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la economía pública, social
y cooperativa

Scientific production on cooperatives: bibliometric analysis and information visualization

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Abstract

This research aimed to show how scientific production on cooperatives has been developed. All information was collected from the Scopus database in January 2022. The methodology used was bibliometric with data from 2012 to 2021, using the VosViewer software to analyze 709 articles. The scientific production by Spanish researchers is very high compared to other countries. The period with the highest number of publications, authors, and countries involved was 2016-2017. Topics such as sustainability, economics and finance, social participation, stakeholders, communication, and agri-food cooperatives are the most covered. Few are the authors who work in cooperation networks. This study is limited to the Scopus database, the subject areas, the time span, and the Boolean logic model selected. This investigation will be useful for future lines of investigation since any researcher will find the main studies, authors, and scientific sources with the most influential articles in the Cooperatives context.

Keywords: cooperatives, worker cooperatives, social economy, governance, sustainability, internationalization, social capital, bibliometric analysis.

Expanded abstract

Scientific production on cooperatives: bibliometric analysis and information visualization

Context

The constant changes in the spheres of the social, economic, competitive market (Jorge, 2019), politics, management, and organization models (Diaz-Foncea & Marcuello, 2013) have had an impact on the way individuals relate to each other, to work and to income generation (Hirsch, 1998). It is in this scenario is that the cooperatives are presented as a company model based on principles such as solidarity, cooperation, shared decision, commitment, and respect, among others (Bretos & Marcuello, 2017), points placed in a background in the traditional relationship between work and capital (Jesus et al., 2012). Considering the importance of cooperatives in the different areas of society, the academic and scientific environment investigations are highlighted for the improvement of their activities, labor and management models, people's skills, communication, and innovation processes, given that open the possibility for a better understanding and the implementation of new competences in this type of enterprises.

Objective

Using the similar Ciger's (2020) path, the aim of this investigation is to guide the researchers and provide a panoramic picture of the 'Cooperatives' context in the period from 2012 to 2021. To achieve this objective, this study tries to answer the following research questions:



1: What is the evolution of articles and in which of the subject areas studied were the largest number of articles published in the Cooperatives context? 2: Which scientific journals have the higher number of publications in the Cooperatives context? 3: Which authors published the higher number of articles in the Cooperatives context? 4: What is the total number of citations and what are the most-cited authors in the Cooperatives context? 5: Which authors have the highest impact factors in the Cooperatives context? 6: What is the collaboration between authors in the Cooperatives context? 7: What are the trend topics in the Cooperatives context?

All questions research is based on two types of techniques: measures of evolution (productivity and impact), and relational (type of analysis with a unit of analysis).

Methodology

In terms of methodological procedures, this research can be considered as an exploratory study, using secondary sources for its development and the bibliometric analysis technique has been used because allows to identify, organize, and analyze the main elements that answer the research questions.

The data collection was carried out using the Scopus database which provides wide coverage of academic literature (Zhang & Eichmann-Kalwara, 2019). The analysis was conducted on 01/23/2022 in three stages and specific search terms and strategies: Data Collection, Bibliometric analysis (evaluation techniques: productivity and impact measures; relational techniques), and Conclusions.

VOSViewer software (Visualization Of Similarities) has been used to perform bibliometric analysis (Van Eck, Waltman, 2007). VOSViewer generates a network map for each of the variables used, allowing clusters of words, the construction, and visualization of co-occurrence networks of important terms from scientific literature (Reyes-Menendez et al., 2020).

Results

The search criteria used provided a total of 709 articles. The results indicate that in the first period (2012 – 2013) only 105 articles were published, however, an increase is observed not only in the number of researches but also in almost all variables in subsequent periods, especially in 2016 – 2017 (third period).

Social Science (SS) has been the number one in the total of articles published in all periods, surely because it encompasses several studies of both Business, Management and Accounting (BMA), and Economics, Econometrics, and Finance (EEF).

It can be noted that during the last 10 years, Spanish journals have been providing knowledge in this fieldwork, given that of the six journals with a higher number of publications, three of them are from Spain, with average productivity of 30 articles per journal. It should be highlighted that 'Ciriec-Espana Revista de Economía Pública, Social y Cooperativa' journal had its first publications on Scopus in 2016, showing high productivity in the last 6 years of this study.



The highest number of articles were published by Marcuello C. and Tortia E., followed by Bretos I., Basterretxea I. and Marcuello C. obtained the best averages of citations per document. The interest of Spanish researchers in topics focused on Cooperatives is remarkable. The rest of the studies were carried out by researchers from Italy, the United States, Australia, the United Kingdom, Finland, Belgium, Sweden, and Japan.

The total number of citations in the time span amounts to 5,697. The two most influential cooperatives study were published in the first period (2012) by Fischer and Qaim, followed by Teasdale. The highest H-Index Author factor was obtained by Mazzarol T. from Australia, followed by Jones D.C. from the United States.

Statistically, derived from 709 articles that were contributed by 1,340 different authors, we detected that 17.63% of the authors conducted two investigations published on Cooperatives in cooperation with other authors, 5.64% were credited on at least three studies, and 2.25% conducted at least four investigations, and 1.13% had five or more papers published.

The trending topics in studies on Cooperatives revolve around issues such as internationalization, social responsibility, communication strategies, and their economic and financial performance.

Practical conclusions, limitations, and original values

An increase in the number of investigations in the context of 'Cooperatives' has been observed. And the existing interdisciplinarity in the studies is highlighted, however, it is still necessary to deepen the research as a way of related to functions of cooperatives and local community and its subsequent development. There is a low rate of network collaborations between authors, especially if they are from different countries.

Emerging themes give us a clue as to where researchers can put efforts to answer the questions about this subject. It seems that little research has been done on the importance and relationship between public policies and the cooperative sector. Furthermore, this study suggests the expansion of studies on the performance of the cooperatives in the scope of the objectives of the 2030 agenda, the carrying out of studies on integrated management, and creating value on 'Cooperatives', given that no article has been found on this important topic in the field of management of any type of company. Also, it would also be interesting to refine the bibliometric techniques and social network analysis, through multivariate data statistics.

It is crucial to remark on the main limitations of this study. This bibliometric analysis is strictly carried out according to the search strategies in a single database and in a specific period. This investigation contributes to a relevant scientific baseline for future research on 'Cooperatives'.

Keywords: cooperatives, worker cooperatives, social economy, governance, sustainability, internationalization, social capital, bibliometric analysis.



1. Introduction

The constant changes in the fields of the social, economic, competitive market (Jorge, 2019), politics, management, and organization models (Díaz-Foncella & Marcuello, 2013) have had an impact on the way individuals relate to each other, to work and to income generation (Hirsch, 1998). It is in this scenario that the cooperatives are presented as a company model based on principles such as solidarity, cooperation, shared decision, commitment, respect, among others (Bretos & Marcuello, 2017), points placed in a background in the traditional relationship between work and capital (Jesus et al., 2012). Considering the importance of cooperatives in the different areas of society, the academic and scientific environment investigations are highlighted for the improvement of their activities, labor and management models, people's skills, communication, and innovation processes, given that open the possibility for a better understanding and the implementation of new competences in this type of company.

From this perspective, according to Palomo et al. (2017), Andras (2011), Keathley-Herring et al. (2016), and Barrot (2016), the increase in scientifically based studies has evolved and has been key to modern science, especially since the mid-20th century, providing information on the level of maturity of a research area and providing crucial evidence for the relevant and effective management of studies in universities and research institutes. These authors also agree that the maturity assessment aims to promote the mapping of the current state of scientific production in a subject area. In addition, current trends, the main thematic categorizations, as well as the search for gaps to propose future research are analyzed.

Given the important role of social economy organizations, the growing interest of researchers in knowing what is being studied is denoted. An example of this, and studies similar to this investigation, it can be found in Durán-Sánchez et al. (2018), who conduct a study of scientific production related to innovation and social entrepreneurship, using bibliometric techniques and longitudinal statistical analysis of articles published from 2006 to 2016 in Scopus database. Macía Ruanos et al. (2021) evaluate the use of the term Social Economy, while being aware of its lack of concreteness, and analyze the level of scientific production by means of a bibliometric analysis using Web of Science and Scopus databases. Another example is the investigation conducted by Duque et al. (2021) that performs a bibliometric analysis and a bibliographic review on the social economy and solidary economy between the years 2000 and 2020.

Thus, the objective of this investigation is to guide researchers and provide a panoramic picture of scientific production in the 'Cooperatives' context, from 2012 to 2021. To achieve this objective, this study answers the following research questions:

- 1: What is the evolution of articles and in which of the subject areas studied were the largest number of articles published?
- 2: Which scientific journals and authors have the higher number of publications?
- 3: What is the total number of citations and what are the most-cited authors?
- 4: Which authors have the highest impact factors?
- 5: What is the collaboration between authors?
- 6: What are the trend topics?



To answer these questions, the bibliometric analysis is used as a tool that can offer a view of the investigations carried out in three specific subject areas: Social Sciences, Business, Management and Accounting, and, Economics, Econometrics, and Finance. Despite the growing importance given to investigations on 'Cooperatives' and their relevance in the economy, no bibliometric study has been found with the same characteristics and level of depth as this one. This is the main motivation of this work, which provides an evaluation of the scientific production on 'Cooperatives', covering 10 years, of 709 articles published in the SCOPUS database and, using the visualization format of the VOSViewer (Visualization Of Similarities), a free software (Van Eck, Waltman, 2007).

Apart from this introduction, the remainder of this investigation has the following structure. Section 2 explains the methodology. Section 3, the main section, discloses the results and their discussion. The final section presents conclusions.

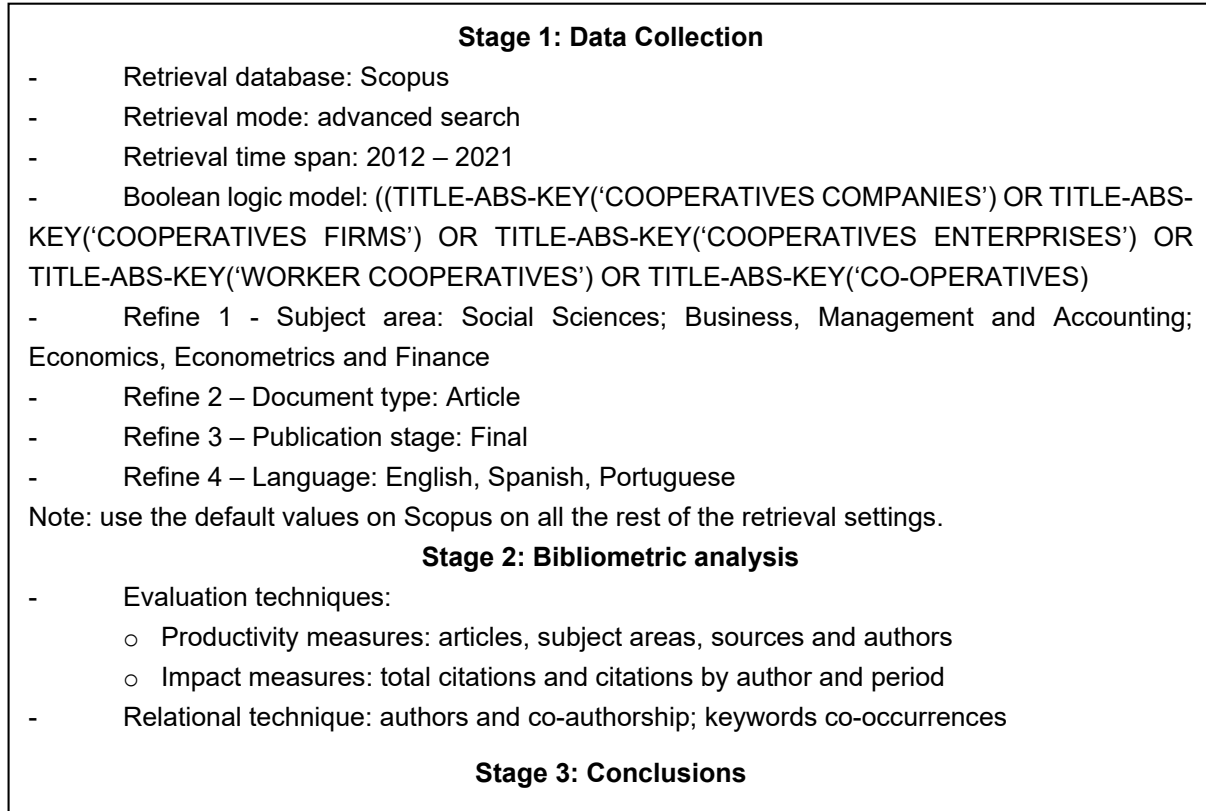
2. Methodology

The bibliometric method has been used based on evaluation and relational techniques on Cooperatives. The purpose of the bibliometric analysis, defined as a discipline as it uses mathematical and statistically process (Pritchard, 1969), is to obtain valuable knowledge by collecting information from a database on a certain topic (publications, citations, authors, journals, institutions, countries, keywords, etc.) to expand the related topic or discipline of the topic (Ciger, 2020). It is possible to offer a macroscopic general perspective to the academic literature and assess research trends (Lee et al., 2020).

On January 23, 2022, from the Scopus database, a total of 709 articles in the final stage has been identified following the search terms and strategies of this research displayed in Figure 1.



Figure 1. Stages of bibliometric analysis on Cooperatives



Source: Own elaboration

VOSViewer software has been used to perform bibliometric analysis (Van Eck, Waltman, 2007). VOSViewer generates a network map for each of the variables used, allowing clusters of words, the construction, and visualization of co-occurrence networks of important terms from scientific literature (Reyes-Menendez et al., 2020).

Finally, the evaluation techniques are analyzed based on the number of articles by period, number of articles by subject area and period, number of sources and authors involved in publications on 'Cooperatives', additionally to the number of citations in total and by author and period, the H-index, and SJR impact factor. On the other hand, the relational technique has been built on the analysis of collaboration between authors and co-authorship taking into consideration link-weights, citation scores, and average year scores, as well as, categorizing the themes in the 'Cooperatives' context, keyword analyses were used in this research.

3. Results and discussion

This section presents the results of the bibliometric analysis in terms of evaluation and relational techniques for the Cooperatives context.



3.1. Evaluation techniques: productivity and impact measures

3.1.1. General descriptive findings

Table 1 reports the evolution of the main characteristics of the 709 documents or articles published with the research topic under study. The time span covers 10 years, from 2012 to 2021, divided into 5 periods of 2 years for better comprehension.

Table 1. Characteristics of scientific production on cooperatives

Period	D	A	C	Ci	Ci/D	J
2012-2013	105	202	37	1,790	17.05	75
2014-2015	144	254	42	1,631	11,33	86
2016-2017	172	360	53	1,359	7.90	99
2018-2019	141	295	43	694	4.92	93
2020-2021	147	335	43	223	1.52	98

(D): number of documents (articles); (A): number of authors; (C): number of countries; (Ci): number of citations; (Ci/D): average citations per document; (J): number of journals

Source: Own elaboration

When Table 1 is analyzed, in the first period (2012 – 2013) only 105 articles were published, however, it is observed an increase not only in the number of researches but also in almost all variables in subsequent periods, especially in the years 2016 and 2017. This third period obtained the greatest result in terms of the number of publications (172), which corresponds to 24.26% of the total documents (709) published from 2012 to 2021. If it is compared with the first period, there is a 1.6-fold growth (from 105 to 172) in the number of articles in 99 different journals. It was also during the period from 2016 to 2017 that the largest number of authors (360) who contributed to this field of research was recorded out of 53 countries that have paid attention to the issue. Nonetheless, it is in the first period when the number of citations (1,790) and the average of citations per document (17.05) ranked first position. The last period (2020-2021) has obtained the second position in the number of articles (147) published and the authors (335) involved in this issue, however, the lowest number of citations and the average number of that, possibly because they are the last documents published of the analyzed period (2012 – 2021).

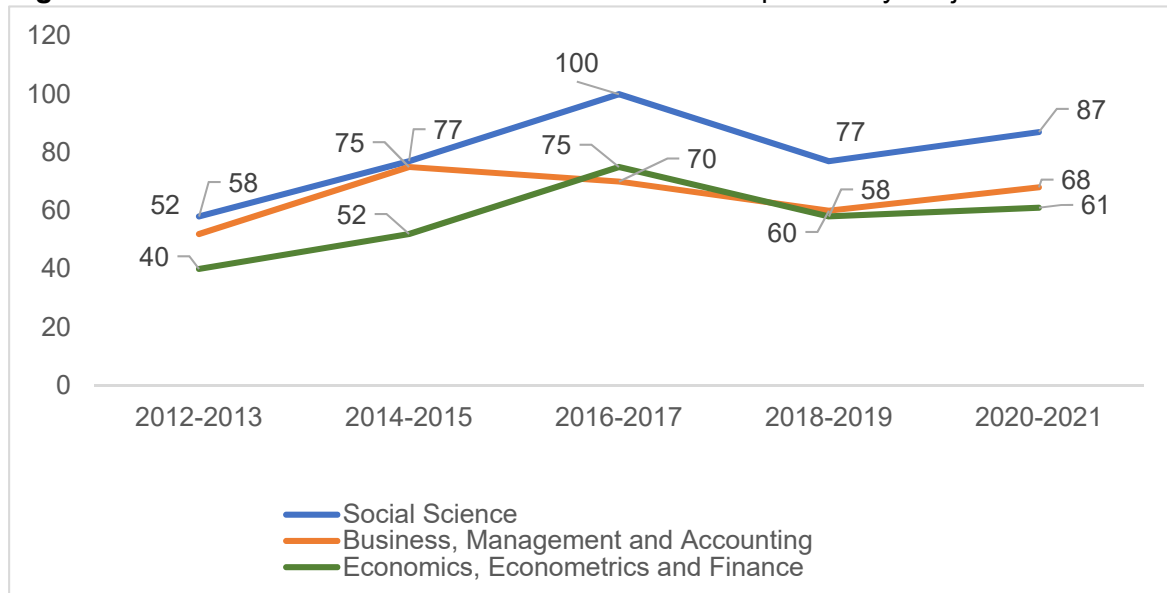
Bibliometric indicators are used to study scientific activity in its quantity and quality, as well as essential information on the dissemination of knowledge within the scientific community and making possible contributions to the advancement of studies. To illustrate a basis for further investigations on cooperatives, we identified the most cited articles on 'Cooperatives'. The two most influential cooperatives study were published in the first period (2012) by Fischer and Qaim with 311 Citations (Ci), followed by Teasdale with 230 citations. In the second period, we found the studies published in 2014 by Cheeney et al. (98 Ci), and by Heras-Saizarbitoria (61 Ci). The research carried out by Stephan and Pathak (2016) marked the highest number of citations (71) in the third period, and the one published by Bretos and Marcuello (2017) was cited 52 times. In the fourth period, the most cited investigations were published by Bontis et



al., and Höhler and Kühl with 62 and 34 citations, respectively. Finally, in the last period, the studies by Ajates (14 Ci), Sandoval (11 Ci), and Charles, et al. (11 Ci), all of them published in 2020, were the most influential articles.

The records of how often documents are published indicate the interest of the scientific community in this thematic. Figure 2 shows the evolution of the production in the three subject areas framed in this research on cooperatives in the five periods. It is important to emphasize that some documents can be classified in more than one area of knowledge due to the interdisciplinarity of the research line.

Figure 2. Evolution of the number of documents between periods by subject area



Source: Own elaboration

Social Science (SS) subject area has been the number one in the quantity of articles published in all periods, surely because it encompasses several studies of both Business, Management and Accounting (BMA), and Economics, Econometrics and Finance (EEF). In this way, the SS with a total of 399 publications, which represents 56.28% of the total (709). In decreasing order of importance, they are followed by BMA area (325 articles, 45.84%) and, EEF (286 documents, 40.34%). It is in the 2016-2017 period that the EEF area exceeds the number of articles published by the BMA area, confirming an increase in the interest of the authors in economic issues in the cooperatives field.

3.1.2. Scientific production by sources, authors, and countries

The bibliometric analysis provided the most relevant sources, authors, and countries that have published documents on cooperatives. The results of the investigation found 339 research sources, such as journals, annals, etc. framed by Scopus. Of these 339, the sources with 10 or more published articles are in Table 2. Given the multidisciplinary of the subject, some sources may belong to various subject areas.



Table 2. The most productive scientific sources

Source	D	Ci	Ci/D	H-I (J)	SJR	Fp	Lp	D				
								2012- 2013	2014- 2015	2016- 2017	2018- 2019	2020- 2021
JCOM	57	552	9.68	12	0.593	2013	2021	9	12	12	11	13
APCE	41	393	9.59	37	0.526	2012	2021	6	9	16	4	6
REV	38	101	2.66	11	0.510	2012	2021	6	11	7	5	9
CIRIEC	32	109	3.41	8	0.656	2016	2021	0	0	10	13	9
BAIDC	20	40	2.00	5	0.255	2013	2021	1	1	5	7	6
ORG	14	431	30.79	99	1.908	2014	2021	0	7	3	1	3

(JCOM): Journal of Co-Operative Organization and Management; (APCE): Annals of Public and Cooperative Economics; (REV): Revesco Revista de Estudios Cooperativos; (CIRIEC): Ciriec-Espana Revista de Economía Pública, Social y Cooperativa; (BAIDC): Boletín De La Asociación Internacional De Derecho Cooperativo; (ORG): Organization; (D): number of documents; (Ci): number of citations; (Ci/D): average number citations per document; (H-I_J): H-Index Journal; (SJR): Schimago Journal Rank; (Fp): first publication; (Lp): last publication

Source: Own elaboration

Exploring the sources listed in Table 2, it is clear that the ‘Journal of Co-Operative Organization and Management’ was the most productive source in the context of cooperatives, with a total of 57 articles. This journal also has the highest number of citations (552), with a great difference from the rest of the journals. The closest in the number of citations is the ‘Organization’ with 431 citations in its 14 publications, obtaining the best average of citations per document (30.79).

In terms of impact sources index (H-I_J), ‘Organization’ (99) and ‘Annals of Public and Cooperative Economics’ (37) journals had the most substantial impact, followed by the ‘Journal of Co-Operative Organization and Management’ (12). On the other hand, the highest Schimago Journal Rank can be observed in the ‘Organization’ journal (1.908) and ‘Ciriec-Espana Revista de Economía Pública, Social y Cooperativa’ (0.656). Both journals are in the first quartile, and the rest journals are in quartile two.

It can be noted that during the last 10 years, Spanish journals have been providing knowledge in this fieldwork, given that of the six listed journals, three of them are from Spain, with average productivity of 30 articles per journal. It should be highlighted that ‘Ciriec-Espana Revista de Economía Pública, Social y Cooperativa’ journal had its first publications on Scopus in 2016, showing high production capacity in the last 6 years of this study.

With respect to findings for authors, the studies on cooperatives found on the Scopus database during the investigated period were developed by a total of 1,340 authors. Table 3 shows the list and the main characteristics of authors with 4 or more publications on cooperatives in the period from 2012 to 2021.



Table 3. Authors with 4 or more documents published on cooperatives

Author	D	H-I_A	Ci	Ci/D	Ay	Institution Affiliation	C
Marcuello C.	8	12	156	19.50	2016	University of Zaragoza	Spain
Tortia E.	8	12	99	12.38	2016	University of Trento	Italy
Bretos I.	6	9	109	18.16	2018	University of Zaragoza	Spain
Jones D.C.	5	21	65	13.00	2013	Hamilton College	United States
Mazzarol T.	5	26	64	13.00	2017	The University of Western Australia	Australia
Errasti A.	5	9	57	11.40	2018	University of the Basque Country	Spain
Vicari S.	5	5	55	11.00	2014	Co-operative College	United Kingdom
Sobering K.	5	4	17	3.40	2017	University of North Texas	United States
Basterretxea I.	4	10	88	22.00	2016	University of the Basque Country	Spain
Kalmi P.	4	15	62	15.50	2013	University of Vaasa	Finland
Borda-Rodriguez A.	4	9	42	10.50	2016	The Open University	United Kingdom
Navarra C.	4	5	32	8.00	2016	European Parliamentary Research Service	Belgium
Nilsson J.	4	12	31	7.75	2015	Swedish University of Agricultural Sciences	Sweden
Talonen A.	4	3	31	7.75	2017	University of Helsinki	Finland
Johnson H.	4	10	28	7.00	2016	The Open University	United Kingdom
Palomo-Zurdo R.	4	6	19	4.75	2018	University of San Pablo	Spain
Mikami K.	4	6	19	4.75	2015	University of Hyogo	Japan
Rada A.A.	4	4	14	3.50	2017	University of Deusto	Spain

(D): number of documents; (H-I_A): H-Index Author; (Ci): number of citations; (Ci/D): average number citations per document; (Ay): average publication year; (C): country

Source: Own elaboration

The highest number of articles were published by Marcuello C. (8) and Tortia E. (8), followed by Bretos I. (6). Basterretxea I. and Marcuello C. obtained the best averages of citations per document, 22 and 19.50, respectively. The interest of Spanish researchers in topics focused on Cooperatives is notorious, given that 31 of 87 studies (36%) presented in this table were published by them. The rest of the studies were carried out by researchers from Italy, the United States, Australia, the United Kingdom, Finland, Belgium, Sweden, and Japan.

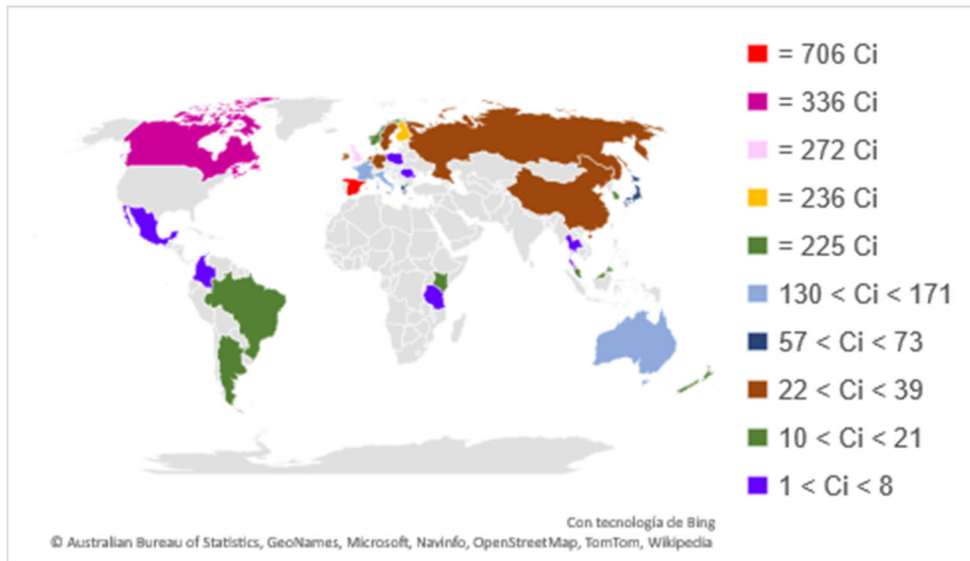
The author's impact factor values were seen in which, in this study, the h-index was considered the most common in the literature, although it is possible to state that other index values of the index, for instance, the g-index and m-index, also have a high contribution (Bornmann and Leydesdorff, 2014). Consequently, the highest H-Index Author factor was obtained by Mazzarol T. (26) from Australia, followed by Jones D.C. (21) from the United States.

In terms of countries, we have identified according to the number of citations received by those authors who published at least two papers. In this way, the data from Scopus identified a total of 78 countries involved in the scientific production on Cooperatives, however, the most influential countries were 32, with two or more publications and the highest number of citations, as shown in Figure 3.



As can be seen in Figure 3, the highest concentration of the number of articles and number of citations, respectively, are denoted in countries such as Spain (76 articles, with 706 Ci), Canada (13, with 336 Ci), the United Kingdom (35, with 272 Ci), and Finland (16, with 236 Ci).

Figure 3. Number of citations by countries on Cooperatives, according to affiliation



(Ci): number of citations

Source: Own elaboration

3.2. Relational techniques: network analysis

3.2.1. Collaboration networks for authors

Collaboration networks present the partnership among the authors and counties in order to analyze the cooperation among them in research on Cooperatives, using co-authorship visualization of VOSviewer software.

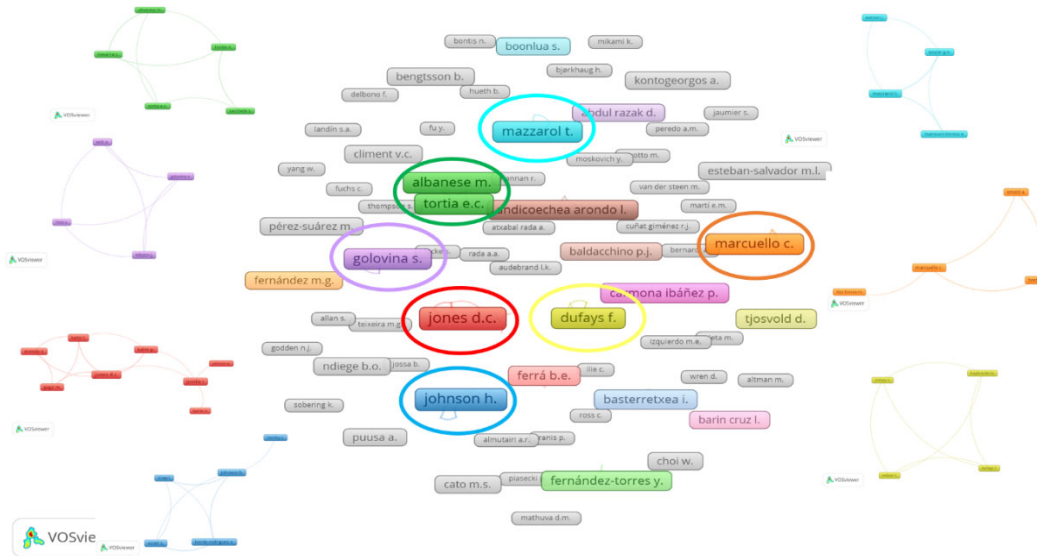
Following the example presented by Guo et al. (2019), it was calculated the statistics values derived from 709 documents that were contributed by 1,340 different authors. In that, it was detected that 17.63% of the authors ($n=125/709$) conducted two investigations published on Cooperatives in cooperation with other authors, 5.64% ($n=40/709$) were credited on at least three studies, and 2.25% ($n=16/709$) conducted at least four investigations, and 1.13% ($n=8/709$) had five or more papers published.

Analyzing the co-authorship based on the author link-weights map (Figure 6), the threshold value was set at two, where it can be seen that among the 72 clusters, one of these clusters identified only 8 authors, in two of them there were 5 authors, in four clusters were detected 4 authors, in six clusters 3 authors, in fourteen clusters 2 authors, and, in the rest of them only 1 author. It is important to highlight that the authors in the same cluster present more frequent collaboration and the thickness of the connections show higher collaboration. Additionally, as the nodes grow (author names), the impact of the authors on the network grows as well (Ciger,



2020). This map is indicative that there is a great dispersion among the researchers in this field.

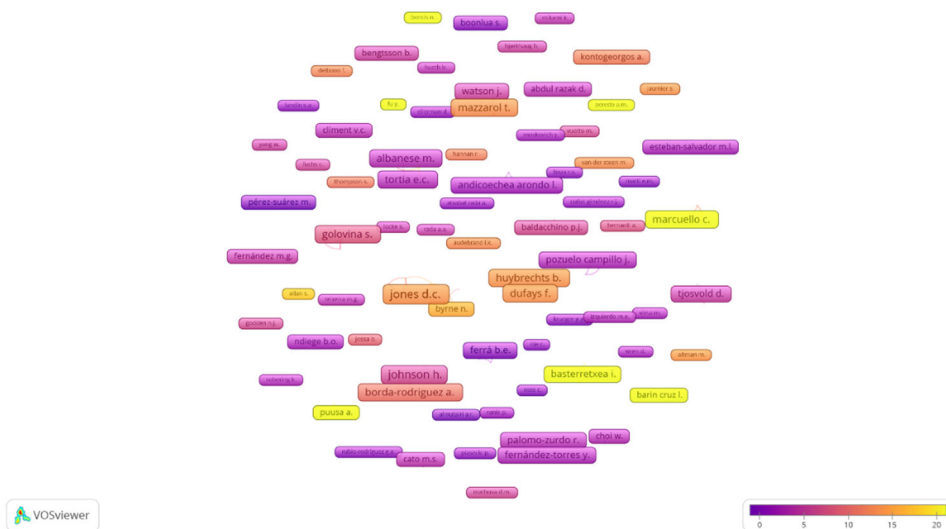
Figure 6. Authors' cooperation map based on author link-weights



Source: Own elaboration

In Figure 7 the author's link-weights are shown through the size of the frames and, the citation scores are represented by the gradient color from purple to yellow indicating the average citation scores of documents. It is readily apparent that, though some authors linked relatively less, their publications received a significant average of citations, as it is the case of 'Bontis N.', 'Fu Y.', 'Varis A.', 'Puusa A.', 'Borin Cruz I.', and 'Leca B.'

Figure 7. Overlay map based on author link-weights and citation scores



Source: Own elaboration



The network analysis in Figure 8, the size of the frames represents the average publication of an author, and the gradient color from blue to red demonstrates the novelty of documents. On average, the most recent articles published on Cooperatives were by the following researchers: 'Ferrá B.E.', 'Almutairi A.R.', and 'Ross C.', all of them published in 2021. On the other hand, the pioneers in that research line were 'Cato M.S.' and 'Myers J.' in 2012, the first year in the fieldwork of this investigation. This may explain that more recent research has fewer citation scores.

Figure 8. Overlay map based on document weights and average publication year scores



Source: Own elaboration

3.2.2. Keywords maps and the trending topics

The keywords analysis helps to identify the central nodes of the network and classify them according to their importance and strength in the network. In this way, the main focus that the researchers have wanted to give to a certain study can be determined (Guo, et al., 2019). According to this type of bibliometric analysis, a total of 2,810 keywords on Cooperatives were found. In order to avoid deviant results, the database was screened before being submitted for analysis by the software. This examination resulted in the exclusion of 49 keywords (i.e. name of countries or regions; the spelling of keywords - plural and singular -; and words such as 'cooperative(s)', 'co-operative(s)', 'work cooperative(s)'. 'social economy' because it is obvious that these words belong the main context of the research. The keywords co-occurrence analysis was carried out with VOSViewer software with a minimum frequency equal to 5 and the number of items connected amounts to 51.

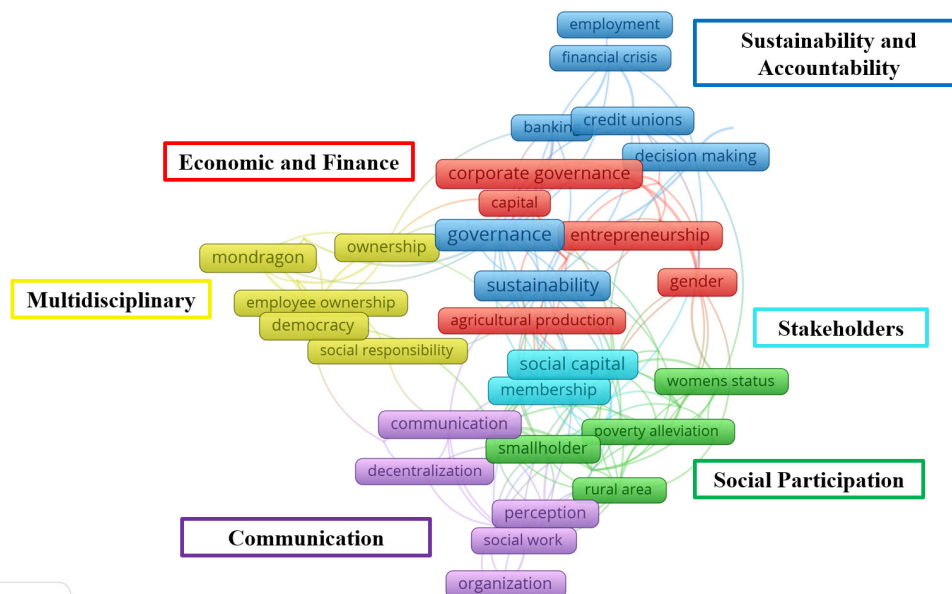
The size of the frames represents the occurrences of keywords, the larger a frame, the more a keyword has been co-selected in the publications on Cooperatives context. According to Van Eck and Walkman (2007), each link has a strength, represented by a positive numerical value. The higher this value, the stronger the link. On the other hand, the total link strength indicates the number of publications in which two keywords occur together.



It can be seen in Table 4 and Figure 9 that ‘Governance’, ‘Sustainability’, ‘Social capital’, and ‘Corporate governance’ keywords had the highest number of occurrences in the Cooperatives field. On the other hand, it is important to clarify that the distance between two keywords demonstrates relative strength and topic similarity that also it can be reflected in the colors of each cluster.

The clusters consist of a group of key issues on Cooperatives. As an example, the ‘Communication’ theme (purple cluster) is about the internal culture, public satisfaction, image, and reputation of cooperatives (Martínez-Carrasco Pleite & Eid, 2017, Almeida & Coelho, 2019). Clusters ‘Stakeholders’ (light blue cluster) and ‘Social participation’ (green cluster) have a strong connection as they both provide studies on how interest groups participate in cooperatives and their structures (Sabatini et al. 2014, Vicari, 2014). Cluster ‘Economic and finance’ (red cluster) deals with aspects such as results, experiences, efficiency and performance management (Guzmán et al., 2020, Monreal & Orellana, 2019, Atienza-Montero & Rodríguez-Pacheco, 2018). Under ‘Sustainability and accountability’ theme (blue cluster) discusses the dimension of governance and empowerment (Tallia et al., 2014, Kleanthous et al., 2019). And finally, and ‘Multidisciplinary’ theme (yellow cluster), the most generic cluster, is about the different alternatives of policies, democratic management, internationalization, and mainly case studies in Mondragon’s cooperatives (Bretos et al., 2020, Heras-Saizarbitoria, 2014).

Figure 9. Co-keyword clustering based on occurrences

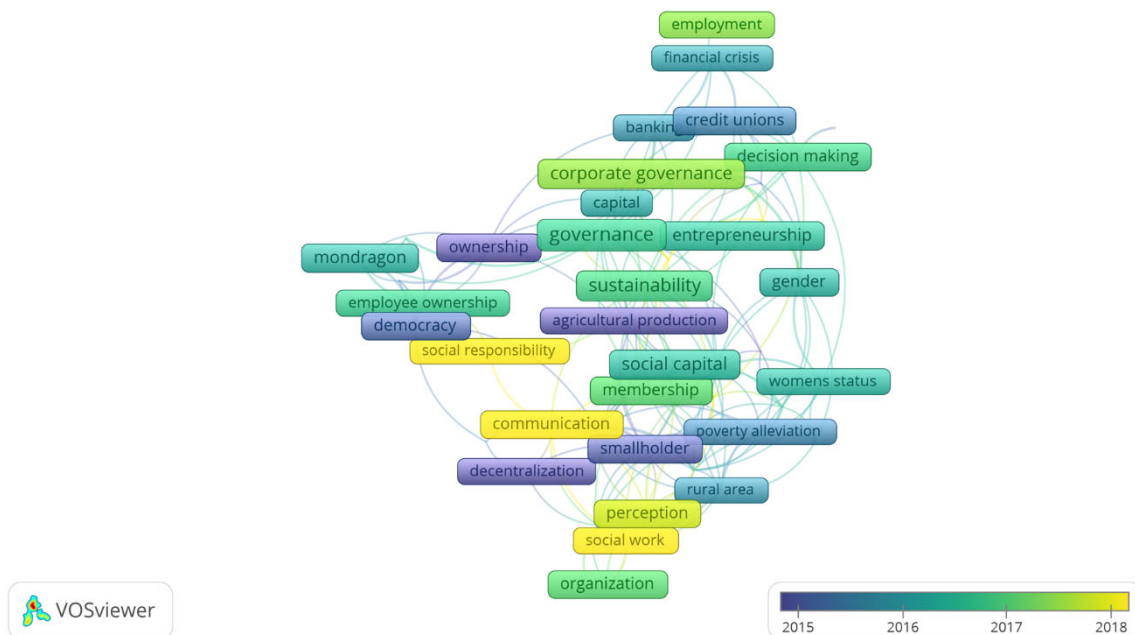


Source: Own elaboration



Using the same co-occurrence of keywords, they can be identified the new trends in the research on Cooperatives. Through VOSViewer overlay visualization based on the average publication year of articles related to specific keywords (Figure 10), it can be found the older themes in purple and the most recent topics in yellow color. According to Figure 10, the trending topics include social and organizational aspects such as keywords ‘social work’ and ‘communication’ located in the ‘Communication’ theme, ‘corporate governance and ‘employment’ placed in the ‘Sustainability and Accountability’ topic, and other two keywords ‘social responsibility and ‘internationalization’ found in ‘Multidisciplinary’ theme. Examples of these trending topics could be found in Guzman et al.’s (2020) investigation which builds links between cooperative principles, entrepreneurial orientation, and performance from the perspective of corporate governance and resource management practices. Another example of new trends in the study about diversification (Cos et al., 2021) presents some variables that have a relationship with the internationalization of agri-food cooperatives.

Figure 10. Co-keyword map based on occurrences and average publication per year scores



Source: Own elaboration



The most found keywords on Cooperatives context are presented in Table 4.

Table 4. Top 5 of the most common keywords on Cooperatives

Ranking	Keyword	Occurrences	Average publication year
Top 1	Governance	17	2016
Top 2	Sustainability	16	2016
Top 3	Social capital	13	2016
	Corporate governance	13	2017
Top 4	Performance	11	2017
	Mondragon	11	2016
	Entrepreneurship	11	2016
Top 5	Profitability	9	2018
	Participation approach	9	2016

Source: **Own elaboration**

4. Conclusions

This study provides a bibliometric analysis in the 'Cooperatives' context of 709 articles published from 2012 to 2021, in the Social Sciences, Business, Management and Accounting, and, Economics, Econometrics, and Finance subject areas in the English, Spanish, Portuguese languages, in the Scopus database.

An increase in the number of investigations in the context of 'Cooperatives' has been observed mainly in 2016 and 2017. The existing multidisciplinary in the studies is highlighted, however, it is still necessary to deepen the research as a way of related to functions of cooperatives and local community and its subsequent development. There is a low rate of network collaborations between authors, especially if they are from different countries. Greater collaboration between researchers would encourage the number of articles and the scientific impact by increasing the number of citations. These opportunities could materialize in the diversification of research a process that would also lead to an increase in the geographical scope of the studies (Palomo et al., 2017).

All the particular conclusions about which authors publish the most studies, and who obtained the highest number of citations, lead to the general conclusion that currently the greatest interest is concentrated in Spain, followed by Canada, the United Kingdom, and Finland.

This article's contribution is to extensively analyse the investigations related to the 'Cooperatives' context and from there extract the main themes studied by the preceding authors. Recently investigated topics were also identified, which might become a trend in future research.

Emerging themes give us a clue as to where researchers can put efforts to answer the questions about this subject. It seems that little research has been done on the importance and relationship between public policies and the cooperative sector. Furthermore, this study suggests the expansion of studies on the performance of the cooperatives in the scope of the



objectives of the 2030 agenda, the carrying out of studies on integrated management, and creating value on 'Cooperatives', given that no article has been found on this important topic in the field of management of any type of company. Also, it would also be interesting to refine the bibliometric techniques and social network analysis, through multivariate data statistics.

It is crucial to remark on the main limitations of this study. This bibliometric analysis is strictly carried out according to the search strategies in a single database and in a specific period. Nevertheless, this investigation contributes to a relevant scientific baseline for future research on 'Cooperatives'.

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