

# THE PATH OF COOPERATIVE DEVELOPMENT RESEARCH: THE BIBLIOMETRIC ANALYSIS USING R

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## ABSTRACT

*This paper seeks to shed light on cooperative development through a bibliometric analysis of 568 articles culled from the Scopus database between 1927 and 2022. Using the Bibliometrix package in RStudio and the Biblioshiny web apps, the bibliometric analyses reveal a significant increase in the number of publications related to cooperative development over the years, indicating a growing interest in this topic among researchers. This study analysed the annual publication trends, the most influential journals and articles, the leading authors, and the countries of cooperative development research. The Sustainability (Switzerland) published the greatest number of cooperative development-related articles, followed by the Annals of Public and Cooperative Economics, and Collection Management. Additional analyses included a keyword analysis, a co-occurrence network, and a thematic map to illustrate the evolution of pertinent themes and subthemes in cooperative development research. The article concludes with a discussion of limitations and recommendations for future research.*

**Keywords:** *Bibliometric analysis, biblioshiny, cooperative development, Scopus*

## INTRODUCTION

A revised Statement on the Cooperative Identity in 1995 states that a cooperative is defined as an “autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically-controlled enterprise” (International Cooperative Alliance, 2018). Previous records mention that the cooperative development had begun in the 18th century when the Industrial Revolution broke out in England (Salleh, al., 2008). They describe that Robert Owen (1771–1858) is considered as the father of the cooperative creating a human association, which is now known as a cooperative. Owen’s idea attempted to solve the oppression and corruption that occurs in society. Although the efforts failed, the idea was continued by Dr. William King (1786 – 1865). He improved the idea to be more practical and was spread by publishing *The Co-operator*.

Later, in year 1844, cooperative ideas were used by 28 workers from the textile industry based in Rochdale to develop a cooperative known as the Rochdale Equitable Pioneers Society or officially the Rochdale Society of Equitable Pioneers (Salleh, et al., 2008). The oppression that they experienced, such as inadequate wages, welfare, and health by employers led to the establishment of this movement. Their innovation in implementing cooperatives through principles, philosophy, and identity became the backbone of the cooperative movement in England and even around the world.

Currently, the development of the cooperative is growing very well all over the world. For examples, in many European countries (i.e., 50 % in France, 37 % in Cyprus, 35 % in Finland, 31 % in Austria, and 21 % in Germany), cooperative institutions have a predominant market share in the retail banking and insurance businesses. On the other part, the Asian societies have adapted the co-operative model for enhancing the value of life. Based on ICA in 2018 statement, more than 12 % of humanity is part of any of the 3 million cooperatives in the world. Furthermore, World Cooperative Monitor (2020) states that the largest 300 cooperatives report a total turnover of USD 2,146 billion. In addition, cooperative contributes to the sustainable economic growth and stable, quality employment, and work opportunities to 280 million people across the globe or 10 % of the world’s employed population.

Majee and Hoyt (2011) suggest that cooperatives can be an effective participatory strategy to attract low-income people into the socio-economic mainstream. Cooperative business has a potential as a community development strategy particularly in resource-limited communities. Meanwhile, Bretos and Marcuello (2017) state that the role of cooperatives is as a strategic element to promote sustainable and inclusive growth in the context of globalization. This statement is supported by Altman (2015) where cooperatives can potentially generate higher rates of growth and more equitable growth, even in competitive economic environments.

Further, Ribas et al. (2022) utilised a systematic review method to acquire sufficient knowledge about cooperatives to understand them as efficient and proactive organizations. Accordingly, this study attempted to use the Scopus database in bibliometric analysis and mapping aimed to provide a better understanding on the trend of research in the field of cooperative development. Scopus is the largest abstract and citation database of peer-reviewed literature, namely scientific journals, books, and conference proceedings. Scopus covers nearly 36,377 titles (22,794 active titles and 13,583 inactive titles) from approximately 11,678 publishers, of which 34,346 are peer-reviewed journals in the top-level subject fields, such as life sciences, social sciences, physical sciences, and health sciences. Scopus has emerged as a reliable and an easy-to-use research tool for citation

searching (Gorraiz & Schloegl, 2008). In addition, Scopus is recognised by the international scientific community as one of the main sources of relevant information (Wahid et al., 2020).

This study aimed to answer the following questions related to articles published on the cooperative development topic:

Research Question 1: What is the trend of research in cooperative development?

Research Question 2: Which are the leading, influential, and impactful sources, and contributors to the extant literature?

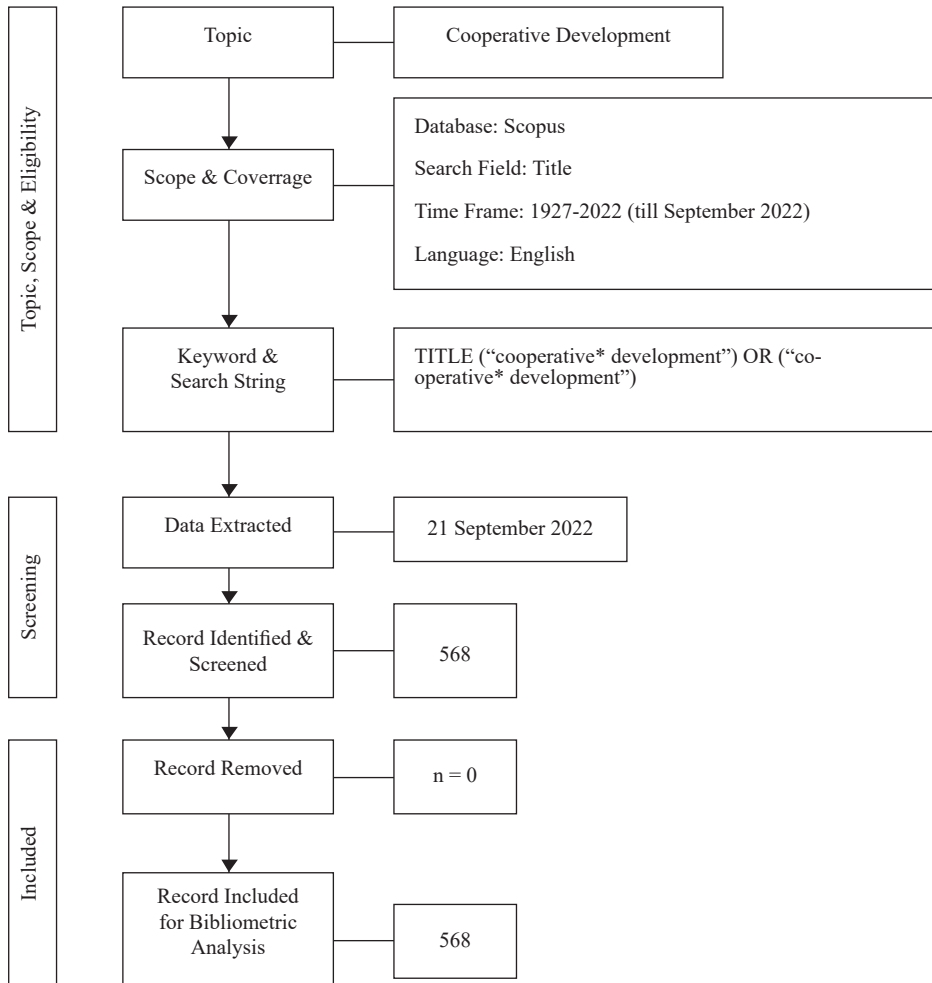
Research Question 3: What is the common theme of research flowing among researchers in this field?

This paper is divided into four sections. The next section describes the methodology used in this paper. This is followed by the results of the bibliometric analysis, and the last section presents the discussions and conclusion.

## **METHODOLOGY**

In this study, the bibliometric analysis was used to examine publications pertaining to cooperative development. As one of the techniques for demonstrating study trends, the bibliometric analysis is gaining its popularity. According to Aria and Cuccurullo (2017), the bibliometric method is “more objective and reliable” than other techniques for conducting a literature review. The bibliometric analysis enables research into the state-of-the-art of the topic (Corte et al., 2019) and includes a network analysis of authors, journals, universities, countries, and keywords based on citations and frequency analysis techniques. This analysis significantly improves the quality of the literature review by introducing a systematic, transparent, and reproducible review procedure. Therefore, the bibliometric method was appropriate for this study because it facilitates the identification of research clusters, offers insights into current research interests, and reveals the trends for emerging topics within a field (Munim et al., 2020).

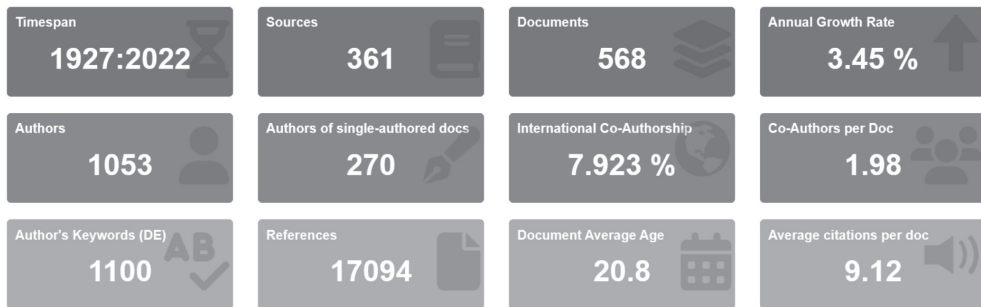
Figure 1 depicts the data extracted from the Scopus database on September 21, 2022. To retrieve all relevant publications for this study, the keyword search in Scopus was configured to include publication titles. The following keyword combination was used: TITLE (“cooperative\* development”) OR (“co-operative\* development”). Only journal articles were chosen, and all documents were inspected for duplication to ensure that the sample was unique. As a result, 568 records or journal articles pertaining to cooperative development were extracted, and all records were included in the bibliometric analysis because no duplicates were identified.



**Figure 1:** Flow diagram of the search strategy

*Source:* Zakaria et al. (2021)

## RESULTS



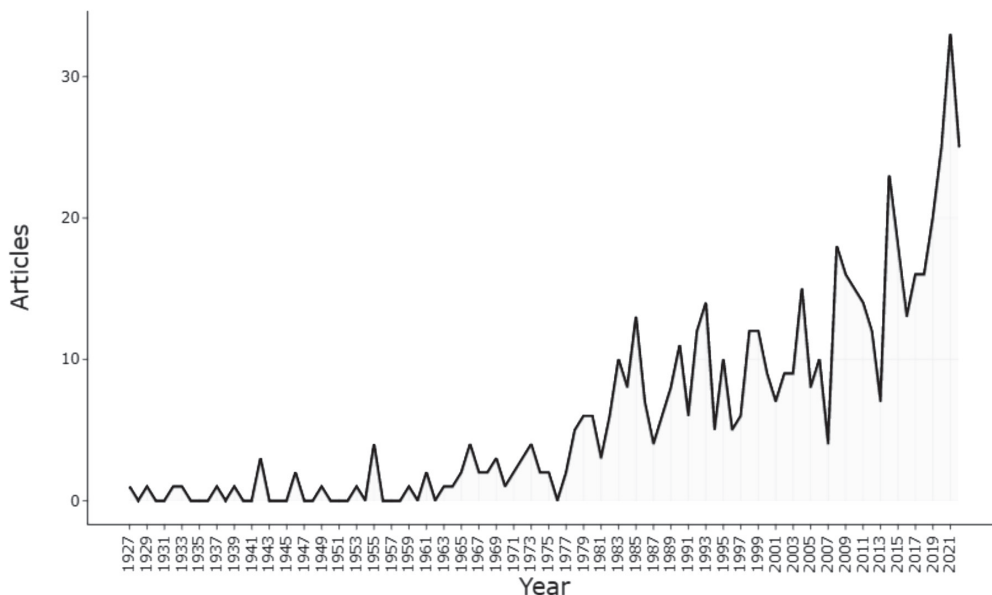
**Figure 2:** Main information

As stated in Figure 2, a total of 568 documents were identified from the Scopus database for the period of 1927 to 2022 (up to 21 September 2022). To address the research trends in cooperative development, this study analysed the following trends: a) Annual publication trends, b) most influential journal, c) top contributing universities/institutions, and d) top contributing countries.

### *Research trends in cooperative development*

#### a) Annual publication trends

Figure 3 shows the patterns in publications on cooperative development since 1927. Since 2008 only a number of articles published had shown a significant increment with 33 publications in 2021 and 25 publications in 2022. This shows that the trend of cooperative studies began to increase rapidly starting in 2000.



**Figure 3:** Annual trends in publications in cooperative development

**Table 1:** Number of publications from 1927 to 2022

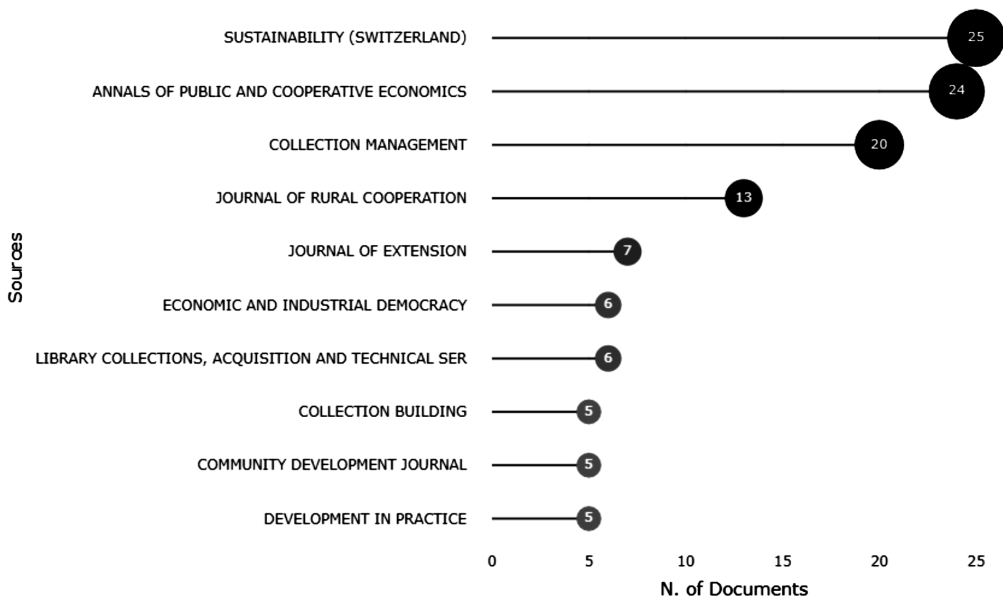
<b>Year</b>	<b>Articles</b>	1959	1	1991	6
1927	1	1960	0	1992	12
1928	0	1961	2	1993	14
1929	1	1962	0	1994	5
1930	0	1963	1	1995	10
1931	0	1964	1	1996	5
1932	1	1965	2	1997	6
1933	1	1966	4	1998	12
1934	0	1967	2	1999	12
1935	0	1968	2	2000	9
1936	0	1969	3	2001	7
1937	1	1970	1	2002	9
1938	0	1971	2	2003	9
1939	1	1972	3	2004	15
1940	0	1973	4	2005	8
1941	0	1974	2	2006	10
1942	3	1975	2	2007	4
1943	0	1976	0	2008	18
1944	0	1977	2	2009	16
1945	0	1978	5	2010	15
1946	2	1979	6	2011	14
1948	0	1980	6	2012	12
1949	1	1981	3	2013	7
1950	0	1982	6	2014	23
1951	0	1983	10	2015	18
1952	0	1984	8	2016	13
1953	1	1985	13	2017	16
1954	0	1986	7	2018	16
1955	4	1987	4	2019	20
1956	0	1988	6	2020	25
1957	0	1989	8	2021	33
1958	0	1990	11	2022	25

## b) Most influential journals

Table 2 and Figure 4 show the most influential journals in the cooperative development research. Sustainability (Switzerland) published 25 articles, followed by Annals of Public and Cooperative Economics with 24 articles. Collection Management produced 20 articles in the cooperative development research, while Journal of Rural Cooperation published only 13 articles.

**Table 2:** Most influential journals

Sources	Articles
Sustainability (Switzerland)	25
Annals of Public and Cooperative Economics	24
Collection Management	20
Journal of Rural Cooperation	13
Journal of Extension	7
Economic and Industrial Democracy	6
Library Collections, Acquisition and Technical Services	6
Collection Building	5
Community Development Journal	5
Development in Practice	5

**Figure 4:** Most influential journals

c) Top contributing universities/institutions

In terms of universities/institutions that contributed the most publications related to cooperative development as shown in Figure 5 are Shanghai Jia Tong University with 13 articles and followed by Tongji University - 12 articles. Some of the universities are in the range of 7 - 11 articles as stated below. However, there are 2 universities that are in the lowest position with only 6 articles, namely Arizona State University and Iowa State University.

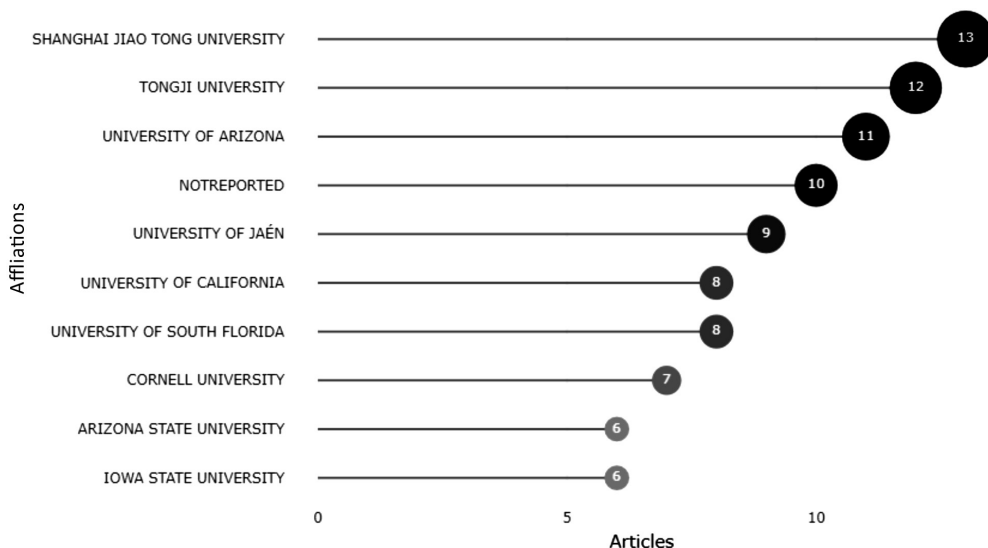
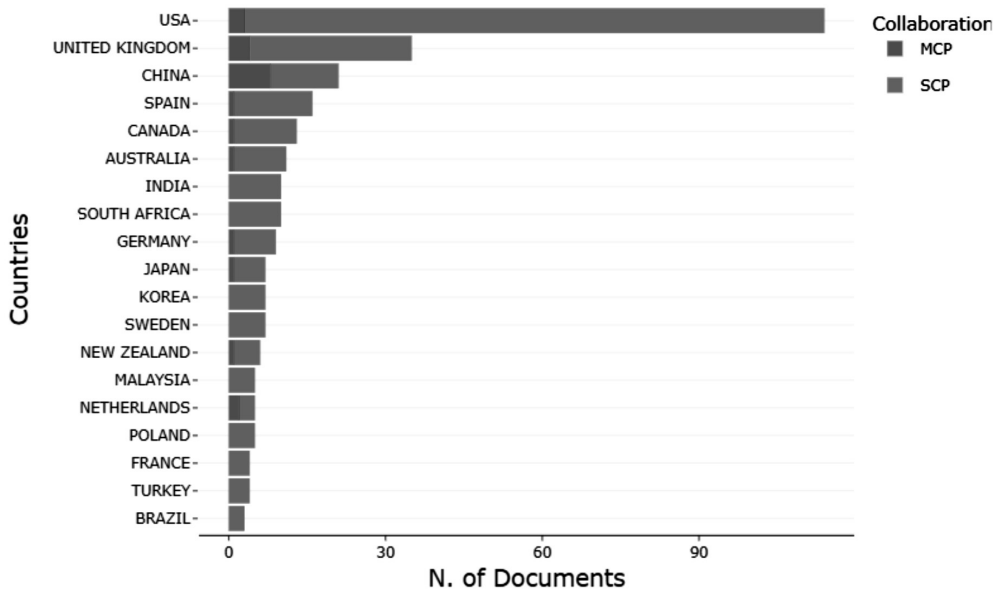


Figure 5: Top contributing universities/institutions

d) Top contributing countries

Figure 6 illustrates the countries where the articles related to cooperative development were published. Therefore, the USA is the largest contributor with 114 articles. This is followed by the United Kingdom with a total of 35 articles. China is in the third place with 21 articles. There are also some countries that contributed only 1 article, namely Zambia, Tanzania, and Saudi Arabia as shown in Figure 6.





**Figure 6:** Top contributing countries

**Table 3:** Top contributing countries

Country	Articles	SCP	MCP	Freq	MCP_Ratio
	220	208	12	0.387	0.055
USA	114	111	3	0.201	0.026
UNITED KINGDOM	35	31	4	0.062	0.114
CHINA	21	13	8	0.037	0.381
SPAIN	16	15	1	0.028	0.063
CANADA	13	12	1	0.023	0.077
AUSTRALIA	11	10	1	0.019	0.091
INDIA	10	10	0	0.018	0
SOUTH AFRICA	10	10	0	0.018	0
GERMANY	9	8	1	0.016	0.111
JAPAN	7	6	1	0.012	0.143
KOREA	7	7	0	0.012	0
SWEDEN	7	7	0	0.012	0
NEW ZEALAND	6	5	1	0.011	0.167
MALAYSIA	5	5	0	0.009	0

**Contributors in cooperative development research**

a) Most productive authors

As shown in Table 4, the most productive authors in publications related to cooperative development are Dannelly, G. N, Giagnocavo, C., Johnson, D. W, Johnson, R. T, Purvis, M., Raniga, T., and Wang, X. with 3 articles each, followed by Bernal-Jurado, E., Canabate, D., Chen, R. S., Chen, Y., Cohen, J. P., Colomer, J., Cornforth, C., Downs, R. R., Edge, J., Ehui, S., Erickson, R., Fernández-uclés, D., Gagliardi, F., Garnevska, E., Glatthorn, A. A., Gu, T., and Guo W with 2 articles in the second rank. The productivity of the authors is shown from the perspective of individual production, while the Articles Fractionalized indicates that a document was developed by several authors, with each of them represented by a fraction of the authorship.

**Table 4:** Most productive authors

<b>Authors</b>	<b>Articles</b>	<b>Articles Fractionalized</b>
DANNELLY GN	3	3.00
GIAGNOCAVO C	3	1.67
JOHNSON DW	3	1.83
JOHNSON RT	3	1.83
PURVIS M	3	3.00
RANIGA T	3	3.00
WANG X	3	0.65
BERNAL-JURADO E	2	0.50
CAÑABATE D	2	0.50
CHEN RS	2	1.00
CHEN Y	2	0.42
COHEN JP	2	1.00
COLOMER J	2	0.50
CORNFORTH C	2	1.50
DOWNS RR	2	1.00
EDGE J	2	2.00
EHUI S	2	0.53
ERICKSON R	2	2.00
FERNÁNDEZ-UCLÉS D	2	0.50
GAGLIARDI F	2	2.00
GARNEVSKA E	2	0.67
GLATTHORN AA	2	2.00
GU T	2	0.40
GUO W	2	0.40

## b) Most influential articles

Table 5 provides information on the most influential articles. The most cited article is by Sakakibara (1997) “Heterogeneity of Firm Capabilities and Cooperative Research and Development: An Empirical Examination of Motives”, which received a total of 231 citations. However, for the context of cooperative as a business entity, Majee and Hoy (2011) who published the article titled “Cooperatives and Community Development: A Perspective on the Use of Cooperatives in Development” had received a total of 62 citations. The second most cited article was published by Bretos and Marcuello (2017) that describes cooperative as strategic elements to achieve a sustainable economic development and greater social cohesion in their paper titled “Revisiting Globalization Challenges and Opportunities in The Development of Cooperatives”. This paper received a total of 57 citations.

Meanwhile, a paper titled “The Role and Characteristics of Social Entrepreneurs in Contemporary Rural Cooperative Development in China: Case Studies of Rural Social Entrepreneurship” by Lan et al. (2014) had received a total of 38 citations. This case study suggests that there are multiple key characteristics of social entrepreneurship in the process of rural cooperative management. The article also found occurred implications for rural community development in transitional economies in terms of developing social entrepreneurship capabilities. Lastly, an article by Altman (2015) titled “Cooperative Organizations as an Engine of Equitable Rural Economic Development” had received a total of 37 citations. Altman (2015) claims that cooperative can potentially generate higher rates of growth and more equitable growth is even a re-key to the success of the cooperative farm.

**Table 5:** Most influential articles

Paper	DOI	Total Citations	TC Per Year	Normalized TC
SAKAKIBARA MKO, 1997, STRATEGIC MANAGE J	3.3.Co;2-P” Target=”_Blank”>10.1002/(Sici)1097-0266(199707)18:1+3.3.Co;2-P	231	8.88	4.20
BAUWENS T., 2016, ENERGY RES SOC SCI	10.1016/J.Erss.2015.12.016	222	31.71	9.59
YILDIZ Ö., 2015, ENERGY RES SOC SCI	10.1016/J.Erss.2014.12.001	208	26.00	8.73
HOLLOWAY G., 2000, AGRIC ECON	10.1016/S0169-5150(00)00089-X	179	7.78	6.08
LOOMIS J. L., 1959, HUM RELAT	10.1177/001872675901200402	123	1.92	1.00
CAI S., 2008, J SUPPLY CHAIN MANAGE	10.1111/J.1745-493X.2008.00045.X	118	7.87	5.63
BACON C. M., 2008, GLOBALIZATIONS	10.1080/14747730802057688	116	7.73	5.54
PALME U., 2005, RESOUR CONSERV RECYCL	10.1016/J.Resconrec.2004.06.006	93	5.17	5.20
ASADA M., 1999, ARTIF INTELL	10.1016/S0004-3702(99)00026-0	92	3.83	8.76
BROEKEL T., 2015, REG STUD	10.1080/00343404.2013.812781	63	7.88	2.64
LANGSTON M., 2003, LIBR COLL ACQUIS TECH SER	10.1016/S1464-9055(02)00305-6	63	3.15	2.67

MAJEE W., 2011, J COMMUNITY PRACT	10.1080/10705422.2011.550260	62	5.17	3.77
CHEN X-P, 2011, MANAGE ORGAN REV	10.1111/J.1740-8784.2011.00215.X	59	4.92	3.59
SAKAKIBARA M., 2003, MANAGE DECIS ECON	10.1002/Mde.1080	58	2.90	2.46
CUI L., 2018, TRANSP RES PART C EMERG TECHNOL	10.1016/J.Trc.2018.10.005	57	11.40	4.24
BRETOS I., 2017, ANN PUBLIC COOP ECON	10.1111/Apce.12145	57	9.50	4.93
HÅKANSON L., 1993, R D MANAGE	10.1111/J.1467-9310.1993.Tb00834.X	56	1.87	5.30
ROGERS E. M., 1998, R D MANAGE	10.1111/1467-9310.00084	51	2.04	5.32
AZIZAN M. T., 2018, EDUC CHEM ENG	10.1016/J.Ece.2017.10.002	46	9.20	3.42
GAGLIARDI F., 2009, SMALL BUS ECON	10.1007/S11187-007-9080-Z	44	3.14	4.40
SAKAKIBARA M., 2001, RES POLICY	10.1016/S0048-7333(00)00127-X	44	2.00	3.90
BRICHERI-COLOMBI S., 2003, GEOGR J	10.1111/1475-4959.T01-1-00002	41	2.05	1.74
LAN H., 2014, ASIA PAC BUS REV	10.1080/13602381.2014.929300	38	4.22	3.95
SHREEVES E., 1997, LIBR TRENDS		38	1.46	0.69
ALTMAN M., 2015, J COOP ORGAN MANAGE	10.1016/J.Jcom.2015.02.001	37	4.63	1.55

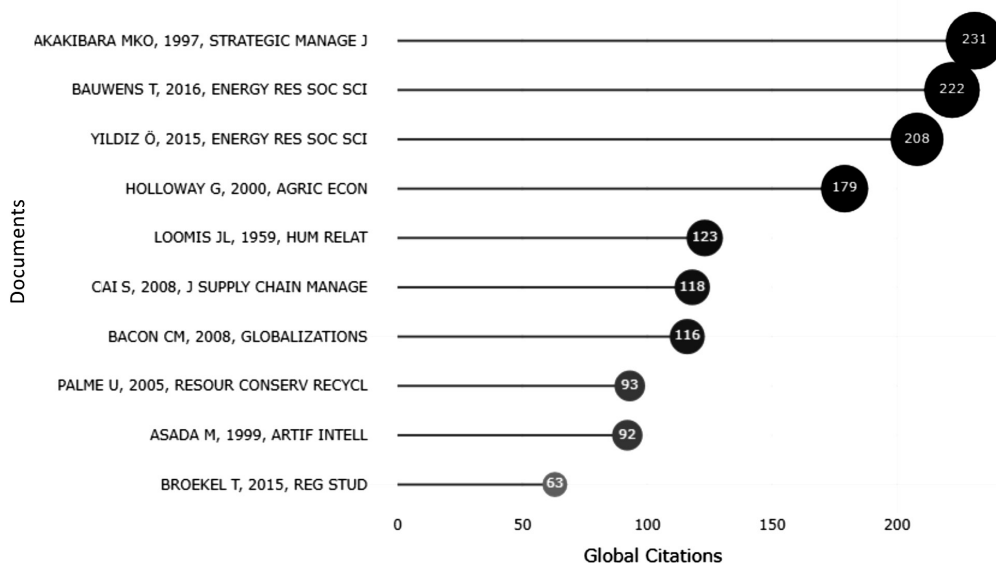
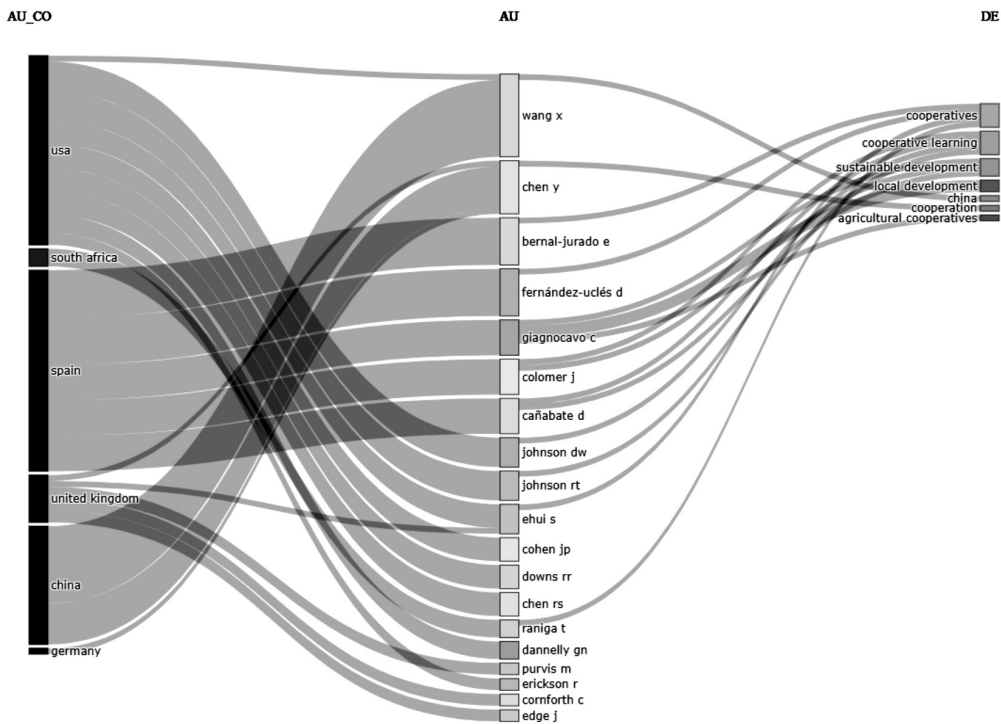


Figure 7: Most influential articles

c) Three-field plot

The connections between countries, authors, and keywords can provide useful information. Figure 8 depicts a three-field plot analysis used in cooperative development research, of which keywords are on the right, countries data on the left, and author data in the centre.

The Figure reveals that the USA, South Africa, Spain, United Kingdom, China, and Germany were the countries where research on cooperative development was being carried out. The analysis also shows that Wang, X., Chen, Y. and Bernal-Jurado, E. were among the most productive authors. The keywords mostly utilised were cooperatives, cooperative learning, and sustainable development.



**Figure 8:** Three-field plot of countries, authors, and keywords

**Themes discussed**

The bibliometric analysis allows the identification of research clusters, provides insights into current research interests, and reveals trends for emerging topics in a field (Munim et al., 2020). To understand the common theme of research flowing among researchers within the cooperative development research, the followings analyses were conducted: a) Keywords analysis and b) thematic map.

a) Keywords analysis

A keyword analysis was conducted in order to determine the most prevalent themes in cooperative development publications. The author’s keywords are those provided by the authors at the time the article was published. According to Zheng et al. (2016), authors use keywords as a clear, representative, and succinct description of the research content, and thus, hot topics and themes of a research domain can be identified based on a keyword analysis. Table 6 summarises the most frequently used author keywords in cooperative development research, while Figure 9 provides a visual representation of the terms that appeared most frequently in cooperative development-related publications. According to the data displayed in Table 6, “cooperatives” was the most prevalent associated keyword (n = 34). Additionally, “cooperative learning” (n = 22), “sustainable development” (n = 14), and “China” (n = 12) were the frequently associated keywords.

Table 6: Most frequent words

Terms	Frequency
Cooperatives	34
Cooperative learning	22
Sustainable development	14
China	12
Cooperative	10
Cooperation	9
Rural development	9
Cooperative collection development	8
Local development	8
Agricultural cooperatives	7



Figure 9: Word cloud – author’s keywords

b) Thematic map

The thematic map in Figure 10 represents various theme classifications based on their placement in the respective map quadrants. The upper-right quadrant of the thematic map represents the motor themes, which have high centrality and density. The quadrants highlight the developed and most significant research fields of these themes. The themes in the upper-left quadrant are considered niches, which were developed but isolated from other research areas. The lower-left quadrant highlights emerging themes or declining themes with low centrality and density. The final lower-right quadrant represents the corresponding basic research areas with high centrality but low density.

The themes in the lower-right quadrant are the basic or transversal themes with high centrality and low density. Among the themes in this quadrant are represented by the keywords, such as “cooperative development”, “sustainable development”, “sustainability”, “sustainable development goals”, “cooperative societies”, “women’s cooperatives” and “social economy”. Basic themes are important for the development of a research field, but internally they are not sufficiently developed (Martínez et al., 2015). Hence, these themes are important within the cooperative development research and much more research needs to be done on these themes. The themes in the upper-right quadrant are known as the motor themes. They are characterized by both high centrality and density. This means that they are developed and important for the research field. The themes in this quadrant are represented by keywords, such as “cooperatives”, “China”, “rural development”, “local development”, “agricultural development”, “capabilities”, and “cooperative learning”.

The themes that appear on the lower left part are the emerging or declining themes. They both have low centrality and density, meaning that they are weakly developed and marginal. The topics under this theme include “collective action”, “family farming”, and “cooperative education”. The themes in the upper-left quadrant are niche themes. These themes are known as highly developed but isolated themes. Keywords, such as “cooperative model”, “staff development”, “poverty alleviation”, and “women” are found in this quadrant.

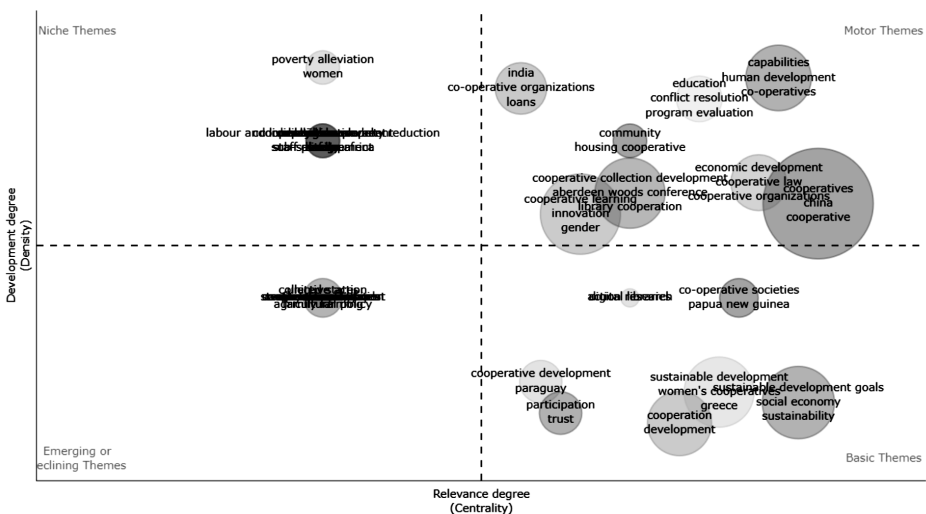


Figure 10: The Thematic Map (Author’s keywords)

## DISCUSSION

This study aimed to provide an insight into cooperative development, which can improve the quality of papers by helping academics identify relevant literature, assess the impact of their work, and compare their work to that of other researchers in their field. This study also signifies to the cooperatives as it could predict the forward trends of cooperative development. This study adopted a bibliometric analysis using a freely available, Biblioshiny program to analyse 568 documents obtained from the Scopus database.

From the first publication in 1927 until 2022, the number of publications on cooperative development has remained below 100, however, the number of publications has significantly increased to more than 100 articles per year, showing a growing interest of researchers on the topic of cooperative development. Secondly, the Sustainability (Switzerland), Annals of Public and Cooperative Economics, and Collection Management are the most influential journals for the cooperative development topic. Thirdly, for the context of cooperative as a business entity, Majee and Hoy (2011) are the most influential authors with 62 citations per paper. Dannelly G.N. is the most prominent researcher in the cooperative development domain, followed by Giagnocavo, C., Johnson, D.W, and Johnson, R.T in terms of number of publications.

Although the analytic programme is freely accessible online, there are certain restrictions on the research. First off, the application only permits one database to be imported for analysis at a time. Other databases might be used in the upcoming research. Second, the Scopus database—which is frequently updated as the number of journals changes—was used to do the article search. Theme analysis will occasionally reveal oscillations. Thirdly, the current study offers insights into cooperative development research even if the current bibliometric analysis was restricted to only 568 article journals.

## CONCLUSION

In conclusion, future studies for the bibliometric analysis might include additional sources, such as books and conferences. Moreover, future studies on the cooperatives research might also look into other topics, such as cooperative growth and issues using other bibliometric analysis themes, such as worldwide maps and collaboration networks. Besides, future studies could use software programmes, such as VOSviewer and CiteSpace to conduct the bibliometric analysis.

## ACKNOWLEDGMENT

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## REFERENCES

- Altman, M. (2015). Cooperative organizations as an engine of equitable rural economic development. *Journal of Co-operative Organization and Management*, 3(1), 14–23. doi:10.1016/j.jcom.2015.02.001



- Aria, M. & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Infometrics*, 11(44), 959-975. <https://doi.org/10.1016/j.joi.2017.08.007>
- Bretos, I. & Marcuello, C. (2017). Revisiting globalization challenges and opportunities in the development of cooperatives. *Annals of Public and Cooperative Economics*, 88(1), 47–73. doi:10.1111/apce.12145
- Corte, V. D., Gaudio, G. D., Sepe, F., & Sciarelli, F. (2019). Sustainable tourism in the open innovation realm: A bibliometric analysis. *Sustainability*, 11(21), 6114 <https://doi.org/10.3390/su11216114>
- Gorraiz, J., & Schloegl, C. (2008). A bibliometric analysis of pharmacology and pharmacy journals: Scopus versus Web of Science. *Journal of information science*, 34(5), 715-725.
- International Cooperative Alliance. (2018). *Co-operative identity, values & principles*. <https://www.ica.coop/en/cooperatives/cooperative-identity>
- Lan, H., Zhu, Y., Ness, D., Xing, K., & Schneider, K. (2014). The role and characteristics of social entrepreneurs in contemporary rural cooperative development in China: Case studies of rural social entrepreneurship. *Asia Pacific Business Review*, 20(3), 379–400. doi:10.1080/13602381.2014.929300
- Majee, W. & Hoyt, A. (2011). Cooperatives and community development: A perspective on the use of cooperatives in development. *Journal of Community Practice*, 19(1), 48–61. doi:10.1080/10705422.2011.550260
- Martínez, M. A., Cobo, M. J., Herrera, M., & Herrera-Viedma, E. (2015). Analyzing the scientific evolution of social work using science mapping. *Research on Social Work Practice*, 25(2), 257-277.
- Md Salleh, H., Asha'ari, A., Ahmad Faizal, A. S., & Norbiha, K. (2008). *Gerakan Koperasi di Malaysia*. Maktab Kerjasama Malaysia.
- Munim, Z. H., Dushenko, M., Jimenez, V. J., Shakil, M. H., & Imset, M. (2020). Big data and artificial intelligence in the maritime industry: A bibliometric review and future research directions. *Maritime Policy & Management*, 47(5), 577-597.
- Sakakibara, M. (1997). Heterogeneity of firm capabilities and cooperative research and development: an empirical examination of motives. *Strategic management journal*, 18(S1), 143-164.
- Ribas, W. P., Pedroso, B., Vargas, L. M., Picinin, C. T., & Freitas Júnior, M. A. de. (2022). Cooperative organization and its characteristics in economic and social development (1995 to 2020). *Sustainability*, 14(14), 8470. MDPI AG. Retrieved from <http://dx.doi.org/10.3390/su14148470>
- Wahid, R., Ahmi, A., & Alam, A. F. (2020). Growth and collaboration in massive open online courses: A bibliometric analysis. *International Review of Research in Open and Distributed Learning*, 21(4), 292-322.

Zakaria, R., Ahmi, A., Ahmad, A. H., & Othman, Z. (2021). Worldwide melatonin research: a bibliometric analysis of the published literature between 2015 and 2019. *Chronobiology International*, 38(1), 27-37.

Zheng, T., Wang, J., Wang, Q., Nie, C., Shi, Z., Wang, X., & Gao, Z. (2016). A bibliometric analysis of micro/nano-bubble related research: Current trends, present application, and future prospects. *Scientometrics*, 109, 53-71.