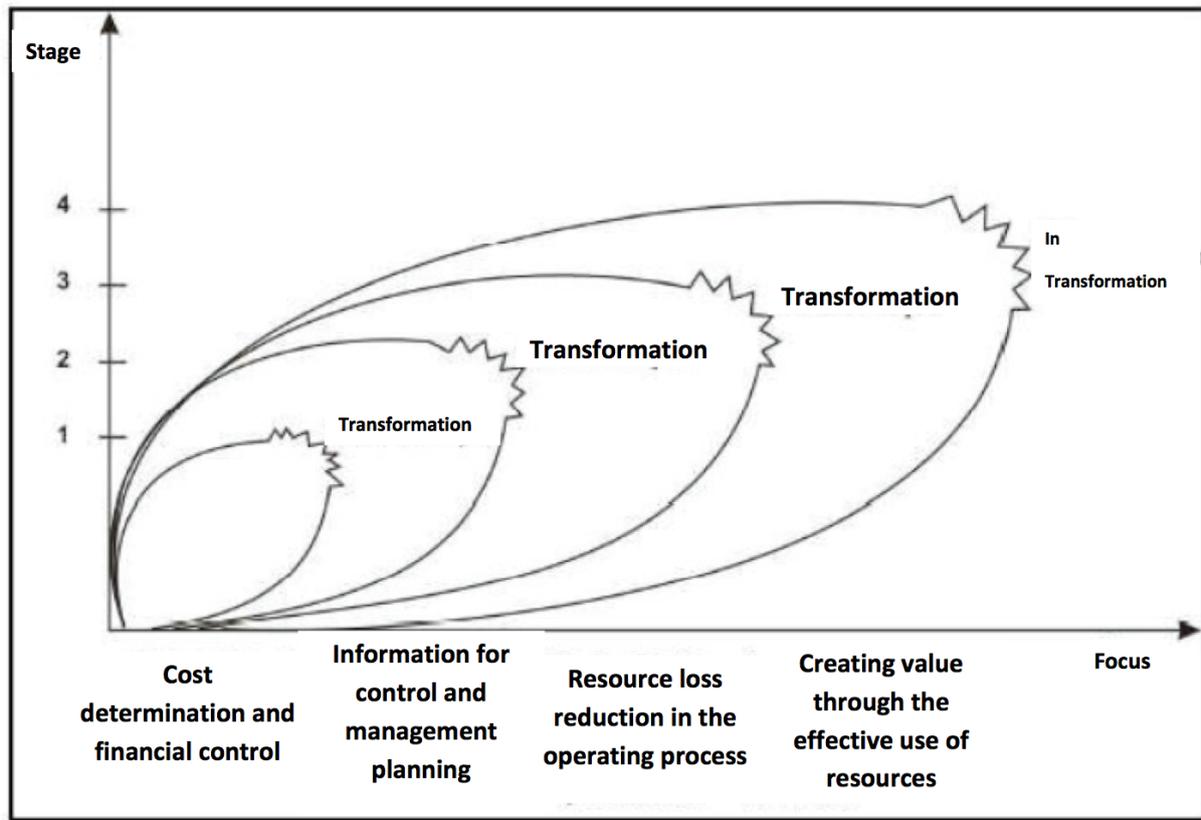
As from the 1960s, the theme "Management Accounting" became mature and legitimized in a tangible way as a social science. In a macro way, this maturation and concretization took place due to the emphasis on empiricism and positivism which, together with the growth of case and field studies on the subject in Europe, have consequently impacted its establishment as an academic discipline in universities (Lunkes et al., 2011; Lunkes, Feliu, Borba & Rosa (2012).

Another justification for the emphasis on management accounting research in the 1960s was based on entrepreneurial motivations, which required new techniques and theories that would provide greater assertiveness towards organizations pondering this new scenario (Cruz et al., 2010).

In this panorama, management accounting interacts with a wide range of management procedures in all companies. Accounting is characterized as a universal institution in which the role of management accounting evolves and spreads according to the needs of companies in the global corporate market (Beuren & Erfurth, 2010). It should be noted that, in the last decades, management accounting has undergone four evolutionary stages (Ribeiro & Espejo, 2013).

According to Ribeiro and Espejo (2013), the four evolutionary stages of management accounting (Figure 1) proposed took into account that, with the improvement of organizations in the financial market, management accounting practices were also evolving and gaining shape, seeking to attend to the information needs. Thus, they ended up attributing a new reality to global business. In a general way, management accounting had clearly outlined phases, which demonstrate their respective ranges throughout their existence, as highlighted below.

The first stage lasted until 1950 and, in that period the main objective was qualified as the determination of cost and financial control, through budget and cost accounting. At this stage, the main mechanisms and methods used were: annual budgets, financial and operational control, absorption costing and variable costing (Guerreiro, Cornachione Júnior & Soutes, 2011; Teixeira et al., 2011).



**Figure 1.** Evolution of stages of Management Accounting

Source: Padoveze (1999).

The second stage was from 1950 to 1965 and, in that period, management accounting was concentrated in the provision of information for planning and management control, through the use of information techniques of decision-making analysis and accountability-based accounting. The following stand out as instruments and methods: standard costing, activity-based costing (ABC), RKW (Reichskuratorium für Wirtschaftlichkeit) and decentralization of decision-making (Briers & Chua, 2001; Guerreiro, Cornachione Júnior & Soutes, 2011; Teixeira et al., 2011).

The third stage began in 1965 and lasted until 1985. During this period, the focus was on minimizing waste of economic resources in processes and projects, with emphasis on process analysis and cost management through strategic management. Value-based management, accountability centers, transfer pricing, target costing, kaizen costing and life-cycle costing are some of the tools and methods focused on this stage (Guerreiro, Cornachione Júnior & Soutes, 2011; Teixeira et al., 2011).

The last stage of Management Accounting identified began in 1985 and lasts until the present day, focusing on the production and / or creation of value by the effective use of resources, using value-creation drivers for the consumer, shareholder value and organizational innovation (Guerreiro, Cornachione Júnior & Soutes, 2011). Strategic planning, BSC, performance assessment method, EVA and MVA (Market Value Added) are the tools and methods that stand out in this stage (Teixeira et al., 2011).

Management Accounting encompasses several resources: human, physical and financial, so that, perfectly integrated, they contribute to good organizational management. Therefore, it is important to note that the business world is competitive and fierce, having a direct impact on the development of companies that have perfected their control systems to face this competition (Oliveira & Boente, 2012). In this panorama, management accounting is essential and preponderant to develop these control systems.

Regarding the control system, the Management Accounting System (SCG) (Chenhall & Morris, 1986) is highlighted, which is the means by which the executive summit evidences the goals and objectives of the organization for employees and managers of business units, and is therefore considered a channel through which the accounting information (Hopp & Leite, 1988; Oliveira & Ávila, 1999) on the organizational performance and efficiency are disseminated to the company managers (Oliveira & Ávila, 1999), influencing decision making (Rocha & Guerreiro, 2010).

Thus, in line with the objective proposed in this study, a perspective of management accounting research is presented, regarding the state of the art of its academic production disseminated and published in Brazilian journals.

### 2.3 Studies on academic production in management accounting

It is known that the publication of the academic production of scientific studies is one of the essential forms for the dissemination of scientific knowledge in fields of knowledge and / or scientific themes (Borba & Murcia, 2006). And articles are essential to understand the phenomena that guide this scientific knowledge (Ribeiro, 2015). It should be noted that, in recent years, the theme of "Management Accounting" has significantly expanded due to numerous changes in the economic, financial and social spheres.

Thus, in order to better understand and capture this theme, several authors carried out bibliometric studies in order to map, investigate and analyze the aforementioned topic in the Brazilian and international literary context, based on several databases, such as theses and dissertations, congress annals, websites of national magazines and international databases. A brief summary of these Brazilian and international studies is provided next, focusing on their respective objectives and their main findings.

Luft and Shields (2003) mapped the research on the theme "Management Accounting" through 275 articles published in six leading journals in the area. Through the connections and disconnections of the academic literature, the authors observed the development of research on the aforementioned topic, helping to contribute to a better understanding of the causes and effects of management accounting at the international level.

Cruz et al. (2010) identified the authors and their respective most relevant HEIs in the development process of management accounting research from 2004 till 2008. In the results with respect to the HEI, it is observed that the main agents of the field include the University of São Paulo (USP). Among the authors, Antônio A. de Souza remained central in the period 2005-2007, and other authors also stood out in each period.

Nascimento, Junqueira and Martins (2010) identified and analyzed the epistemological characteristics of the academic production of management accounting research in Brazil from 2005 till 2008. The results indicate: low use of references that address management accounting theories, low incidence of references to articles published in international journals and high average age of the works cited - 10 years. Regarding theories, it is observed that 83% of the works are based only on accounting concepts or legislation, while 17% use theories of economics, sociology or psychology.

Tavares Araújo and Castro Silva (2010) studied some bibliometric aspects of management accounting in Enanpad between 2003 and 2008. In the empirical research, 251 articles were analyzed. They verified that the Brazilian authors follow the trend to replicate the international studies in management accounting, mainly in the theme “Management Control System”. In general, it was noticed that, apparently, there is a shortage of scientific research in management accounting in the Enanpad congresses.

Lunkes et al. (2011) analyzed the scientific production and the doctoral training in management accounting in Brazil, published in national journals and in doctoral theses from 1962 till 2010. The results show an increase in the publications on management accounting. On the other hand, the doctoral education in management accounting increased in the period, which in a way reflects the growth in doctoral education in Accountancy in recent years.

Lunkes, Feliu, Borba & Rosa (2012) identified and analyzed articles on management accounting published in the main journals and the doctoral education in accounting in Spain. The results show that the publications in management accounting correspond to only 12% of the total. The doctoral education slightly dropped, with the graduation of 549 Ph.D. until 2010, while graduates in management accounting represent 20.5%. In a way, less publications in management accounting end up affecting the newly graduated Ph.D.’s in their research options and vice versa.

Oliveira and Boente (2012) described and analyzed the main characteristics of the academic production profile on the topic “Management Accounting” and explored 50 Brazilian scientific articles from 2002 till 2010. The main findings of this research were: predominance of exploratory research; the State of São Paulo as the largest place of scientific production; and balance in the use of national and international references by article.

Ribeiro and Espejo (2013) analyzed the thematic options in theses and dissertations defended in the *Stricto Sensu* Post-graduation Programs in Accounting in Brazil between 1973 and 2010. They concluded that, in Stage 1, absorption costing and variable costing were predominant; in Stage 2, the budget was highlighted; In Stage 3, ABC costing and strategic planning were evidenced; and, finally, in Stage 4, EVA and BSC were predominant in the theses.

Beuren and Hall (2014) identified the profile of articles that used or referred to the case study strategy in research on the practice of managerial accounting published in international journals in English Language. The results of the research show that the publications of articles developed through a case study in managerial accounting had a growth over the years analyzed, but with a high concentration in few journals. Most of these papers report empirical studies, followed by theoretical and bibliometric studies.

Beuren and Nascimento (2014) analyzed the profile of Management Accounting articles published in *Accounting, Organizations and Society*, from 2005 till 2009. The results of the research demonstrate, besides general characteristics and the authorship of the articles, that, regarding the disciplines of the investigated articles, Sociology stood out, followed by Economics; Production and Management; and Psychology.

Lunkes et al. (2014) described the development of management accounting in Brazil, from the perspective of socio-political and cognitive legitimacy. The results show, descriptively, that management accounting in Brazil presents socio-political legitimacy and still lacks greater recognition and insertion in the professional entities, whereas, in terms of cognitive legitimacy, it is consolidated in research in periodicals and congresses, in view of its strong presence in research lines and researchers, although its insertion in disciplines at the federal universities remains limited.

Da Silva and Beuren (2015) analyzed the intellectual production on the subject of management accounting in hospitals published between 1950 and 2011 and empirically tested whether it is in line with the bibliometric laws and principles. The results show greater adherence of the articles in health journals compared to the accounting area and that the United States has the largest number (48.5%) of published articles. In the empirical application of Lotka and Bradford’s laws and productivity assumptions, the findings did not confirm the assumptions and bibliometric laws tested, which may be indicative of non-consolidation of the subject, with a body of authors, institutions and journals.

Analyzing the studies in this section, a macro range of information on management accounting is observed, in the national and international scenarios, thus revealing the importance of the aforementioned topic for the diffusion, socialization, development and promotion of the field of accounting knowledge. However, none of the investigations seen in this section dealt with the ISI Web of Science Core Collection in a more thorough, extended and contemporary way, as we did in this study, thus showing a differential and a contribution of this research in comparison to the studies published recently.

### 3. Methodological procedures

The objective in this study was to analyze the behavior and peculiarities of the academic production on the subject Management Accounting published in the ISI Web of Science Core Collection from 1985 till 2014. Therefore, bibliometric (Michels & Schmoch, 2014) and sociometric (Rostampoor-Vajari, 2012) analysis techniques were used.

In order to evaluate the activity of science, bibliometrics is based on bibliometric laws, of which the following are evidenced: Lotka's Law, Bradford's Law and Zipf's Law (Da Silva & Beuren, 2015), that is, these bibliometric laws will be important for a better understanding and the information that requires greater transparency. These laws are: Lotka's Law, Bradford's Law and Zipf's Law (Table 1).

Table 1

#### Bibliometric laws

| Author                    | Law                 | Description  |
|---------------------------|---------------------|--|
| <i>Lotka</i><br>(1926)    | Inverse-Square Law  | The number of authors who publish $n$ articles in a given scientific area is about $1/n^2$ of those who publish only 1 article, and the proportion of authors who publish only 1 article should be 60% of all authors. Hence, the authors' productivity is measured through a size-frequency distribution model of the different authors in a group of publications. |
| <i>Bradford</i><br>(1961) | Law of Scattering   | Measuring the journals' productivity permits establishing the core and dispersion areas on a given theme in a same set of journals.  |
| <i>Zipf</i><br>(1949)     | Law of Least Effort | Measures how frequently the words appear in several texts, producing a ranked list of terms on a given theme. The author affirm that, if words that figure in a considerably long text are listed in decreasing order of frequency, the ranking of a word on the list will be inversely proportional to the frequency of the word ( $P_n - 1/na$ ).                  |

Source: Tavares Araújo and Castro Silva (2010, p. 36).

Quantitative bibliometric research, based on the Laws of Lotka and Bradford (in this study, Zipf's Law will not be used) and on indicators of author, HEI and country collaboration and productivity, carried out through the analysis of articles published in journals indexed in the database of the ISI Web of Science, in the areas of Social Sciences and Economics and Business.

In addition to bibliometrics, this study will also focus on sociometrics (Ribeiro, 2014c). A sociometric study or analysis of social networks of relationship, as it is also known (Cruz et al., 2010), is focused on the investigation of the matrix of relationships constituted among social actors (Galaskiewicz & Wasserman, 1994), represented in this study by the authors.

In the analysis of social networks, there are four basic elements, which are: the nodes, the positions, the connections and the flows (Wasserman & Faust, 1994). Nodes are the actors that make the network; the positions are the positions these actors occupy in the network. The connections entail the degree of density of the network; and, finally, the flows, are the exchange of information in a network (Wasserman & Faust, 1994).

In this context, relationships in a network are measured by pairs of actors, regardless of the structure and location where all actors are evaluated (Guimarães, Gomes, Odelins, Zancan & Corradi, 2009). There are several ways of identifying the structure and interactions of a network, such as network size, density and centrality (Wasserman & Faust, 1994).

Density is considered as the total active ties existing in a certain group of actors, that is, an indicator of the communication potential among the network actors (Guimarães et al., 2009). This structural indicator of the network varies between zero and one. Thus, the closer to zero, the less connected the social network is. However, the closer to one, the more connected the actors in a social network will be (Mendes-da-Silva, Onusic & Giglio, 2013).

And centrality is weighted as an indicator that calculates the acuity of an actor's locale in relation to the other actors in the network, that is, in other words, the amount of linkages this actor has with the other actors (Wasserman & Faust, 1994).

Three are the degrees often used to gauge the centrality of a network, namely: degree centrality; Centrality of closeness; and the centrality of intermediation (betweenness) (Ribeiro, Cirani & Freitas, 2013). Among these, the degree centrality is emphasized, conceptualized as the number of adjacent ties of one actor in relation to others in a network (Wasserman & Faust, 1994), helping to better estimate the positional "activity" of the actors (Rossoni & Guarido Filho, 2009).

The research universe encompassed all the articles of scientific journals available in the ISI Web of Science Core Collection database, especially in the areas of Social Sciences and Economics and Business. Regarding the ISI Web of Science, the scholars Vieira and Gomes (2009) affirm that, for years, it has been the database that covers all the domains of science.

The five fields of knowledge chosen for the data search, Social Sciences and Economics and Business, are due to the belief that these areas can contain research on management accounting in a broad and robust manner.

The sample selection procedure happened as follows: i) choosing the keywords applied in the search filter of the database; ii) data collection in the ISI Web of Science Core Collection database; iii) search for the keywords in the titles, abstracts and keywords of the articles; iv) definition of the sample, by reading the titles and / or abstracts of each article.

In the ISI Web of Science Core Collection, a filter with the keyword "management accounting" was established. This keyword was searched for in the title, abstract and keywords of each article, not simultaneously, thus allowing all articles on the subject studied in this research to be identified and catalogued.

After the definition of the sample, by reading the titles and / or abstract of each article, papers that could not be related to the main theme of this study were deleted, thus obtaining a sample of 242 articles, in a timeframe from 1985 to 2014.

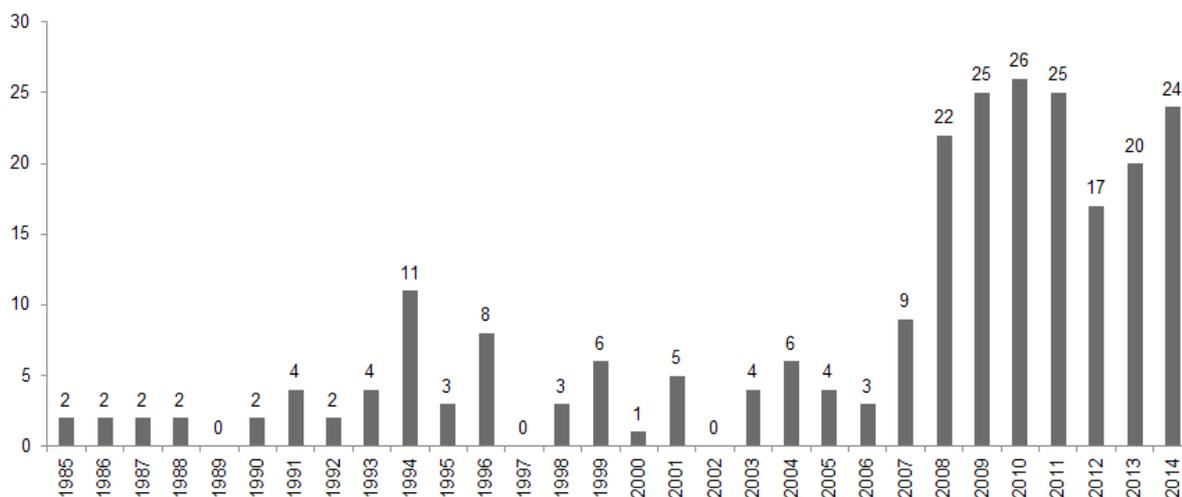
As previously evidenced, the data collection identified 242 articles, which were quantitatively analyzed according to the following indicators: (I) evolution of the topic management accounting; (II) newspapers; (III) authors; (IV) social network of authors; (V) HEI; (VI) countries; (VII) most cited articles; and (VIII) themes addressed. The data on each article were decomposed into information and captured through the software Bibexcel, while the figures were elaborated in UCINET 6 for Windows and Microsoft Excel 2007.

#### 4. Results and discussion

This section analyzes and discusses the results of the 242 articles on management accounting found in the ISI Web of Science Core Collection database in a 30-year timespan. Figure 2 shows the evolution of the theme "Management Accounting" between 1985 and 2014.

The analysis of Figure 2 reveals that the theme studied has always been diffused in the years investigated in this research, with peaks of production, such as in 1994 for example. It is well known, however, that the evolution of the management accounting theme started to emerge in 2007, achieving a certain degree of constancy in subsequent years, standing out more in 2010 and suffering a small decrease in 2012.

Information evidenced here shows two behaviors of the theme "Management Accounting", that is, the first as an emerging issue during the period from 1985 to 2008; and the second as a mature and legitimized theme in the international scientific context, between 2009 and 2014. This finding contributes to understand the importance of this theme, not only between 1985 and 2008, but especially during the most recent years. This has influenced its sustainable growth, creating value in the international academic field, regarding the dissemination and socialization of its academic production, through international scientific journals important for that disclosure and dissemination.

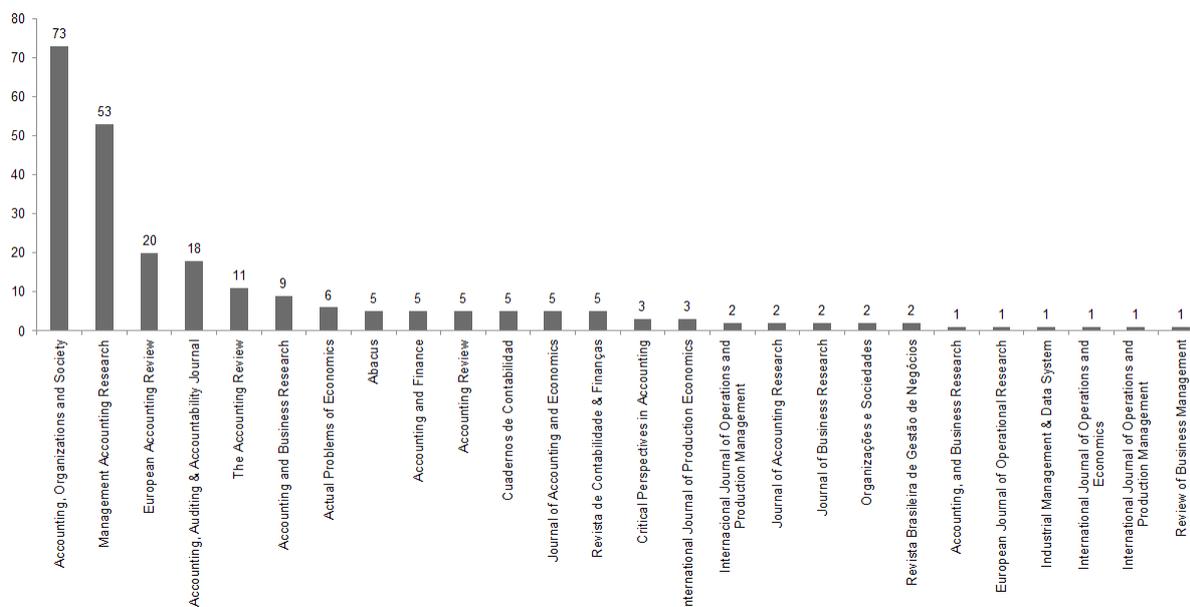


**Figure 2.** Evolution of the theme

Source: research data

Lunkes et al. (2011) and Beuren and Hall (2014) similarly corroborate the findings in this part of our study.

Figure 3 shows the 26 international journals identified in this study. Accounting, Organizations and Society and Management Accounting Research were the journals that excelled in the academic production on the theme “Management Accounting” in this study, with 73 and 53 articles published, respectively. These journals, especially Accounting, Organizations and Society, are also emphasized and highlighted in the authors’ national surveys: Borba and Murcia (2006), Riccio, Mendonça Neto and Sakata (2007), Murcia and Borba (2008), Borba et al. (2009) and Beuren and Nascimento (2014). That reveals the acuity of these journals for the diffusion and dissemination of the scientific knowledge on the theme “Management Accounting” at a global level.



**Figure 3.** Journals

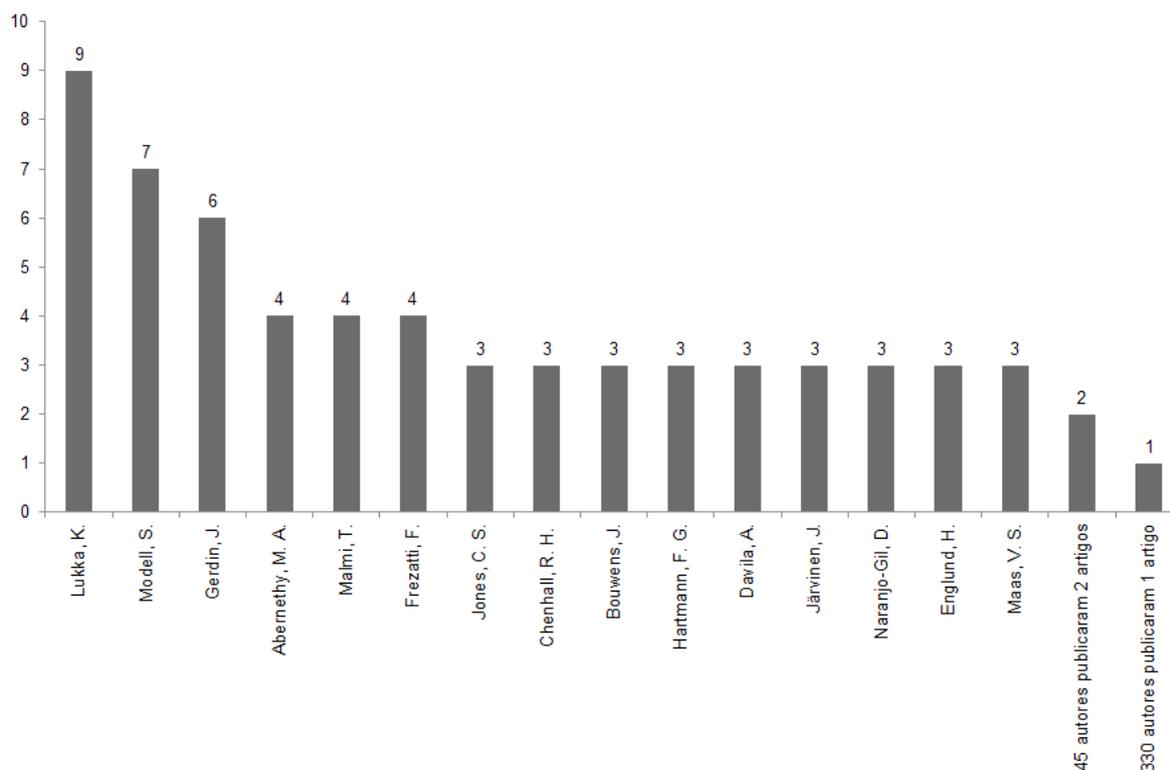
Source: research data

The European Accounting Review, Accounting, Auditing & Accountability Journal and The Accounting Review were also highlighted in this study, with 20, 18 and 11 articles published on the subject. These five journals, which are highlighted in this section, are equivalent to 175 articles published on management accounting from 1985 till 2014, making up approximately 72% of the total of 242 papers identified and assessed in this study. This information refers to the Bradford Law, which assesses the productivity of scientific journals, thus allowing them to constitute the core of journals on a given subject (Ribeiro, 2014c; Ribeiro, Costa & Ferreira, 2015).

The aforementioned core of journals that more systematically and robustly highlight the theme “Management Accounting” at the international level are: Accounting, Organizations and Society, Management Accounting Research, European Accounting Review, Accounting, Auditing & Accountability Journal and The Accounting Review.

Figure 4 shows the 390 authors identified in this study, emphasizing the 15 with greater scientific production on the subject. The researcher Lukka was the most productive in this study, publishing nine articles on the subject mapped; he is followed by Modell, with seven publications; Gerdin with six; Abernethy, Malmi and Frezatti with four each; and Jones, Chenhall, Bouwens, Hartmann, Davila, Järvinen, Naranjo-Gil, Englund and Maas with three.

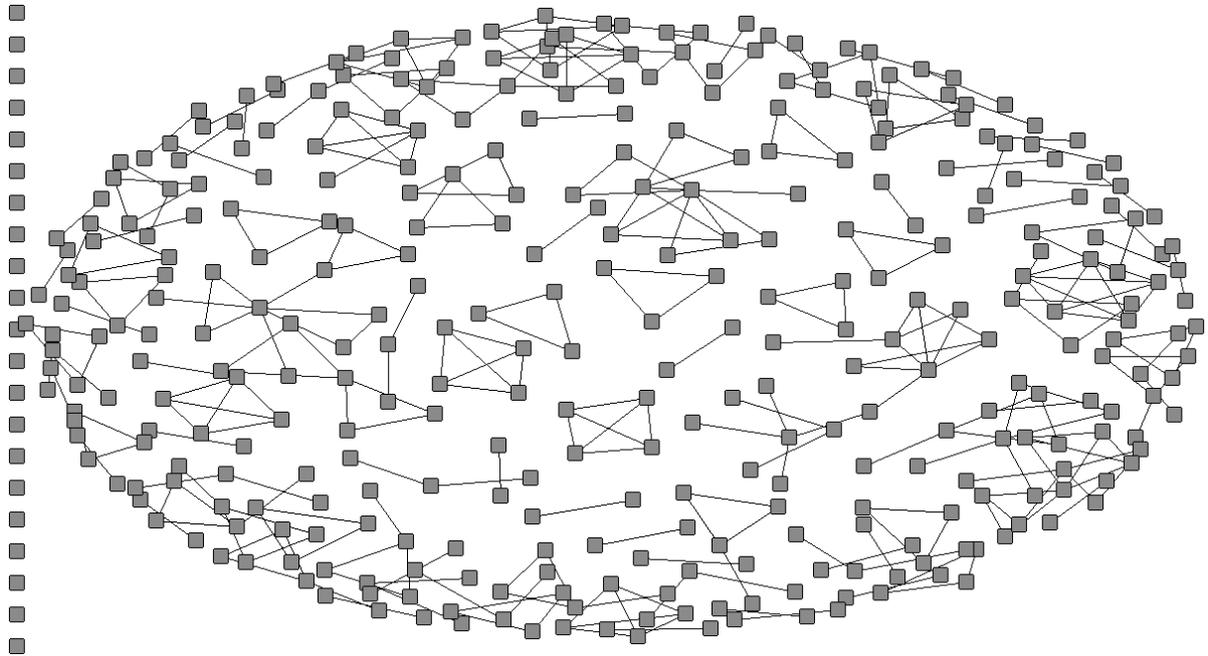
In short, 15 academics published three to nine articles on “Management Accounting”; 45 authors published two articles; and the vast majority, that is, 330 researchers, published one publication each. Such data and information refer to Lotka’s Law that measures the number of authors (Da Silva & Beuren, 2015) who publish n studies in a given field of knowledge (Tavares Araújo & Castro Silva, 2010). That is, few researchers publish much and many researchers publish little (Souza & Ribeiro, 2013), which is shown in Figure 4.



**Figure 4.** Authors

Source: research data

Figure 5 reveals the co-authoring network of the 390 authors identified in this research. The density of the co-authoring network in this study is 0.0045, representing 0.45% of the interactions among the actors in the social network mentioned, thus remaining far below the ideal (Mendes-da-Silva, Onusic & Giglio, 2013).

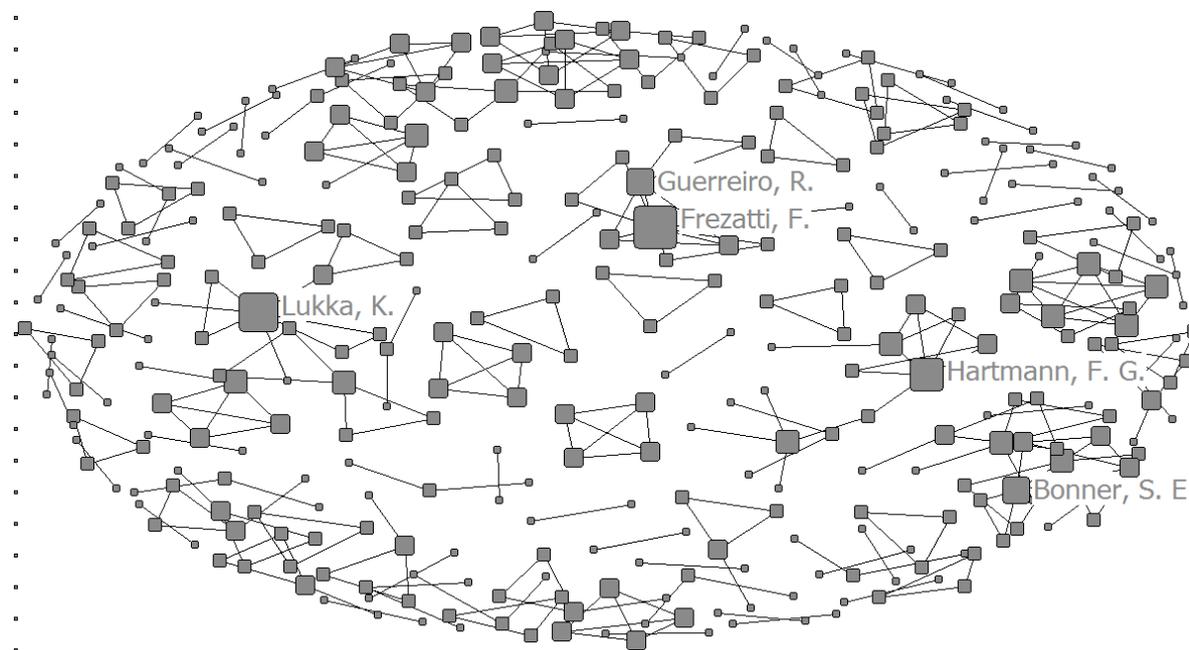


**Figure 5.** Co-authorship network

Source: research data

In other words, 99.55% of the possible active interactions in this group of actors still have not actually happened yet, which substantially compromises the potential for diffusion of information among these network actors (Guimarães et al., 2009), which is equivalent to a social network that is characterized by weak ties, impacting on the degree centrality (Mendes-da-Silva, Onusic & Giglio, 2013).

Figure 6 contemplates the same co-authoring network seen in Figure 5, but emphasizing the degree centrality of the aforementioned social network.

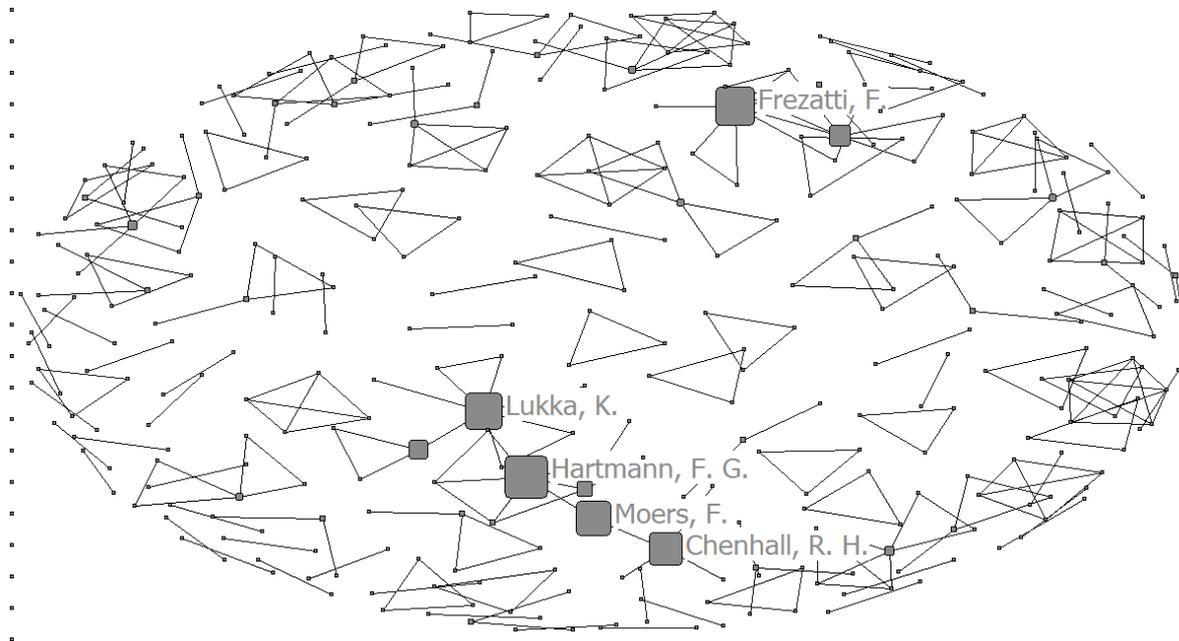


**Figure 6.** Co-authorship network (degree)

Source: research data

The authors Frezatti, Lukka, Hartmann, Bonner and Guerreiro are the most central, with regard to degree in this study. Three of them also figure as the most profitable in the production on the theme "Management Accounting": Frezatti, Lukka and Hartmann. Also considering that the degree centrality focuses on an author's number of adjacent bonds with others in a network (Wasserman & Faust, 1994), contributing to better measure the importance of their position in this social network (Rossoni & Guarido Filho, 2009), one may say that the researchers Frezatti, Lukka, Hartmann, Bonner and Guerreiro are the most important in this network, thus contributing to the spread and dissemination of ideas, information and knowledge on the subject of management accounting in the context of the international academic literature.

Figure 7 identifies the co-authorship network visualized in Figure 5, however, focusing on the betweenness.



**Figure 7.** Co-authorship network (betweenness)

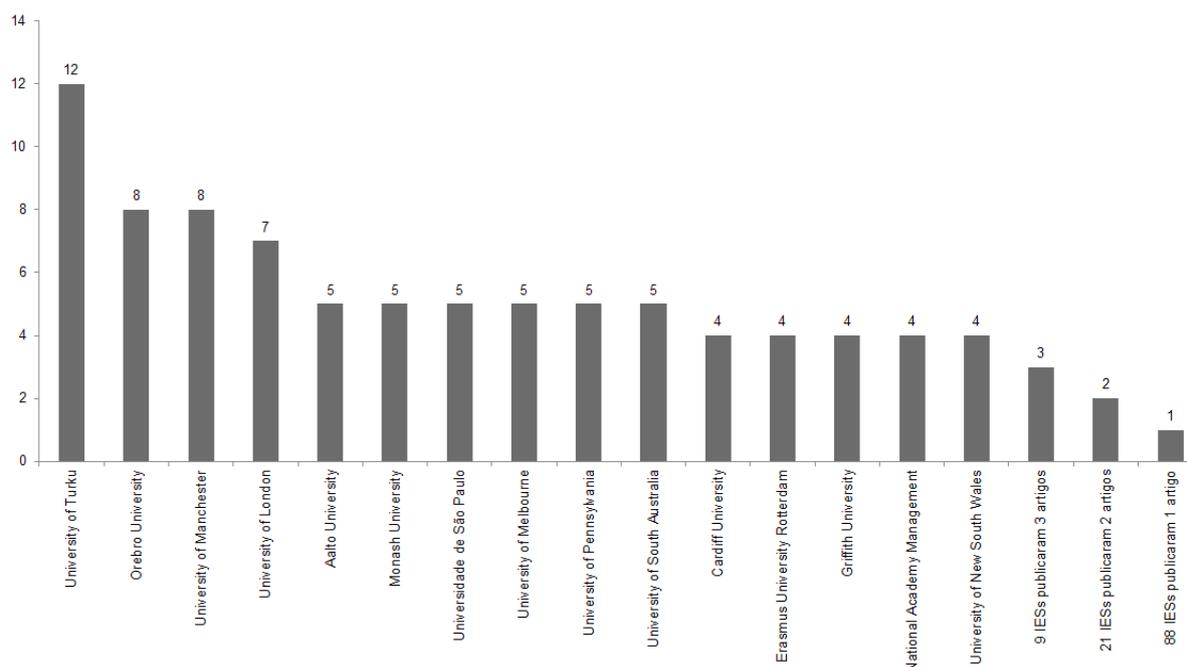
Source: research data

Considering that the betweenness reveals the authors who serve as mediators in a social network (Ribeiro, 2015), in the network shown in Figure 7, these authors are: Hartmann, Frezatti, Lukka, Chenhall and Moers. Of these, four appear as the most productive: Hartmann, Frezatti, Lukka and Chenhall; and of these, three also stand out in the degree centrality, who are: Hartmann, Frezatti and Lukka. Therefore, these are considered the most essential and central in the co-authoring networks conceived in this study.

The academics who were highlighted in this section are seen and considered as a sort of bridge to the accomplishment of the relationship with the other academics in the same network (Ribeiro, 2015), that is, they are the main responsible for the exchange of information in the aforementioned co-authoring network (Ribeiro, Cirani & Freitas, 2013). It should be noted that the intermediation role these researchers admit in the aforementioned social network permits and contributes to the exchange of ideas, information and knowledge among different groups (Rossoni & Guarido Filho, 2009).

Figure 8 shows the 133 HEIs identified in this study, focusing on the 15 best placed, due to their respective scientific productions on the subject analyzed.

The University of Turku was highlighted in this section, with 12 articles published; next, Orebro University and University of Manchester published eight; The University of London issued seven articles; with five publications, Aalto University, Monash University, University of São Paulo, University of Melbourne, University of Pennsylvania and University of South Australia; and with four papers, Cardiff University, Erasmus University Rotterdam, Griffith University, National Academy Management and University of New South Wales are evidenced. Of these, five universities come from Australia, and this country figures among the three that stood out in the publication of articles on the subject “Management Accounting” (Figure 9).

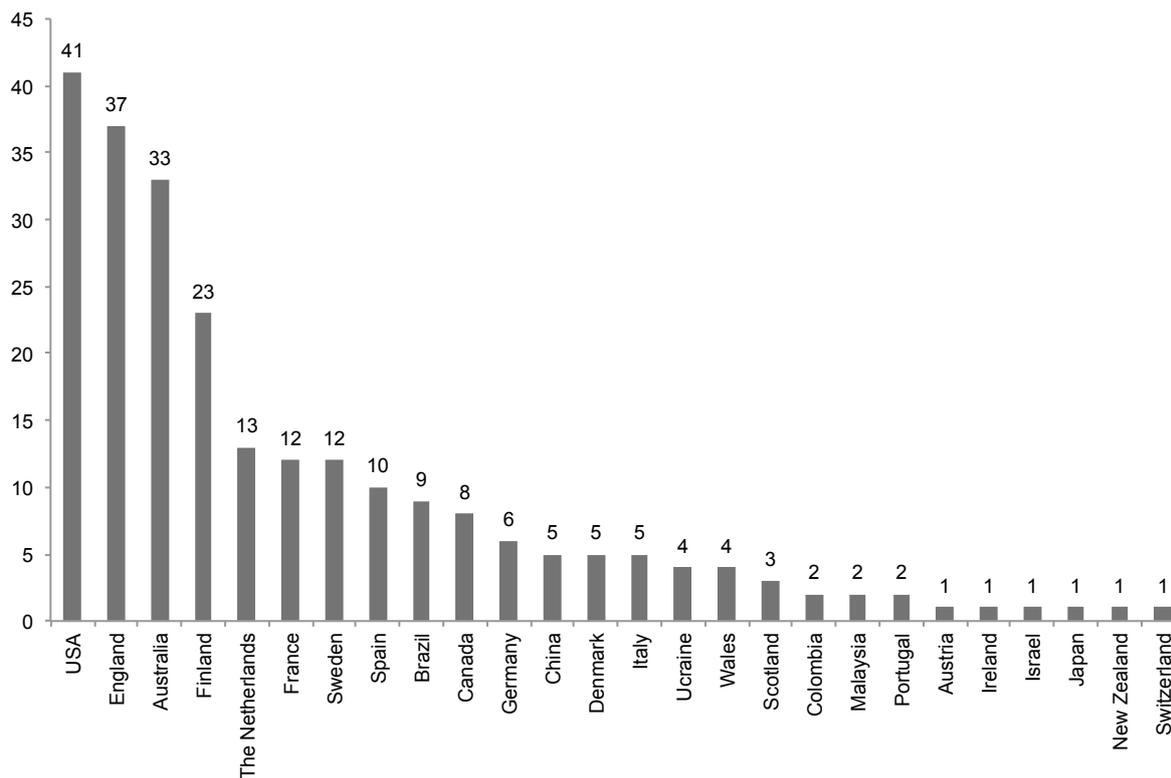


**Figure 8.** HEIs

Source: research data

The University of São Paulo is highlighted, thus showing its importance in the national context regarding the scientific production on the theme “Management Accounting” in the Brazilian scientific literature. Cruz et al. (2010) and Oliveira and Boente (2012), in their respective research, corroborate the statement in general.

Figure 9 shows the 26 countries identified in this study. The United States of America (USA), England and Australia stood out in the scientific production on the theme “Management Accounting”, with 41, 37 and 33 published articles, respectively. Such finding implies that these countries are the central and influential guides in the academic production on this subject. Other bibliometric studies, which focused on the scientific production of other subjects, also verified the assiduity and importance of these nations in the dissemination and socialization of the knowledge on these subjects, were: Ribeiro (2014a), Ribeiro (2014b) and Ribeiro, Costa and Ferreira (2015).



**Figure 9.** Countries

Source: research data

Brazil figures among the 10 countries with the highest academic production on the subject, with nine publications, and these 10 publications come from USP, which in this research published five papers on the subject. This finding indicates that, even though the national academic production is incipient, in the international context on the subject “Management Accounting”, Brazil stands out among the nations that published the most. This demonstrates the importance and maturity that the theme has in the context of the Brazilian academic literature (Lunkes et al., 2011), and that maturity can a posteriori be extended in the medium or long term, also in the international academic scene.

It is understood that citations are important for the construction of scientific knowledge (Silveira & Bazi, 2010). In view of this, Table 2 highlights the 10 most cited articles in the 30-year timeframe on the subject "Management Accounting" in the international context.

Table 2

**10 most cited articles**

| 10 most cited articles   |
|--|
| Feltham, G. A., & Xie, J. (1994). Performance measure congruity and diversity in multi-task principal/agent relations. <i>The Accounting Review</i> , 429-453.   |
| Luft, J., & Shields, M. D. (2003). Mapping management accounting: graphics and guidelines for theory-consistent empirical research. <i>Accounting, Organizations and Society</i> , 28(2), 169-249.   |
| Chenhall, R. H., & Morris, D. (1986). The impact of structure, environment, and interdependence on the perceived usefulness of management accounting systems. <i>The Accounting Review</i> , 16-35.  |
| Chenhall, R. H., & Langfield-Smith, K. (1998). The relationship between strategic priorities, management techniques and management accounting: an empirical investigation using a systems approach. <i>Accounting, Organizations and Society</i> , 23(3), 243-264. |
| Briers, M., & Chua, W. F. (2001). The role of actor-networks and boundary objects in management accounting change: a field study of an implementation of activity-based costing. <i>Accounting, Organizations and Society</i> , 26(3), 237-269.                    |
| Malmi, T., & Brown, D. A. (2008). Management control systems as a package—Opportunities, challenges and research directions. <i>Management Accounting Research</i> , 19(4), 287-300.   |
| Abernethy, M. A., & Brownell, P. (1999). The role of budgets in organizations facing strategic change: an exploratory study. <i>Accounting, Organizations and Society</i> , 24(3), 189   |
| Abernethy, M. A., & Lillis, A. M. (1995). The impact of manufacturing flexibility on management control system design. <i>Accounting, Organizations and Society</i> , 20(4), 241-258.  |
| Wruck, K. H., & Jensen, M. C. (1994). Science, specific knowledge, and total quality management. <i>Journal of Accounting and Economics</i> , 18(3), 247-287.  |
| Baines, A., & Langfield-Smith, K. (2003). Antecedents to management accounting change: a structural equation approach. <i>Accounting, Organizations and Society</i> , 28(7), 675-698.  |

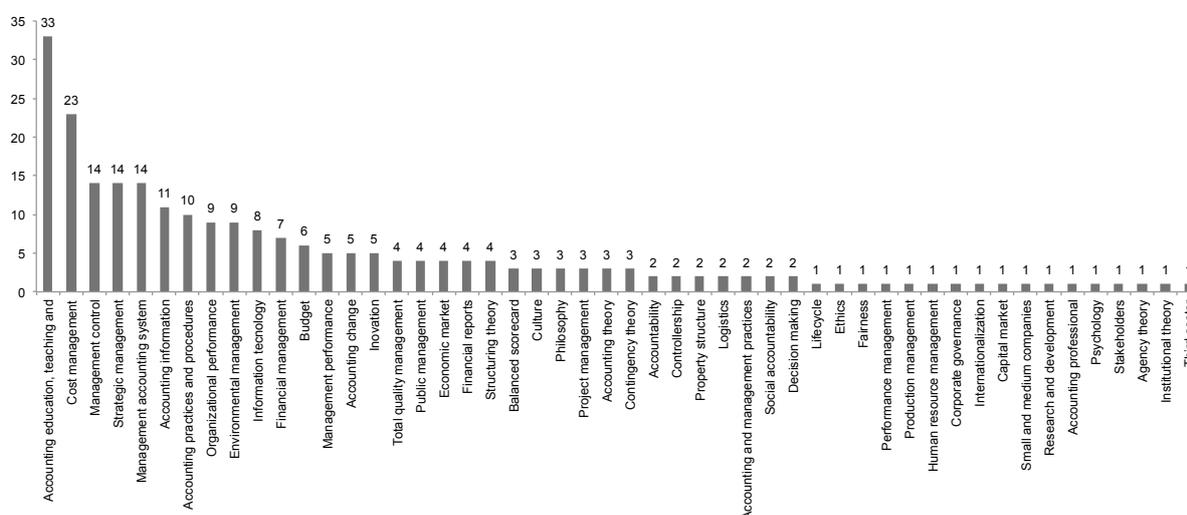
Source: research data

The analysis of the citations reveals the flow published and the evolution of a determined study over a given timeframe, and can therefore serve as a source to measure the direct and / or indirect influence of a specific research by a research group and / or an HEI of academics, or of scientific journals (Caldas & Tinoco, 2004).

It was observed that, of the 10 most cited articles, six are from the journal *Accounting, Organizations and Society*, which in this study was also highlighted as the magazine that most published studies on the subject analyzed. Still on the 10 most cited papers, four are from the 21st century, that is, from the 2000s. Two studies by Chenhall are among the most cited. The aforementioned researcher is also highlighted in this research as one of the most productive and is put in evidence as one of the academics with greater betweenness.

Figure 10 shows the 50 topics on management accounting identified in this study. Accounting education, teaching and research is the most discussed topic, with 33 articles published. It should be mentioned, however, that the subject addressed themes and / or research methods that dealt with education and accounting education, thus seeking to understand the evolution of the accounting area and / or its history in the global context. And in relation to the methods, some studies focused on the analysis, investigation, mapping and / or exploration of several subjects related or directly or indirectly linked to management accounting, through research on their respective academic production.

The subject “Cost Management” ranked second with 23 papers published in 30 years of research on the central theme of this study, that is, management accounting. It is important to highlight that cost management is an intrinsic subject to the theme “Management Accounting” (Briers & Chua, 2001; Carmo et al., 2014), and is important for managers in decision making (Küpper, 2009). It is also highlighted that ABC costing was evidenced in this study.



**Figure 10.** Themes discussed

Source: research data

The themes “Management Control”, “Strategic Management” and “Management Accounting System” were also highlighted in this research, as 14 publications were found on each of them. Therefore, the highlight on these three themes is due to the importance of the MAS, as they accumulate procedures incorporated in management accounting, such as budget and production costs, and at the same comprise the systematic processes used to achieve the objectives of the company’s business, approached from other fields of knowledge. In general, MAS are composed of management controls that enable and evidence the accounting information of routines and processes managers use to facilitate strategic management decisions (Beuren & Oro, 2014).

In sum, 50 themes were identified in this study, the first five of which account for approximately 40% of the total of 242 articles published on management accounting. Fifteen themes were published four to 11 times; 13 subjects were published two to three times; and 17 themes were published only once each.

As this finding offers an opportunity to encourage, spread and disseminate even more on the subject "Management Accounting" in the international scientific literature, those subjects that are directly or indirectly linked to this theme were only published once in 30 years of studies, meaning that they are still embryonic in the international context, thus providing and contributing to a chance to broaden their respective knowledge in the global academic scope, with direct impact on the optimization, disclosure and socialization of the main theme of this study.

## 5. Final considerations

The objective in this study was to analyze the behavior and the particularities of the academic production on the theme Management Accounting published in the ISI Web of Science Core Collection from 1985 to 2014.

As of 2007, there was an evolution in the subject "Management Accounting". The journal Accounting, Organizations and Society stood out in the disclosure of publications on the research subject. Lukka was the most prolific author; the University of Turku was evidenced among the HEI; the US was the focus country in this study; the co-authorship networks had low density and high degree of centrality and betweenness; and the subjects that were emphasized were: Education, Accounting Teaching and Research, Cost Management, Management Control, Strategic Management and Management Accounting System.

The theme "Management Accounting" as observed in this study, is already in a mature and legitimized phase in the international academic context. This assertion can be confirmed through the themes identified and addressed in this study, thus contemplating a range of subjects that are systematically and recurrently interacting in a management accounting system, helping in their own right to improve and disseminate the theme, not only in the global academic sphere, but also in the business environment.

In a way, even if we verify the heterogeneity of the themes addressed in this study, there is still the possibility to better develop them, especially the less publicized themes, based on the temporality addressed in this study. Thus, by improving them, it would influence a trend towards greater development of the theme "Management Accounting", permitting the emergence of new groups of studies, new research, new models, new insights, to add this value to research in management accounting, clearly influencing the growth of the accounting knowledge field.

These emerging studies, developing themes that relate to management accounting, especially emerging issues and embryonic issues, would help to guide, extend and devise new procedures, processes and / or working methods in the business field, collaborating to optimize and further materialize management accounting as the preponderant and unique theme in decision processes and decision making in organizations.

One cannot understand a particular theme if one does not understand it. This study, through the bibliometric and sociometric indicators, permitted and contributed to this, bringing to light new and contemporary data and information on the broad and rich nuances that guide and underlie the theme "Management Accounting" in the academic field, such as, for example, the most cited studies, the social networks of the actors (authors and HEIs), the most prolific authors, the most productive HEI and the countries that stand out in the production on this theme in the world.

This study also contributed to the presentation of contemporary data and information on the subject of "Management Accounting", at the international level, cooperating to help spread, disclose and disseminate knowledge on the subject in the international and Brazilian academic literature, providing a better understanding by part of the researchers already legitimized in the area and by those academics who want and wish for a better judgment and comprehensiveness on the research theme.

It is concluded in this study that efforts like this, that is, to analyze the scientific production on the theme "Management Accounting", also contribute to further discernment and elaboration, not only on the subject matter itself, but also on the inherent and somehow related themes, and which were evidenced in

Figure 10 of this study, contributing to the development of new correlated research and / or studies that use similar and / or different techniques and methods, but which, in a certain way, strengthen the scientific production on management accounting in the international scientific literature.

This study was limited to research publications in the ISI Web of Science Core Collection from 1985 to 2014. Thus, for future studies, an optimization and / or improvement of this study is suggested, extending the search for articles on management accounting to other databases such as Scopus. For future studies, a greater emphasis on the techniques of social network analysis is also suggested, trying to understand the links of other actors, such as HEIs, countries and citations. Another suggestion for future research is to better understand the 50 themes highlighted in this study, focusing in a more analytical manner on all or at least the most outstanding, through a content analysis.

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