

Review Article

Longitudinal Study of Credit Union Research: From Credit-Provision to Cooperative Principles, the Urban Economy and Gender Issues

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Credit unions are one of the most widely established corporate entities in the financial systems of most of the world's nations. Their historical support to the financing needs of small savers, as well as their assimilation into the framework of contemporary microfinance, gives them an important specific weight in the economic-financial literature of our time. In this sense, our research has carried out a systematic review of the main contributions (articles in scientific journals) focused on the area of credit unions over the period 1936–2020, using Scopus and WoS as bibliographic databases. In summary, the main countries, journals, authors, articles, and the main collaborative research networks at the level of authors or countries have been analyzed. In the same way, the implementation of strategic diagrams based on Callon's procedure has facilitated the classification of the most important terms linked to financial cooperativism, which has served to detect future lines of research related to the terms (among others): asymmetric-information, capital-provision, cooperative-principles, customer-reduction, gender-issues, neoinstitutionalism, poverty, and urban-economy.

1. Introduction

It was not always possible for all social classes to access credit. Until well into the nineteenth century, only the large industrial conglomerates of that time could obtain financing, excluding the most disadvantaged strata of society, which inhibited the growth of small manufacturing businesses or peasants with scarce financial resources. Access to credit for less well-off individuals was the work of several English philanthropists, the so-called “Rochdale Pioneers,” who founded in 1844 “The Rochdale Society of Equitable Pioneers,” a consumer cooperative that would eventually lay the foundations of the modern cooperative movement and, obviously, of today's credit unions [1]. Among the leading figures of the cooperative movement, names such as F. W. Raiffeisen (1818–1888), H. Schulze-Delitzsch (1808–1883),

A. Desjardins (1854–1920), and E. Filene (1860–1937) stand out, who were the creators of the first credit unions in Germany, Canada, and the United States, respectively [2]. It should be borne in mind that the first credits granted by these institutions in their beginnings were valued at several cents on the dollar. In contrast, at present, they represent the second source of global financing after conventional banking [3], serving the interests of citizens with fewer economic resources [4]. At the same time, they have been revealed as a necessary instrument to combat material poverty [5], especially in rural or agrarian areas [5–7].

The humanist spirit of the Rochdale pilgrims is still present in the daily work of these financial institutions since the guidelines set by those social benefactors are still followed according to the “Rochdale Principles” [2]. That is, a set of postulates that reflect the character and circumstances

of the founders of the cooperative movement, faithfully transferred today to the organizational structure and *ad hoc* legislation of these corporate entities [8]. The founders came from different countries and professed diverse religions and ideologies. Hence, the internationalist vocation of these organizations, their political-religious neutrality, and a consideration of social benefit are utterly different from that of mere economic return [9], whereby the “non-profit” concept [10] prevails over any other type of consideration. For these reasons, financial institutions linked to cooperativism went from being residual associations of just a handful of members to substantially increasing their business volume [11], being able to generate synergies among their members, as well as economies of scale from the capital provided by small savers [12]. These elements have led to a growing demand for the services offered by credit unions [13–15], consolidating a series of practices that, by definition, entail considerably less risk than those of conventional banking [16].

The altruistic-cooperative scheme that defines Credit Unionism has adapted to the passing of time since the principle of neutrality has facilitated its expansion throughout the planet, giving rise to innovative initiatives such as the “Fountain of Love Credit Union” in Indonesia [17]. This same principle embodies the fact that the solidarity vocation of these institutions allowed them to be commonly accepted by various religious denominations. Credit unions found broad support from specific sectors of the Catholic Church from the perspective of Catholic social teaching [18]. Likewise, it has been perfectly assimilated by contemporary Islamic Banking and Finance by creating inclusive financial institutions in line with the principles of this religion [7, 19]. They represent a fundamental tool for supporting and disseminating microcredits [5, 17, 20]. Consequently, according to the supranational institution in charge of the regulation of these institutions, the World Council of Credit Unions [21], their importance in the world economic-financial panorama can be summarized in the following figures: there are more than 86,000 institutions present in all continents that group together more than 300 million members from 118 different countries.

Therefore, due to the historical significance of these corporate entities in the financial systems of most countries, to their proactive welfare work against social exclusion, to their strong presence in the rural environment of both developed and underdeveloped countries, or the booming volume of credit they finance worldwide, these institutions are worthy of exhaustive bibliometric analysis, with a sufficiently long time horizon to detail the main aspects and defining features that have surrounded their study, this being the primary objective of this research.

Currently, bibliometric methods and models have allowed metadata to go from being simple microfiles of structured information to become an inexhaustible source of descriptive or visual resources [22], capable of clarifying any discipline or domain of knowledge. This phenomenon is due to the fact that scholars have an increasing number of bibliometric tools and applications [23] (some of them freely available to the scientific community [24]), which have led to

the emergence of bibliometric software over the last 25 years. Among this wide range of applications are BibExcel [25], Bibliometrix [26], CiteSpace [27], HistCite [28, 29], NetDraw [30], Network Workbench [31], Pajek [32], Sitkis [33], UCINET [34], or Leydesdorff Toolkit [35].

However, in this research, two bibliometric applications, whose versatility has led them to become a standard in the applied bibliometric analysis, have been used complementarily: VOSViewer [36] and SciMAT [37]. The former is a significant improvement over multidimensional scaling techniques, being particularly suitable for visualization, clustering, and mapping of bibliometric networks [38–41]. By its part, SciMAT [42–44] bases its analytical potential on the use of co-word analysis for the construction of strategic diagrams representative of any discipline or knowledge domain [45].

Both tools have been applied at the same time on two reference indexes in the scientific literature: Scopus (Elsevier) and Web of Science (Clarivate Analytics) (hereinafter Scopus and WoS, respectively). Such implementation allows mitigating the relative problems of working with both indexes simultaneously until there is a plausible integration of these bibliographic platforms [28]. Likewise, the use of quantitative techniques or the visualization of bibliometric networks has made it possible to describe the evolution of the study of credit unions over a long period of analysis (1936–2020) reliably, detailing its defining facts and, above all, its multidisciplinary nature, given that its study is linked to other branches of knowledge such as economics, politics, history, and philosophy.

The remaining part of this manuscript is structured as follows: section 2 contains a bibliographical review of the financial cooperative phenomenon. Next, section 3 details the methodology followed by this research, while section 4 presents the results obtained. Finally, section 5 specifies the conclusions to be drawn from this research work, including a series of future lines of research.

2. Literature Review

Such has been the impact of credit unions on the economic panorama of the last century that they have become part of recent economic history. In this sense, Guinnane [46, 47] analyzes their impact on the economic structure of the Reich until 1914 or documents how implementing the original German model (Raiffeisen’s model) in Ireland initially caused more problems than benefits, given that the idiosyncrasies and socio-cultural differences between the two peoples were enormous [48]. Other research such as Thomas et al. [49, 50] link the birth of cooperativism to the expansion of the socialist movements of the nineteenth century, while Hibberd [51] denies the weight that tradition always gave to the Rochdale Pioneers, considering that this institution was historically mythologized. There is no doubt that the U.K. was the driving force behind the cooperativism and has often been the source of seminal research. Focusing on this nation, Ward et al. [52] underline the prolonged growth of these institutions at the national or regional level. Likewise, Ward et al. [53] analyze the link between the characteristics and

location of credit unions and their financial success, which, on the other hand, is also strongly associated with environmental variables [54].

The global expansion of credit unions is evidenced by the countless number of studies spread over the five continents, both in developed and developing countries [55, 56]. Thus, we find works on initiatives carried out by credit unions in Albania [57], Australia [58], Bulgaria [59], Cameroon [60], Ethiopia [61], Finland [62], Indonesia [17], Ireland [63], Japan [64], United States [65], etc. Research has gradually diversified into works analyzing the conceptual framework of its operation from theoretical [66–68] and empirical perspectives [63, 69, 70].

In the first case, Smith [71] develops a theoretical framework in which the decision-making processes of credit unions are modelled. They always have to be implemented under strict ethical-moral conditions, given the solidarity nature of these institutions [72], which makes them regulated by specific legislation [58, 63, 73], completely different from conventional banking. From the empirical point of view, there are multiple works focused on the rural environment [5, 7, 61, 74], on the credit needs of agrarian communities [57, 59, 75], and microfinance [5, 7, 15, 17, 57, 59, 60], as one of the few viable alternatives to eradicate poverty in the poorest nations [76, 77] and the most disadvantaged local communities of developed countries [78, 79]. In this sense, Yunus [80] undoubtedly played an essential role in conceptualizing financial credit as an inalienable right of all human beings [81].

Because of the importance of financial cooperativism as a mechanism for social cohesion, Khafagy [82] highlights the importance of political institutions as a factor in the development of credit unions, which must be taken into account when making economic policy measures [83], or any other integrating measure that facilitates equitable distribution among their members [84]. In this way, considerable benefits are generated for the entire social collective such as public health [85], one of the many initiatives carried out by these social entities.

Independently of their beneficial vocation, they also pursue obtaining an economic benefit to sustain their ordinary operations. For this reason, there is a predominance of research aimed at evaluating their financial performance [59, 62, 63, 86–90], their growth patterns [52, 70, 73, 91, 92], life cycle [93, 94], degree of efficiency in credit allocation [54, 59, 61, 64], or their capacity to develop economies of scale [12, 95–98] according to its relative size [11, 12, 70, 99], which, as a general rule, is usually lower than that of commercial banking institutions.

Another defining characteristic of today's credit unions is the greater degree of diversification of their operations [87, 100] and their capacity to establish cooperative integration networks [88]. These networks have given them greater proximity to end customers, reducing the cost of credit available to the public [101], and they are an alternative to the mergers, which have also occurred among this type of institution [75, 90].

Other studies specifically address different aspects of the contemporary reality of this sector, such as the

implementation of new technologies that have revolutionized the business channels of credit unions concerning their traditional operations [102] or the links between the objectives pursued by these entities and the establishment of the U.N. Development Goals [85, 103, 104]. Concerning the methodology applied in the analysis of financial cooperativism, it could be said that its multidisciplinary nature has been matched by multiple methodological perspectives, among which the following approaches could be mentioned: statistical and econometric models [13, 14, 58, 70, 85], stochastic frontier analysis [54], neural networks [105, 106], Gibrat's rule of proportionate effect [52], data development analysis [89], and genetic algorithms. [105].

3. Methodology

This research has carried out an exhaustive analysis of the bibliographic production related to credit unions from 1936 to 2020. Figure 1 shows the flow diagram of the document search [107].

In line with other bibliographic works [108–110], a systematic research design has been followed, subdivided into 4 phases: determination of terms on which the bibliometric analysis is performed (I); selection of databases, search, cleaning, and tabulation of records (II); use of bibliometric tools to obtain information maps and tables representative of the analyzed phenomenon (III); and analysis of the outputs obtained (IV). Figure 2 summarizes the methodological design implemented.

The terms that best fit a comprehensive review of any aspect related to the phenomenon of financial cooperativism were specified during the first phase. The three key concepts on which the bibliometric analysis was based were selected: credit union, credit cooperative, and financial cooperative. In the second phase, it was estimated which databases would be used to obtain the bibliographic base, choosing Scopus and WoS since they have a proven reputation in the scientific field from among the number of databases currently available to the scientific community [111]. The decision to implement both of them was justified by the fact that Scopus represents the most comprehensive bibliographic database in terms of indexed items, while WoS is the one that introduces a wider range of interdisciplinary contents [110, 112–114]. Subsequently, an exhaustive search was carried out in the Title field for the key terms determined in the first phase using Boolean operators (“credit union” OR “credit cooperative” OR “financial cooperative”). In order to homogenize the results obtained, this search was subject to two restrictions: scientific production expressly written in English (1) in the form of articles (2), discarding any other type of publication (e.g., books, chapters, conferences, editorials, and notes).

As a horizon for the research, the period 1936–2020 was selected, a time frame long enough to reliably analyze the depth, multidisciplinary, and relevance of financial cooperativism. The search was carried out in October 2021, and since this study collects the bibliographic production of each year in its entirety, no bibliographic record corresponding to 2021 was included. For illustrative purposes, the

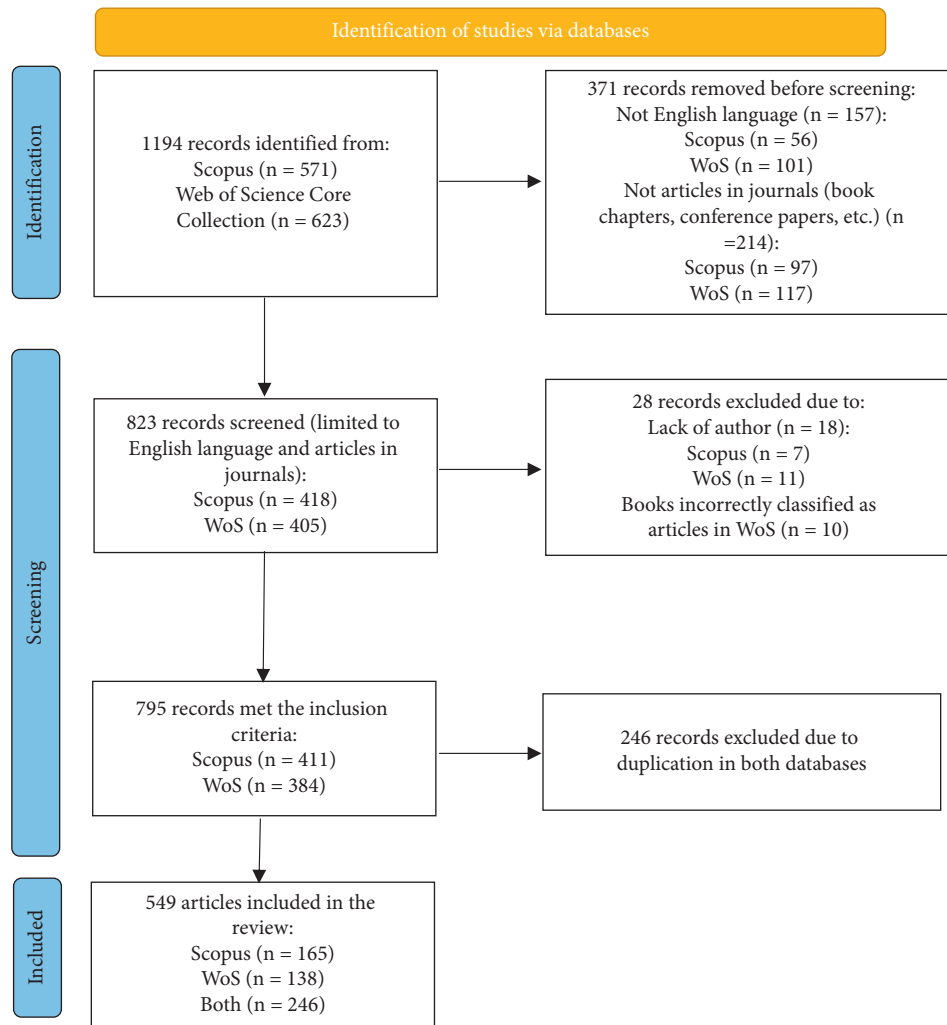


FIGURE 1: PRISMA flow diagram for systematic review.

lower interval of the established period (1936) is represented by “Rural cooperative credit unions” [6], while among the items forming the upper interval (2020), we can find “Drivers of credit union penetration: An international analysis” [115]. Note that this bibliometric study covers practically half of the years that have elapsed since the movement’s founding in 1844 to the present day. Next, the bibliographic databases’ metadata was cleaned using the JabRef 5.4 program. Basically, this task consisted of eliminating duplicate records in the same index, correcting records lacking an author or affiliation, or correcting names and surnames of authors that remained incomplete. From this point on, the bibliographic database was conveniently tabulated using MS Excel 2019, which made it possible to obtain the final arrangement of bibliographic records shown in Figure 3.

According to Figure 3, the records used in this research corresponding to the databases implemented in the bibliographic analysis can be clearly observed. More specifically, 549 bibliographic items were incorporated: 165 exclusives to Scopus, 138 exclusives to WoS, and 246 commons to both indexes. To obtain a greater precision about the dimension

of the bibliographic analysis, Table 1 represents the core of the research, highlighting the main characteristics of the bibliographic production studied. In this sense, the study period was subdivided into two representative subperiods: 1936–2004 and 2005–2020. It is significant to observe an unusual growth in the bibliographical production related to financial cooperativism during the last fifteen years. Indeed, the number of articles, journals, authors, countries, and organizations has increased significantly from 2005 onwards compared to the 1936–2004 subperiod. On the other hand, the indicators relating to citations are higher during the first subperiod. This fact may be fundamentally due to the enormous impact of the classic and pioneering works in the pre-existing literature focused on the study of credit unions [66, 86, 91, 101, 106].

In the third phase of the research, two bibliometric applications were implemented in a complementary manner: VOSViewer v1.16.17 and SciMAT v1.1.04. The first application allowed the mapping and visualization of cooperative bibliometric networks [116] at the level of key topics, the leading authors in the field of financial cooperativism, and the countries from which the most relevant



FIGURE 2: Methodological flowchart.

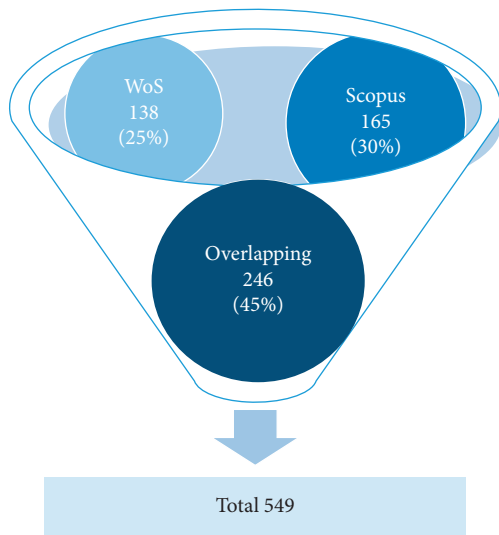


FIGURE 3: Number of articles in Scopus and Web of Science database (1936–2020).

research originates. The use of SciMAT resulted in the creation of strategic diagrams obtained from the systematic clustering of the most important research terms, thus making it possible to observe the enumeration of a series of future lines of research arising from this study.

Additionally, the tabulation of the data utilizing Excel has served as support for the elaboration of descriptive figures and analytical tables in which key indicators in the area of bibliometrics have been used, such as the h-index (Hirsch index) [117–119] and SJR (SCImago Journal Rank)

TABLE 1: Summary of data.

Data	1936–2004	2005–2020	Total
Number of articles	240	309	549
Number of journals	133	210	321
Number of authors	293	562	829
Number of countries	17	51	55
Number of organizations	197	446	639
Number of citations	3,971	1,830	5,801
Average citations/article	17	6	11
Average citations/authors	14	3	7

Source: own elaboration.

[120], a key bibliometric indicator that uses the Google PageRank algorithm in its analysis. Finally, the fourth phase involved a double analysis of the results obtained (descriptive and content analysis), which is detailed in the following section.

4. Results

Figure 4 shows an overview of the evolution of credit union research using Scopus and WoS together over the period 1936–2020. A first distinctive feature is that the number of citations is practically residual between 1936 and 1970. During the 1970s, the number of citations experienced moderate growth, motivated by the appearance in 1977 of the classic manuscript “Recent Research on Credit Unions: A Survey” [121]. The growth of citations began to be practically exponential from 1994 onwards, given that during this same year, three papers were published that would eventually have an enormous impact on the literature in terms of citations: “A time to grow and a time to die: Growth and mortality of credit unions in New York City, 1914–1990,” “Thy neighbor’s keeper: The design of a credit cooperative with theory and a test,” and “A Failed Institutional Transplant: Raiffeisen’s Credit Cooperatives in Ireland, 1894–1914” [48, 66, 91].

Subsequently, three significant “peaks” can also be observed: in 1996, 1998, and 2001, resulting from the impact of several seminal articles such as “A comparison of neural networks and linear scoring models in the credit union environment,” “Availability and cost of credit for small businesses: Customer relationships and credit cooperatives,” and “Cooperatives as information machines: German rural credit cooperatives, 1883–1914” [47, 101, 106]. Regarding the dating of the records included in the databases used, the oldest in Scopus is from 1945 (“How the Credit Union Serves Teachers” [122]), while the oldest in WoS is from 1956 (“The Federal Credit Union System: A Legislative History” [123]).

Within the category of articles contained in both indexes (“overlapping articles”) can be found the oldest item, dating from 1936 (“Rural cooperative credit unions” [6]). Likewise, four stages can be distinguished in the evolution of the records exclusively contained in Scopus and WoS: between 1936 and 1969, the number of records is practically equal in both indexes; between 1970 and 2001, the items from WoS exceed those from Scopus; and from 2002 onwards, the opposite occurs. Precisely, it is also from this period ahead

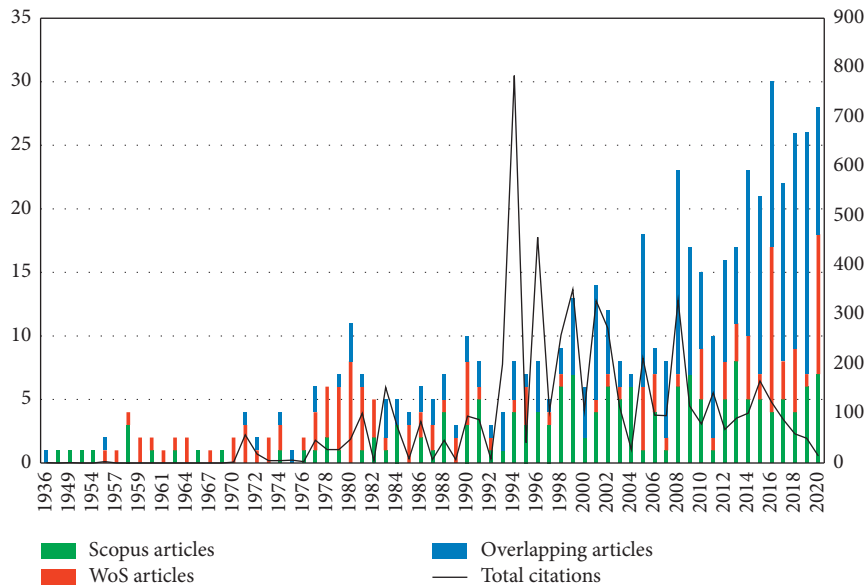


FIGURE 4: Research evolution based on Scopus and Web of Science database (1936–2020).

that there begins to be a more significant simultaneous presence of records in Scopus and WoS relating to the study of credit unions, mainly during the last years of the time horizon analyzed.

Table 2 compiles the ten journals with the highest number of citations, representing more than 50% of the citations contained in the records analyzed (5,801). First, a particularly significant fact can be detected: either over the entire period of analysis (Panel A, 1936–2020) or taking into account the two reference subperiods (Panel B, 1936–2004 and Panel C, 2005–2020), this group of publications is reduced to only 11 journals from three countries: the United Kingdom, Netherlands, and United States (with 8, 2, and 1 publication, respectively).

Similarly, no single journal can be said to dominate specifically in all the metrics employed: *Journal of Economics and Business* leads in the number of articles published, total citations and citations per year (1,185, 197.5, and 26.93, respectively); *The Journal of Finance* presents the highest SJR (18.151 (Q1)); *Journal of Banking and Finance* exhibits the highest h-index of the period (h-index = 13), and the *Review of Social Economy* has the longest longevity publishing topics related to credit unions (66 years).

For greater detail, it can be seen how the ranking of publications alters slightly depending on the subperiods of reference. In the 1936–2004 subperiod (Panel B), the three most relevant journals in terms of total citations are (in this order): *Services Marketing Quarterly*, *Journal of Banking and Finance*, and *The Journal of Finance*. However, in the 2005–2020 subperiod (Panel C), the ranking corresponds to (in this order): *Journal of Banking and Finance*, *Annals of Public and Cooperative Economics*, and *Journal of Financial Services Research*. In this regard, a quite significant pattern can be observed in both subperiods: curiously, the journals that top the rankings of total citations in each subperiod (*Services Marketing Quarterly*, and *Journal of Banking and*

Finance) are those that have the least longevity presenting in the literature works focused on financial cooperativism (12 and 8 years, respectively).

Table 3 lists the most prolific countries in research on the credit union phenomenon. It can be seen that three countries lead the bibliographic production in this field throughout the period and subperiods defined: United States, United Kingdom, and Australia being precisely these countries, in that order, the ones with the highest number of authors and contributors. United Kingdom is the nation that usually presents the highest number of citations per author, except for Italy (Panel A, 1936–2020), which exhibits relatively high figures (31.57), starting from a relatively low number of authors (7). Once again, the United States, United Kingdom, and Australia are present in almost all the collaborative networks formed, while these networks are usually composed of nations with socio-cultural solid relations (e.g., France-Canada, Brazil-Portugal, United States-Canada-United Kingdom-Australia), or geographical proximity (e.g., Brazil-Ecuador).

Although most of the contributions come from the Anglo-Saxon area, some “newcomers” in financial cooperativism, such as Vietnam or Brunei, can also be found in the table, given the global dimension of the research. In this sense, Figure 5 outlines the network of clusters derived from the cooccurrence relationships that have emerged between the different countries that have contributed to the bibliographical production of credit unions over the 1936–2020 time horizon. Among them, the most representative cluster is the one formed by the United States, Cameroon, India, Japan, Nepal, and Uganda (red colour), followed by other groups formed by: Brazil, Chile, Ecuador, and Portugal (green colour), United Kingdom, Cyprus, Greece, and New Zealand (blue colour), Germany, South Africa, Switzerland, and Vietnam (yellow colour), Canada, China, and France (purple colour), Belgium, Denmark, and Ethiopia (light blue

TABLE 2: The most productive journals.

Panel A: The top 10 most productive journals in the period 1936–2020									
Journal	A	C	TC	TC/A	1st A	Last A	TC/Y	SJR(Q)	h-index
Annals of Public and Cooperative Economics	27	United Kingdom	250	9.26	1974	2020	5.32	0.526 (Q2)	9
Journal of Banking and Finance	18	Netherlands	890	49.44	1980	2016	21.71	1.580 (Q1)	13
Applied Economics	11	United Kingdom	145	13.18	1972	2020	2.96	0.569 (Q2)	8
Services Marketing Quarterly	7	United Kingdom	56	8.00	1986	1998	3.73	0.299 (Q3)	2
Managerial Finance	7	United Kingdom	68	9.71	2001	2018	6.80	0.271 (Q3)	5
Review of Social Economy	7	United Kingdom	124	17.71	1949	2015	1.72	0.281 (Q3)	6
The Journal of Finance	7	United Kingdom	269	38.43	1956	1984	4.14	18.151 (Q1)	5
Journal of Economics and Business	6	United States	1185	197.50	1977	2017	26.93	0.636 (Q1)	6
Journal of Financial Services Research	6	Netherlands	124	20.67	2000	2016	11.27	0.860 (Q1)	6
Public Money and Management	6	United Kingdom	77	12.83	2003	2020	9.63	0.492 (Q2)	4

Panel B: The top 5 most productive journals in the period 1936–2004									
Journal	A	C	TC	TC/A	1st A	Last A	TC/Y	SJR(Q)	h-index
Journal of Banking and Finance	12	Netherlands	650	54.17	1980	2002	15.85	1.580 (Q1)	8
Applied Economics	9	United Kingdom	127	14.11	1979	2003	3.02	0.569 (Q2)	8
Services Marketing Quarterly	7	United Kingdom	935	133.57	1986	1998	26.71	0.299 (Q3)	7
The Journal of Finance	7	United Kingdom	269	38.43	1956	1984	4.14	18.151 (Q1)	5
Annals of Public and Cooperative Economics	6	United Kingdom	64	10.67	1974	2004	1.36	0.526 (Q2)	4
Review of Social Economy	6	United Kingdom	115	19.17	1949	1996	1.60	0.281 (Q3)	5

Panel C: The top 5 most productive journals in the period 2005–2020									
Journal	A	C	TC	TC/A	1st A	Last A	TC/Y	SJR(Q)	h-index
Annals of Public and Cooperative Economics	21	United Kingdom	186	8.86	2005	2020	11.63	0.526 (Q2)	8
Journal of Banking and Finance	6	Netherlands	240	40.00	2008	2016	20.00	1.580 (Q1)	5
Managerial Finance	6	United Kingdom	53	8.83	2005	2018	3.31	0.271 (Q3)	4
Public Money and Management	5	United Kingdom	56	11.20	2007	2020	4.31	0.492 (Q2)	3
Enterprise Development and Microfinance	4	United Kingdom	36	9.00	2009	2020	3.00	0.209 (Q3)	3
Journal of Financial Services Research	4	Netherlands	89	22.25	2005	2016	6.36	0.860 (Q1)	4

A: number of articles; C: country; T.C: total citations; TC/A: total citations by article; 1st A: year corresponding to first published article; Last A: year corresponding to last published article; TC/Y: average number of citations per year since the 1st published article; SJR(Q): SCImago Journal Rank (Quartile in 2020); h-index: Hirsch in this topic. Source: own elaboration.

TABLE 3: The most productive countries and main collaborators.

Panel A: The top 10 most productive countries in the period 1936–2020					
Country	A	TC	TC/A	NC	Main collaborators
United States	134	2,249	16.78	14	Canada, United Kingdom, Australia
United Kingdom	75	1,407	18.76	13	United States, Canada, Australia
Australia	33	406	12.30	5	United States, United Kingdom, Brazil
Canada	21	170	8.10	5	United States, United Kingdom, France
Brazil	16	51	3.19	3	Australia, Ecuador, Portugal
Ireland	13	128	9.85	2	United Kingdom, Brunei
China	12	49	4.08	1	Canada
Germany	7	24	3.42	3	United Kingdom, Switzerland, Vietnam
Italy	7	221	31.57	2	United Kingdom, Finland
France	6	42	7.00	1	Canada

Panel B: The top 5 most productive countries in the period 1936–2004					
Country	A	TC	TC/A	NC	Main collaborators
United States	74	1878	25.39	5	United Kingdom, Canada, Belgium
United Kingdom	26	819	31.50	4	United States, Ireland, Brunei
Australia	16	238	14.88	0	
Canada	6	43	7.17	1	United States
Ireland	4	30	7.50	2	United Kingdom, Brunei

Panel C: The top 5 most productive countries in the period 2005–2020					
Country	A	TC	TC/A	NC	Main collaborators
United States	60	371	6.18	11	Canada, United Kingdom, Australia
United Kingdom	49	588	12.00	11	United States, Canada, Australia
Australia	17	168	9.88	5	United Kingdom, United States, Brazil
Brazil	16	51	3.19	3	Australia, Ecuador, Portugal
Canada	15	127	8.47	5	France, United States, United Kingdom

A: number of articles, T.C: number of citations; TC/A: citations by article; NC: number of collaborators. Source: own elaboration.

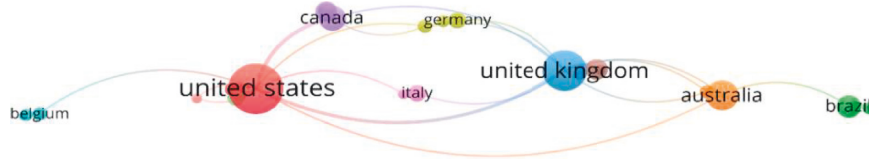


FIGURE 5: Network of cooperation based on authorship between countries (1936–2020).

TABLE 4: The top 10 most productive authors.

Panel A: The top 10 most productive authors in the period 1936–2020									
Author	A	TC	TC/A	1 st A	Last A	TC/Y	h-index	Country	Affiliation
Mckillop D.	34	701	20.62	1995	2017	26.96	15	United Kingdom	Queen's University Belfast
Wilson J.O.S.	14	441	31.50	2002	2016	23.21	11	United Kingdom	University of St Andrews
Goddard J.	9	293	32.56	2002	2016	15.42	7	United Kingdom	Bangor University
Ward A.M.	9	130	14.44	2005	2014	8.13	8	United Kingdom	Queen's University Belfast
Ferguson C.	8	139	17.38	1995	2003	5.35	7	United Kingdom	University of Ulster
Ryder N.	7	34	4.86	2002	2009	1.79	4	United Kingdom	University of the West of England Bristol
Taylor R.A.	7	104	14.86	1971	1979	2.08	5	United States	Northern Illinois University
Glass J.C.	5	107	21.4	2002	2014	5.10	5	United Kingdom	University of Ulster
Kohers T.	5	31	6.20	1986	1990	0.89	2	United States	Mississippi State University
Mathuva D.M.	5	38	7.60	2015	2018	6.33	4	Kenya	Strathmore University
Mullis D.	5	31	6.20	1986	1990	0.86	2	United States	University of North Carolina at Charlotte

Panel B: The top 5 most productive authors in the period 1936–2004									
Author	A	TC	TC/A	1 st A	Last A	TC/Y	h-index	Country	Affiliation
Mckillop D.	11	229	20.82	1995	2004	8.81	8	United Kingdom	Queen's University Belfast
Ferguson C.	8	139	17.38	1995	2003	5.35	7	United Kingdom	University of Ulster
Taylor R.A.	7	104	14.86	1971	1979	2.08	5	United States	Northern Illinois University
Kohers T.	5	31	6.20	1986	1990	0.89	2	United States	Mississippi State University
Mullis D.	5	31	6.20	1986	1990	0.86	2	United States	University of North Carolina at Charlotte

Panel C: The top 5 most productive authors in the period 2005–2020									
Author	A	TC	TC/A	1 st A	Last A	TC/Y	h-index	Country	Affiliation
Mckillop D.	23	472	20.52	2005	2017	29.50	12	United Kingdom	Queen's University Belfast
Wilson J.O.S.	12	353	29.42	2005	2016	70.60	9	United Kingdom	University of St Andrews
Khafagy A.	9	7	0.78	2017	2020	1.75	1	Germany	Ruhr University of Bochum
Ward A.M.	9	130	14.44	2005	2014	8.13	8	United Kingdom	Queen's University Belfast
Goddard J.	8	226	28.25	2005	2016	14.13	6	United Kingdom	Bangor University

A: number of articles; T.C: total citations; TC/A: total citations by article; 1st A: year corresponding to first published article; Last A: year corresponding to last published article; TC/Y: average number of citations per year since the 1st published article; h-index: Hirsch in this topic. Source: own elaboration.

colour), Australia, Netherlands, and Thailand (orange colour), Ireland and Brunei (brown colour), and Italy and Finland (pink colour).

Table 4 lists the top ten most productive authors in the field of credit unions. First, there is a common denominator among these authors: their origin. These authors come from only four countries: the United Kingdom and the United States (mainly) and, to a lesser extent, Germany and Kenya. The preeminence of authors of British origin is quite representative, given that with 1,845 citations, they represent more than 30% of the total. Similarly, these researchers come from practically the same university centres. Again, the UK-based institutions predominate, reduced to 5: Queen's University Belfast, University of St Andrews, Bangor University, University of Ulster, and the University of the West of England Bristol. All of these universities are near each other and, except for the last one, they are located in central-northwest England, Wales, Scotland, and Northern Ireland.

Another aspect to consider is that these universities are quite close to Rochdale, the cradle of the cooperative

movement. To a certain extent, the abundance of research in these universities could be due to the strong roots of the historical legacy of cooperativism in this zone of the planet. As far as North American universities are concerned, Northern Illinois University and Mississippi State University are located in rural areas of the United States (DeKalb and Starkville, respectively). The two regions have a strong presence of agrarian cooperativism arising from the cultivation of corn and cotton.

Focusing on the specific contributions of the authors, McKillop D. is undoubtedly the most prolific author, given that he shows the greatest bibliographic production, citations, citations per year, and h-index (34 articles, 701 citations, 20.62 citations per year, and h-index = 15). McKillop D. is followed in the ranking (in this order) by the following authors, who have frequently collaborated in his contributions: Wilson J.O.S., Goddard J., Ward A.M., and Ferguson C. (all from British universities). Note how McKillop D. leads the ranking throughout the period (Panel A) and subperiods analyzed (Panel B and Panel C), while several of

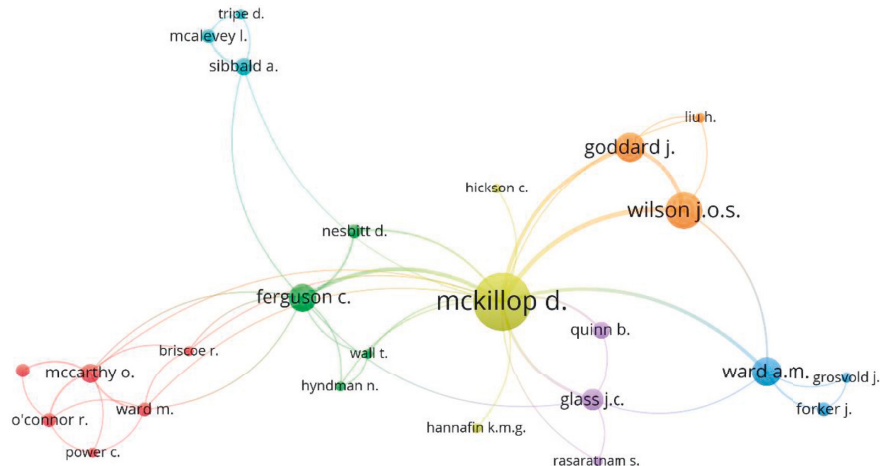


FIGURE 6: Network of cooperation based on coauthorship of the leading authors in the period 1936–2020.

the three authors indicated always accompany him in the first positions.

Concerning the clustering of the relationships between authors-collaborators arising from the bibliographic production related to credit unions, Figure 6 represents it, assigning a specific colour to each cluster. In this way, the following collaborative groups are defined: Hannafin KMG, Hickson C, and McKillop D (yellow colour), Goddard J, Liu H, and Wilson JOS (orange colour), Ferguson C, Hyndman N, Nesbitt D, and Wall T (green colour), Glass JC, Quinn B, and Rasaratnam S (purple colour), Mcalevey I, Sibbald A, and Tripe D (light blue colour), Briscoe R, Byrne N, McCarthy O, O'Connor R, Power C, and Ward M (red colour), and Forker J, Grosvold J, and Ward AM (blue colour).

Table 5 shows the most cited articles according to two subperiods: 1936–2004 (Panel A) and 2005–2020 (Panel B). First, it can be seen that there is no record before 1982 and that the oldest item according to this criterion is dated 1983 and corresponds to “Economies of Scale and Economies of Scope in Multiproduct Financial Institutions: A Study of British Columbia Credit Unions” [95]. Of the remaining records, eight were published during the 1990s (1990–2000) and eleven were published at the beginning of the millennium (2001–2011). Likewise, there is a certain dispersion in the journals in which the papers included in the ranking were published. A different journal published each article except for the *Journal of Banking and Finance*, including five papers.

The ranking in the subperiod 1936–2004 is headed by Barron, D.N. et al. [91, 106] with 14.19 and 13.52 citations per year, respectively, while in the subperiod 2005–2020 are [67, 87], with 10 and 6 citations per year, respectively. The multidisciplinary and the different approaches from which the credit unions have been analyzed are evident in Table 5. In the subperiod 1936–2004 (Panel A), we can find lines of research related to economic history [47, 48], determination of the performance of these institutions [86], generation of economies of scale [95], or agricultural economics [74]. In the 2005–2020 subperiod (Panel B), the most cited articles

focus on topics related to integration [88], diversification [87, 100], or poverty eradication [4, 78].

Figures 7 and 8 represent two strategic diagrams elaborated using SciMAT, taking as reference two measures for the realization of the clusters [44]: centrality and density. The former quantifies the interaction of a network to other networks, while the latter measures the degree of intensity of internal links within the cluster. Based on this preliminary arrangement, four types of themes can be identified: driving themes (first quadrant): developed themes, singularly important for the construction of the scientific field; peripheral themes (second quadrant): themes isolated from the rest, which have developed internally and play only a marginal role in the development of the scientific field; emerging or declining themes (third quadrant): poorly developed themes; and basic or transversal themes (fourth quadrant): themes important for the development of the scientific field, which lack previous development.

Thus, in the strategic diagram exhibited in Figure 7 (subperiod 1936–2004), the peripheral themes of this scientific field identified by the strategic diagram are Agricultural-credit, Commercial Bank, China, Credit-Cooperatives, Depository-institution-competition, Domestic-institution, and Household-savings. In the emerging or declining themes quadrant can be found: Banking-industry, Capital-flow, Cobb–Douglas, DEA, OECS-Country, and Nonradial, while in the core or cross-cutting themes quadrant, the following terms are listed: Asymmetric-information, Capital-provision, Credit unions, Customer-reduction, Gender-issues, Neoinstitutionalism, and Urban-Economy. Finally, the quadrant assigned to the driving themes of the research includes Artificial-intelligence, Article, Credit-access, Finance, Credit-provision, and Methodological-approach.

Following an analogous scheme, according to Figure 8 (subperiod 2005–2020), this scientific field's driving or important themes are: Article, Financial-Sustainability, and Credit-provision. Likewise, the peripheral themes indicated by the strategic diagram are Basel-III, Indonesia, Kenya, and Financial-Literacy. In the quadrant of emerging or declining

TABLE 5: The most cited articles.

Title	Author/s	Journal	TC	Year	TC/ Year
Panel A: The top 10 most cited articles in the period 1936–2004					
A time to grow and a time to die: Growth and mortality of credit unions in New York City, 1914–1990	Barron D.N., West E, Hannan M.T.	American Journal of Sociology	383	1994	14.19
A comparison of neural networks and linear scoring models in the credit union environment	Desai V.S., Crook J.N., Overstreet G.A. Jr	European Journal of Operational Research	338	1996	13.52
Thy neighbor's keeper: The design of a credit cooperative with theory and a test	Banerjee A.V., Besley T., Guinnane T.W.	Quarterly Journal of Economics	245	1994	9.07
Availability and cost of credit for small businesses: Customer relationships and credit cooperatives	Angelini P., Di Salvo R., Ferri G.	Journal of Banking and Finance	199	1998	8.65
Evaluating the performance of US credit unions	Fried H.O., Knox Lovell C.A., Eeckhaut P.V.	Journal of Banking and Finance	166	1993	6.15
Economies of scale and economies of scope in multiproduct financial institutions: A study of British Columbia credit unions	Murray J.D., White R.W.	The Journal of Finance	139	1983	3.66
Cooperatives as information machines: German rural credit cooperatives, 1883–1914	Guinnane T.W.	Journal of Economic History	125	2001	6.25
Credit-scoring models in the credit union environment using neural networks and genetic algorithms	Desai V.S., Conway D.G., Crook J.N., Overstreet G.A. Jr	IMA Journal of Management Mathematics	99	1997	4.13
A failed institutional transplant: Raiffeisen's credit cooperatives in Ireland, 1894–1914	Guinnane T.W.	Explorations in Economic History	93	1994	3.44
The role of groups and credit cooperatives in rural lending	Huppi M., Feder G.	World Bank Research Observer	70	1990	2.26
Panel B: The top 10 most cited articles in the period 2005–2020					
The diversification and financial performance of US credit unions	Goddard J., McKillop D., Wilson J.O.S.	Journal of Banking and Finance	130	2008	10.00
Credit unions: A theoretical and empirical overview	Mckillop D., Wilson J.O.S.	Financial Markets, Institutions and Instruments	60	2011	6.00
Firm operation performance analysis using data envelopment analysis and balanced scorecard: A case study of a credit cooperative bank	Chen T.-Y., Chen C.-B., Peng S.-Y.	International Journal of Productivity and Performance Management	43	2008	3.31
The power of networks: Integration and financial cooperative performance	Desrochers M., Fischer K.P.	Annals of Public and Cooperative Economics	41	2005	2.56
Diversification, fee income, and credit union risk	Esho N., Kofman P., Sharpe I.G.	Journal of Financial Services Research	35	2005	2.19
From tackling poverty to achieving financial inclusion: The changing role of British credit unions in low income communities	Jones P.A.	Journal of Socio-Economics	33	2008	2.54
Are credit unions too small?	Whelock D.C., Wilson P.W.	Review of Economics and Statistics	33	2011	3.30
Irish credit unions: Investigating performance determinants and the opportunity cost of regulatory compliance	Glass J.C., McKillop D., Rasaratnam S.	Journal of Banking and Finance	28	2010	2.55
The development of credit unions and their role in tackling financial exclusion	McKillop D., Ward A.M., Wilson J.O.S.	Public Money and Management	28	2007	2.00
The effect of mergers on credit union performance	Bauer K., Miles L.L., Nishikawa T.	Journal of Banking and Finance	27	2009	2.25

TC: total citations; TC/Year: average number of citations per year since the article was published.

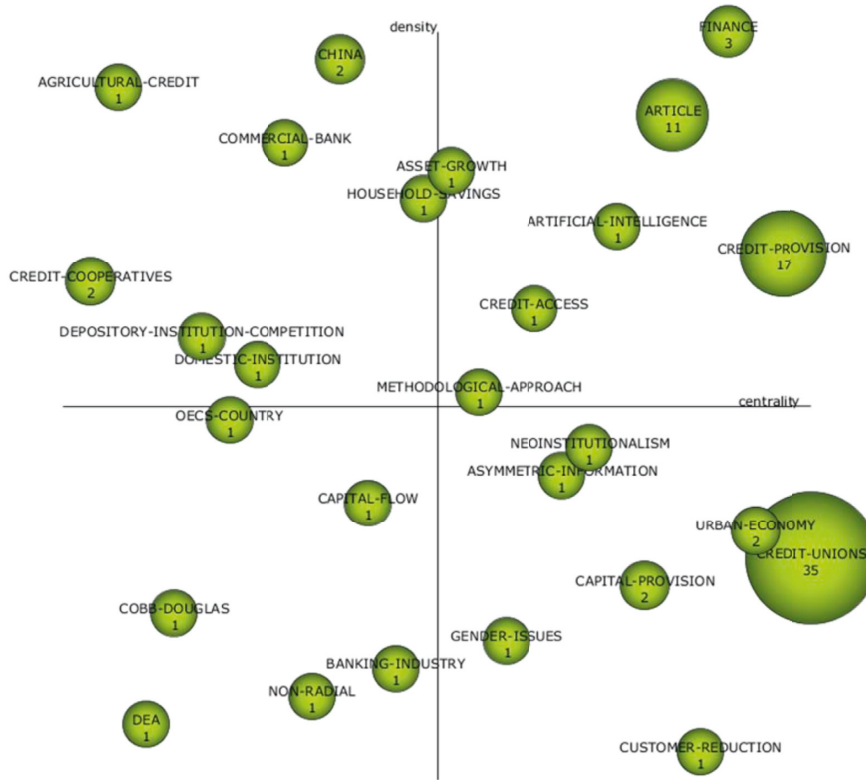


FIGURE 7: Strategic diagram of keywords from 1936–2004.

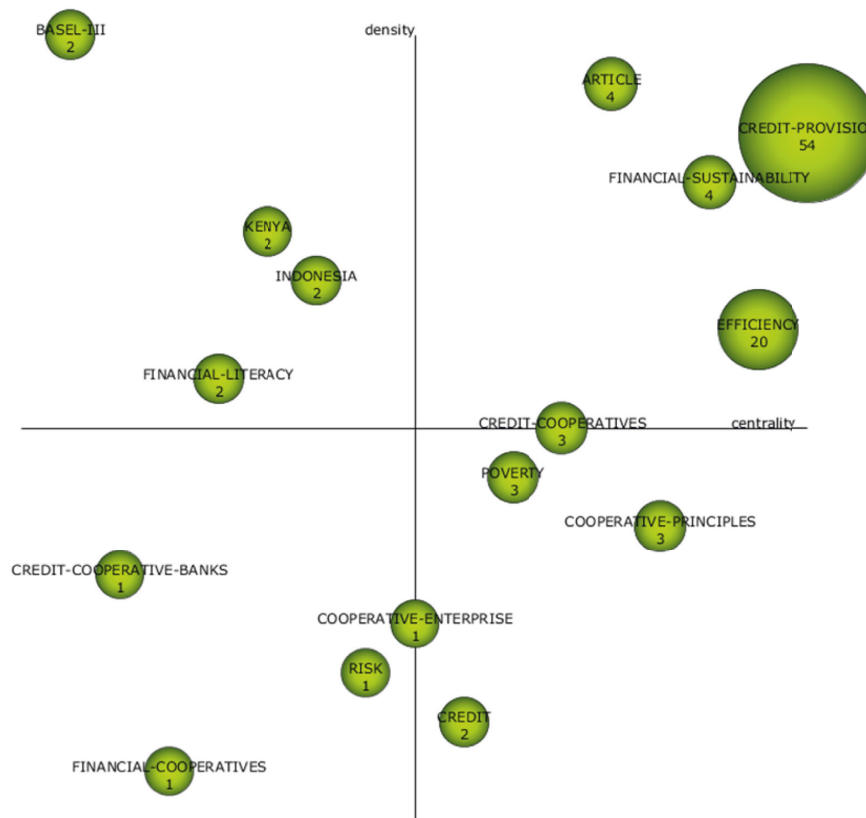


FIGURE 8: Strategic diagram of keywords from 2005–2020.

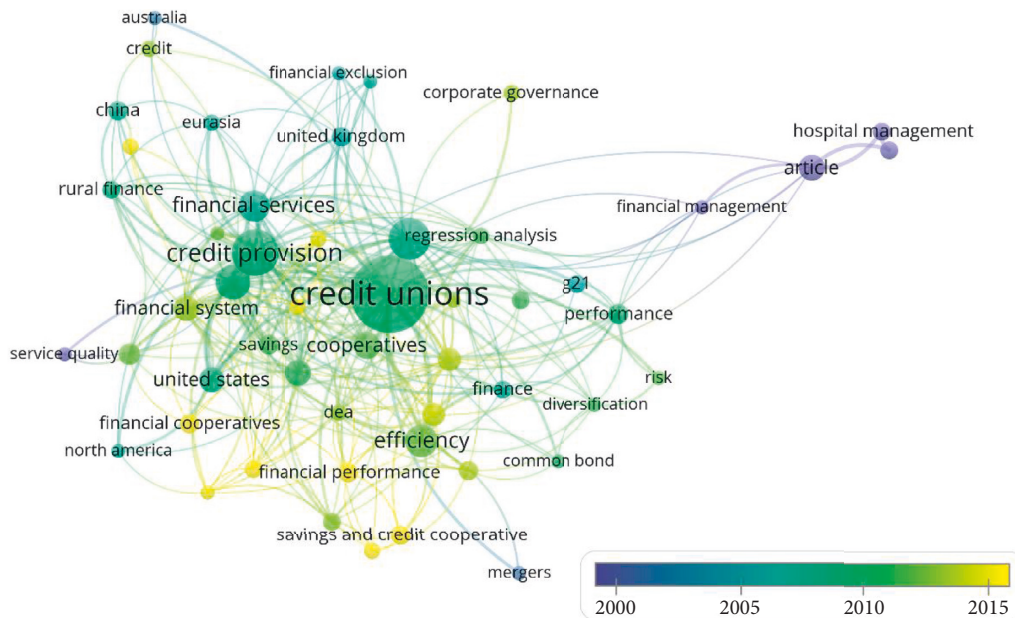


FIGURE 9: Evolution of leading keywords network based on cooccurrence (1936–2020).

themes are Credit-cooperative-banks, Cooperative-enterprise, Financial-cooperatives, and Risk and, subsequently, in the fourth quadrant (themes important for the development of the scientific field), three terms are located: Poverty, Cooperative-principles, and Credit.

Figure 9 complements the analysis of the most used keywords through the network visualization map based on the cooccurrence of keywords. The importance of each term analyzed is directly proportional to the “bubble” size in which it is included. As can be seen, appreciate credit unions leads the cluster, followed by other keywords such as credit provision, financial system, financial services, regression analysis, performance, efficiency, or saving cooperatives.

5. Conclusions

This study has carried out a bibliometric analysis of credit unions based on three keywords able to synthesize the main aspects of financial cooperativism: credit unions (*per se*), credit cooperatives, and financial cooperatives over almost a century, the period between 1936 and 2020. The Scopus and WoS databases have been used as representative indexes of the bibliographic analysis, detecting the common items present in both. Our research has used VOSviewer and SciMAT as joint bibliometric tools, which has allowed us to implement two types of analysis: content and descriptive. This research has resulted in a detailed dating of the main works published in the area, as well as the authors, countries, and university institutions of origin. In the same way, a mapping of the main collaborative networks that have emerged from the study of credit unions has been carried out based on two key elements: coauthorship of the principal authors and cross-country authorship.

On the other hand, the use of strategic diagrams oriented to the analysis of co-words based on a contrasted procedure such as Callon’s co-word analysis [45, 124] has given rise to a

taxonomy of the main terms according to the variables’ density and centrality, describing the degree of relative importance of the main terms associated with financial cooperativism research. In this sense, the basic or transversal terms should guide future relevant lines of research in this area. We refer to lines of research related to the following terms: Asymmetric-information, Capital-provision, Cooperative-principles, Credit, Credit unions, Customer-reduction, Gender-issues, Neoinstitutionalism, Poverty, and Urban-Economy. Apart from these proposals, other recommendable lines of research would be to analyze monographically the new trends in rural cooperativism [125] or the implications of digitalization in credit unions [126]. Similarly, this field of research would be enriched by a bibliometric analysis of the impact of COVID-19 in the area of credit unions [126, 127]. The pandemic in 2019 has had a global impact on all human activities and areas of knowledge. Still, given its recent appearance, it is foreseeable that the specialized literature will consider the impact of the effects of COVID-19 on financial cooperativism.

Among the findings of this research, its dual nature should be highlighted. Indeed, it has become evident that the study of credit unions is a global, multidisciplinary phenomenon that encompasses different domains of knowledge (economics, finance, history, philosophy, politics, etc.). However, the prominent authors, contributions, and shared knowledge networks come from the United States and the United Kingdom. More specifically, we have been able to ascertain that most of the bibliographical production analyzed comes from areas relatively close geographically (Scotland, Wales, Northern Ireland, and central-northwest England), also very close to Rochdale, the historical epicentre of the cooperative financial movement. Hence, the existence of a certain “British School” in the study of credit unions formed by renowned authors such as McKillop D., Wilson J.O.S., Goddard J., Ward A.M., or Ferguson C. (who

have the highest number of articles, citations, and citations per year, as well as the highest h-index). Regarding the bibliographic evolution of the most representative publications, our findings show that *Annals of Public and Cooperative Economics* is the publication with the highest number of articles, followed by the *Journal of Banking and Finance* (which has the highest h-index of all the publications analyzed). In turn, *The Journal of Finance* represents the journal with the highest SJR(Q), with another publication, the *Journal of Economics and Business*, showing the highest number of total citations and citations per year and author.

In the light of the results obtained in this research, the implications and policies that can be established in practice are quite noticeable. This paper shows a joint perspective of the main characterizing facts of the cooperative movement, allowing us to obtain an accurate picture of its contribution to the well-being of society and its commitment to the neediest communities. A first practical implication of this study arises from verifying how the cooperativism of the Rochdale Pioneers was a movement that was born with a handicap: in fact, in the same way, that they advocated for the equality of all human beings, there was the curious paradox that women did not have the right to vote. Therefore, following McKillop's thesis [128], our research confirms that female emancipation would not be effective without the support of the credit unions.

If in practice, two major schools of research have investigated this movement (the United Kingdom and the United States versus France and Canada), everything seems to indicate that, consubstantially, both groups have studied the financial cooperativism according to the two main types of financial systems, continental and Anglo-Saxon, although the beneficial action of the credit unions can probably be considered as a response to the crisis of the latter [129]. In the same way, our research shows that cooperativism is an entirely global phenomenon that gathers multiple points of view depending on the needs of each country or specific area. Indeed, this paper contributes to summarize the main characteristics of financial cooperativism, without forgetting the nature of each society in which it is implemented. In other words, this bibliometric research has yielded the required results to compare the morphology of Western cooperativism versus other historical movements in other countries as is the case of Turkey [130, 131], which dates back to 1863. The strong linkage of financial cooperatives with Islamic Banking and Finance has been underlined [19], therefore and again in practice, public authorities have to facilitate the creation of Islamic credit cooperatives such as Al Barakah Multi-purpose Co-operative given that it is somewhat ironic that Islamic banking is becoming more and more popular in non-Islamic countries, while in several Islamic countries like Mauritius there is still a long way to go [132], whilst initiatives such as "Halal tourism" are starting to be successfully implemented.

From the bibliometric analysis, we have been able to verify how one of the fundamental roles of credit unions is to serve as a transmitter of microcredits towards the most disadvantaged sectors both in urban and rural areas of any

country, whether developed or underdeveloped. Therefore, in the latter case, public authorities and supranational organizations must do everything possible to ensure that credit flows freely and not at a much higher cost than in developed countries, as is usually the case [133]. In the light of our work, credit unions must have a sufficiently flexible and dynamic organizational structure to cope with any problems that may arise, as demonstrated by the recent Ukrainian war crisis in which the reconstruction of this country would have been virtually impossible [134] without the measures, mechanisms, and projects that are analyzed in this bibliometric research.

The main limitation that we have encountered when carrying out this research is not a bibliometric impediment *per se* but is the very nature of the subject analyzed, the credit unions. By carrying out an exhaustive bibliometric analysis, it has been possible to determine at a global level the main distinctive features in the study of these societies based on their bibliographical production. However, it cannot be said that there is a homogeneous concept of the term that can be extrapolated to all nations and cultures. In other words, a corporate entity considered as a credit union in one country may not necessarily be regarded as such in another, and *vice versa*. This fact is because the regulation of credit unions is quite heterogeneous from one country to another, despite the efforts made by WOCCU [135].

Consequently, the lack of absolute harmonization of the term due to how each country regulates the legal and economic spheres of these organizations [8] constitutes a limitation of this study. The same consideration could be made concerning the overall values of each society. Credit unions are widespread worldwide, but there is no full equivalence of values at the global level either. The term "non-profit," which is so closely linked to these financial institutions, sometimes depends on the cultural relativism of policymakers [136], another element that makes it challenging to analyze credit unions from a univocal perspective.

Data Availability

The data correspond to Scopus and Web of Science, which are publicly available.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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