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Mapping a Specialist Journal with Single-Source Science Mapping: A Bibliometric Analysis of the Annals of Public and Cooperative Economics (2000–2025)

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Mapping a Specialist Journal with Single-Source Science Mapping: A Bibliometric Analysis of the *Annals of Public and Cooperative Economics* (2000–2025)

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Mapping a Specialist Journal with Single-Source Science Mapping: A Bibliometric Analysis of the *Annals of Public and Cooperative Economics* (2000–2025)

Abstract

Single-journal bibliometric studies, which map the output of one specialist venue rather than an entire field, offer a bounded and interpretable window onto how a research community develops. This paper applies that design to the Annals of Public and Cooperative Economics (APCE)—the oldest journal dedicated to the public, cooperative, and social economy—covering 2000 to 2025, and uses it to show what single-source science mapping can reveal that broader, multi-journal surveys cannot. The corpus comprises 276 cooperative-focused articles retrieved from Scopus, analysed with the bibliometrix R-package. Alongside standard performance measures, the study draws on science-mapping techniques—co-word analysis, thematic mapping, and thematic evolution—and examines intellectual structure through co-citation and historiographic analysis. Output has grown steadily over the period, at roughly 5.5% a year, with a clear jump after 2011 and a second acceleration from 2019 onward. Author productivity conforms to Lotka's law: a large pool of one-time contributors surrounds a small group of sustained specialists. Three research communities dominate the field—agricultural cooperatives, social economy and social enterprise, and cooperative governance and finance—and these rest on two theoretical lineages, one grounded in agricultural and institutional economics, the other in the social economy and the theory of ownership, with ownership theory serving as the connective tissue between them. Over time, the field has moved away from its early preoccupation with efficiency and organisational form and toward empirical, impact-oriented work on agricultural cooperatives in developing economies, which now stands as its most active frontier.

Keywords: Single-journal bibliometrics; Science mapping; Co-citation analysis; Thematic evolution; Cooperative economics; bibliometrix.

JEL classification P13; Q13; L31; B31.

1. Introduction

A cooperative is a member-owned, democratically governed enterprise through which people pursue shared economic and social goals (International Co-operative Alliance, 2005). Because ownership and control rest with members rather than outside investors, cooperatives occupy an unusual position between market and state, pursuing commercial viability without surrendering a social purpose (Hansmann, 1996; Birchall, 2011). They take several institutional forms, including consumer, producer, worker, financial, and service cooperatives (Ortmann & King, 2007), yet their role has been most extensively studied in agriculture. Through resource pooling and coordinated collective action, agricultural cooperatives enable smallholder farmers to overcome market failures, access inputs, credit, and buyers unavailable to individual producers, and generate shared value (Borzaga & Defourny, 2001). Such mechanisms are especially critical in developing economies (Bijman et al., 2012; Bernard & Spielman, 2009; Abate et al., 2014). More broadly, alongside mutuals, associations, and social enterprises, cooperatives constitute a foundational pillar of the social economy.

In the last twenty years, interest in cooperatives has increased. The 2008 financial crisis made experts and people who make policies look again at ways of owning businesses that are based on members, the social and solidarity economy has become more important in policy plans, and cooperatives are now often talked about as tools for making development more inclusive and lasting, especially when it comes to the Sustainable Development Goals (Ajates, 2020; Candemir et al., 2021). Consequently, cooperative research has grown into a rich literature drawing on agricultural economics, institutional and organisational economics, and third-sector studies. That expansion has a downside, however: scholarship is now scattered across disciplines, topics, and regions. Stepping back to map this trajectory makes it possible to see who has shaped the field, which foundational ideas anchor it, and how its core themes have shifted over time.

Bibliometric analysis offers an effective framework for this inquiry. Drawing on quantitative publication and citation indicators, bibliometric analysis evaluates research output and impact while uncovering a discipline's intellectual, conceptual, and social structures. In doing so, it provides an objective, replicable complement to conventional narrative reviews (Donthu et al., 2021; Zupic & Čater, 2015; Aria & Cuccurullo, 2017). Methodologically, bibliometric research encompasses two main approaches: performance analysis, which measures the productivity of authors, institutions, countries, and journals, and science mapping, which leverages co-word, co-citation, and collaboration networks to uncover how a field is structured and how it evolves (Cobo et al., 2011). Over the past decade, a growing body of studies has applied these methods to cooperative research. Specifically, the methodology encompasses two core approaches:

performance analysis, which tracks the productivity of authors, institutions, countries, and journals, and science mapping, which uses co-word, co-citation, and collaboration networks to trace a field's structure and evolution (Cobo et al., 2011). In recent years, researchers have increasingly applied these techniques to cooperative studies. A clear example is Khajuria and Kohli (2026), who studied 311 articles on agricultural marketing cooperatives from Scopus. They identified the contributors and created a map of the main themes and intellectual structure in that field, covering many different journals.

Field-wide surveys of this kind buy breadth. Breadth has a cost. Pooling articles from outlets blurs how research grows inside any single thematically coherent venue. This is where the single-journal study earns its place in the toolkit. Mapping the output of one journal is a genre with a history applied to outlets as varied as Scientometrics, the Journal of Informetrics and the Journal of Business Research; it trades the scope of a field-level survey for interpretive precision. Because a single journal keeps its scope roughly constant, its keyword, citation and collaboration patterns are easier to read, and the internal architecture of the research it carries comes into sharper focus. The design also lets the analyst treat the journal itself as the unit of study: its growth, its contributors, its intellectual debts and the way its thematic concerns migrate over time.

The Annals of Public and Cooperative Economics (APCE) makes an unusually good case for such a study. Established in 1908 by Edgard Milhaud and now published by Wiley-Blackwell on behalf of the International Centre of Research and Information on the Public, Social and Cooperative Economy (CIRIEC), it is the oldest journal devoted specifically to the public, cooperative, and social economy. More than a century of continuous publication, a tight thematic focus, and an international readership make it close to an ideal test case: a long-running, specialised outlet whose internal structure a single-journal design can map with little of the noise a broader corpus would introduce. We use APCE, then, both as a subject worth profiling in its own right and as a vehicle for showing what single-source science mapping can do.

Against this backdrop, the present study conducts a comprehensive bibliometric analysis of cooperative research published in APCE between 2000 and 2025. Specifically, it addresses the following four research questions:

- **RQ1.** How has the volume and impact of cooperative research in APCE evolved over 2000–2025, and who are its most productive and influential authors, institutions, and countries?
- **RQ2.** What is the conceptual structure of the field—its principal themes and their strategic positions?

- **RQ3.** What are the intellectual foundations of cooperative research, and how are they organised?
- **RQ4.** How have the field's themes evolved over the study period, and what constitutes its contemporary frontier?

The study makes two kinds of contribution. The first is methodological: it works through, on a real corpus, what a single-journal science-mapping design reveals and where its limits lie, offering a template that could be applied to other specialist journals. The second is substantive: it delivers a structured profile of one such journal–its contributors, its intellectual foundations, and the way its themes have shifted over a quarter-century–and in doing so illustrates the kinds of pattern the design brings out, from the correspondence between a field's citation foundations and its current themes to the migration of its research frontier over time. The rest of the paper follows the usual order. Section 2 sets out the data and methods. Section 3 reports and discusses the results, covering both performance analysis and science mapping. Section 4 concludes with the study's contributions, limitations, and some directions for further work.

2. Research methodology

We use bibliometric analysis to review and map the cooperative literature published in the Annals of Public and Cooperative Economics (APCE). The approach works quantitatively from bibliographic data to describe a field's performance and knowledge structure in a transparent, repeatable way (Donthu et al., 2021; Zupic & Čater, 2015). It proceeds in two steps: first, assembling the corpus through a systematic search and screening; then analysing it through performance analysis and science mapping. To keep the process replicable, we followed the PRISMA 2020 guidelines (Page et al., 2021) for identifying, screening, and including records, as Figure 1 sets out.

2.1 Data source and search strategy

Bibliographic records were retrieved from the Scopus database, selected as the single data source to minimise the inconsistencies that can arise when merging records across multiple databases (Donthu et al., 2021), and for its broad coverage of the social sciences and its provision of structured metadata- author keywords, affiliations, and cited references- required for science mapping. The search was confined to the Annals of Public and Cooperative Economics by restricting the source title, and to articles addressing cooperatives by applying the corresponding topic terms to the title, abstract, and keyword fields. The exact query entered in the advanced search of the Scopus database was:

> SRCTITLE("Annals of Public and Cooperative Economics") AND TITLE-ABS-KEY("cooperativ*" OR "co-operativ*") AND PUBYEAR > 1999 AND PUBYEAR < 2026

The search was further restricted to the document type "article." This procedure returned 294 records, which formed the basis for the subsequent screening.

2.2 Screening and corpus construction

The 294 records were screened by document type. Fifteen conference papers and one letter were removed to restrict the corpus to peer-reviewed research articles, and two records containing malformed metadata (arising from reference strings with embedded line breaks) were excluded. Because the analysis draws on a single database and a single journal, no duplicate records were present. The screening procedure yielded a final corpus of 276 research articles. The complete identification, screening, and inclusion process is depicted in the PRISMA flow diagram (Figure 1).

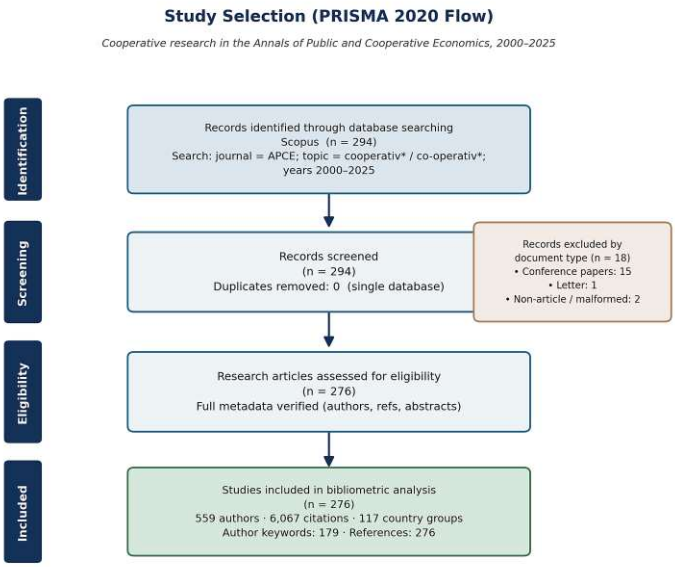


Figure 1. PRISMA 2020 flow diagram of the study selection process.

2.3 Data cleaning and analytical tools

Before analysis, the corpus was converted into a bibliographic data frame using the bibliometrix R-package and its Biblioshiny interface (Aria & Cuccurullo, 2017). To enhance the reliability of the science-mapping analysis, the dataset underwent two cleaning procedures. First, JEL codes captured by Scopus within the author-keyword field were removed, as they denote formal subject categories rather than substantive research topics. Second, spelling and pluralisation variants were consolidated using a thesaurus file to prevent identical concepts from fragmenting across the network (Zhao & Li, 2019).

In accordance with standard bibliometric methodology, the study integrates performance analysis and science mapping (Cobo et al., 2011; Donthu et al., 2021). Performance analysis evaluated both the output and scholarly impact of the literature. Specifically, it tracked annual publication counts, author productivity distributions under Lotka's law (Lotka, 1926), and citation metrics across authors, articles, countries, institutions, and top globally and locally cited works. Science mapping examined how ideas and foundational studies connect: using author keywords, the conceptual structure was mapped via co-word analysis, thematic mapping, and thematic evolution, whereas the intellectual structure was traced through author co-citation and historiographic direct-citation networks. An overview of these methods is provided in Table 1.

Two methodological considerations should be noted. First, as Scopus did not index author keywords before 2010, the thematic-evolution analysis spans two periods (2000–2018 and 2019–2025) rather than three. Second, the single-journal design precludes source-level productivity tests such as Bradford's law; accordingly, the field's intellectual foundations were examined via co-citation and cited-reference analyses.

Bibliometric analysis	**Tool**	**Purpose**
Performance analysis	Annual scientific production	Productivity trend of the field over time
	Lotka's law	Distribution of scientific productivity across authors
	Citation analysis	Identifies influential authors, documents, countries, institutions
	Local vs. global citations	Distinguishes internal from external influence of works
Science mapping	Co-word analysis & thematic map	Identifies principal themes and their strategic positions
	Thematic evolution	Traces how themes transform across time periods
	Co-citation analysis	Reveals the intellectual foundations of the field
	Historiograph	Maps the internal citation lineage of the corpus

Table 1. Summary of the bibliometric analyses and tools used in the study.

3. Results and discussion

The results come in two parts. The first covers the performance analysis—how productive and how influential the field and its various contributors have been. The second turns to the science mapping, looking at the conceptual and intellectual structure of cooperative research in APCE and how it has shifted over time.

3.1 Publication data summary

The main characteristics of the corpus are summarised in Table 2. The 276 research articles, published over the 2000–2025 period, were contributed by 559 authors and drew on 14,296 cited references. The field exhibits a strong collaborative orientation: 210 of the 276 articles (76.1%) are multi-authored, with an average of 2.32 co-authors per document, and international co-authorship accounts for 20.65% of the corpus. Author keywords were available for a subset of the

articles, yielding 699 distinct terms; consistent with the coverage characteristics of the source, keywords-plus terms were not available. The average article has been cited 21.98 times, and the average document age is 10.5 years, indicating an established yet still-active body of research.

Description	Result	Description	Result
Timespan	2000–2025	Author keywords (DE)	699
Documents	276	Keywords-Plus (ID)	0
Source (journal)	1	Authors	559
Annual growth rate	5.52%	Single-authored documents	66
Average citations per document	21.98	Co-authors per document	2.32
Total cited references	14,296	International co-authorship	20.65%
Document average age (years)	10.5	Multi-authored documents	210

Table 2. Main information about the corpus.

The rate of average annual scientific production over the study period is 5.52%, reflecting steady growth in cooperative research in APCE. As Figure 2 shows, however, this growth has been uneven, and three distinct phases can be identified. During the first phase (2000–2010), annual output was low and relatively flat, typically ranging between two and eight articles per year, indicating that cooperative research constituted a modest and stable presence in the journal. A pronounced structural break occurs in 2011, when annual output rose sharply from four articles in 2010 to more than twenty in 2011, peaking at twenty-seven in 2012. This expansion plausibly reflects the heightened international attention to cooperatives associated with the 2012 United Nations International Year of Cooperatives. During the second phase (2011–2018), output settled into a higher but volatile band of eight to fifteen articles per year. In the third phase (2019–2025), production climbed again to a further peak of twenty-seven articles in 2024. The apparent decline in 2025 reflects the incomplete indexing of that year at the time of data extraction rather than a genuine contraction, and should be interpreted with caution.

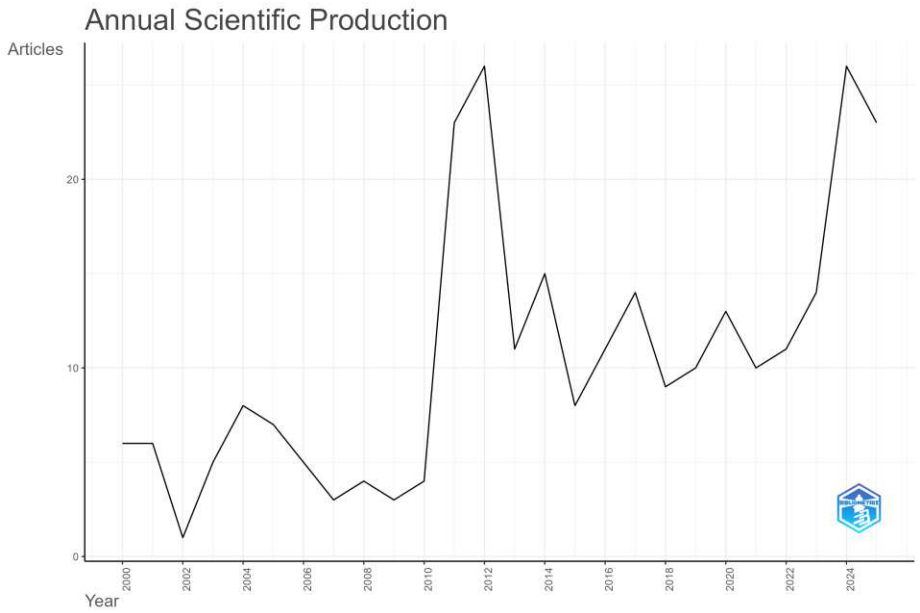


Figure 2. Annual scientific production, 2000–2025.

Beyond the volume of output, the citation impact of the field over time was examined through the average citations received per year of publication (Figure 3). Citation impact rose from the late 2000s, with notable peaks around 2014 and again in the 2017–2020 period, indicating that articles published in these years attracted particularly strong scholarly attention. The marked decline in average citations for the most recent years is a citation-window artefact rather than a substantive fall in quality: articles published in 2023–2025 have had comparatively little time to accumulate citations. A further observation is that the years of highest output do not coincide exactly with the years of highest citation impact; the production peak associated with the post-2011 expansion precedes the impact peaks of the mid-2010s and later. This mild decoupling of productivity and influence suggests that periods of rapid growth in output were followed, with a lag, by the emergence of the field's most influential contributions.

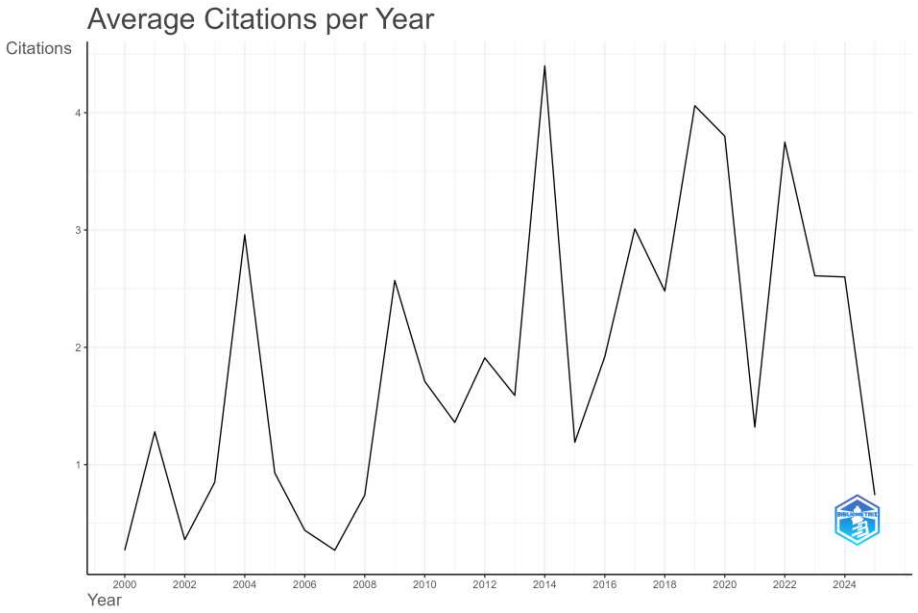


Figure 3. Average citations per year of publication.

What emerges, then, is not merely growth but growth in bursts, with the years since 2019 marking the strongest sustained expansion of cooperative scholarship the journal has seen. This tracks the wider revival of interest in cooperatives over the past two decades, and echoes the post-2016 uptick that field-wide analyses have reported (Khajuria & Kohli, 2026).

3.2 Authors' and sources' productivity

The 276 research articles in the corpus were authored by 559 researchers, indicating a broad community of contributors to cooperative research in APCE. The field displays a pronounced collaborative character: of the 276 documents, 66 (23.9%) were single-authored while the

remaining 210 (76.1%) were multi-authored, with an average of 2.32 co-authors per document. This collaborative orientation is consistent with the empirical and often fieldwork-intensive nature of much cooperative research, particularly the agricultural-cooperative studies that require data collection across multiple sites and institutions, and it aligns with the collaborative patterns reported in field-wide analyses of cooperative scholarship (Khajuria & Kohli, 2026). The presence of a substantial minority of single-authored works, however, also reflects the continued contribution of conceptual, theoretical, and governance-oriented scholarship, which is frequently produced by individual authors.

The scientific productivity of authors was examined through Lotka's law, which describes the inverse-square relationship between the number of authors and the number of contributions they make, positing that a small number of authors account for a disproportionate share of publications while the majority contribute only a single work (Lotka, 1926; Coile, 1977). The distribution of author productivity in the present corpus is presented in Figure 4. Of the 559 authors, 503 (90.0%) contributed a single article, 42 (7.5%) contributed two, eight (1.4%) contributed three, and only six (1.1%) contributed four or more articles. The most prolific author produced seven articles. The estimated parameters of the fitted distribution ($\beta = 3.26$; $C = 0.694$) yielded a strong fit to the observed data ($R^2 = 0.962$), and a Kolmogorov–Smirnov goodness-of-fit test did not reject conformity to the theoretical Lotka distribution ($p = 0.441$). Author productivity in cooperative research in APCE therefore conforms to Lotka's law, exhibiting the classic pattern in which the overwhelming majority of contributors author a single paper and a small nucleus of scholars sustain a continuing research programme. This finding contrasts with the field-wide corpus analysed by Khajuria and Kohli (2026), in which author productivity did not conform to the law, and suggests that the bounded scope of a single specialised journal yields a more regular productivity distribution.

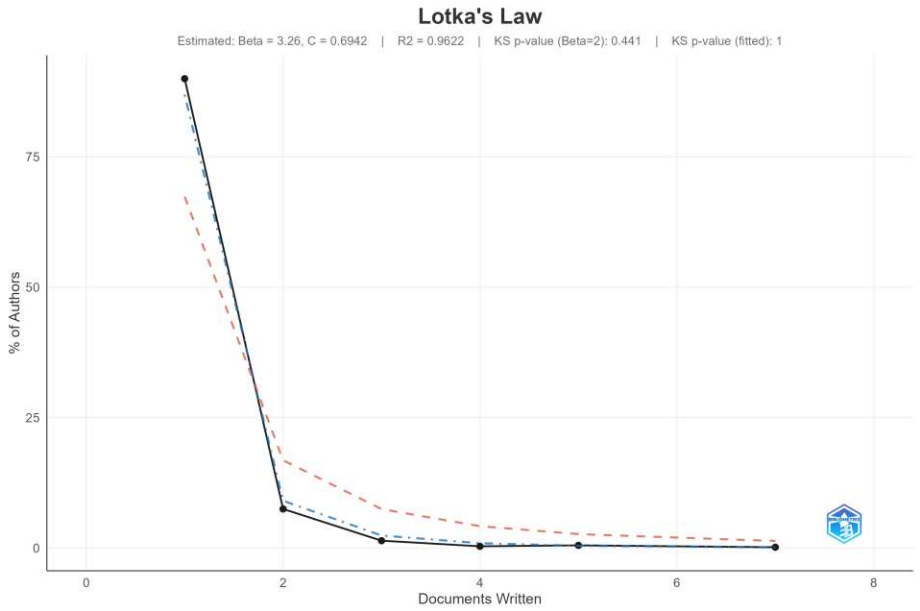


Figure 4. Author productivity and Lotka's law.

This lopsided distribution says something about the field. Cooperative research in APCE draws a broad and open crowd—many contributors turn up once, often with a single empirical study of a particular cooperative or setting—while a small nucleus of specialists carries the work forward across the years. That mix is characteristic of applied, policy-facing fields, where case studies attract many hands but the theoretical and programmatic advances tend to come from a handful of established figures. Who those figures are, and how much weight they carry, is the subject of the citation analysis below.

Because the present study analyses a single journal, the productivity of sources cannot be assessed in the conventional manner, and source-distribution laws such as Bradford's law—which characterise the scattering of a field's literature across a large set of journals (Bradford, 1934)—are not applicable. The single-source design is a deliberate feature of the study rather than a limitation in this respect: by holding the publication venue constant, it isolates the internal structure of cooperative research within the discipline's flagship journal. Accordingly, the analysis of sources is reframed in terms of the intellectual foundations on which the corpus draws—that is, the journals and works most frequently cited by articles in the corpus—which are examined as part of the citation and intellectual-structure analysis in Sections 3.3 and 3.6.

3.3 Citation analysis

Citation analysis identifies the most influential and productive constituents of a research field, on the premise that the impact of a publication, author, or country is reflected in the citations it receives (Zupic & Čater, 2015; Donthu et al., 2021). This section examines the most productive

and most cited authors, the most influential countries and institutions, and the linkages among authors, keywords, and countries in the field of cooperative research in APCE.

3.3.1 Most productive and most cited authors

The most productive contributors to the corpus are presented in Figure 5. The leading author is Jasper Grashuis, with seven articles (3.5 fractionalised), followed by Jos Bijman, Anjel Errasti, and Carmen Marcuello, each with five articles. Ignacio Bretos and Flavio Delbono each contributed four articles, and a further group of authors—including Baleren Bakaikoa, Cristian Barra, Imanol Basterretxea, Marie J. Bouchard, Gian Nicola Francesconi, Constantine Iliopoulos, Derek C. Jones, and Fleur Wouterse—contributed three each. Productivity, in other words, is spread thin rather than concentrated: even the most prolific author accounts for just seven of the 276 articles, and most of the leading names have three to five. What stands out is that this core maps neatly onto the field's main research communities—an agricultural-cooperatives group (Grashuis, Bijman, Francesconi, Wouterse), a Spanish and Basque worker-cooperative group tied to the Mondragón tradition (Marcuello, Errasti, Bretos, Basterretxea, Bakaikoa), and an Italian social-economy group (Delbono, Barra).

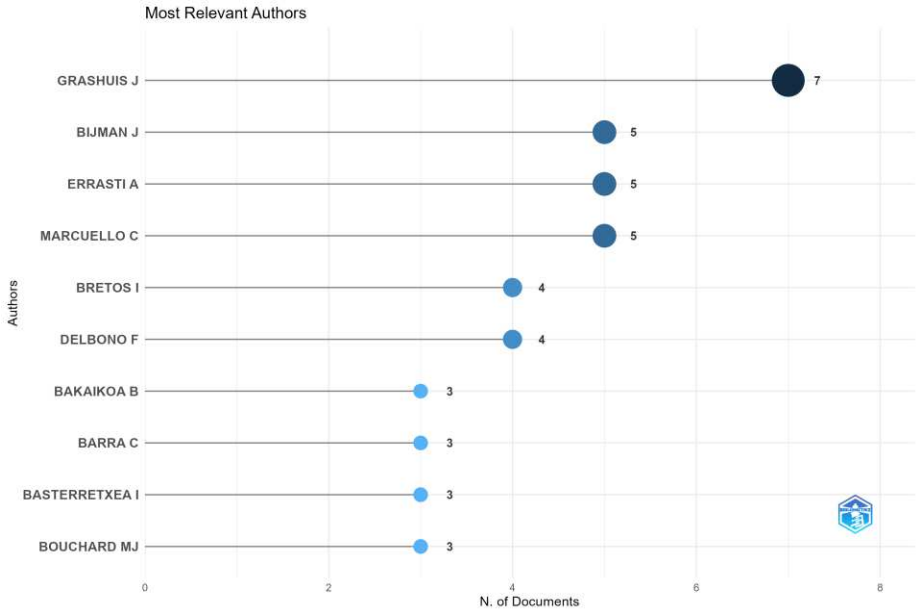


Figure 5. Most productive authors by number of documents.

The temporal dimension of author productivity was examined through authors' production over time (Figure 6), which traces the publication activity of the leading contributors across the study period. The analysis reveals a clear generational structure within the field. An earlier cohort of Spanish and Basque scholars associated with the Mondragón tradition was active from the early 2000s, with figures such as Errasti contributing across the longest span of any leading author. A

newer cohort emerged from the mid-2010s onward and drives the field's most recent output; Jasper Grashuis, in particular, is a recent entrant whose productivity is concentrated in the latest years of the study period, marking him as the field's principal rising contributor. Jos Bijman occupies an intermediate and bridging position, with sustained activity from the early 2010s and a concentration of influential work around 2013–2014. This pattern of generational renewal—an established European worker-cooperative tradition succeeded and complemented by a newer, agriculturally oriented and increasingly international cohort—corresponds closely to the thematic and temporal shifts identified elsewhere in the analysis, and helps to account for the renewed growth in output observed from 2019 onward.

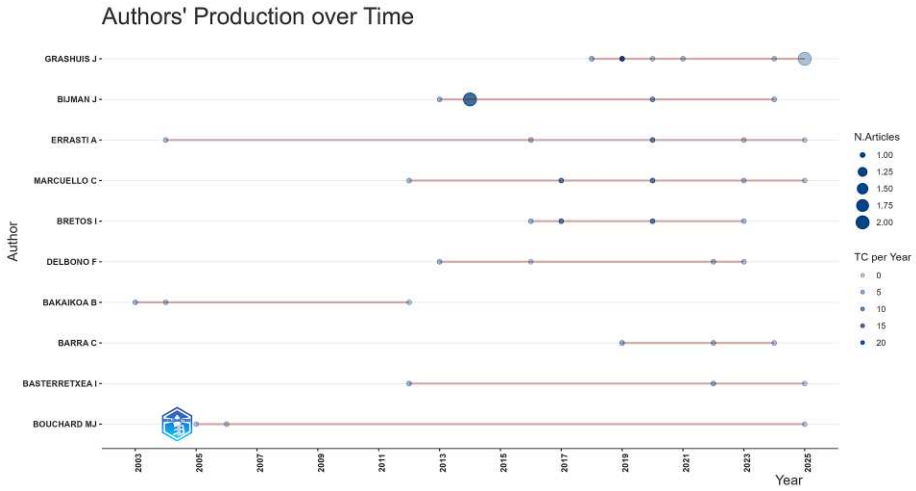


Figure 6. Authors' production over time.

The influence of authors within the corpus was further assessed through local citation analysis, which counts the number of times an author is cited by other articles within the corpus, thereby capturing influence within the internal scholarly conversation of the field. As shown in Figure 7, Jos Bijman is the most locally cited author (28 local citations), followed by Jasper Grashuis (21), Ignacio Bretos and Carmen Marcuello (19 each), and Kindeya Getnet and Constantine Iliopoulos (18 each). The prominence of Bijman and Grashuis on both the productivity and local-citation measures identifies them as the central figures of contemporary cooperative research in APCE—scholars who are simultaneously prolific and influential within the community. The strong local-citation showing of empirical agricultural-cooperative researchers (Getnet, Francesconi, and others working on Ethiopian and developing-economy cooperatives) further indicates that this community forms the most internally cohesive and mutually referencing group in the corpus.

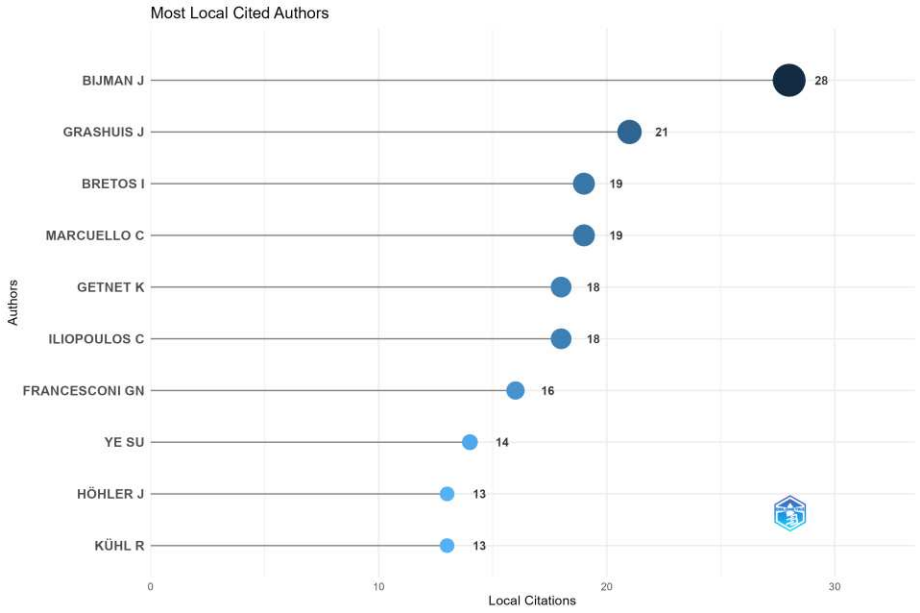


Figure 7. Most locally cited authors.

3.3.2 Most cited countries and institutions

A total of 50 countries contributed to the corpus. In terms of productivity, Spain leads with 48 articles, followed by Italy (35), the United States (33), China (20), and Belgium (19). The prominence of Spain, Italy, and Belgium reflects the European centre of gravity of cooperative research and, in the case of Belgium, the location of CIRIEC, on whose behalf the journal is published. Citation impact, however, reveals a distinct pattern (Figure 8; Table 3). Italy leads in total citations (695), combining substantial output with a high average of 30.2 citations per article. The Netherlands, despite a comparatively modest output of twelve articles, achieves the highest average citation impact (33.6 citations per article), reflecting the influence of its agricultural-cooperative governance research. Spain, though the most productive country, records a lower average impact (18.9 citations per article), indicating a broad but individually less-cited output, while China's low average (11.5 citations per article) is consistent with its recent entry into the field and the correspondingly limited time its publications have had to accumulate citations. The gap between how much a country publishes and how much it is cited is a reminder that volume and influence are not the same thing, and that both are worth weighing when judging a country's contribution.

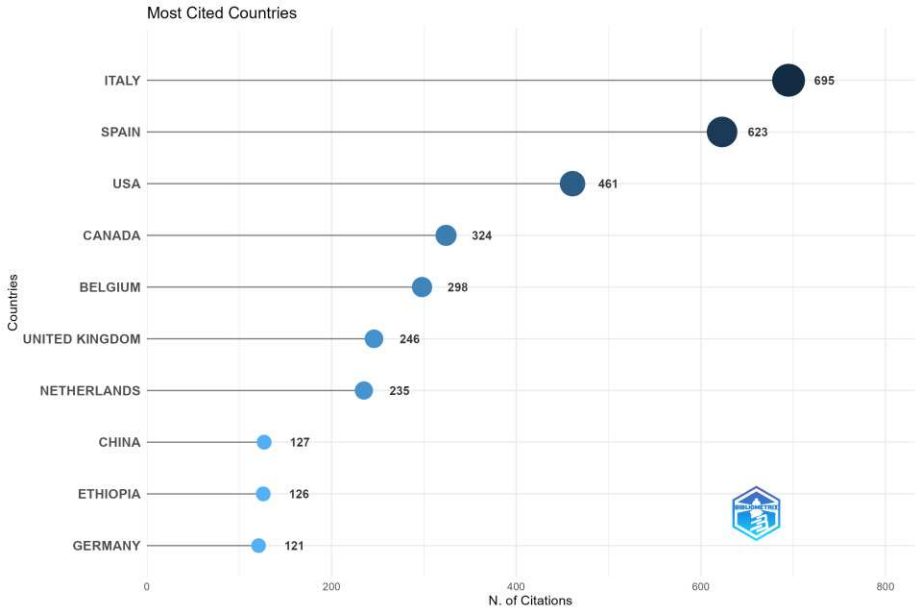


Figure 8. Most cited countries (total citations).

Country	Articles	Total citations	Avg. citations/article
Italy	35	695	30.2
Spain	48	623	18.9
United States	33	461	25.6
Canada	10	324	24.9
Belgium	19	298	29.8
United Kingdom	—	246	27.3
Netherlands	12	235	33.6
China	20	127	11.5
Ethiopia	9	126	25.2

Table 3. Leading countries by productivity and citation impact. Dashes indicate values not among the top producers.

The University of Missouri leads institutional productivity with ten articles, anchoring both agricultural-cooperative scholarship and the corpus's most prolific author. Close behind are the University of the Basque Country, which accounts for eight articles across two name variants and serves as the Mondragón research base, followed by the University of Bologna and the Université du Québec à Montréal, with five articles each. Universities in developing economies, notably Mekelle University in Ethiopia alongside Huazhong and Nanjing Agricultural Universities in China, also appear prominently, reflecting substantial engagement with cooperatives across the Global South. Notably, while Spain tops the country rankings overall, no single Spanish institution leads the list. Instead, Spanish scholarship is distributed across several universities, whereas US output funnels largely through a single dominant hub, illustrating two contrasting national models of research organisation.

3.3.3 Author, keyword, and country linkages

The interrelationships among authors, keywords, and countries are depicted in the three-field plot in Figure 9, which links the most prolific authors (left) to their principal keywords (centre) and

countries (right). The plot reveals that the field is organised into geographically clustered research communities. A Spanish and Basque cluster—comprising Errasti, Marcuello, Bretos, Basterretxea, and Bakaikoa—flows into keywords such as social economy, Mondragón, and worker cooperatives, and is associated predominantly with Spain. A distinct agricultural-cooperatives cluster—including Grashuis, Bijman, Francesconi, Wouterse, and Abate—flows into keywords such as agricultural cooperatives, collective action, and efficiency, and is associated with Ethiopia, the Netherlands, and the United States. This alignment of authors, themes, and geographies provides an initial indication of the thematic structure of the field, which is examined in detail in the following section.

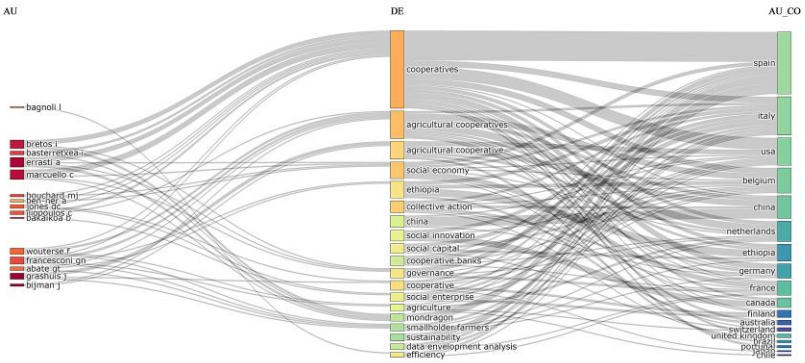


Figure 9. Three-field plot of authors, author keywords, and countries.

3.4 Co-word analysis

Co-word analysis examines the co-occurrence of author keywords to identify the principal themes of a research field and the linkages among them, on the premise that keywords appearing together represent conceptually related ideas (Callon et al., 1983; Donthu et al., 2021). Keywords provide a concise representation of the content of a field, and their clustering reveals the thematic areas around which research is organised (Duriau et al., 2007; Assefa & Rorissa, 2013). The co-word network for cooperative research in APCE is presented in Figure 10, in which nodes represent author keywords, node size reflects frequency of occurrence, and colours denote distinct thematic clusters identified through the Louvain community-detection algorithm.

The analysis yields nine keyword clusters, which consolidate into three principal thematic domains. The largest and most connected cluster, centred on the keyword agricultural cooperatives, is closely associated with Ethiopia, smallholder farmers, technical efficiency, and impact-evaluation methods such as data envelopment analysis and propensity-score matching. This cluster represents the empirical study of agricultural-cooperative performance, particularly in

developing economies. A second major domain, centred on social economy and social enterprise, encompasses keywords such as sustainability, social innovation, internationalisation, and competitiveness, reflecting a broad European social-economy tradition concerned with the identity, scope, and societal role of cooperative and social-economy organisations. A third domain groups governance, membership, ownership, cooperative principles, and the Mondragón worker-cooperative case, together with a semi-detached set of clusters concerned with cooperative banking and finance. The following subsections discuss the principal thematic clusters in turn.

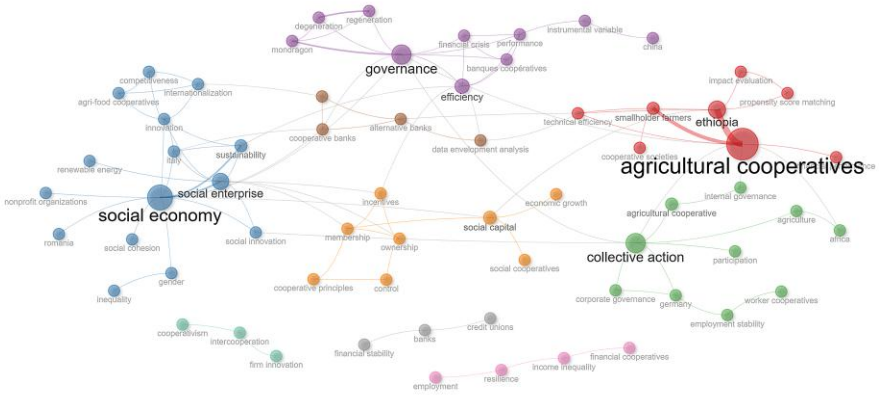


Figure 10. Author-keyword co-occurrence network.

3.4.1 Agricultural cooperatives and rural development

The largest thematic cluster concerns the role of agricultural cooperatives in rural development, with a strong empirical orientation toward developing economies. Research in this cluster looks at how cooperatives help smallholder farmers get access to markets, agricultural inputs and credit. It also studies how being part of a cooperative affects farm productivity and household well-being. A lot of studies show that cooperative membership helps smallholder farmers become more technically efficient, more commercialized and earn income. Much of this evidence comes from Ethiopia and other countries in Africa and Asia (Abate et al., 2014; Bernard & Spielman, 2009; Getnet & Anullo, 2012). Keywords like efficiency and data envelopment analysis are often used, showing that the research in this area relies heavily on quantitative methods. Many studies use impact-evaluation techniques to measure the effect of cooperative membership. These methods take into account selection bias to ensure accurate results. This research cluster is mainly focused on developing economies with links to countries like Ethiopia and China. This reflects a growing interest in understanding how cooperatives can contribute to development. The focus on smallholder empowerment and inclusion matches trends seen in the overall body of agricultural-cooperative research (Khajuria & Kohli 2026).

3.4.2 Social economy and social enterprise

A second major thematic cluster places cooperatives within the framework of the social and solidarity economy. Studies in this area look at cooperatives, social enterprises, mutuals and non-profit organisations. They focus on how these organisations create social value. These studies explore issues such as sustainability, social innovation and how social-economy organisations can stay competitive and grow internationally. This line of research reflects a European academic tradition. It is especially linked to countries like Italy and Spain. It also connects to the study of the social economy as noted by Borzaga and Defourny in 2001. The repeated use of terms like innovation and sustainability shows that this cluster is concerned with how cooperatives are adapting to society's changing needs. It also looks at how cooperatives help build sustainable development. Unlike the agricultural-cooperatives cluster, which focuses more on real-world impact, this cluster leans toward organisational questions. It explores what makes cooperatives and social-economy organisations unique in their identity and purpose.

3.4.3 Cooperative governance, membership, and ownership

A third thematic cluster examines internal cooperative governance, membership, and ownership, defined by keywords including membership, ownership, and cooperative principles. Research in this domain examines organisational challenges specific to the cooperative model, including tensions between member control and managerial authority, difficulties in maintaining member participation and commitment, and the property-rights constraints that separate cooperatives from conventional firms (Cornforth, 2004; Cook, 1995). The cluster also includes the Mondragón worker-cooperative case, a central benchmark for studying governance dynamics, organisational decline, and long-term resilience. Studies in this cluster examine how cooperatives are organised internally and what sustains or weakens their cooperative identity. In doing so, they link empirical evidence to theory, showing how governance and membership shape both the performance of agricultural cooperatives and the character of social-economy enterprises.

3.4.4 Cooperative banking and finance

A more specialised fourth cluster centres on cooperative banking and finance, built around keywords such as cooperative banks, financial cooperatives, credit unions, and financial stability. Research in this cluster examines the distinctive characteristics of cooperative and mutual financial institutions, including their governance, stability, and role in local development. Although internally coherent, this cluster is comparatively detached from the field's principal thematic domains, forming a specialised research area that engages only weakly with the broader cooperative literature. As the thematic-map analysis in the following section demonstrates, cooperative banking constitutes a well-developed but peripheral niche within the field, an observation with implications for the integration of cooperative-finance scholarship into the mainstream of cooperative research.

3.5 Thematic map and thematic evolution

While co-word analysis identifies the themes of a field, the thematic map situates those themes within a strategic space defined by two dimensions: centrality, which measures the relevance or degree of interaction of a theme with other themes, and density, which measures the internal development or coherence of a theme (Callon et al., 1991; Cobo et al., 2011). The intersection of these dimensions divides the map into four quadrants: motor themes (high centrality, high density), which are well-developed and central to the field; basic themes (high centrality, low density), which are important and cross-cutting but not yet fully developed; niche themes (low centrality, high density), which are well-developed but peripheral; and emerging or declining themes (low centrality, low density). The thematic map for cooperative research in APCE is presented in Figure 11, and the centrality and density values of the principal clusters are reported in Table 4.

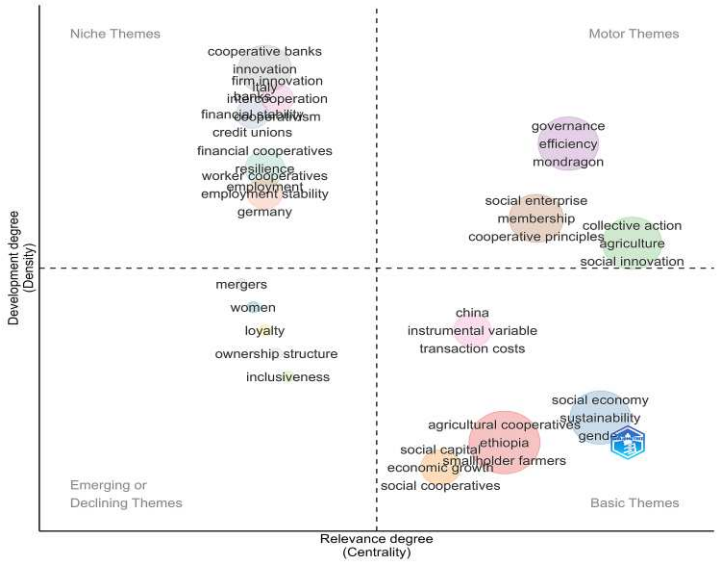


Figure 11. Thematic map of author keywords (centrality × density).

Theme (cluster)	Centrality	Density	Frequency	Quadrant
Social economy	0.54	45.4	33	Basic
Collective action	0.48	50.8	26	Basic
Governance	0.43	63.0	28	Motor
Agricultural cooperatives	0.38	49.4	44	Basic
Social enterprise	0.37	56.0	20	Motor
China (emerging)	0.25	50.0	8	Emerging
Cooperative banks	0.00	73.4	19	Niche
Financial cooperatives	0.00	62.5	9	Niche
Worker cooperatives	0.00	58.3	7	Niche

Table 4. Thematic clusters with Callon centrality and density measures (author keywords).

The thematic map reveals four distinct structural patterns across the field. Firstly, the motor quadrant comprises two mature, central research fronts: governance (linked with efficiency and the Mondragón case) and social enterprise (linked with membership and cooperative principles), with governance displaying the highest density and internal coherence among central themes.

Secondly, within the basic quadrant, social economy records the highest centrality (0.54) but lower density, functioning as a cross-cutting pillar across the literature. Also located in the basic quadrant are agricultural cooperatives, the most frequent theme in the corpus, whose high centrality and volume, paired with moderate density, point to ongoing theoretical consolidation, marking it as the field's primary conceptual frontier. Thirdly, cooperative banking achieves the highest internal density (73.4) alongside negligible centrality, confirming its status as a mature yet isolated niche. Finally, transaction-cost econometrics and research focused on China appear in the emerging quadrant, highlighting the field's evolving methodological and empirical frontiers.

The temporal dynamics of these themes were examined through trend-topic analysis and thematic evolution. Trend-topic analysis (Figure 12) reveals a clear progression in the field's thematic focus. Early research, with a median publication year around 2013, centred on efficiency and performance measurement. Attention subsequently shifted, in the middle years of the study period, toward governance, social enterprise, and social innovation, with governance exhibiting the longest active span. The most recent and dominant themes—agricultural cooperatives, Ethiopia, and social capital, with median years around 2022—reflect a decisive turn toward context-specific, empirical research on cooperatives in developing economies. This progression indicates a movement from methodological and organisational concerns toward impact-oriented empirical work.

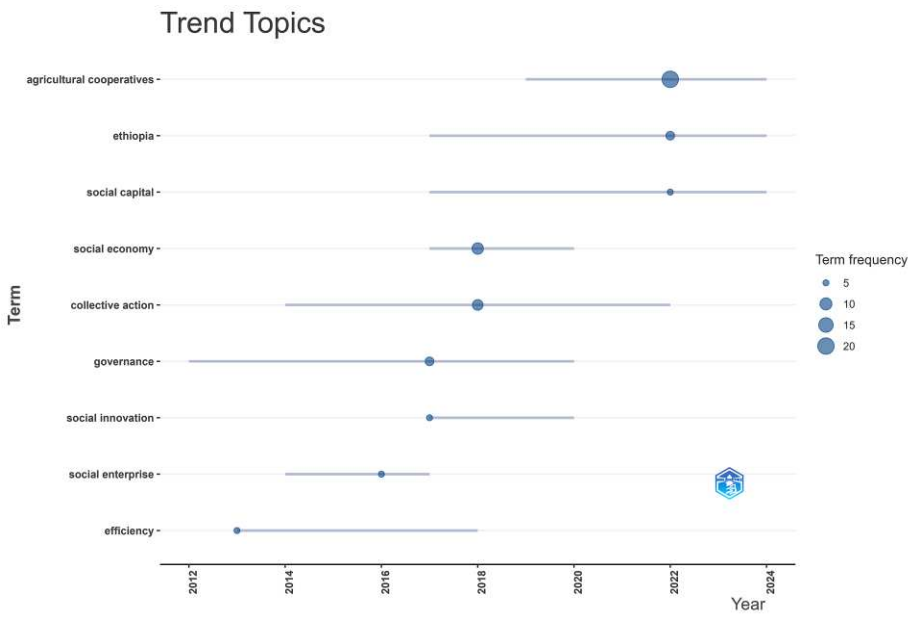


Figure 12. Trend topics (author keywords).

The evolution of the field's themes across time was analysed through thematic evolution, which traces how themes merge, split, and transform between successive periods. Because author

keywords were not indexed for articles published before 2010, the analysis was conducted across two periods, 2000–2018 and 2019–2025, as presented in Figure 13. The analysis reveals a combination of continuity and transformation. Three themes persist as the field's stable backbone across the two periods: agricultural cooperatives (weighted inclusion index 0.60), social economy (0.44, the most central), and collective action (0.40). At the same time, several themes underwent transformation. The cooperative-banks theme of the earlier period migrated into governance (weighted inclusion 0.50), as did the efficiency theme (0.33), while social innovation was wholly absorbed into collective action (inclusion index 1.0). Governance thus emerges as a consolidating hub that absorbed the more specialised organisational and financial concerns of the earlier period, while agricultural cooperatives and social economy remained the field's durable, central pillars.

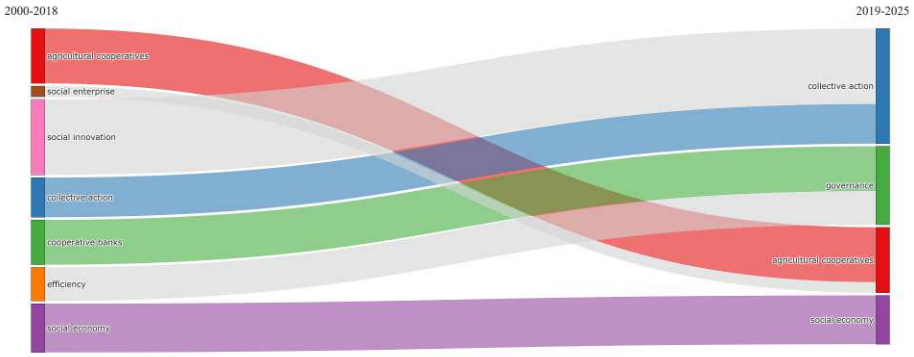


Figure 13. Thematic evolution across two periods (2000–2018 and 2019–2025).

Integrating the thematic map, trend topics, and thematic evolution provides a clear picture of how cooperative research in APCE has developed. Over time, scholarship has moved away from efficiency measurement and organisational structures toward empirical studies of agricultural cooperatives in developing economies, with governance acting as an increasingly common thread across subfields. On the thematic map, agricultural cooperatives sit in the basic rather than the motor quadrant—showing that while the topic is central to the field, its internal dynamics still call for deeper theoretical development. Cooperative banking, meanwhile, stands out as a mature yet relatively isolated niche, pointing to a clear opportunity to link cooperative-finance research more closely with the broader literature.

3.6 Co-citation analysis and intellectual structure

Co-citation analysis examines the frequency with which pairs of authors or works are cited together, on the premise that documents or authors frequently cited in conjunction are intellectually related and belong to a common research foundation (White & Griffith, 1981; White & McCain,

1998). Author co-citation clustering maps the intellectual foundations, the underlying knowledge base, of a field and reveals the core schools of thought shaping its development (Acedo & Casillas, 2005; Zupic & Čater, 2015). The co-citation network of cited authors for cooperative research in APCE is presented in Figure 14, in which nodes represent cited authors, node size reflects co-citation frequency, and colours denote the intellectual clusters identified through community detection.

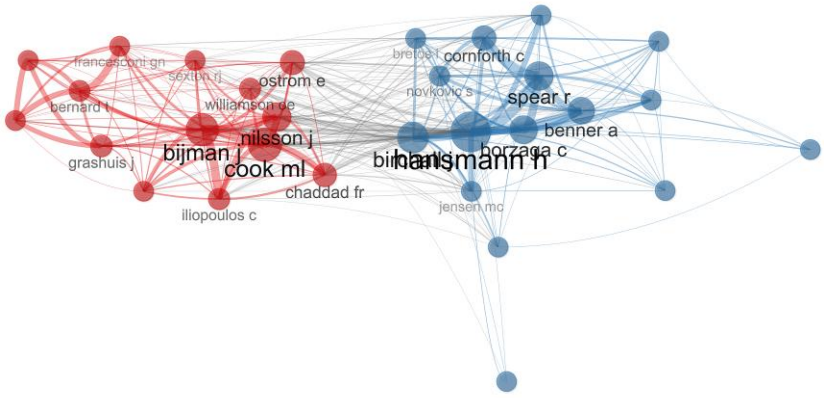


Figure 14. Co-citation network of cited authors.

The analysis shows that cooperative research in APCE is built on two intellectual foundations. The first tradition is rooted in agricultural and institutional economics. It builds on the work of Michael Cook, whose life-cycle and property-rights framework serves as a foundational reference (Cook, 1995). This cluster also incorporates Jerker Nilsson and Jos Bijman on organisational structure, Elinor Ostrom on collective action, and Oliver Williamson on transaction-cost economics. Together, these contributions establish the theoretical basis for studying agricultural cooperatives. In its use of the concepts of property rights, transaction costs and collective action, it raises issues of ownership, governance and member behaviour. The second cluster reflects a social-economy and ownership-theory tradition anchored in the theory of enterprise ownership, with Henry Hansmann's framework serving as a central reference (Hansmann, 1996). This cluster also incorporates key contributors in adjacent domains, including Avner Ben-Ner on labour-managed firms, Carlo Borzaga on social enterprise and the social economy, and Chris Cornforth on cooperative governance. Together, these works establish the theoretical basis for analysing cooperatives as a distinct form of ownership and as integral actors within the broader social economy.

A notable feature of this intellectual structure is Henry Hansmann’s role as a bridge between the two clusters. As one of the field's most influential foundational scholars, Hansmann developed a theory of enterprise ownership that is drawn upon by both the agricultural-economics and social-

economy traditions. This bridging position reflects the core premise and cross-cutting nature of ownership theory, which examines what distinguishes member-owned from investor-owned enterprises across institutional contexts. Moreover, these two theoretical traditions align directly with the co-word thematic domains, underpinning the agricultural-cooperative and the governance, social-economy, and worker-cooperative clusters, respectively. This convergence between the field's theoretical origins and contemporary research fronts indicates strong structural coherence.

3.6.1 Most cited sources

Co-citation of authors highlights the intellectual base of the field in terms of individual scholars, but an analysis of the most frequently cited sources can indicate the journals upon which cooperative research in APCE relies (Figure 15). Alongside substantial journal self-citation, which underscores the internal coherence of APCE's scholarly discourse, the most cited external sources coalesce around four distinct bodies of literature. The first and largest category comprises agricultural and development-economics journals such as the Journal of Rural Studies, Agricultural Economics, World Development, and the American Journal of Agricultural Economics, which underpin the empirical agricultural-cooperative research currently prominent in the field. The second comprises general-economics outlets, including the American Economic Review, the Journal of Political Economy, and the Quarterly Journal of Economics, which provide the discipline's core theoretical foundations. The third encompasses management and organisation journals, such as the Strategic Management Journal, the Academy of Management Journal, and the Academy of Management Review, which inform the study of cooperative governance and organisational structure. Finally, the fourth consists of finance and comparative-economics journals, such as the Journal of Financial Economics and the Journal of Comparative Economics, which anchor scholarship on cooperative banking and ownership. The interdisciplinary nature of cooperative research is confirmed in this distribution, which shows that the field integrates findings from agricultural economics, mainstream economics, management and finance, and that is consistent with the two intellectual traditions found in the co-citation network.

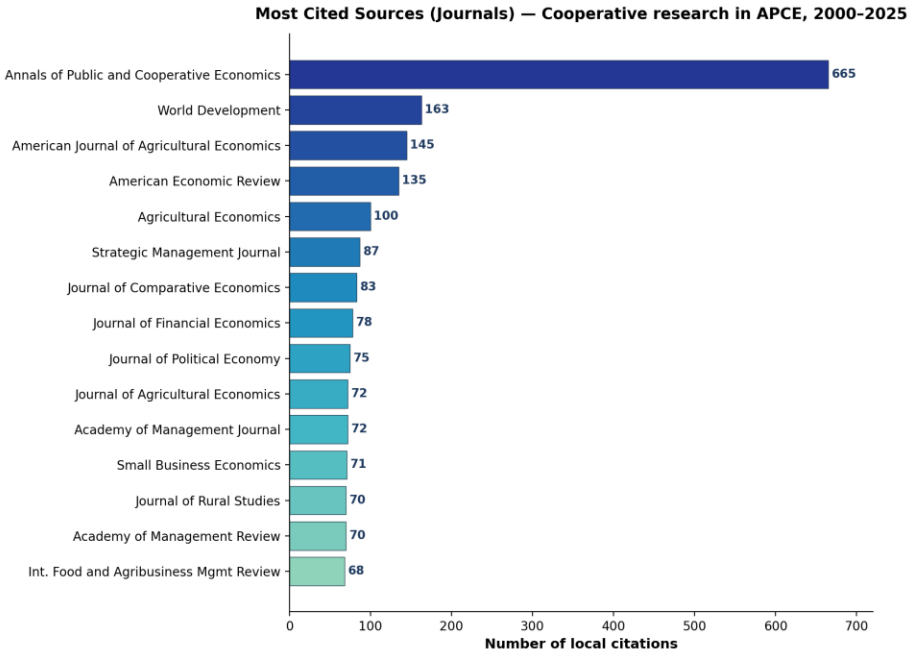


Figure 15. Most cited sources (journals) in the corpus references.

3.6.2 Most influential documents

The most influential individual works in the corpus were identified through global and local citation analysis. The most globally cited article is Cornforth's (2004) analysis of the governance of cooperatives and mutual associations as a set of paradoxes (336 citations), followed by Abate et al.'s (2014) study of the technical efficiency of Ethiopian agricultural cooperatives (201 citations) and Grashuis's (2019) review of the empirical literature on farmer cooperatives (195 citations). A comparison of global and local citations is instructive. Cornforth's (2004) article, although dominant in global citations, records a low ratio of local to global citations (3.3%), indicating that its governance framework has been adopted primarily by adjacent fields rather than within cooperative research itself. In contrast, recent empirical works—including Grashuis (2019), Höhler and Kühl (2018), and Ma et al. (2022)—exhibit high internal citation, functioning as reference points within the field's own scholarly conversation. The split here is telling. Some contributions—Cornforth's especially—travel outward, lending a framework to neighbouring fields; others circulate mainly at home, forming the field's own working canon of applied studies. Cooperative research does both at once, borrowing theory from adjacent disciplines while building an empirical literature of its own.

3.6.3 Historiographic analysis

The internal intellectual lineage of the corpus was examined through historiographic analysis, which maps the direct-citation relationships among the field's most influential works to reveal the genealogy of ideas over time (Figure 16). The lineage originates with two early works—Ole

Borgen's (2001) study of trust as a mechanism for cooperative membership and Cornforth's (2004) analysis of cooperative governance—which form the roots from which subsequent research descends. It develops through a series of empirical studies of cooperatives in developing and transitional economies (Wanyama, 2009; Getnet & Anullo, 2012; Cechin et al., 2013), and converges on a pivotal cluster of works published around 2014, in which Bijman et al.'s (2014) studies of governance in European agricultural cooperatives and Abate et al.'s (2014) analysis of Ethiopian cooperatives consolidated the empirical agricultural-cooperative agenda. The lineage culminates in the current generation of synthesis and review works, most notably Grashuis's (2019) review of the empirical literature—the most locally cited article in the corpus—and Höhler and Kühl's (2018) review of member heterogeneity. A separate and minor lineage links works on cooperative banking, corroborating the position of cooperative finance as a self-contained niche identified in the thematic analysis. The prominence of recent review articles as the culmination of the internal lineage suggests that the field has reached a stage of consolidation, in which the accumulated body of empirical work is being synthesised and appraised.

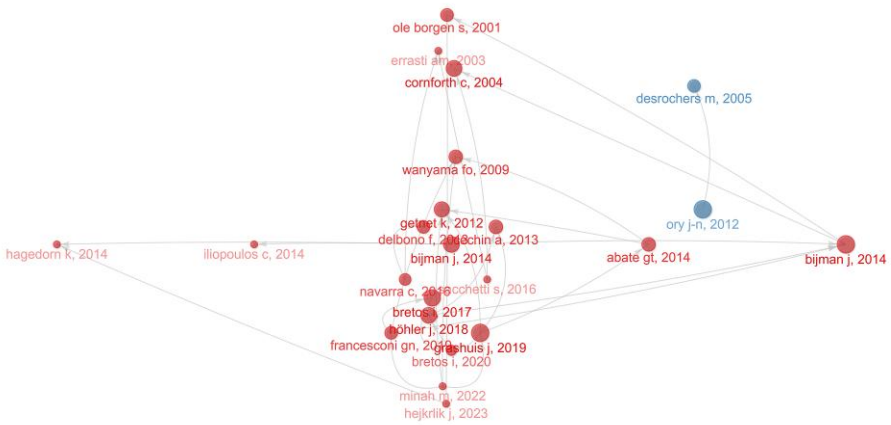


Figure 16. Historiograph of the most influential documents.

4. Conclusion, limitations, and future research

This paper set out to map how cooperative research in the Annals of Public and Cooperative Economics has been structured and how it has changed between 2000 and 2025, combining performance analysis with science mapping. The result is a bibliometric portrait of cooperative scholarship in the field's oldest journal, and an answer to each of the four questions posed at the start.

In response to the first research question, the analysis has shown that cooperative research in APCE has grown steadily over the study period, at an average annual rate of 5.52%, in a trajectory marked by a formative early phase, a pronounced expansion following 2011, and a renewed surge from

2019 onward. Author productivity conforms to Lotka's law, indicating a broad and accessible research community supported by a small nucleus of sustained contributors, chief among them Jasper Grashuis and Jos Bijman, who are simultaneously the most productive and the most internally influential scholars in the field. At the national level, cooperative research is European-centred in volume—led by Spain, Italy, and Belgium—yet displays a distinct impact profile, with Italy and the Netherlands achieving the highest per-article influence, and it is increasingly engaged with cooperatives in developing economies. Analysis of the field's temporal structure further revealed a process of generational renewal, in which an established European worker-cooperative tradition has been complemented by a newer, agriculturally oriented, and increasingly international cohort.

In response to the second and third research questions, the analysis has demonstrated that cooperative research in APCE is organised around three principal thematic communities, agricultural cooperatives, social economy and social enterprise, and cooperative governance and finance, which rest on two distinct intellectual foundations: an agricultural- and institutional-economics tradition, anchored by the work of Cook, Nilsson, Bijman, Ostrom, and Williamson, and a social-economy and ownership-theory tradition, anchored by the work of Hansmann, Ben-Ner, Borzaga, Spear, and Cornforth. A defining feature of this structure is how ownership theory, and Hansmann’s work in particular, bridges the two traditions. At the same time, the close alignment between the field's intellectual foundations and its contemporary themes shows that the theoretical roots of cooperative research and its current research fronts remain coherent rather than divergent. Further, analysis of the most influential documents distinguished broadly exported theoretical contributions, such as Cornforth's governance framework, from the field's internal empirical canon, as evidenced by recent review and impact-evaluation studies that anchor the field's internal scholarly discourse.

The thematic-map, trend-topic, thematic-evolution, and historiographic analyses converge to address the fourth research question, providing a consistent narrative of the field's evolution. Whereas earlier APCE cooperative research emphasized efficiency measurement and organisational form, contemporary scholarship prioritizes integrated, empirically grounded investigations of agricultural cooperatives in developing economies. In this trajectory, governance functions as a unifying framework that integrates previously specialised strands of organisational and financial inquiry. On the thematic map, agricultural cooperatives emerge as the dominant theme, occupying a central, high-volume position in the basic quadrant. This position marks empirical cooperative research as the field's main current frontier, and its most promising area for future theoretical consolidation. Across the analyses, there is clear potential to integrate

cooperative-finance scholarship into the mainstream of the field, particularly given the current status of cooperative banking as a well-developed yet isolated niche. The synthesis and review nature of the most recent research, as illustrated in the historiographic analysis, also indicates that the field is now consolidating, that is, its empirical results have been synthesized and evaluated in ways that are increasingly integrated.

Two contributions follow from this analysis. Firstly, methodologically, the study demonstrates across a complete corpus how a single-journal science-mapping design illuminates a thematically coherent literature, trading the breadth of field-wide surveys for the analytical precision of a bounded, consistent corpus and offering a template that other specialist journals could adopt. The second contribution is substantive, offering a comprehensive intellectual profile of the journal across its contributors, foundational concepts, and thematic evolution. Two defining patterns emerge from the analysis: a close alignment between the field's citation roots and its contemporary themes, and a clear shift of the research frontier toward empirical studies of agricultural cooperatives in developing economies.

With these contributions, the study has several limitations, and these limitations point to directions for future research. Firstly, the analysis is of one journal. APCE is an example of the public, cooperative and social economy, but the findings reflect the cooperative research as presented in this journal and not in the world at large. Future research should expand this analysis across multiple journals and bibliographic databases. Such comparative studies would clarify how APCE compares with peer outlets and situate its contributions within the broader landscape of cooperative scholarship. Secondly, the study was conducted on one database, namely Scopus. Due to this, the study presents the coverage and indexing of papers in Scopus. For instance, the papers before 2010 were missing author keywords. The study was only able to divide the theme changes into two time periods. Database coverage could be extended with the addition of other databases (e.g., Web of Science, Dimensions) and other keyword sources, with the possibility to examine the time in greater detail. Thirdly, science mapping using keywords is highly dependent on the words used by the authors. The study made efforts to remove data problems; it cleaned the data, but there may be some small errors. Lastly, future studies may examine the most salient writings in the area, and may explore further the boundaries, which are still small. In particular, we must introduce theory into agricultural-cooperative research and introduce the ideas of cooperative-finance into the mainstream of the field. Working on these ideas will push forward our understanding of cooperative research and its role in the public, social and cooperative economy.

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