

BIBLIOMETRIC ANALYSIS OF SCIENTIFIC PRODUCTION REGARDING THE HARMONIZATION OF ACCOUNTING IN BRICS EMERGING ECONOMIES**Anatol MELEGA***Stefan cel Mare University of Suceava, 720229, Romania
melega.anatol@gmail.com***Abstract**

The BRICS economies are one of the most influential economic and political groups in the world, being characterized by cheap labor, increased attractiveness from investors, vast natural resources and a high level of foreign direct investment flows. With the development and growth of the multinationals' number in these states, the issue of convergence and harmonization of accounting practices with the international framework of this domain has been raised in order to create a conducive environment for investors and to reduce information asymmetry. The literature contains a multitude of studies that have analyzed and evaluated the achieved level of convergence and harmonization in accounting matters in the BRICS emerging economies. Thus, in this research we aim to perform a bibliometric analysis of the scientific production whose research topic is the harmonization of accounting in BRICS emerging economies. Therefore, in order to achieve the proposed goal, the following objectives were set: O1 - analysis and evaluation of the scientific production published in the Web of Science database in the 1990-2021 period that have as topic the harmonization of accounting in BRICS emerging economies; O2 - identification of the main research niches and design of new research directions.

Keywords: *accounting harmonization; bibliometric analysis; cluster method; emerging economies; future research.*

JEL Classification: *M40; C02; C40; C69*

I. INTRODUCTION

The accelerated and continuous development of BRICS emerging economies has highlighted the need for harmonization and convergence of the accounting systems from these economies with the international accounting standards. Thus, over time, professional bodies as well as line ministries of these countries have taken important steps in adopting International Financial Reporting Standards (IFRS). In recent years, all BRICS countries have begun the process of convergence towards IAS / IFRS. On the one hand, unlike the other countries, Russia and Brazil have decided on a full convergence of the national GAAPs by directly adopting IAS / IFRS into their domestic legislation. On the other hand, China and India have issued or intend to issue new national accounting standards based on IAS / IFRS.

In Brazil, the IFRS are mandatory for the consolidated financial statements of listed companies for the financial years that ended on or after December 31st, 2010 (Carneiro, Rodrigues & Craig, 2017). The Consolidated Accounts Act (LoCA), signed in 2010, introduced the requirements for the use of IFRS for consolidated financial statements in Russia beginning with 2012. In January 2015, the Indian Ministry of Corporate Affairs (MCA) released a revised roadmap reflecting that companies with a net worth of Rs 500 million (approximately \$71 million) or more, will be required to comply with the Indian Accounting Services Standards (Ind AS) - which are largely convergent with IFRS – beginning with April 1st, 2016 (MCA, 2015). In China, the process of accounting harmonization is somehow different. The Chinese Ministry of Finance, through direct takeover of standards from IFRS, it has directed the Chinese GAAPs towards convergence with IFRS (Peng & van der Laan Smith, 2010). In South Africa, the option of using SA GAAP or IFRS existed from 1995 to 2012 (Prather-Kinsey, 2006), but since 2012, only the use of International Financial Reporting Standards is permitted. The analysis of the adoption path of the International Financial Reporting Standards at the level of BRICS economies has been a continuing concern for researchers. In this regard, we note the usefulness of an analysis regarding the scientific production that had as its topic the "harmonization of accounting in the BRICS economics."

Bibliometrics is a field of study in librarianship and information science that appeared in the early twentieth century and which, through quantitative methods, analyzes the bibliographic production (Broadus, 1987; André, 2009) of a particular field of interest or publication. Among the methods of quantitative bibliometric analysis, we can mention the "Bibliometric mapping", which is a technique of spatial representation of the relationships between keywords, disciplines, domains, documents, countries, institutions or authors (Small, 1999). This bibliometric analysis technique helps to identify research topics and the ones that have not been explored or documented in the literature, providing this way a broad spectrum of research directions (Cartes-Velásquez &

Manterola Delgado, 2014; Huang & Chang, 2014). As mentioned above, the elements that are at the basis of a bibliometric analysis are usually authors, co-authors, number of publications, partnerships, citations, co-citations, research centers, countries, universities, journals and also the connections that are established between these components (Zupic and Cater, 2015). Thus, in the literature, there are bibliometric studies that guide the analysis of scientific production considering the approached subject or theme (Castillo-Vergara et al. 2018; Rubin and Chang, 2003; Pitt et al. 2016; Rey-Martí et al. 2016; Zeng et al. 2018), authors (Podsakoff et al. 2008; Goyal, 2017), universities (Siwach and Kumar, 2015; Merigó et al. 2019; Skute et al. 2019), databases (Fernández et al. 1993); Mallig, 2010; Wang et al. 2014; AlRyalat et al. 2019) and countries (Arencibia-Jorge and Moya-Anegón, 2010; Bonilla et al. 2015; Haddad et al. 2017). Through this study we aim to analyze and highlight the quality of publications, research niches and future research trends. In this regard, in the first part of the study we focused on a bibliometric analysis of the co-occurrence of keywords plus as a working method, but using in the same time other methods of analysis that are specific to bibliometrics.

The research results are materialized in the quality evaluation of the published scientific production, in the global mapping of the published works, as well as in the identification of the future research trends. The usefulness and relevance of our study derives from the fact that the results are obtained from the processing of data that was officially reported and also recognized by academia, fact that obviously adds value to this work which is intended to be a benchmark for current and potential researchers.

II. RESEARCH METHODOLOGY

The research methodology consists in collecting data on scientific production from the period of 1991-2022, which had as their topic the "convergence and harmonization of accounting in BRICS emerging economies". As a search tool we used the Web of Science database, applying as a parameter the keywords "IFRS" and "Brazil, Russia, India, China, South Africa." Applying the search strategy, it resulted in a number of 411 scientific articles and publications published in the period of 2008-2020. The second stage of our research focuses on establishing the indicators for evaluating the scientific production and on developing the bibliometric analysis through the cluster method. The reference areas for the bibliometric analysis were selected and included the research areas, the institutions to which the authors belong, as well as the regions of origin (countries). In order to detect the research topics, we used the Bibliometrix software (Aria and Cuccurullo, 2017) which helped us to analyze the keywords plus (Callon et al. 1983) that are found in the documents included in our database and which were previously divided according to the periods mentioned above. Obtaining clusters by grouping the keywords plus is based on a simple targeting algorithm (Callon et al. 1983) that identifies subgroups of keywords plus with strong links between them and that can be associated with research topics.

III. RESULTS OF BIBLIOMETRIC ANALYSIS

a) *The main characteristics of the authors*

Regarding the characteristics of the authors who published in the period of 2008-2022, the aim was to present their contribution to the scientific literature production, in terms of the analyzed topic: the convergence and harmonization of accounting in BRICS emerging economies. The data collected from the Web of Science platform were sectioned into 3 periods, 5 years each, from 2008 to 2022. The purpose of this section is to detail as much as possible the contribution of the authors to the scientific production. Therefore, as can be seen from Table 1, out of the total number of 411 publications from 2008-2022, 11.28% of them, respectively 44 articles have a single author, 34.10% have 2 authors, 30% have 3 authors and 18.21% have 4 authors. In the 2008-2011 period, it can be seen that out of the total number of published papers during this period, more than a quarter of them have two authors (35.53%), the lowest publication rate being registered for articles published by 4 and 5 authors: only 13.16% and 1.32% respectively. In the next period, 2015-2018, there is a decrease in the number of publications with a single author to 11.11% and an increase in those with 4 and 5 authors, respectively 19.61% and 1.96%. According to the data in Table 1, we notice that the number of publications with more authors is increasing in the period of 2019-2022, when out of the total publications of this period, 19.25% of them have 4 authors and 8.07% have 5 authors, reducing the number of single author publications at 8.07%. This highlights the tendency of researchers to collaborate with several authors pointing out the idea that collaborating with several authors to debate and analyze a research topic has a major impact on the research process and of course on the quality of research results. A multi-author research requires a more detailed approach, due to their different views regarding the setting of research directions and the way ideas are presented through different practices.

Table 1. The contribution of the authors to the scientific production

Authors characteristics	Total	Time period		
		2008-2014	2015-2018	2019-2022
Number of authors				
1	11.28%	18.42%	11.11%	8.07%
2	34.10%	35.53%	35.95%	31.68%
3	30.00%	31.58%	31.37%	27.95%
4	18.21%	13.16%	19.61%	19.25%
5	4.36%	1.32%	1.96%	8.07%
> 5	2.05%	0.00%	0.00%	4.97%
Total	100.00%	100.00%	100.00%	100.00%

Source: Developed by the authors

From the point of view of authors' affiliation, according to the data in Table 2, it can be observed that the authors' affiliation is closely correlated with the number of authors of the publications. Therefore, out of the total number of published articles in the period of 2008-2022, 11.28% of the papers and authors are affiliated to a single institution, 34.10% are associated with two institutions, 30% with 3 institutions, 18.21% with 4 institutions, 4.36% with 5 institutions and only 2.05% are associated with more than 5 institutions. We also note that there are articles and authors who are affiliated with two institutions. Most of the publications belong to authors who are affiliated with the University of Sao Paulo, Hong Kong Polytech University, Chinese University Hong Kong, Shanghai University of Finance and Economics, Univ Fed Uberlandia, Hong Kong Univ SCI and Technolo, University Sydney etc.

Table 2. The contribution of the author's affiliation institutes to the scientific production

Affiliation's characteristics	Total	Time period		
		2008-2014	2015-2018	2019-2022
Number of institutions				
1	11.28%	18.42%	11.11%	8.07%
2	34.10%	35.53%	35.95%	31.68%
3	30.00%	31.58%	31.37%	27.95%
4	18.21%	13.16%	19.61%	19.25%
5	4.36%	1.32%	1.96%	8.07%
> 5	2.05%	0.00%	0.00%	4.97%
Total	100.00%	100.00%	100.00%	100.00%

Source: Developed by the authors

In terms of the authors' characteristics, it is noted that most publications have two authors and are affiliated with two institutions, a trend that is not currently observed, highlighting the increase in the number of publications that are associated with 3 or even 5 authors.

In the bibliometric analysis, the collaboration between authors is an important factor that allows the evaluation and analysis of the scientific collaborations between them and between countries and institutions (Tabatabaei-Malazy et al. 2016). In this sense, using the software R Bibliometrix 3.0 (Aria and Cuccurullo, 2017), we analyzed the scientific collaborations of the authors that published works on the subject of accounting harmonization in BRICS emerging economies.

Table 3. Most Relevant Countries By Corresponding Author

Country	Articles	Freq	SCP	MCP	MCP_Ratio
CHINA	100	0.25126	72	28	0.28
BRAZIL	86	0.21608	78	8	0.093
RUSSIA	31	0.07789	27	4	0.129
USA	31	0.07789	11	20	0.645

AUSTRALIA	26	0.06533	16	10	0.385
SOUTH AFRICA	24	0.0603	21	3	0.125
INDIA	19	0.04774	17	2	0.105
UNITED KINGDOM	12	0.03015	7	5	0.417
CANADA	11	0.02764	6	5	0.455
CZECH REPUBLIC	7	0.01759	7	0	0

Source: Developed by the author with Bibliometrix

According to the intra-country (SCP) and inter-country (MCP) collaboration index, it is observed that the publications with the highest rates of national and international collaboration belong to authors from China, Brazil, Russia, USA and Australia (see Table 3). International and national collaboration between authors is important in the development of research directions and at the same time in the identification of research niches in accordance with the stakeholders’ interest from different environments.

b) Geographical mapping of publications and their characteristics

Figure 1 shows the distribution of the scientific production that was published in the period of 2008-2022. Most of the scientific publications are affiliated with institutions based in China and operating in China (25.13%), followed by Brazil and Russia, with 21.61% of the total publications and 7.79%, respectively. The hegemony of the scientific production is held by emerging countries in Asia, which comprise 42.71% of the total number of publications, followed by South America with 86 publications (21.61%), Europe 10.80%, North America 10.55%, Oceania 8.29% and Africa 6.03 % of the total publications.

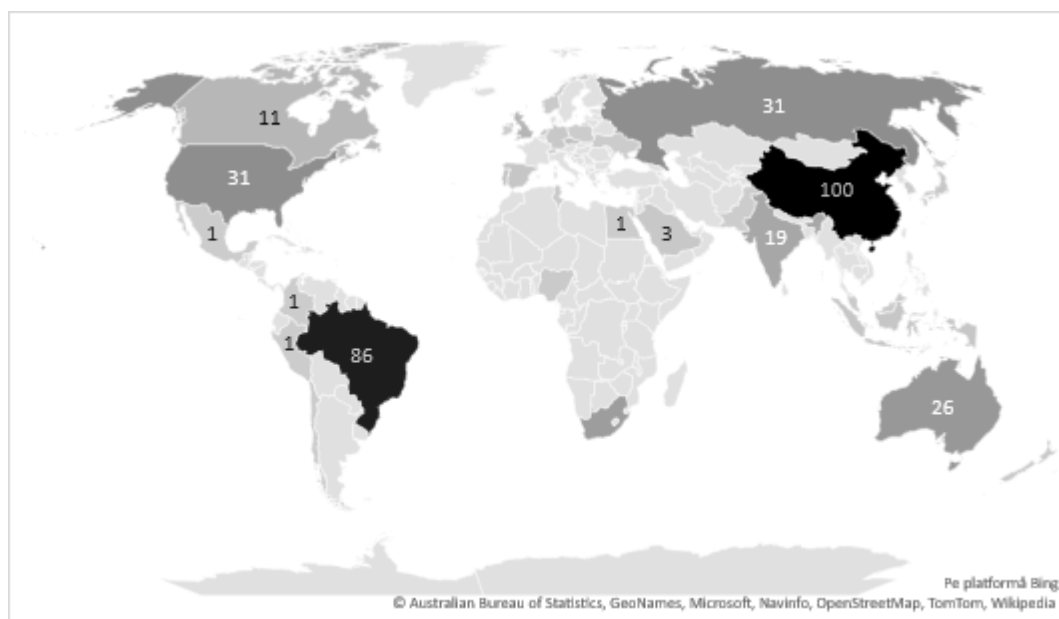


Figure 1 – Mapping of countries/regions with significant contribution to the scientific production

Source: Developed by the author

Following the cartographic analysis of the scientific production, we can point out that most publications are affiliated with institutions in emerging countries. The abundance of articles and publications in India and South Africa highlights the interest of research on the Anglo-Saxon accounting model, which is applied in those countries where the accounting profession deals with the development of accounting regulations / rules and practices. The main concern of the scientific community in these countries is to improve the quality of the information that is made available to stakeholders, in particular potential or current investors. Regarding publications from countries with continental accounting such as Russia and China, the research focuses mainly on the study of the relationship between taxation and accounting, the two of them being strongly connected.

An important aspect in the bibliometric analysis is the research of the main characteristics of the articles such as: the number of pages, the number of references and of course the number of citations. The role of this analysis - especially of the number of pages and references - is to highlight the characteristics of the accepted and published papers and the analysis of the citations’ number aims to assess the impact of publications on the

international scientific environment, and on the quality of publications.

Table 4. Manuscript characteristics

Manuscript characteristics	Total	Time period		
		2008-2014	2015-2018	2019-2022
Number of pages				
10 or les	14.58%	28.57%	12.42%	9.94%
10-20	42.20%	28.57%	47.71%	43.48%
21-30	28.64%	22.08%	26.80%	33.54%
>30	14.58%	20.78%	13.07%	13.04%
Number of references				
0-20	19.69%	36.36%	19.61%	11.80%
20-30	13.04%	14.29%	16.34%	9.32%
30-40	10.49%	6.49%	9.15%	13.66%
>40	56.78%	42.86%	54.90%	65.22%

Source: Developed by author

According to the data in Table 4, it is observed that the most of the publications, approximately 42.20% of them have a number of pages between 10-20 and the articles with a number of pages less than 10 record the lowest values of only 14.58%. At the same time, if we look at the periods, we can see that the number of articles with 20-30 pages has an upward trend: if in the period of 2015-2018 they accounted for 47.71% of the total number of publications, between 2019-2022 their number decreased to 43.48%, noting a drastic reduction of articles with less than 10 pages, from 28.57% in 2008-2014 to 9.94% between 2018-2022. In terms of the number of references, it is found that most published articles (56.78%) have over 40 bibliographic sources, which indicates that the publications are well documented, based on know-how and on a perspective adapted to the needs of stakeholders.

Table 5. Top 10 most global cited Documents

Paper	Total Citations	TC per Year	Normalized TC
HE XJ, 2012, CONTEMP ACCOUNT RES	87	7.9091	2.1911
KIM JB, 2011, REV ACCOUNT STUD	74	6.1667	2.0205
CHAN KH, 2010, J ACCOUNT ECON	53	4.0769	1.8171
PENG SL, 2010, ACCOUNT AUDIT ACCOUN	52	4	1.7829
DING Y, 2008, J ACCOUNT PUBLIC POL	38	2.5333	3.8776
PELUCIO-GRECCO MC, 2014, EMERG MARK REV	34	3.7778	1.7492
CHEN JJ, 2010, EUR ACCOUNT REV	33	2.5385	1.1314
HO LCJ, 2015, J INT FIN MANAG ACC	33	4.125	2.2589
ZHANG Y, 2012, ACCOUNT AUDIT ACCOUN	31	2.8182	0.7807
GARCIA MDR, 2017, EMERG MARK REV	24	4	4.8201

Source: Developed by author with Bibliometrix

In terms of the citations' number (see Table 5), the most cited paper is "Challenges for Implementation of Fair Value Accounting in Emerging Markets: Evidence from China" by He, Wong and Young (2012) with a number of 87 quotes. The paper provides an analysis of the impact of China's adoption of International Financial Reporting Standards, with a focus on Fair Value. The paper of Chan, Lin and Mo (2010), having 53 citations, analyzed whether "a deviation from a tax-based accounting system to the adoption of International Financial Reporting Standards encourages fiscal non-compliance in China." Peng and Bewley (2010) examined "the degree of adoption of the FVA in China's new accounting standards ("2007 GAAP"), the reasons for the existing differences from the IFRS International Accounting Standard Board and how 2007 GAAP was implemented in practice." Accelerated development of accounting standards in China began in 2007, the year in which "substantially convergent" with IFRS, the national GAPS became mandatory. In this regard, Ding and Su (2008) provide a descriptive analysis of the "rough road leading to internationalization" of Chinese accounting. Pelucio-Grecco, Geron, Grecco, and Lima (2014) developed "a model for observing the effect of International Financial Reporting Standards (IFRS) on firms' EMs, as well as the restrictive effects of auditing, corporate governance, and the regulatory environment." Chen and Zhang (2010), using a sample of 103 Chinese companies, examined the impact of adopting IFRS on the "convergence of Chinese accounting practices." Ho, Liao, and Taylor (2015) analyzed "the prevalence of revenue management on both commitments and activities for Chinese A-share firms around the adoption of substantially convergent accounting standards under IFRS." Using a sample of 923 Latin American firms from 2000-2014, García, Cortez Alejandro, Sáenz and Sánchez (2017) analyzed whether "the

transition from local to international accounting standards improves the quality of accounting for Latin American companies, identifying if fundamental accounting variables are more relevant and if they increase the opportunity for earnings after companies adopt International Financial Reporting Standards.”

The number of citations is an important feature in evaluating the quality of a paper, validating the importance of the research topic and highlighting the impact it has had on scientific production.

c) Visualization and evolution of research topics

The bibliometric analysis is based on two procedures: the first procedure is the one that we have previously applied, namely the identification and evaluation of the research impact and of the authors’ groups by affiliation (institution, country) (Noyons et al. 1999; van Raan, 2005). The second procedure involves “detecting and visualizing conceptual subdomains” by analyzing Keyword plus in a longitudinal framework (Garfiel, 1994). This procedure allows the classification of research topics and the follow-up of their evolution (López-Herrera, 2011).

Through the Bibliometrix software, a structuring of the research topics was made, depending on the centrality and density of the topics. According to Wasserman and Faust (1994), “the network density of each group varies from 0 to 1, where a value of zero indicates that there is no relationship between group members and a value of 1 indicates that all groups are interconnected between them, this being the maximum level of relationship that can exist between the members of the group. The vertical axis - the central area is an attribute that identifies the node with the most connections in the network.” The strategic diagram consists of four quadrants: niche themes - segments of topics with a specialized character and a marginal importance; motor themes - are located in the right quadrant and represent developed and relevant topics with a strong centrality and density related to external concepts; emerging or declining themes - are marginal, poorly developed or disappearing research topics with low centrality and density; basic themes - are important but poorly developed areas of research (Cahlik, 2000; Callon et al. 1991; Courtial and Michelet, 1994; Coulter et al. 1998; He, 1999; López-Herrera, 2011).

Figure 2 shows the evolution and relationships between research topics, grouped into 3 periods of analysis. The quality of the relationships between the keywords is given by the characteristics of the lines. The map of the thematic evolution of scientific production allows the structuring of research topics into motor and basic themes.

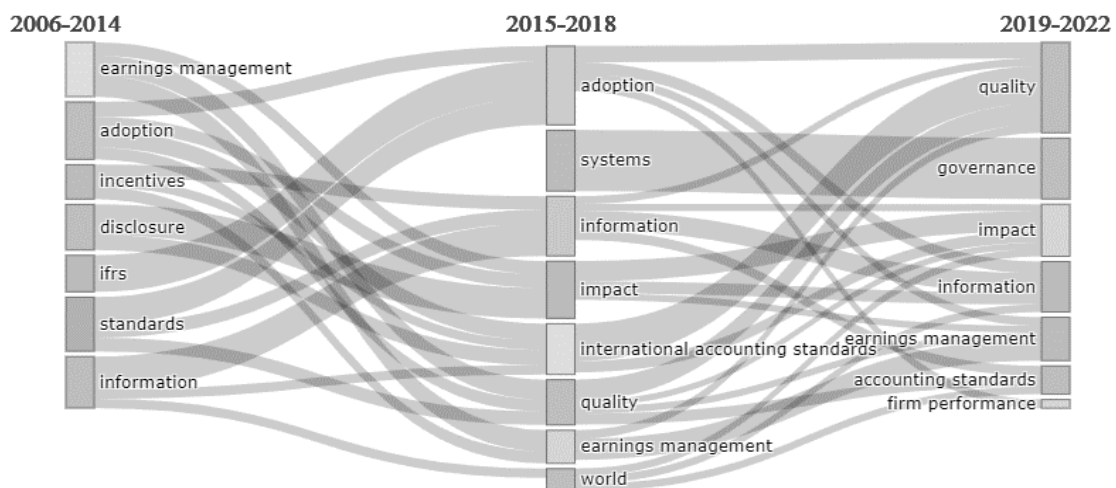


Figure 2 – Thematic evolution
Source: Developed by author with Bibliometrix

According to Figure 2, we can see that the research topics are strongly interconnected. There are topics that have many links with each other, belonging to several different areas of research. At the same time, in the map of the thematic evolution, we can identify research topics that have been highlighted by others. For example, IFRS has merged with adoption, becoming this way a single topic. Even though a much higher number of articles were published in the years of 2019-2022 than in the previous periods (161 publications), the research areas are more restricted, reducing from 8 in the period of 2015-2018 to 7 in 2019-2022 period.

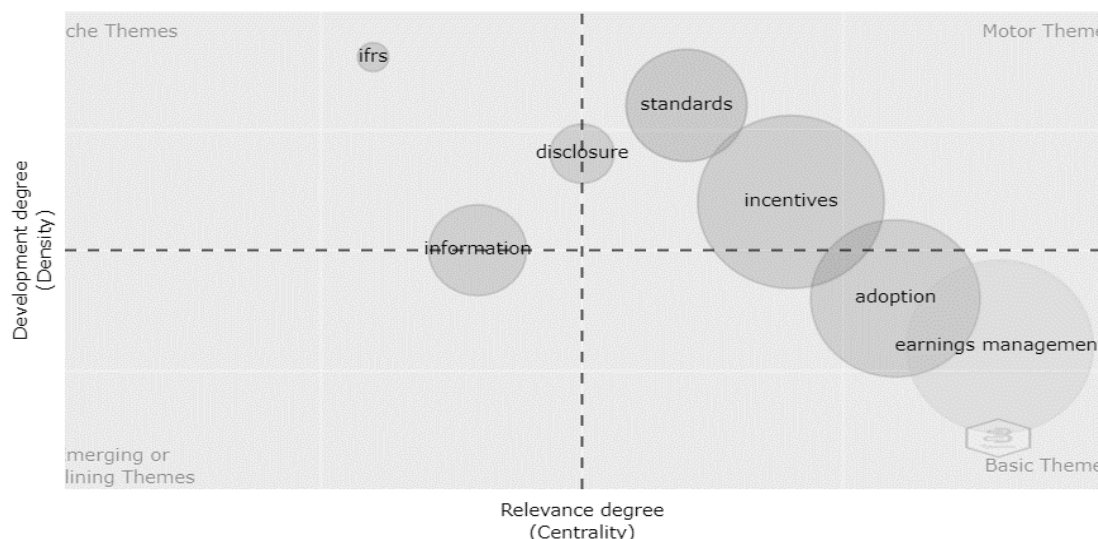


Figure 3 – Thematic map representation 2008 -2014
Source: Developed by author with Bibliometrix

In the period of 2008-2014, according to the publications, seven research topics were identified (see Figure 3) that are classified into niche themes, motor themes, emerging or declining themes and basic ones. Niche themes with a specialized character are grouped into three clusters. The first cluster, consisting of topics such as: IFRS and US is the central cluster representing niche themes, the second cluster "disclosure" is close to quadrant 2 that refers to engine themes and cluster 3 named "information" is close to quadrant 3 Emerging or Declining Themes. However, these topics are of insignificant importance for scientific production, being well developed only internally. The most common research topics by the number of occurrences of the keywords plus are the basic themes, which are grouped into two clusters of topics like: adoption (6), international accounting standards (6), accounting standards (5), cost (4), earnings (4), impact (4), valuation (3), equity (2), market reaction (2), firms (7), quality (8), earnings management (12), ownership (4), investement (2). As motor themes, representing a large part of scientific production, with a strong density and centrality we can mention the following topics: incentives, private, investor protection, value relevance, empirical analysis, market, association, standards, forecasts, income and management. Basically, scientific production in the period of 2007-2011 focuses on studying the efficiency indicators regarding the adoption of International Financial Reporting Standards and their impact on stakeholders and on the value of the company. The scientific output from 2008-2022 focused on assessing the impact of the economic crisis on the process of accounting harmonization and convergence with the international accounting framework.

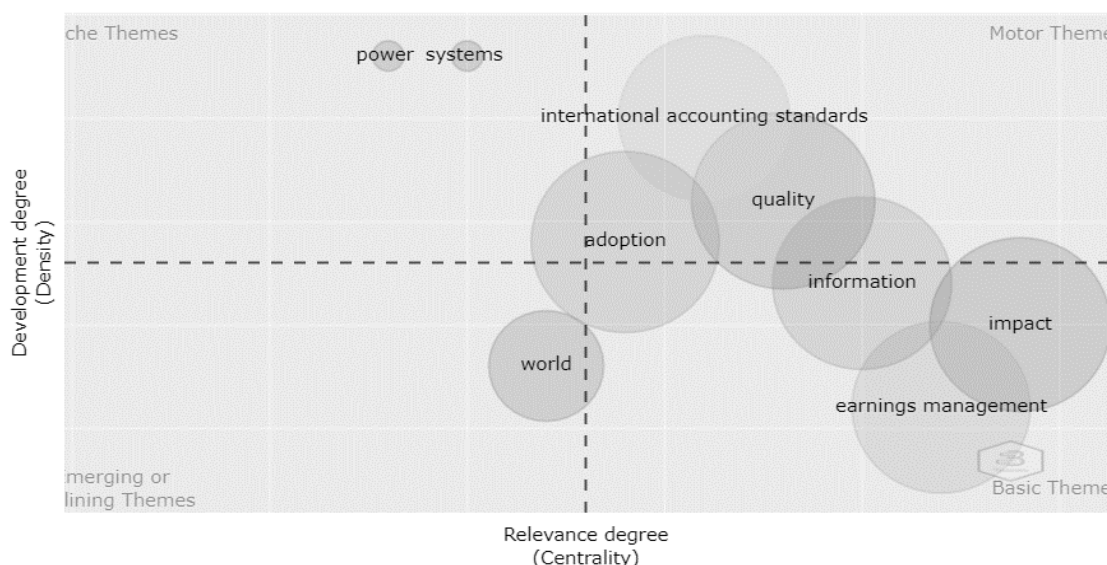


Figure 4 – Thematic map representation 2015-2018
Source: developed by author with Bibliometrix

According to the strategic diagram presented in Figure 4, in the period of 2015-2018, 7 research topics were identified. Motor themes are focused on the study of the process regarding the IFRS adoption and their impact on accounting and stakeholders. For example, Dolgikh (2016) assessed the efforts of BRICS economies to achieve accounting convergence in IFRS, emphasizing the idea that the adoption of IFRS by BRICS countries contributes to the development of accounting in these countries and also helps them to eliminate information asymmetry. The authors Vysotskaya and Mikhalkina (2018) analyzed the effects of the adoption of IFRS in Russia on the quality of financial reporting of Russian listed companies. They compared the financial statements before and after the adoption of IFRSs, analyzing the issues of achieving accounting convergence and the transition to international accounting standards. Dhankar, Chaklader and Gupta (2015) examined, through a questionnaire, “the perception of the public sector banks from India towards the implementation of IFRS.”

At the same time, there is a radical change in research topics that are included as engine themes. If in the period of 2008-2014, the theme of adoption was located between the axis between the basic themes dial and the themes motor dial, in the period of 2015-2018, it occupies a place slightly displaced towards the centre of the motor themes dial.

During the years 2019-2022, there is a reduction of the research areas, which are reduced to 7 (see Figure 5). With centrality and significant density, the motor themes of the analyzed period are earnings management and information, having a frequency of 22 occurrences. The next theme as importance is placed in the basic themes category and refers to topics like: quality, performance, determinants, ifrs, adoption, corporate governance, earnings, investor protection, management..

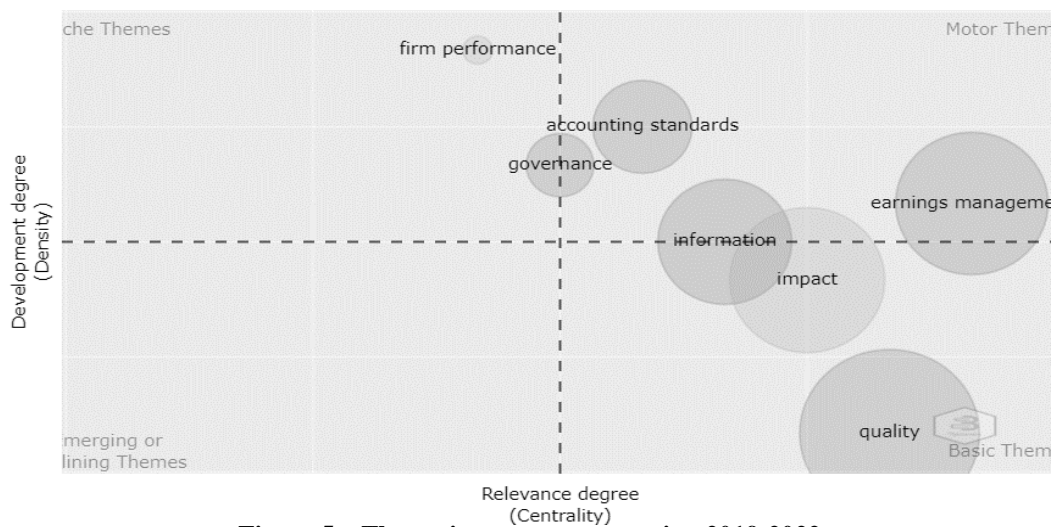


Figure 5 – Thematic map representation 2019-2022
Source: Developed by author with Bibliometrix

It is important to emphasize that words like adoption, information, impact and quality are considered key topics in most of the periods and the rest of the topics are closely related to the economic and social situation.

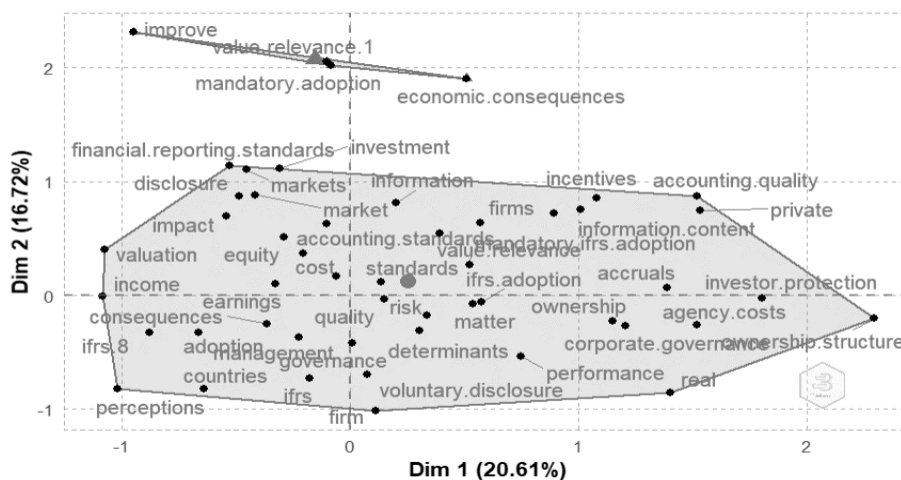


Figure 6 – Conceptual structure map
Source: Developed by author with Bibliometrix

Figure 6 shows the conceptual map of publications from 2008-2022, which shows that research in this period is limited to terms that appear in different forms, but which describe the same topics. For example, around the keyword "ifrs adoption", there are circumscribed topics that are closely related to the keywords like impact, consequences, quality, ifrs, information, etc. The most common keyword is quality, which has the highest frequency of occurrence, followed by earnings management, impact and information. During the period under review, it is noted that researchers are generally concerned about the impact of the adoption of International Financial Reporting Standards on the quality indicator of financial reporting. Overall, we can see that all keywords have an upward trend, except for small fluctuations. Through this part of the bibliometric analysis, the macro-changes of the research topics in the analyzed field were reflected both visually and quantitatively.

IV. CONCLUSION

The bibliometric analysis of the scientific production from 2008-2022 whose main research topic was the harmonization and accounting convergence of accounting in BRICS emerging economies to the international accounting framework, highlighted that research in this period is limited to keywords, or in other words around research areas such as: impact, consequences, adoption, ifrs, management, performance, market, firms, etc. At the same time, the fact is that most of the scientific production belongs to authors affiliated with the institutions from the BRICS countries. Convergence and harmonization of accounting in the BRICS economies remains an important research topic, justified by the issue of achieving convergence of accounting in these countries due to the existence of outdated national standards and shortcomings in accounting and tax legislation.

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