

*Full Length Research Paper*

# Audit research: A systematic literature review of published research on ISI Web of Science between 2002 and 2013

Marcelo de Santana Porte<sup>1,3\*</sup>, Irina Saur-Amaral<sup>2,3</sup> and Joaquim Carlos da Costa Pinho<sup>3</sup>

<sup>1</sup>University of Minho, Portugal.

<sup>2</sup>Portuguese Institute of Marketing Administration (IPAM), Portugal.

<sup>3</sup>University of Aveiro, Portugal.

Received 07 October, 2014; Accepted 11 February, 2015

**We examined the international scientific productivity on auditing between 2002, when the Sarbanes-Oxley Act (SOX) was published, and the end of 2013, based on a bibliometrics/scientometrics analysis of scientific articles included in the Web of Science from the Institute for Scientific Information (ISI). A database was created including 2,394 publications. As a contribution it was possible to systematically identify the main features of the auditing publications in the extended literature through bibliometrics and scientometrics analysis for the creation of its state of art in auditing. It is important that other researchers study the reason for the growth in auditing publications and identify relevant concepts, theories, methodologies, and emerging issues that have arisen in the field of auditing considering that there is a transactional empirical gap for future studies in the literature.**

**Key words:** Bibliometrics, scientometrics, scientific production, Social Science Citation Index (SSCI), literature review.

## INTRODUCTION

Although researchers from several fields of knowledge have used bibliometric/scientometric techniques to know what is being produced in terms of scientific publications, the number of studies on accounting, and specifically auditing, is quite low. The study conducted by Moya and Prior (2008) can be cited as an example. In the study, they highlighted the scientific production on accounting from an entire decade published in Spanish journals.

Another example is the research done by Neto et al. (2009), in which the authors analyzed the temporal evolution of work published at the Annual Meeting of the National Association of Post-Graduation in Management Programs (ENANPADs), in Brazil. In both cases research was done between 1996 and 2005.

There is, therefore, an increase in the frequency of use of bibliometrics/scientometrics in scientific studies as a

\*Corresponding author. E-mail: [marcelo\\_porte@hotmail.com](mailto:marcelo_porte@hotmail.com); Tel: +55 6182662897.

methodological way of identifying the scientific production of peers. Bibliometric studies can be found in different fields, such as venture capital (Cornelius and Persson, 2006), economics (Lee et al., 2010), supply chain management (Charvet et al., 2008), corporate governance (Durisin and Puzone, 2009), marketing (Stremersch and Verhoef, 2005; Stremersch et al., 2007), family companies (Casillas and Acedo, 2007), among others.

Studies on international entrepreneurship (Kraus, 2011) and on family businesses (Chrisman et al., 2010; Kraus et al., 2011) were conducted some years ago. The objective of the studies was to describe the state of the art through the analysis of citation in order to characterize the main topics, gaps, research basis and tendencies in the field, thus demonstrating the need to know what is being published from a holistic view to interpret results.

Such research is important in terms of scientific investigation, as it refers to a bibliometric and scientometric perspective on worldwide scientific production on auditing. In our longitudinal study, we aimed at presenting a global view of the state of the art of publications in auditing through a bibliometric and scientometric study of Web of Science. We examined some specific objectives in the literature of the field as a basis, such as: Category from Web of Science; Distribution of the published source and number of citations; Sources of publications with Impact Factor (IF), Eigenfactor (EF), and Article Influence (AI); Chronological evolution of the publication number; Profile of the partnerships between authors, language of works, research funding; Countries of publication; Distribution of published Institutions; Description of the most cited documents; Productivity of authors and co-authors; Keywords most used; H-Index profile of publications.

The sample period starts in 2002 due to the global impact that auditing experienced after the scandal involving Eron's financial reports, audited by Arthur Andersen, which culminated in the creation of SOX. The objective of this act is to ensure the formulation of auditing mechanisms and reliable security in businesses, including the guidelines for the formation of committees in charge of supervising its activities and operations in order to reduce the risks of the business, prevent fraud or ensure there is a way to identify it if it takes place, guaranteeing transparency in corporate management.

This research was as a scientific precept of the study conducted by Verbeek et al. (2002), which addresses the key indicators that should be used to support a bibliometric study: number of publications, data sources, citations, impact factor, time evolution of the number of publications, publishing countries, productivity of the authors and co-authors.

In agreement with Verbeek et al. (2002), this study might be able to assist junior and senior researchers in future research. Also, there is a lack of research directed to bibliometrics and scientometrics in accounting, particu-

larly concerning publications present in international databases and covering the auditing subject.

## REVIEW OF THE LITERATURE

It is not a novelty that scholars from several sciences are concerned about what is published in their fields. With the development in technology and countless sources of publications in several fields, there is an increase in the need for researchers to use technological resources alongside the methodology research for a systematic review of the literature and even as a way to a better development of reliable indicators for the analysis of scientific activity, once the databases are being used as the sampling universe in several scientific researches, such as Web of Science from the Institute for Scientific Information (ISI) (Chang and Ho, 2010; Duan, 2011; Kostoff et al., 2007; Kostoff et al., 2006; Machacek and Kolcunova, 2008; Nerur et al., 2008).

In their study, Verbeek et al. (2002) demonstrate how science can be mapped using technological measurement instruments. It is worth noticing that the same authors also report that the quantitative indicators should be supplemented with qualitative analyses from the experts in each field.

It is common to link a quantitative study to a research involving bibliometrics/scientometrics; however there are qualitative studies, such as Leal et al. (2013), and Bogdan et al. (2009) that are also used in the literature primarily to (i) explore how the field has evolved over time, (ii) identify groups of research themes that have emerged over time and the relationships between them, and also (iii) identify the cooperation evaluation between authors and countries.

There are several forms of applicability of bibliometric/scientometric studies, such as:

- (i) disclosure of the publications of a country (Butler, 2003; Daraio and Moed, 2011; Fetscherin et al., 2010; Jacobsson and Rickne, 2004; Jimenez-Contreras et al., 2003; Kostoff et al., 2007, 2005, 2007, 2006; Sarafoglou, 2006; Schoeneck et al., 2011);
- (ii) creation of research networks between university-industry-government/university-industry/public-private partnership (PPP) (Abramo et al., 2009, 2011; Hayashi, 2003; Marsilio et al., 2011; Park and Leydesdorff, 2010);
- (iii) a field/subfield of Science (Alfalla-Luque and Medina-Lopez, 2009; Chabowski et al., 2011; Cornelius et al., 2006; Etemad, 2004; Kim and McMillan, 2008; Ma and Stern, 2006; Rubin and Chang, 2003; Serenko and Bontis, 2013; Talukdar, 2011; Uysal, 2010; Walter, 2010);
- (iv) specific contributions of an author (Diamond, 2007; Meyer et al., 2004; Uslay et al., 2009);
- (v) scientific production of a scientific journal or

journal group (Biemans et al., 2007; Casey and McMillan, 2008; Francisco, 2011; Kirchler and Holzl, 2006; Mazzon and Hernandez, 2013; McMillan and Casey, 2007; Ramos-Rodriguez and Ruiz-Navarro, 2004; Salas and Sobrevias, 2011; Valacich et al., 2006);

(vi) books as knowledge distribution agents (Serenko et al., 2012);

(vii) Dissemination of a theory in a scientific field (Weerakkody et al., 2009).

In a research conducted by Groot and Garcia-Valderrama (2006) it is seen that "*the number of publications in top international journals is the best predictor of the results of peer review*," emphasizing how important it is for the researcher to publish in international journals to raise their academic reputation or even to assist in raising funds for investment in research and development.

Nevertheless, funding agencies use such resources as one of the indicators to assess the quality of the publications, verifying whether the research makes use of good reputation sources of publications, and whether the research references have a good impact factor (IF), so that they can offer financial support for research. According to Groot and Garcia-Valderrama (2006), to provide financial resources to support academic research programs the sponsors evaluate the quality of their publications and productivity of their collaborators.

With the global economic downturn the economics of knowledge becomes an important factor for increasing the Gross Domestic Product (GDP) of a nation. Investment in Research and Development (R&D) is one way to try to overcome recession in the future. However, high R&D costs associated with limited sources of public funding increasingly restrict the allocation of funds for scientific development which are distributed according to the merit and capacity of researchers (Abramo et al., 2009).

Confirming the information above, Bengisu and Nekhili (2006) conducted a study in which they seek to align the Turkish efforts of technology anticipation to the international Science and Technology (S&T) activities. Furthermore, they aimed to collect quantitative information on priority technologies in order to fund research and invest in technology.

## METHODOLOGY

The word "audit\*" was used in the topic field (including title, abstract and keywords) with a limited survey period from 1900 to 2013 on the citation database data at the Social Science Citation Index (SSCI) in Web of Science. After this procedure the refinement showed 40,140 results. The next process was the completion of the document type selection, refining Article and Review groups, therefore reducing the results to 34,670. After that, the Business Economics research field was selected, as, based on a pre-test, this is the field that is closest to the proposed theme, creating an indicator of 4,572 results. However, it is worth noticing that, although there was a refining in the above-mentioned field, other

fields are present since the same publication might be classified in more than one field; so, to guarantee the best research scope, there were no exclusions of fields that were not refined precisely due to the fact that these publications are in another field, and if such exclusion happened it would also exclude the publications from one of the fields chosen for refinement. It is worth noticing that the present data listed here was updated up to January 10, 2014.

The next step was to select the publications from 2002 to 2013, a total of 2,480 results, and transport them to the EndNote X5 program so that a Systematic Literature Review and content analyses could be conducted in order to highlight the results found in only in the auditing field. After this it was possible to find 2,394 publications in auditing once the outlines were excluded. Then these references were transported to the Nvivo10 program with purpose of developing a specific database on the subject so that a quantitative (Category from Web of Science; Distribution of the published sourced and number of citations; Sources of publications with Impact Factor (IF), Eigenfactor (EF), and Article Influence (AI); Chronological evolution of the publication number; Profile of the partnerships between authors, language of works, research funding; Countries of publication; Distribution of published Institutions; Description of the most cited documents; Productivity of authors and co-authors; H-Index profile of publications) and qualitative (Keywords most used) approach could be conducted based on statistics, mathematics and content analyzes. It is worth noting that most of the quantitative data were generated directly by the Web of Science system and only tabulated by researchers.

The results will provide future researchers with the knowledge of who the main auditing authors are in the Web of Science database, and will also provide information such as: which institutions are performing studies in the field, which publication sources, authors, and countries publish the most, what are the most used keywords, among others.

## RESULTS

Based on the methodological assumptions used for the period between 2002 and 2013, after the Systematic Literature Review, 86 publications were found from a total of 2,480 publications to have no connection with the auditing field, so 2,394 publications were used in this research (Table 1).

The publications in auditing can be divided into four major categories classified by Web of Science: Business Finance, Economics, Management and Business. However, Business Finance is the most expressive because it consists of more than half of the publications in the field. The other three balance each other with a range of 19 to 22% of the found results. It is worth noting that the same item can be classified in more than one area (Table 2).

The journal that publishes the most in auditing is the Auditing Journal of Practice and Theory (299; 12.5%), followed by Accounting Review (162; 6.8%) and Contemporary Accounting Research (158; 6.6%). The top 13 journals put together represent more than half of the publications in the field (1,233; 51.5%), highlighting the importance its editors give to the topic. The Accounting Review also carries another feature, the ratio of times its studies were cited (3,577) and without self-citations (3,191), thus having the second highest average of citations 22.08, short only to the Journal of Accounting

**Table 1.** Profile of the analyzed publications.

| Profile                                                                                                                  | P     | F1 (≅) |
|--------------------------------------------------------------------------------------------------------------------------|-------|--------|
| Publications from 2002 to 2013 in Web of Science (filter the use of the term “audit”) in the field of Business Economics | 2.480 | 100%   |
| Outlines (Excluded articles for not having any connection to the auditing field)                                         | 86    | 3.47%  |
| Publications selected after content analyzes linked to the auditing field                                                | 2.394 | 96.53% |
| Publications analyzed in this research                                                                                   | 2.394 | 100%   |

P = Number of publications.

**Table 2.** Category distribution in Web of Science by number of publication with a minimum of 2%.

| Web of science categories              | P     | F1 (E) |
|----------------------------------------|-------|--------|
| Business Finance                       | 1.436 | 60%    |
| Economics                              | 524   | 22%    |
| Management                             | 507   | 21%    |
| Business                               | 449   | 19%    |
| Ethics                                 | 114   | 5%     |
| Public Administration                  | 75    | 3%     |
| Operations Research Management Science | 54    | 2%     |

P = Number of publications.

Research with an average of 31.20 citations per publication (Table 3).

There are many publication sources that hold productions linked to the auditing field (343). However, more than half of the publications (61.5%) can be found in only 13 journals (Table 3), only nine of which include Impact Factor (IF)<sup>1</sup> > 1 (Table 4). The journal that stands out is the Journal of Accounting & Economics for having an IF close to four, and for being the third source of publication with the largest Eigenfactor (EF)<sup>2</sup>, second only to the Journal of Business Ethics and Accounting Review, in addition to also having greater Article

<sup>1</sup> The Impact Factor is the average of the number of times articles from the journal published in the last two years have been cited in the year in the Journal Citation Reports (JCR). The impact factor is calculated by dividing the number of citations in the JCR a year by the total number of articles published in the two previous years. An impact factor of 1.0 means that, on average, the articles published one or two years ago have been cited one time. An impact factor of 2.5 means that, on average, the articles published one or two years ago have been cited two and half times. The pieces might be citing articles published in the same journal. However, most of the citing articles are from different journals, proceedings or books indexed by the Web of Science. Source: [http://admin-apps.webofknowledge.com/JCR/help/h\\_eigenfact.htm](http://admin-apps.webofknowledge.com/JCR/help/h_eigenfact.htm)

<sup>2</sup> The Eigenfactor Score calculation is based on the number of times journal articles published in the last five years have been cited in the JCR year, but also considers that journals have contributed to these journal citations highly cited journals influence to the network more than lesser cited journals. The reference to an article in a journal to another article from the same journal is removed, so that Eigenfactor Scores are not influenced by journal self-citation. Source: [http://admin-apps.webofknowledge.com/JCR/help/h\\_eigenfact.htm](http://admin-apps.webofknowledge.com/JCR/help/h_eigenfact.htm)

Influence (AI)<sup>3</sup>.

The results show that the authors of almost one third of the publications (758) from the Top 13 publication sources focused on only six journals (AOS, CAR, CGIR, AH, JBE and AJPT) with an IF between [1;2]. The result is even better considering the publication sources with an IF between [1;3] with eight publications (JAE, AR, JAR, AOS, CAR, CGIR, AH, JBE e AJPT) which form a group of 974 publications responsible for nearly 40% of the publications in auditing (Table 5).

It is noticeable that over time there was a trend of more journals publishing about auditing – 2011, with 311 published studies, can be highlighted – since the number of submitted publications probably also increased because of the enactment of the Sarbanes-Oxley Act (SOX) in 2002. The research cannot explain the reason for the increase in publications, but it is worth remembering that in 2005 the public companies of the European Union were forced to adopt the standards of the International Financial Reporting Standards (IFRS), possibly as an indicator of the increase in auditing productions. It is important that other researchers check what the real reason for the growth of such publications was and thus complement the information reported here (Figure 1).

Based on Table 6 we can notice that 79% of the articles found here were produced in partnerships, thus demonstrating the need for group work in order to obtain more significant results. However, the partnerships of two or three authors are significant, as they represent approximately 69% of the studies.

Still on Table 6, we can detect that the studies are mostly published in English (96%). In second place, with a much smaller representation, are the publications written in German, Spanish, Russian and French.

<sup>3</sup> The Article Influence determines the average influence of articles in a journal over the first five years after publication. It is calculated by dividing a periodical Eigenfactor Score by the number of articles in the journal, normalized as a fraction of all articles in all publications. This measure is roughly comparable to the journal Impact Factor of 5 years considering that it is an influence citation relation of a journal with the size of the contribution of the journal article for a period of five years. The average Article Influence Score is 1.00. A score higher than 1.00 indicates that each article in the journal has an above average influence. A score less than 1.00 indicates that each article in the journal has below-average influence. Source: [http://admin-apps.webofknowledge.com/JCR/help/h\\_eigenfact.htm](http://admin-apps.webofknowledge.com/JCR/help/h_eigenfact.htm)

**Table 3.** Distribution of publication sources according to general data.

| Publication sources                          | Acronym | P            | F1 (E)      | C1       | C2       | $\bar{x}$ |
|----------------------------------------------|---------|--------------|-------------|----------|----------|-----------|
| Auditing-a Journal of Practice & Theory      | AJPT    | 299          | 12.5%       | 2,263    | 1,531    | 7.57      |
| Accounting Review                            | AR      | 162          | 6.8%        | 3,577    | 3,191    | 22.08     |
| Contemporary Accounting Research             | CAR     | 158          | 6.6%        | 1,982    | 1,738    | 12.54     |
| Journal of Business Ethics                   | JBE     | 105          | 4.4%        | 668      | 609      | 6.36      |
| Accounting Organizations and Society         | AOS     | 80           | 3.3%        | 1,043    | 925      | 13.04     |
| Corporate Governance-an International Review | CGIR    | 62           | 2.6%        | 386      | 345      | 6.23      |
| Journal of Accounting and Public Policy      | JAPP    | 60           | 2.5%        | 166      | 142      | 2.77      |
| Journal of Accounting Research               | JAR     | 54           | 2.3%        | 1,685    | 1,638    | 31.20     |
| Accounting Horizons                          | AH      | 54           | 2.3%        | 162      | 145      | 3         |
| Journal of Accounting & Economics            | JAE     | 54           | 2.3%        | 2,214    | 2,143    | 41        |
| African Journal of Business Management       | AJBM    | 52           | 2.2%        | 28       | 24       | 0.54      |
| Accounting and Finance                       | AF      | 50           | 2.1%        | 150      | 126      | 3         |
| European Accounting Review                   | EAR     | 43           | 1.8%        | 176      | 164      | 4.09      |
| The other 330 publication sources            | -       | 1,161        | 48.5%       | NA       | NA       | NA        |
| <b>Total</b>                                 |         | <b>2,394</b> | <b>100%</b> | <b>-</b> | <b>-</b> | <b>-</b>  |

P = Number of publications; C1 = Number of citations. C2 = Number of citation excluding self-citations;  $\bar{x}$  = Average of citations per item.

**Table 4.** Top 13 publication sources by Impact Factor (IF) and Eigenfactor (EF) and Article Influence (AI).

| Publication source                           | Acronym | IF    | EF             | AI           |
|----------------------------------------------|---------|-------|----------------|--------------|
| Journal of Accounting & Economics            | JAE     | 3.912 | 0.00741        | <b>2.453</b> |
| Accounting Review                            | AR      | 2.319 | 0.00795        | 1.474        |
| Journal of Accounting Research               | JAR     | 2.192 | 0.00703        | 2.210        |
| Accounting Organizations and Society         | AOS     | 1.867 | 0.00364        | 1.028        |
| Contemporary Accounting Research             | CAR     | 1.564 | 0.00348        | 1.094        |
| Corporate Governance-an International Review | CGIR    | 1.400 | 0.00164        | 0.364        |
| Accounting Horizons                          | AH      | 1.288 | 0.00117        | NA           |
| Journal of Business Ethics                   | JBE     | 1.253 | <b>0.01395</b> | 0.450        |
| Auditing-a Journal of Practice & Theory      | AJPT    | 1.015 | 0.00110        | 0.483        |
| Accounting and Finance                       | AF      | 0.875 | 0.00065        | 0.192        |
| Journal of Accounting and Public Policy      | JAPP    | 0.770 | 0.00100        | NA           |
| European Accounting Review                   | EAR     | 0.654 | 0.00102        | 0.453        |
| African Journal of Business Management       | AJBM    | NA    | NA             | NA           |

Impact Factor (IF) from 2012; Eigenfactor (EF) e Article Influence (AI) updated until 01/10/2014.

Unfortunately the results show that only 1% of the reported studies reported had funding sources for their research, confirming that governments/companies are not willing to invest in new studies in the auditing field.

A total of 70 countries produced publications involving the auditing field, but 35 of the records did not inform the country of affiliation for its publications. American publications represent more than half of the publications in auditing, followed by Australia, Canada, England, China, among others (Table 7).

In accordance with the fact that more than half of publications are American, seven of the 11 institutions

that publish in auditing are also American, with emphasis on the Florida International University System with 130 publications. The results show that American researchers and other countries are associated with American research institutions, making the US the number one country in auditing publications (Table 8).

The article with highest number of citations is "Theorizing change: The role of professional associations in the transformation of institutionalized fields", by Greenwood et al., with 437 citations since 2002 and with the highest citation average: 33.32 per year. The content of the quotation was not analyzed, making it possible for

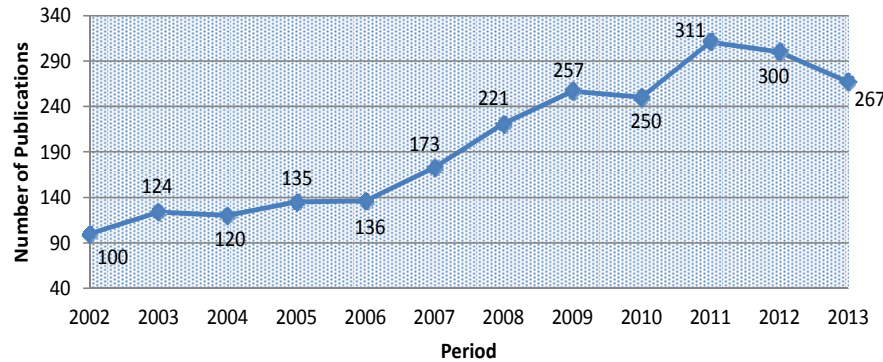


Figure 1. Distribution of publications per year.

Table 5. Distribution of the Impact Factor (FI) of the Top 13 publication sources.

| Impact factor in 2012 | J   | P     | Fi (≅) |
|-----------------------|-----|-------|--------|
| 0 < FI ≤ 1            | 3   | 153   | 6,4%   |
| 1 < FI ≤ 2            | 6   | 758   | 31,7%  |
| 2 < FI ≤ 3            | 2   | 216   | 9%     |
| 3 < FI                | 1   | 54    | 2,3%   |
| Not informed          | 1   | 52    | 2,2%   |
| Not analyzed (N/A)    | 330 | 1,161 | 48,5%  |
| Total                 | 343 | 2,394 | 100%   |

J = Number of publication sources; P = Number of publications.

future research to address this issue so that we may have a parameter of how these citations occurred (Table 9).

The author with the largest number of publications in auditing is Kannan Raghunandan, with 26 publications, being cited 525 times and with the second highest average of citations per study, 20.19, followed only by Jere R. Francis with an average of 26.76 citations. Just as in the most cited articles, the publications per author did not take into account the content of the quotation, such as it must be in future researches (Table 10).

Finally, we observe in Figure 2, popularly known as cloud of terms, the most repeated words among the found publications. It is worth noting that the database is formed by 2,394 publications, about 2,275 of which had keywords in their studies, accounting for 95% of the total. We note the words highlighted in larger font, the common key terms that surround the issue and naturally the term "audit" stands out for being used as filter for the research, however the results also emphasize the nine other terms: management, earnings, quality, performance, corporate, governance, auditor risk, information.

The database composed of 2,394 publications includes about 23,162 citations; and, excluding self-citations, there are 13,010. In more than 10,000 studies there was no citation of the studies analyzed in this research.

Table 6. Authors' partnership profile, language of publication and research incentive.

| Profile                                | P     | Fi (E) |
|----------------------------------------|-------|--------|
| Number of analyzed publications        | 2.394 | 100%   |
| Number of authors per publication      |       |        |
| Publications by one author             | 495   | 21%    |
| Publications by two authors            | 853   | 36%    |
| Publications by three authors          | 797   | 33%    |
| Publications by four authors           | 205   | 9%     |
| Publications by more than four authors | 44    | 2%     |
| Language of publications               |       |        |
| English                                | 2,298 | 96%    |
| German                                 | 28    | 1,2%   |
| Spanish                                | 21    | 0,9%   |
| Russian                                | 16    | 0,7%   |
| French                                 | 12    | 0,5%   |
| Other Languages                        | 19    | 0,8%   |
| Research incentive                     |       |        |
| Funded                                 | 23    | 1%     |
| No information about funding           | 2.371 | 99%    |

P = Number of publications.

Table 7. Top 10 countries with publications.

| Countries          | P     | Fi (E) |
|--------------------|-------|--------|
| USA                | 1.234 | 51.5%  |
| Australia          | 213   | 8.9%   |
| Canada             | 199   | 8.3%   |
| England            | 177   | 7.4%   |
| China              | 145   | 6.1%   |
| Germany            | 83    | 3.5%   |
| Taiwan             | 82    | 3.4%   |
| Spain              | 76    | 3.2%   |
| Netherlands        | 74    | 3.1%   |
| Nova Zealand       | 59    | 2.5%   |
| 60 other countries | 657   | 27.4%  |

P = Number of publications.

**Table 8.** Distribution of the institutions (organizations-enhanced) with publications (authors and co-authors).

| <b>Institutions (<i>Organizations-enhanced</i>)</b>                            | <b>Country</b> | <b>P</b> | <b>Fi (E)</b> |
|--------------------------------------------------------------------------------|----------------|----------|---------------|
| Florida International University System                                        | USA            | 130      | 5.4%          |
| University of California System                                                | USA            | 55       | 2.3%          |
| University of New South Wales                                                  | Australia      | 54       | 2.3%          |
| University of Wisconsin System                                                 | USA            | 52       | 2.2%          |
| Pennsylvania Commonwealth System of Higher Education Pcshe                     | USA            | 51       | 2.1%          |
| Hong Kong Polytechnic University                                               | Hong Kong      | 42       | 1.8%          |
| Northeastern University                                                        | USA            | 42       | 1.8%          |
| Nanyang Technological University                                               | Singapore      | 39       | 1.6%          |
| Nanyang Technological University National Institute of Education Nie Singapore | Singapore      | 39       | 1.6%          |
| Florida International University                                               | USA            | 38       | 1.6%          |
| University of Wisconsin Madison                                                | USA            | 38       | 1.6%          |

P = Number of publications.

**Table 9.** Top 20 most cited studies.

| <b>Ranking</b> | <b>Times cited</b> | <b><math>\bar{X}</math></b> | <b>Authors</b>         | <b>Title of the article</b>                                                                                               | <b>Year</b> |
|----------------|--------------------|-----------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------|-------------|
| 1              | 437                | 33.62                       | Greenwood et al.       | Theorizing change: The role of professional associations in the transformation of institutionalized fields                | 2002        |
| 2              | 355                | 27.31                       | Klein, A               | Audit committee, board of director characteristics, and earnings management                                               | 2002        |
| 3              | 238                | 18.31                       | Frankel et al.         | The relation between auditors' fees for nonaudit services and earnings management                                         | 2002        |
| 4              | 217                | 21.70                       | Ball, R; Shivakumar, L | Earnings quality in UK private firms: comparative loss recognition timeliness                                             | 2005        |
| 5              | 214                | 17.83                       | Ball et al.            | Incentives versus standards: properties of accounting income in four East Asian countries                                 | 2003        |
| 6              | 187                | 15.58                       | Ashbaugh et al.        | Do nonaudit services compromise auditor independence? Further evidence                                                    | 2003        |
| 7              | 184                | 14.15                       | Mitton, T              | A cross-firm analysis of the impact of corporate governance on the East Asian financial crisis                            | 2002        |
| 8              | 170                | 13.08                       | DeFond et al.          | Do non-audit service fees impair auditor independence? Evidence from going concern audit opinions                         | 2002        |
| 9              | 159                | 12.23                       | Morrison, EW           | Newcomers' relationships: The role of social network ties during socialization                                            | 2002        |
| 10             | 137                | 11.42                       | Joh, SW                | Corporate governance and firm profitability: evidence from Korea before the economic crisis                               | 2003        |
| 11             | 135                | 13.50                       | Agrawal, and Chadha, S | Corporate governance and accounting scandals                                                                              | 2005        |
| 12             | 128                | 11.64                       | Palmrose et al.        | Determinants of market reactions to restatement announcements                                                             | 2004        |
| 13             | 125                | 15.62                       | Olken, Benjamin A.     | Monitoring corruption: Evidence from a field experiment in Indonesia                                                      | 2007        |
| 14             | 125                | 9.62                        | Nelson et al.          | Evidence from auditors about managers' and auditors' earnings management decisions                                        | 2002        |
| 15             | 124                | 10.33                       | Xie et al.             | Earnings management and corporate governance: the role of the board and the audit committee                               | 2003        |
| 16             | 122                | 10.17                       | Myers et al.           | Exploring the term of the auditor-client relationship and the quality of earnings: A case for mandatory auditor rotation? | 2003        |



Table 9. Contd.

|    |     |       |                        |                                                                                                                                      |      |
|----|-----|-------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------|
| 17 | 120 | 10.91 | Anderson et al.        | Board characteristics, accounting report integrity, and the cost of debt                                                             | 2004 |
| 18 | 115 | 9.58  | Chung, HS; Kallapur, S | Client importance, non audit services, and abnormal accruals                                                                         | 2003 |
| 19 | 114 | 10.36 | Abbott et al.          | Audit committee characteristics and restatements                                                                                     | 2004 |
| 20 | 112 | 11.20 | Srinivasan, S          | Consequences of financial reporting failure for outside directors: Evidence from accounting restatements and audit committee members | 2005 |

$\bar{c}$  = Average of citations per year.

Table 10. Top 10 authors and coauthors with the highest production.

| Author              | P  | Times cited | Times cited excluding self-citation | $\bar{c}$    | H-index   |
|---------------------|----|-------------|-------------------------------------|--------------|-----------|
| Raghunandan, Kannan | 26 | 525         | 501                                 | 20.19        | 10        |
| Knechel, W. Robert  | 22 | 201         | 175                                 | 9.14         | 7         |
| Gul, Ferdinand A.   | 19 | 197         | 184                                 | 10.37        | 8         |
| Francis, Jere R.    | 17 | 455         | 430                                 | <b>26.76</b> | <b>11</b> |
| Krishnan, Jayanthi  | 17 | 246         | 223                                 | 14.47        | 6         |
| Tan, Hun-Tong       | 17 | 194         | 179                                 | 11.41        | 8         |
| Bedard, Jean C.     | 16 | 267         | 245                                 | 16.69        | 9         |
| Trotman, Ken T.     | 16 | 140         | 126                                 | 8.75         | 7         |
| Johnstone, Karla M. | 15 | 172         | 160                                 | 11.47        | 7         |
| Rama, Dasaratha V.  | 15 | 173         | 168                                 | 11.53        | 7         |

P = Number of publications;  $\bar{c}$  = Average of citations per year.



Figure 2. Cloud of keywords terms.



**Table 11.** H-index profile of the analyzed publications.

| Profile                                                                                                            | P      |
|--------------------------------------------------------------------------------------------------------------------|--------|
| Publications analyzed in this research (a)                                                                         | 2,394  |
| Number of times the analyzed publications were cited (b)                                                           | 23,162 |
| Number of times the analyzed publications were cited excluding self-citations among referred analyzed publications | 13,010 |
| Number of publications that cited the analyzed publications                                                        | 10,695 |
| Number of publications that cited the analyzed without self-citations among referred analyzed publications         | 9,210  |
| Average of times the publications were cited (b÷a)                                                                 | 9.68   |
| H-index                                                                                                            | 66     |

P = Number of publications.

Excluding self-citations, this number is reduced to 9,210 researches, yielding an average of 9.68 citations per publication and an H-Index of 66 (Table 11).

Through the results found here, we may try to plan, through a global vision, the state of the art in auditing publications through a bibliometric and scientometric study conducted in Web of Science.

### Final considerations

Research limitations/implications - The sample consists of articles published in various academic journals that are indexed in the Web of Science from the Institute for Scientific Information (ISI).

The main purpose of this study is to present an overview of the state of the art in auditing publications through a bibliometric/scientometric study in the Web of Science. Practical implications - about 2,394 publications involving the auditing theme during the period from 2002 to 2013, assembled 60% of the results in the category Business Finance. The journal that publishes the most in the field is the Auditing Journal of Practice & Theory with 299 publications, representing 12.5% of the total; the journal that has the most citations is the Accounting Review with 3,577 studies cited including self-citations, and 3,191 without self-citations; however the one that has the best average of citations is the Journal of Accounting Research with an average of 31.20 citations per publication. The Journal of Accounting & Economics has the highest Impact Factor (IF = 3.912) and the highest Article Influence (AI = 2,453), the Journal of Accounting and Business Ethics Review has the highest Eigenfactor (EF = 0.01395). It is clear that over the years the publications in auditing have been evolving, but this research cannot explain the reason for this increase in publications.

However, the Sarbanes-Oxley Act (SOX) was created in 2002 and that European Union publicly held companies were forced to adopt the rules of International Financial Reporting Standards (IFRS) in 2005. Since it is not easy for one to do research alone, results showed

that 79% auditing productions are conducted in partnerships. There is a balance between two authors (36%) and three authors (33%) per publication. Besides, almost all (96%) are written in English and most researches in the field (99%) have no funding sources, thus demonstrating the difficulty experienced by researchers in the field. The country that publishes the most is USA, with more than half (55%) of the publications found. USA also houses seven of the 11 institutions that produce the most about this topic. The one that stands out is the Florida International University System, with over 130 publications in auditing; The article that stands out with the highest number of citations is "Theorizing change: the role of professional associations in the transformation of institutionalized fields", by Greenwood et al., with 437 citations since 2002 and the highest average of citations per year 33.32. The author with the largest number of publications in auditing is Kannan Raghunandan, with 26 publications, being cited 525 times and with the second highest average of citations per study, 20.19, followed only by Jere R. Francis with an average of 26.76 citations;

The most common keywords, except for "audit" because it was already used as a filter, were: management, earnings, quality, performance, corporate, governance, risk auditor, information. The data collected here formed a database of 2,394 publications, with 23,162 citations and 13,010 without self-citation. Over 10,000 studies have cited one of the publications surveyed here and, excluding self-citation, over 9,000 publications, generating an average of 9.68 citations per publication and an H-Index of 66.

Originality/value - The main contribution of this study is that it systematically plans the main features of the auditing publications in the extended literature through a bibliometric and scientometric analysis to create its state of the art. In addition, the study outlines the main contributions in auditing in the indexed literature in the database of the Web of Science.

Future research - It is important that other researchers investigate what the real reason is for the growth in

auditing publications and identify relevant concepts, theories, methodologies, and emerging issues that have arisen in the field of auditing given that there is a gap for future transactional empirical studies in the literature.

## REFERENCES

- Abramo G, D'Angelo CA, Caprasecca A (2009). Allocative efficiency in public research funding: Can bibliometrics help? *Res. Pol.* 38(1):206-215.
- Abramo G, D'Angelo CA, Di Costa F, Solazzi M (2009). University-industry collaboration in Italy: A bibliometric examination. *Technovation*. 29(6-7):498-507.
- Abramo G, D'Angelo CA, Di Costa F, Solazzi M (2011). The role of information asymmetry in the market for university-industry research collaboration. *J. Technol. Transfer*. 36(1):84-100.
- Alfalla-Luque R, Medina-Lopez C (2009). Supply Chain Management: Unheard of in the 1970s, core to today's company. *Bus. Hist.* 51(2):202-221.
- Bengisu M, Nekhili R (2006). Forecasting emerging technologies with the aid of science and technology databases. *Technol. Forecasting Soc. Change*. 73(7):835-844.
- Biemans W, Griffin A, Moenaert R (2007). Twenty years of the Journal of product innovation management: History, participants, and knowledge stock and flows. *J. Prod. Innov. Manage.* 24(3):193-213.
- Bogdan I, Iuliana I, Valentin D, Vasile G (2009). The quality management of the services of scientometric quantification of the research of the members of the university community deployed within the "e-univroscent" concept. *Amfiteatru Econ.* 11(26):429-440.
- Butler L (2003). Explaining Australia's increased share of ISI publications - the effects of a funding formula based on publication counts. *Res. Pol.* 32(1):143-155.
- Casey DL, McMillan GS (2008). Identifying the "invisible colleges" of the industrial & labor relations review: a bibliometric approach. *Indust. Labor Rel. Rev.* 62(1):126-132.
- Casillas J, Acedo F (2007). Evolution of the intellectual structure of family business literature: A bibliometric study of FBR. *Family Bus. Rev.* 20(2):141-162.
- Chabowski BR, Mena JA, Gonzalez-Padron TL (2011). The structure of sustainability research in marketing, 1958-2008: a basis for future research opportunities. *J. Acad. Mark. Sci.* 39(1):55-70.
- Chang CC, Ho YS (2010). Bibliometric analysis of financial crisis research. *Afr. J. Bus. Manage.* 4(18):3898-3910.
- Charvet FF, Cooper MC, Gardner JT (2008). The intellectual structure of supply chain management: A bibliometric approach. *J. Bus. Logist.* 29(1):47-73.
- Chrisman JJ, Kellermanns FW, Chan KC, Liano K (2010). Intellectual Foundations of Current Research in Family Business: An Identification and Review of 25 Influential Articles. *Family Bus. Rev.* 23(1):9-26.
- Cornelius B, Landstrom H, Persson O (2006). Entrepreneurial studies: The dynamic research front of a developing social science. *Entrepreneurship Theory Pract.* 30(3):375-398.
- Cornelius B, Persson O (2006). Who's who in venture capital research. *Technovation*. 26(2):142-150.
- Daraio C, Moed HF (2011). Is Italian science declining? *Res. Policy*. 40(10):1380-1392.
- Diamond AM (2007). Thriving at Amazon: How Schumpeter lives in books today. *Econ J. Watch*. 4(3):338-U370.
- Duan CH (2011). Mapping the intellectual structure of modern technology management. *Technol. Anal. Strat. Manage.* 23(5):583-600.
- Durisin B, Puzone F (2009). Maturation of Corporate Governance Research, 1993-2007: An Assessment. *Corporate Governance-an Int. Rev.* 17(3):266-291.
- Etemad H (2004). E-commerce: the emergence of a field and its knowledge network. *Int. J. Technol. Manage.* 28(7-8):776-800.
- Fetscherin M, Voss H, Gugler P (2010). 30 Years of foreign direct investment to China: An interdisciplinary literature review. *Int. Bus. Rev.* 19(3):235-246.
- Francisco ED (2011). RAE-Eletronica: exploration of archive in the light of bibliometrics, geoanalysis and social network. *Rae-Revista de Administração de Empresas*. 51(3):280-306.
- Groot T, Garcia-Valderrama T (2006). Research quality and efficiency - An analysis of assessments and management issues in Dutch economics and business research programs. *Res. Policy*. 35(9):1362-1376.
- Hayashi T (2003). Effect of R&D programmes on the formation of university-industry-government networks: comparative analysis of Japanese R&D programmes. *Res. Policy*. 32(8):1421-1442.
- Jacobsson S, Rickne A (2004). How large is the Swedish 'academic' sector really? A critical analysis of the use of science and technology indicators. *Res. Policy*. 33(9):1355-1372.
- Jimenez-Contreras E, Anegon FD, Lopez-Cozar ED (2003). The evolution of research activity in Spain - The impact of the National Commission for the Evaluation of Research Activity (CNEAI). *Res. Policy*. 32(1):123-142.
- Kim J, McMillan SJ (2008). Evaluation of Internet advertising research - A bibliometric analysis of citations from key sources. *J. Advertising*. 37(1):99-112.
- Kirchler E, Holzl E (2006). Twenty-five years of the Journal of Economic Psychology (1981-2005): A report on the development of an interdisciplinary field of research. *J. Econ. Psychol.* 27(6):793-804.
- Kostoff RN, Briggs MB, Rushenberg RL, Bowles CA, Icenhour AS, Nikodym KF, Barth RB, Pecht M (2007). Chinese science and technology - Structure and infrastructure. *Technol. Forecasting Soc. Change*. 74(9):1539-1573.
- Kostoff RN, del Rio JA, Cortes HD, Smith C, Smith A, Wagner C, Leydesdorff L, Karypis G, Malpohl G, Tshiteya R (2005). The structure and infrastructure of Mexico's science and technology. *Technol. Forecasting Soc. Change*. 72(7):798-814.
- Kostoff RN, Johnson D, Bowles CA, Bhattacharya S, Icenhour AS, Nikodym K, Barth RB, Dodbele S (2007). Assessment of India's research literature. *Technol. Forecasting Soc. Change*. 74(9):1574-1608.
- Kostoff RN, Tshiteya R, Bowles CA, Tuunanen T (2006). The structure and infrastructure of Finnish research literature. *Technol. Anal. Strat. Manage.* 18(2):187-220.
- Kraus S (2011). State-of-the-art current research in international entrepreneurship: A citation analysis. *Afr. J. Bus. Manage.* 5(3):1020-1038.
- Kraus S, Filser M, Gotzen T, Harms R (2011). Family firms - On the state-of-the-art of business research. *Betriebswirtschaftliche Forschung Und Praxis*. 63(6):587-605.
- Leal RPC, Almeida VDE, Bortolon PM (2013). Brazilian scientific production in finance in the period 2000-2010. *Rae-Revista de Administração de Empresas*. 53(1):44-55.
- Lee FS, Cronin BC, McConnell S, Dean E (2010). Research Quality Rankings of Heterodox Economic Journals in a Contested Discipline. *Am. J. Econ. Sociol.* 69(5):1409-1452.
- Ma CB, Stern DI (2006). Environmental and ecological economics: A citation analysis. *Ecol. Econ.* 58(3):491-506.
- Machacek M, Kolcunova E (2008). Hirsch index and rankings of Czech economists. *Politicka Ekonomie*. 56(2):229-241.
- Marsilio M, Cappellaro G, Cuccurullo C (2011). The intellectual structure of research into PPPS: A bibliometric analysis. *Public Manage. Rev.* 13(6):763-782.
- Mazzon JA, Hernandez JMD (2013). Brazilian scientific production in marketing in the period 2000-2009. *Rae-Revista de Administração de Empresas*. 53(1):67-80.
- McMillan GS, Casey DL (2007). Research note: Identifying the invisible colleges of the British journal of industrial relations: A bibliometric and social network approach. *Brit. J. Ind. Rel.* 45(4):815-828.
- Meyer M, Pereira TS, Persson O, Granstrand O (2004). The scientometric world of Keith Pavitt - A tribute to his contributions to research policy and patent analysis. *Res. Policy*. 33(9):1405-1417.
- Moya S, Prior D (2008). Who publish in Spanish accounting journals? A bibliometric analysis 1996-2005. *Revista Espanola De Financiacion Y Contabilidad-Spanish J. Finance Accounting*. 37(138):353-374.

- Nerur SP, Rasheed AA, Natarajan V (2008). The intellectual structure of the strategic management field: An author co-citation analysis. *Strat. Manage. J.* 29(3):319-336.
- Neto ORD, Riccio EL, Sakata MCG (2009). Ten years of accounting research in Brazil: analysis with papers of ENANPADs from 1996 to 2005. *Rae-Revista De Administracao De Empresas.* 49(1):62-73.
- Park HW, Leydesdorff L (2010). Longitudinal trends in networks of university-industry-government relations in South Korea: The role of programmatic incentives. *Res. Policy.* 39(5):640-649.
- Ramos-Rodriguez AR, Ruiz-Navarro J (2004). Changes in the intellectual structure of strategic management research: A bibliometric study of the *Strategic Management Journal*, 1980-2000. *Strat. Manage. J.* 25(10):981-1004.
- Rubin RM, Chang CF (2003). A bibliometric analysis of health economics articles in the economics literature: 1991-2000. *Health Econ.* 12(5):403-414.
- Salas OA, Sobrevias EO (2011). Retrospective analysis of the Spanish *Journal of Finance and Accounting* (1985-2011): Authors, subjects, citations and quality perception. *Revista Espanola De Financiacion Y Contabilidad-Spanish J. Finance Accounting.* 40(152):699-721.
- Sarafoglou N (2006). How to measure productivity and how productive are Swedish professors in economics? Research evaluation by using quantitative and qualitative indicators. *Ekonomiska Samfundets Tidskrift.* 59(2):95-103.
- Schoeneck DJ, Porter AL, Kostoff RN, Berger EM (2011). Assessment of Brazil's research literature. *Technol. Anal. Strat. Manage.* 23(6):601-621.
- Serenko A, Bontis N (2013). Global ranking of knowledge management and intellectual capital academic journals: 2013 update. *J. Knowl. Manage.* 17(2):307-326.
- Serenko A, Bontis N, Moshonsky M (2012). Books as a knowledge translation mechanism: citation analysis and author survey. *J. Knowl. Manage.* 16(3):495-511.
- Stremersch S, Verhoef PC (2005). Globalization of authorship in the marketing discipline: Does it help or hinder the field? *Mark. Sci.* 24(4):585-594.
- Stremersch S, Verniers I, Verhoef PC (2007). The quest for citations: Drivers of article impact. *J. Mark.* 71(3):171-193.
- Talukdar D (2011). Patterns of Research Productivity in the Business Ethics Literature: Insights from Analyses of Bibliometric Distributions. *J. Bus. Ethics.* 98(1):137-151.
- Uslay C, Morgan RE, Sheth JN (2009). Peter Drucker on marketing: an exploration of five tenets. *J. Acad. Mark. Sci.* 37(1):47-60.
- Uysal OO (2010). Business Ethics Research with an Accounting Focus: A Bibliometric Analysis from 1988 to 2007. *J. Bus. Ethics.* 93(1):137-160.
- Valacich JS, Fuller MA, Schneider C, Dennis AR (2006). Issues and opinions - Publication opportunities in premier business outlets: How level is the playing field? *Inform. Syst. Res.* 17(2):107-125.
- Verbeek A, Debackere K, Luwel M, Zimmermann E (2002). Measuring progress and evolution in science and technology - I: The multiple uses of bibliometric indicators. *Int. J. Manage. Rev.* 4(2):179-211.
- Walter F (2010). The profile of the papers published on *Custos e @gronegocio* on line. *Custos E Agronegocio.* 6(3):156-175.
- Weerakkody V, Dwivedi YK, Irani Z (2009). The diffusion and use of institutional theory: a cross-disciplinary longitudinal literature survey. *J. Inform. Technol.* 24(4):354-368.