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ORIGINAL PAPER

The coopetition management process: a science mapping analysis

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Abstract

This paper analyzes the coopetition literature to examine how research on coopetition has evolved and to identify the key themes in the coopetition management process. To that end, a science mapping analysis of 890 articles, published between 1996 and 2022, was carried out using co-word networks in a longitudinal overview, applying SciMAT bibliometric software. Motor, basic and transversal, specialized, and emerging or declining themes have been discovered using strategic diagrams and mapping evolution. The findings reveal that coopetition research has evolved to cover several topics. Additionally, a content analysis of the most cited topics was carried out to identify relevant themes involved in the coopetition management process, which have been integrated into five categories: *antecedents*, *coopetitive dynamics*, *facilitators and barriers, outcomes*, and *research contexts*. Therefore, this study organizes the previously fragmented research on coopetition and highlights the *coopetition management process* from an integrative point of view. The results offer a pathway for researchers to understand the evolution and complexity of coopetition from a managerial perspective, as well as providing an original research agenda.

Keywords Coopetition · SciMAT · Bibliometrics · Coopetition management process

JEL Classification M00

Extended author information available on the last page of the article

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1 Introduction

Coopetition involves simultaneous cooperation and competition among actors (Bengtsson et al. 2010; Ritala and Tidström 2014). Although firms usually compete in the market, in coopetitive scenarios, they must sometimes cooperate with their competitors to create greater value. Thus, coopetition could be summed up by the following expression (Chai et al. 2019, p. 959): "Keep your friends close and your enemies closer." For instance, the collaboration between Pfizer and BioNTech during the COVID-19 pandemic is a recent and good example of coopetition. On the one hand, BioNTech combined their biotechnology expertise with Pfizer's production and distribution capabilities—both companies were able to share knowledge and resources, driving innovation and increasing the efficiency of vaccine development. On the other hand, despite their collaboration on the COVID-19 vaccine, Pfizer and BioNTech remain competitors in the pharmaceutical and biotechnology sectors. According to Bouncken and Fredrich (2025), given the recent global crises and increasing environmental turbulence, coopetition may serve as a strategy for fostering innovative approaches that enable firms to change their business models.

Because coopetition combines two types of interaction with opposite logics, it can lead to both enhanced performance and conflict (Peng et al. 2018). According to Le Roy and Czakon (2016), collaboration provides opportunities to access competitors' resources in order to gain competitive advantages but offers the rival the same opportunities. Therefore, since the two aspects coexist, collaboration with competitors does not necessarily reduce rivalry between them (Gernsheimer et al. 2024; Peng et al. 2018). Moreover, this simultaneity creates paradoxical tensions that disrupt the balance in the coopetitive relationship, potentially hindering long-term performance benefits (Raza-Ullah 2021). Thus, since coopetition can lead to both positive and negative outcomes, depending on how it is managed, the first step is to understand its paradoxical nature and identify the mechanisms and processes that balance contradictory demands and enhance performance (Czakon et al. 2020a; Raza-Ullah et al. 2018). However, because the interaction between competition and cooperation is complex and involves several dimensions, our understanding of how and why these paradoxical tensions are managed remains limited (Bengtsson and Raza-Ullah 2016; Raza-Ullah 2020).

The growing interest in coopetition is evident in the numerous studies that have been conducted in recent years (see literature reviews by Bengtsson and Raza-Ullah 2016; Bouncken et al. 2015; Devece et al. 2019; and Gernsheimer et al. 2021). Nonetheless, despite their valuable contributions to the field, previous bibliometric studies (e.g., Köseoğlu et al. 2019; Meena et al. 2023; Yadav et al. 2022) did not examine how coopetition has evolved to provide a comprehensive understanding of the coopetition management process from a longitudinal point of view. Therefore, although the number of papers on coopetition has increased exponentially, the literature remains diverse and more studies are needed to organize this scientific production. In the same vein, Czakon et al. (2020a, b) argue that, although progress in research on coopetition has been impressive, further studies are needed to understand the drivers, dynamics, and outcomes involved in coopetitive relationships. Consequently, this paper presents two research questions:

(1) How has the study of coopetition evolved?
(2) What are the relevant themes in the coopetition management process?

To answer these questions, a co-occurrence bibliometric analysis of 890 Web of Science (WoS) articles from 1996 to 2022 was conducted using the open-source science mapping software SciMAT (Science Mapping Analysis Software Tool). Bibliometric analysis has become a rigorous technique for examining management literature because it reduces the interpretative bias found in qualitative approaches (Oztürk et al. 2024). Specifically, SciMAT carries out a longitudinal science mapping analysis, identifying the most important research topics according to their centrality (importance of the issue) and density (development of the issue) (Cobo et al. 2012). To gain an in-depth understanding of our results and derive valuable insights for the literature, we applied rigorous analytical techniques and triangulated our findings with the existing literature to ensure objectivity (Lim and Kumar 2024). First, for an initial understanding of the cutting-edge coopetition literature, we observed clusters of related themes using the results provided by SciMAT. Subsequently, the evolution map was analyzed in depth to identify the related themes in each cluster and how they have evolved. Thus, a deep analysis was conducted to understand the "how" and the "why" of coopetition literature. Using strategic diagrams, we captured the development and relevance of the identified themes, so we made an extra effort to explore the thematic coverage of the clusters. Third, we present a schematic view of the key themes in the coopetition management process, complementing the bibliometric study with an in-depth analysis of the articles identified. In this way, a more comprehensive view of the literature and an integrative perspective of the coopetition management process were achieved.

This work has made several contributions compared to other bibliometric analyses published in the field of coopetition. (1) This paper examines the evolution of coopetition studies within a longitudinal framework, facilitating an understanding of how the literature evolved between 1996 and 2022. Thus, using SciMAT software, this study overcomes the limitations of previous bibliometric analyses. This software enables us to identify, classify, and analyze the current literature on coopetition by focusing on the relationships between themes rather than on citations or authors. (2) The analysis includes 890 articles in the field of business and management, making it one of the most comprehensive bibliometric studies on coopetition. (3) The bibliometric results have been complemented by a content analysis of the most broadly cited topics regarding the coopetition management process, providing a framework for understanding the underlying relationships of that managerial process. (4) An original research agenda is proposed to broaden the discussion on the coopetition management process.

2 Theory framework

The word "coopetition" was coined to encompass cooperation and competition simultaneously, as earlier literature had analyzed these concepts separately (Bengtsson et al. 2010). According to these authors, discussions about cooperation have

often overlooked competitive elements, while studies of competition have frequently ignored the potential benefits of cooperation. In the early years, coopetition was seen as a strategic alliance characterized by cooperative and competitive interactions between firms (Bengtsson and Kock 2000). However, as the theoretical framework has evolved, it has become increasingly viewed as "a paradoxical relationship between two or more actors involved simultaneously in cooperative and competitive interactions" (Bengtsson and Kock 2014, p. 182).

Actors engage in coopetitive relationships to combine external resources with their internal ones in order to gain competitive advantage and improve performance (Czakon et al. 2020a; Peng et al. 2012). According to Bouncken and Fredrich (2025), when coopetition intensity is high, organizations can better leverage their common market knowledge, economies of scale, and technological advancements. Thus, coopetition allows firms to access new resources and capabilities that they cannot obtain individually (Cassiman et al. 2009; Crick 2021; Peng et al. 2018; Ritala and Hurmelinna-Laukkanen 2009). Therefore, the main elements of coopetition are value creation and simultaneity (Gnyawali and Charleton 2018). Value creation is the main reason why coopetition occurs, as partners must aim to generate both private and-shared benefits (Bouncken et al. 2018, 2020c; Czakon et al. 2020a). As Bouncken et al. (2015) and Ritala and Tidström (2014) argue, actors must simultaneously manage value creation and value appropriation within the same scenario, which differs from collaborative relationships between noncompetitors. Thus, cooperation is based on the need to extend value through joint efforts, while competition is based on the intention to capture a greater part of that value (Bouncken et al. 2020a; Gnyawali and Park 2011). With regard to simultaneity, it shows that coopetition is described along two continua and involves both cooperation and competition at the same time, creating a paradoxical relationship (Bengtsson et al. 2016b).

While most research has focused on analyzing coopetitive relationships between organizations, coopetition could also occur within firms. Interorganizational coopetition, which can be developed in horizontal and vertical relationships, occurs when firms engage in cooperative and competitive dynamics with other firms (Bengtsson and Kock 2014; Devece et al. 2019)—for example, two competing organizations working together to develop new products, such as the example of Pfizer and BioNTech cited in the introduction. Thus, coopetition may take place at the horizontal level between two organizations working in the same sector (Fernandez et al. 2014), or at the vertical level, such as in supply chains (Chai et al. 2020; Li and Zhao 2022). Furthermore, coopetition can occur at the intraorganizational level, as actors cooperate to share resources and perform tasks, but also compete with a view to outperforming their colleagues (Amata et al. 2022; Baruch and Lin 2012; Luo et al. 2006). This internal coopetition enables business units to collaborate and share knowledge while also competing and improving their performance (Séran et al. 2024). Thus, coopetition may also take place between business units, cross-functional units, teams, and individuals (Bengtsson and Raza-Ullah 2016).

Because coopetition involves interactions with opposing logics, it creates multiple tensions between partners that can exist at different levels: External tensions arise from conflicting relationships with other organizations, while internal tensions emerge between departments or employees within the same organization (Bengtsson

et al. 2016b; Bouncken et al. 2020b; Fernandez et al. 2014; Séran et al. 2024). Thus, these tensions reflect the coopetitive paradox since they arise from the challenge of managing the contradictory demands of cooperating and competing simultaneously (Bouncken et al. 2015; Czakon et al. 2020a). Following this argument, in coopetitive relationships, tensions arise from the existence of a paradox (Bengtsson et al. 2016b). A critical aspect of the coopetition management process is how to deal with these tensions (Bengtsson and Kock 2014; Czakon and Czernek-Marszałek 2021; Le Roy and Fernandez 2015). We can draw on three theoretical principles to manage these tensions: *separation*, *integration*, and *co-management*. The separation principle assumes that individuals are not capable of managing the coopetitive paradox, and therefore it advocates functional, temporal, or spatial separation between competition and collaboration (Bengtsson and Kock 2000; Fernandez et al. 2014). The integration principle argues that cooperation and competition should be integrated simultaneously, ensuring that individuals recognize the benefits of both conflicting approaches (Czakon et al. 2020a). Therefore, this principle suggests that coopetition requires the development of the capability to integrate the coopetitive paradox (Séran et al. 2016). In recent years, the literature has suggested combining both principles, given that the separation and integration principles can be complementary solutions, leading to the emergence of the co-management principle (Le Roy and Fernandez 2015). According to these authors, effective management requires organizations to combine the separation principle at the organizational level, the co-management principle at the workgroup level, and the integration principle at the individual level. In sum, coopetition involves numerous tensions that can take place at different levels, which means that, in many cases, a combination of the principles must be applied in order to achieve the expected results (Gernsheimer et al. 2024).

Effectively managing tensions is crucial for balancing value creation and appropriation, as well as for achieving positive results in coopetition (Chiambaretto et al. 2019). Therefore, research on coopetition should focus on understanding its paradoxical nature and the mechanisms and processes that contribute towards managing coopetitive dynamics, achieving competitive advantage, and improving performance (Czakon et al. 2020a; Raza-Ullah et al. 2018).

3 Methodology

Bibliometrics is a discipline that evaluates research conducted in a particular scientific field and has become an essential tool in scientific areas, providing valuable insights into the relationships between articles, keywords, and citations (Albort-Morant and Ribeiro-Soriano 2016; Gutiérrez-Salcedo et al. 2018; Lim and Kumar 2024). According to Oztürk et al. (2024, p. 3335), "bibliometric analysis is a technique employed to map the intellectual structure of any research field and/or discipline, as well as the evolution of the field." The most prevalent techniques for constructing a science map are document co-citation (Small 1973) and co-word analysis (Callon et al. 1983). According to Cobo et al. (2011), in contrast to co-citation analysis, co-word analysis enables the study of the evolution of research topics. Consequently, and in light of the research questions of this paper, a co-word analysis has been carried out.

The bibliometric software tool used in this study is the open-source SciMAT software. SciMAT is a software tool that is widely used to conduct science mapping analysis, and since its development in 2012, more than 300 documents have used this technique, according to the Web of Science (WoS) database. In addition, a recent review of different science mapping tools includes SciMAT as one of the main software tools (Moral-Muñoz et al. 2020). According to its creators, the SECABA group at the University of Granada (see Cobo et al. 2012), SciMAT conducts longitudinal science mapping analysis based on co-word bibliographic networks and identifies the main research themes according to their centrality (importance of the issue) and density (development of the issue). Thus, SciMAT enables the study of the conceptual, intellectual, and social evolution and visualization of a research theme over a period of time. The science maps are enriched with bibliometric measures based on citations and quality indicators, such as the sum or average citations, or h-index. Indeed, the SciMAT technique (Cobo et al. 2012) helps to detect topics in a longitudinal mapping analysis grounded in bibliographic networks. The map creation through co-word analysis in a longitudinal frame offers information on the research themes in a discipline, allowing it to describe the evolution of a research field (Garfield 1994).

Compared to other bibliometric software tools, this technique has a broader range of features (e.g., a longitudinal framework across different periods, impact measures, a processing module, etc.), which enhance comprehension of the findings (de Diego and Almodóvar 2022). Among the several science mapping tools, including Bibliometrix, VOSviewer, Bibexcel, Biblioshiny, CiteSpace, CitNetExplorer, and Sci2 Tool, SciMAT stands out as the only tool that enables: (a) the thematic evolution of an academic discipline to bedescribed; (b) the keyword normalization process to be allowed, which is crucial for achieving good results; (c) the complementing of detected research themes with bibliometric indicators (citations, h-index, etc.) (Guerrero-Villegas et al. 2024; Moral-Muñoz et al. 2020). Likewise, SciMAT provides most of the benefits of the other software techniques and has been developed through its grounding in a robust methodology based on bibliometric indicators and bibliographic networks (Cobo et al. 2011; Garcia-Buendia et al. 2021).

3.1 Process

Following Cobo et al. (2012), in order to carry out a rigorous analysis, the process was divided into the following stages: data search, data refinement, standardization and creation of the network, map creation, result analysis and visualization of the themes, and performance analysis (see Fig. 1).

In the first stage of the data search, we retrieved documents from the Web of Science (WoS) database. This database was chosen because it is based on the widely used Journal Citation Reports (JCR) index, which provides detailed information on each document and is the most widely used indicator for evaluating the quality of scientific journals and articles (Santana and Díaz-Fernández 2023). The search was carried out in November 2022 and included all articles and reviews published up to that year, using the following criteria: TS = *coopet* or co-opet**; Document types = *article or review article*; Categories = *business or management*. TS is a field tag (from the WoS web page) standing for "topic" and indicates that the WoS search has retrieved all the

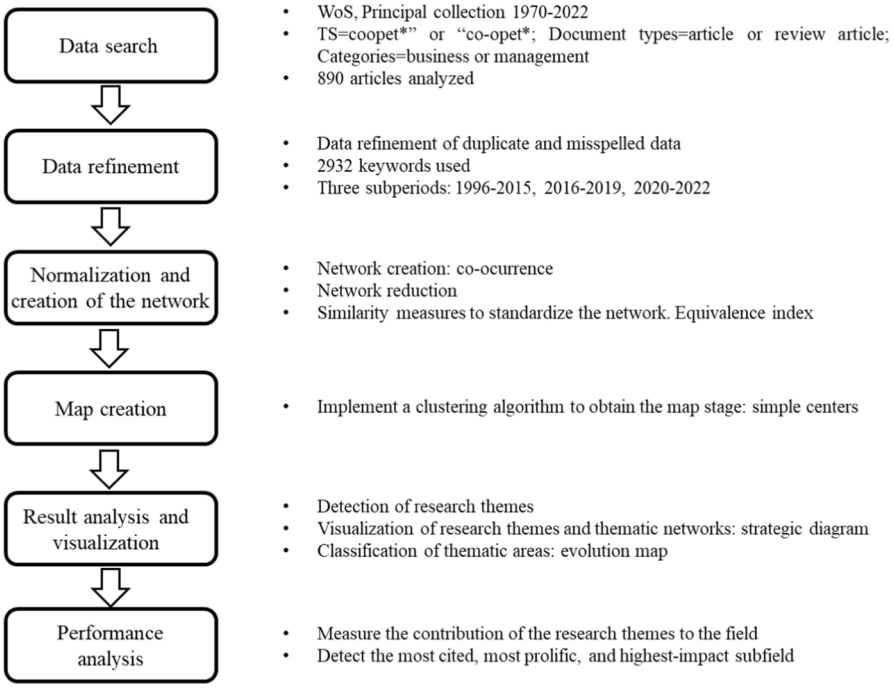


Fig. 1 Science mapping steps

documents that include the unit analysis of the search criteria in their title, abstract, or keywords. As a result, the sample for analysis comprised a total of 890 articles. Science mapping techniques examine the key research trends and their interconnections within a field, while articles and reviews offer a comprehensive portrayal of the discipline. Furthermore, other publications have also considered articles or reviews (Garcia-Buendia et al. 2021; Santana and Cobo 2020; Santana and Díaz-Fernández 2023; Wong et al. 2023). Therefore, this study selected peer-reviewed articles and reviews to gain a sense of understanding of the discipline. Additionally, early access documents were excluded because the period-based nature of our analysis required documents to have a permanent publication date.

To carry out data refinement, documents were analyzed to identify mistakes, duplications, or missing information, and all were corrected. Moreover, a de-duplication process was carried out by joining plurals and singulars, and concepts representing the same notion. Thus, the number of keywords was reduced from 3074 to 2932. In addition, words that were meaningless in the context analyzed (e.g., *model*, *framework*, *search*,…) were omitted. Then, the SciMAT period manager was used to establish three consecutive periods for studying the evolution of coopetition research. In 1996, the concept of "coopetition" appeared for the first time in the literature. Over the next 19 years, the research became more in depth. Notably, in 2015, academia began focusing more on coopetition after Bouncken et al. (2015) published the first literature review on the topic. The year 2016 was a turning point in the scientific field since it was the first year in which more than 70 papers related to coopetition

were published. Between then and 2019, some of the essential theoretical reviews appeared (e.g., Bengtsson and Raza-Ullah 2016; Devece et al. 2019; Dorn et al. 2016). After this period, 2020 was the most prolific year. As regards this evolution, three periods were established. The first produced 262 documents (1996–2015), the second included 300 documents (2016–2019), and the last provided 328 documents (2020–2022).

During the standardization and network creation, the software's co-occurrence matrix was used to analyze keyword co-occurrences and identify relationships (Cobo et al. 2011, 2012). Additionally, the size of the network was established, and normalization was performed using the equivalence index. Subsequently, the single-center algorithm was selected to create the science map and its clusters (Coulter et al. 1998). In regard to the results analysis phases, the following steps were used (Cobo et al. 2011):

1. *Detection of research themes.* The academic topics are identified by applying a co-word analysis (Callon et al. 1983) and clustering of keywords (Coulter et al. 1998). The nodes of the networks represent the keywords, and a link exists between two nodes if both keywords co-appear in a group of documents. Co-citation of documents (Small 1973) and co-word analysis (Callon et al. 1983) are the most common science mapping techniques (Cobo et al. 2011). Co-word analysis is "a content analysis technique that is effective in mapping the strength of association between information items in textual data" (Cobo et al. 2011, p. 147). It works with groups of terms shared by documents, visualizing the research discipline directly from the interactions of key terms (Cobo et al. 2011). As this work aims to retrieve interrelations among concepts that co-occur in document titles, abstracts, and keywords, a co-word analysis has been conducted.
2. *Visualization of research themes and thematic networks.* Identified themes are represented through strategic diagrams and thematic networks. Each theme can be characterized by two dimensions: *centrality* and *density* (Callon et al. 1991). Centrality measures the degree of interaction between the networks and is considered a measure of the theme's relevance value. At the same time, density refers to a network's internal cohesion and represents the theme's development. Thus, as shown in Fig. 2, the themes can be classified according to four groups (Cobo et al. 2012): motor themes (well developed and important to the scientific field, these research themes are very significant and studied in depth); basic and transversal themes (relevant to the field but not fully developed); specialized themes (well developed but marginally relevant); and emerging or declining themes (both poorly developed and marginally relevant). Topics are represented as spheres whose sizes are proportional to the number of documents.
3. *Classification of thematic areas.* The evolution of research topics over periods is detected and represented in an evolution map. The evolution map identifies the field's main general areas, origins, and interrelationships. The changes in the internal conceptual structure are used to determine the main themes and their evolution. Overlaps in the clusters from one period to the next identify changes, meaning that evolution exists if a theme from one period shares keywords with a theme in the next. As an example, in Fig. 3, two different evolution areas

Fig. 2 Strategic diagram

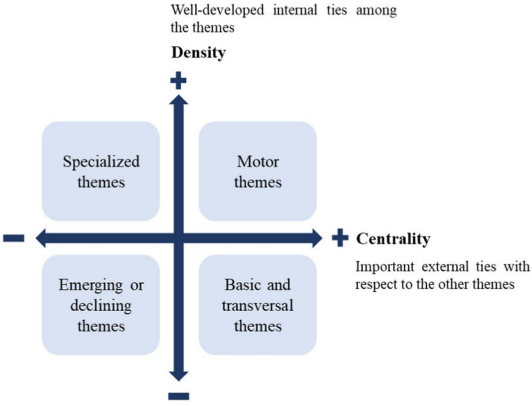
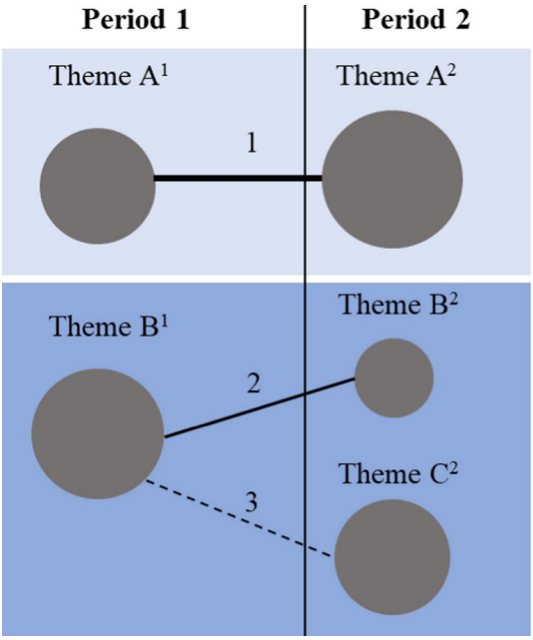


Fig. 3 Thematic evolution



delimited by differently shaded shadows are presented. Solid lines (Lines 1 and 2) mean that the linked themes share the main item. A dotted line (Line 3) means that the themes share elements that are not the main item. Additionally, the thickness of the edges represents the inclusion index, which means that the thicker the line, the more keywords the themes share. The size of the spheres is proportional to the number of documents in each theme.

4. *Performance analysis.* The contribution of research themes to the field is measured through quantitative (number of papers, authors, andjournals) and qualitative (number of citations and the h-index) measures.

4 Results

The following section is structured in two parts to visualize and analyze the results. A preliminary analysis of the cutting-edge coopetition research with relevant journals, authors, and articles can be seen in Appendices I–V. First, in the science mapping analysis, the SciMAT results are presented, where the conceptual evolution map shows the evolution of the coopetition literature from 1996 to 2022, and the strategic diagrams classify the themes of the last period (2020–2022), as this is the most prolific. Second, relevant themes regarding the coopetition management process are integrated into five categories (*antecedents*, *coopetitive dynamics*, *facilitators and barriers*, *outcomes*, and *research contexts*).

4.1 Science mapping analysis

4.1.1 Evolution map

The SciMAT evolution map and strategic diagrams have been used to answer our first research question: *How has the study of coopetition evolved?* To analyze and understand the evolution map, each cluster must be thoroughly examined in order to identify the subthemes that constitute it and relate one topic to another[1] (see Fig. 4).

4.1.1.1 First period (1996–2015) During the first period, the coopetition literature explored general themes, *cooperation* being the one that was studied the most (Bengtsson and Kock 2000; Tsai 2002). This theme was highlighted as the most relevant because papers began to analyze cooperation between competitors, giving little attention to the benefits of simultaneous cooperation and competition (Bengtsson and Kock 2000). As a result, the concept of coopetition remained unclear, with some articles starting to define it and integrate its duality (Bengtsson et al. 2010; Bouncken et al. 2015). The literature focused on analyzing alliances and networks between companies, particularly in the context of R&D (Cassiman et al. 2009; Enberg 2012). Some authors began to study the relevant factors in managing coopetition, and *trust* emerged as a key factor in avoiding opportunism and conflicts (e.g., Tidström 2014). *Product development* was also a fundamental theme, as it is one of the reasons companies collaborate with their competitors. Thus, it was a basic theme because coopetition enables R&D firms to access the resources needed to develop their products (Quintana-Garcia and Benavides-Velasco 2004; Ritala and Hurmelina-Laukkanen 2009). In terms of theories, the *resource-based view* was the first to be used to explain this strategy. Thus, following Gnyawali and Park (2009) and Le Roy and Fernandez (2015), obtaining resources and developing competitive advantages are objectives in coopetitive relationships, which is why the resource-based view was a useful theory for understanding the reasons for cooperating with competitors. *Embeddedness* was studied to identify the optimal level in coopetitive strategies because strong embeddedness may reduce creative tension and affect the dynamics of coopetition (Bengts-

[1] In this article, we only present the evolution map of the coopetition concept in Appendix VI as an example of this process, but other results are available upon request.

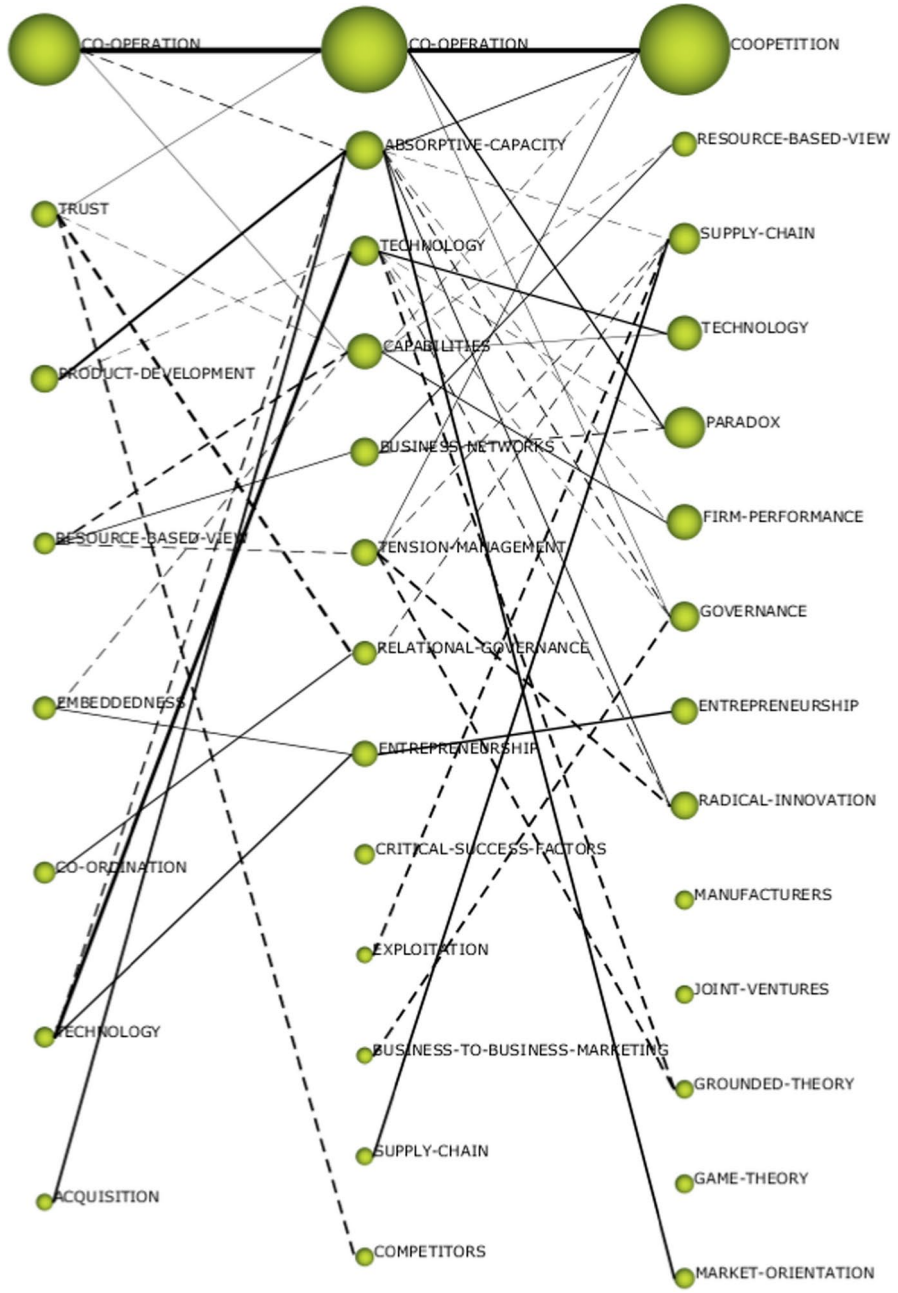


Fig. 4 Evolution map of coopetition themes for the periods 1996–2015, 2016–2019, and 2020–2022

son et al. 2010). Furthermore, in the first period, the literature also began to analyze *coordination* and *acquisition* as important themes regarding alliances between organizations, and it was observed that coopetition between technology firms was beginning to be studied.

4.1.1.2 Second period (2016–2019) From 2016, more specific topics began to emerge because the study of cooperation between competitors continued to be essential and challenging for researchers (Bengtsson et al. 2016a). *Cooperation* was still seen as the most developed theme related to coopetition (e.g., Gnyawali et al. 2016), and the literature continued to analyze this concept in R&D environments. *Absorptive capacity* gained importance in this period and became a relevant theme in studies analyzing product development, acquisition, and radical innovation. According to Estrada et al. (2016), in coopetitive relationships, knowledge exchange and protection mechanisms enable firms to bridge the gap between potential and achieved absorptive capacity. Thus, since the study of knowledge was starting to become relevant, absorptive capacity was positioned as a motor theme. In the first period, *technology* was an emerging theme, as some studies (e.g., Bouncken and Kraus 2013) began to highlight the importance of coopetition in knowledge-intensive fields such as the technology industries. In this second period, it emerges as a basic theme, so the literature analyzed coopetitive relationships, as technological innovation and product development can drive coopetition (Rusko 2019). *Capabilities* were also studied as a critical element for business performance because many articles started to emphasize the role of capabilities as a competitive advantage. Moreover, in the context of coopetitive alliances, access to the knowledge of coopetitors can significantly enhance the actors' capabilities (Bouncken and Fredrich 2016). *Business networks* was related to the resource-based view and appeared to analyze the nature of coopetitive relationships, as cooperation between competitors is a prevalent phenomenon in the business world (Devece et al. 2019). *Tensions management* was established as the main topic in which researchers began to analyze the dynamic capabilities related to the resource-based view in the previous period. In this period, articles analyzed the tensions that arise when cooperating with competitors in depth, so it became an important theme (e.g., Bengtsson et al. 2016b; Fernandez and Chiambaretto 2016). *Entrepreneurship* became a specific context studied in coopetition research that was previously studied mainly in the technological context. Thus, this theme included the study of small and medium-sized enterprises and their embeddedness or growth, since the latter could explain why these types of organizations collaborate with their competitors (e.g., McGrath et al. 2019). *Competitors* also appeared as a relevant theme when analyzing commitment among these actors and its effect on performance. Finally, new and unrelated themes emerged, such as *critical success factors*, *exploitation*, *B2B marketing*, and *supply chains*, which show the diversification starting to emerge in the literature on coopetition.

4.1.1.3 Third period (2020–2022) With respect to the last period, *coopetition* emerged as the most important and developed theme (including 305 documents).

Thus, we can confirm that, in the latter years, the concept was solidified according to the definitions and literature reviews published previously (e.g., Crick and Crick 2020; Czakon et al. 2020a). The *resource-based view* was once again the most relevant theory in this field when analyzing the relationships between business networks and competitive advantages (e.g., Crick and Crick 2021b). While *supply chain* was previously a specialized topic, more recent literature has analyzed this aspect, making it a motor theme (e.g., Faisal 2023). Articles analyzing coopetition in supply chains also studied aspects related to dynamic capabilities and coordination between firms. *Technology* remained an important theme, particularly in analyzing coopetition in technology sectors such as online platforms or startups (e.g., Bacon et al. 2020; Wang and Chen 2022). The coopetition *paradox* was related to cooperation in the second period where it emerged as a relevant theme. Indeed, the paradox was the second most important theme in terms of the number of articles (105 papers). Furthermore, the literature also started to analyze how coopetition could improve firm *performance* (e.g., Raza-Ullah 2020; Wang and Chen 2022). *Governance* had always appeared related to other topics. In the last period, it emerged as an important theme in analyzing coopetitive alliance success, knowledge transfer, and open innovation (e.g., Bicen et al. 2021; Galati and Bigliardi 2019). *Entrepreneurship* remained an important theme when coopetition was analyzed (e.g., Yang and Zhang 2022). *Radical innovation* was a theme related to absorptive capacity, and in the last period, it appeared as a basic topic as the literature began to analyze the types of innovations that could be achieved through cooperation with competitors (e.g., Le Roy et al. 2022). Moreover, to analyze vertical coopetition, papers began to use *grounded theory* (e.g., Bahar et al. 2022), and in the field of strategic management, *market orientation* had begun to be analyzed in depth (e.g., Crick et al. 2022). Finally, new themes emerged, such as *manufacturers*, *joint ventures*, and *game theory*. These new themes revealed that the coopetition literature had started to analyze other types of contexts and relationships, as well as using more theories to understand the dynamics of coopetition.

To sum up, as shown in Fig. 4, research on coopetition has broadened to cover a wide range of topics. Thus, while many new themes have emerged over the years, only four topics have remained across multiple periods: *cooperation*, *technology*, *the resource-based view*, and *supply chains*.

4.1.2 Strategic diagram (2020–2022)[2]

Following SciMAT methodology, the strategic diagram is used to analyze, in depth, the themes and subthemes of the last period based on their density and centrality (see Fig. 5). From the period 2020–2022, we have recognized four motor themes (*coopetition*, *paradox*, *supply chain*, and *resource-based view*); four basic and transversal themes (*firm performance*, *technology*, *governance,* and *radical innovation*); four

[2] In this section, we only analyze the strategic diagram of the last period due to constraints on length, but other results are available upon request.

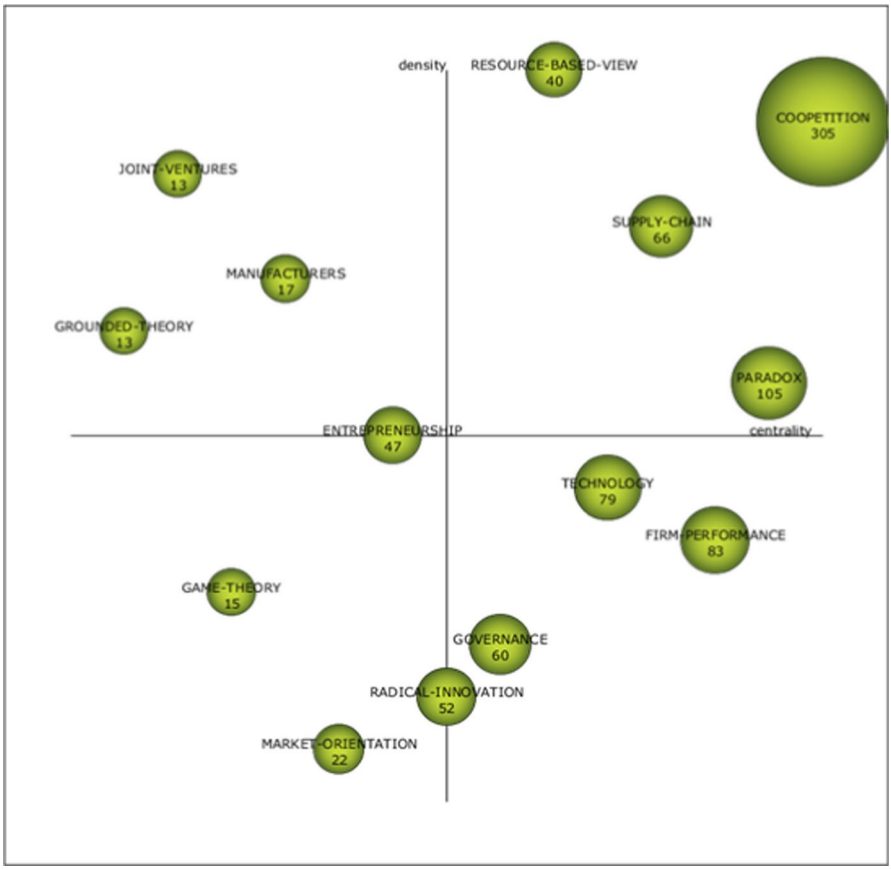


Fig. 5 Strategic diagram of period 2020–2022

specialized themes (*manufacturers*, *joint ventures*, *grounded theory*, and *entrepreneurship*), and two emerging themes (*market orientation* and *game theory*).

4.1.2.1 Motor themes (well developed and important for the scientific field) *Coopetition* was the most important and well-developed theme (305 papers). It encompassed subthemes such as cooperation, competition, innovation, networks, alliances, absorptive capacity, value creation, knowledge, R&D, and tension management. According to Gernsheimer et al. (2021), recent definitions of coopetition have allowed researchers to understand the concept as a complex, multidimensional, multileveled, and interconnected activity.

Paradox included subthemes such as trust, tension, dark side, coopetition strategy, balance, coopetition capability, etc. It has emerged as a relevant theme in recent years (105 papers) due to its role in managing coopetitive relationships (Bacon et al. 2020; Crick and Crick 2020). Thus, because of the coopetition paradox, there is a risk of opportunism and misappropriation of knowledge, generating tensions that must be

managed (Crick 2021). Coopetition capability can mitigate the adverse effects of these tensions (Bengtsson et al. 2020).

Supply chain was another motor theme, which included numerous articles that analyzed coopetition in this context (66 papers). Three examples of the subthemes included were product development, coordination, and dynamic capabilities. Firms in supply chains often need to collaborate to offer their services or products, so it makes sense that this was a motor theme. For example, competing manufacturers and retailers in fashion apparel may cooperate to achieve better results in product development (Guo et al. 2020).

Finally, the *resource-based view* was yet another motor theme, as it is the most widely used theory (40 papers) for explaining coopetition and other related concepts such as organizational performance, as highlighted in studies by Crick (2021) and Crick and Crick (2021b). It relates to various subthemes (e.g., competitive advantage, relational view, psychological contracts, oriented behavior, etc.).

4.1.2.2 Basic and transversal themes (relevant to the field but not fully developed) *Firm performance* was the most relevant basic or transversal theme, as most articles (83) analyzed ways to improve organizational performance in coopetitive relationships (Estrada and Dong 2020). This topic covers various subthemes, such as cross-functional coopetition, interorganizational collaboration, entrepreneurial orientation, etc.

Technology remained a basic theme (79 papers included) since it is a context in which many coopetitive relationships occur. It was related to the following subthemes: capabilities, innovation ecosystem, digitalization, startups, and universities. Thus, technological trends can be a key driver of coopetition as a way to obtain innovation resources and capabilities (Chiambaretto et al. 2020). Therefore, according to Bacon et al. (2020), coopetition is a component of innovation ecosystems that promotes technology domination.

Governance is a theme included in 60 documents and was related to subthemes such as knowledge transfer, open innovation, value co-creation, social structure, etc. As researchers started to analyze the relevant factors of managing coopetition in this last period, governance was studied as a basic theme. Thus, according to Galati and Bigliardi (2019), governance issues are essential for promoting collaboration projects between R&D firms, as they can influence knowledge transfer.

With regard to *radical innovation*, it appeared in the middle of the axis, so it could be an emerging or basic theme. Nevertheless, it was considered fundamental due to the many articles included (52 papers). This topic involved subthemes such as innovation performance, sustainability, partner selection, market, and breakthrough innovation. The literature analyzed radical innovation as a basic theme in coopetition because when firms face unfamiliar markets, collaborating with competitors can enhance knowledge sharing and drive this type of innovation (Czakon et al. 2020a). Furthermore, as stated by Le Roy et al. (2022), when horizontal coopetition is employed, better results can be achieved for radical innovation than for incremental innovation.

4.1.2.3 Specialized themes (well developed but marginally relevant) *Manufacturers* was a specialized theme with 17 papers, as manufacturers play a significant role in supply chains; it is therefore related to other themes relevant to these relationships, such as *retailers* or *supply chain management*. Recent studies have analyzed coopetition in supply chains in order to understand how it occurs and how to manage it, as well as manufacturers' decisions during the production process that can lead to competition or cooperation (e.g., Li and Zhao 2022).

Joint ventures was another specialized topic that included 13 documents analyzing the role of coopetition in this kind of alliance and included subthemes such as *value appropriation*, *national culture*, and *event history analysis*. Most of the literature has analyzed interorganizational coopetition in joint ventures, but, in recent years, some efforts have been made to study this topic in depth (Castañer and Oliveira 2020).

Entrepreneurship was a specialized topic that had been a basic one in the previous period. This could have happened because, in recent years, articles (47 papers) analyzed coopetition as a strategy for small and medium-sized enterprises. For example, according to Theodoraki et al. (2020), after analyzing the results of incubators, it was found that the coopetition strategy positively influences performance in terms of building successful entrepreneurial ecosystems.

Finally, *grounded theory* was referenced in 13 documents. It appeared as a new way to analyze coopetition in *vertical coopetition* and *platforms*. As stated by Bahar et al. (2022), grounded theory is appropriate in coopetition research because it is a complex concept, and there is scant literature in some industries (e.g., hospitality).

4.1.2.4 Emerging or declining themes (both poorly developed and marginally relevant) Recently published articles have focused on the emerging themes of *market orientation* (22 papers) and *game theory* (15 papers). *Market orientation* was related to two subthemes (*conflict* and *strategic*). Thus, according to Crick et al. (2022), it is necessary to analyze whether coopetition improves the performance of market-oriented behavior in order to understand the risks and benefits of cooperating with competitors. *Game theory* appeared recently as a new theory in analyzing coopetition; it was related to the *supply chain coordination* and *logistics* subthemes. However, the literature on coopetition has yet to develop this field of study.

4.2 Coopetition management process

After examining the evolution map and the strategic diagrams from all the periods (1996–2022), an in-depth analysis of the motor and basic theme clusters was carried out to answer our second research question: *What are the relevant themes in the coopetition management process?* As a result of our analysis, a schema for the coopetition management process is presented in Fig. 6. This schema was obtained after conducting a two-step analysis: (1) the SciMAT analysis and (2) a content analysis. First, we carried out a thorough analysis of the themes included in the strategic diagrams and the evolution map provided by SciMAT. This software generates clusters for each main theme, highlighting the related subthemes according to the co-word

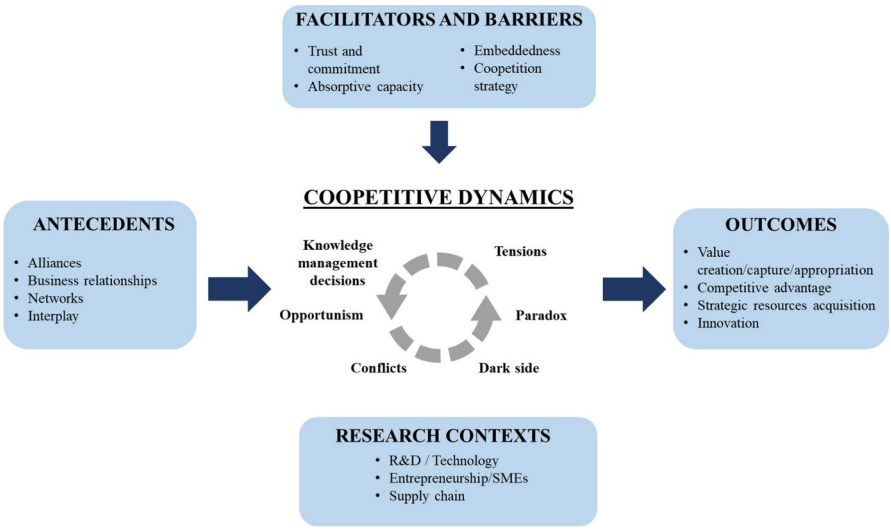


Fig. 6 Coopetition management process: a schematic view

analysis (see Appendix VI as an example). Thus, the motor and basic theme clusters were selected because they are the most developed or most central themes in the literature on coopetition. Second, once the clusters for each theme had been downloaded, all subthemes that appeared in 10 or more documents were analyzed. Thus, a content analysis of the articles was conducted. This step was essential for understanding the literature and categorizing the role of themes and subthemes in the coopetition management process (see Appendix VII for details on authors and papers). Finally, our schema has integrated these themes into five categories: *antecedents*, *coopetitive dynamics*, *facilitators and barriers, outcomes*, and *research contexts*. "Antecedents" refers to those elements that trigger coopetition. "Coopetitive dynamics" includes those processes that occur because of coopetition. Thus, this category describes the complex dynamics that must be managed in a coopetitive relationship. "Facilitators and barriers" are aspects that influence the coopetition management process, as they are elements that can facilitate or hinder the management of coopetitive dynamics and thus influence the outcomes. "Outcomes" refers to performance or results achieved from the coopetitive relationships. These outcomes can be positive or negative, depending on the other elements involved in the coopetition management process. Finally, "research contexts" refers to the field or areas on which the study of coopetition has been focused.

4.2.1 Antecedents

Alliances with competitors are strategies used by organizations to obtain the resources and capabilities that they do not currently possess, as they are considered a key source of knowledge and competitive advantage (Chevallier et al. 2016; Vlaisavljevic et al. 2021). According to Bouncken and Fredrich (2012), companies with a strategic alliance have greater goal orientation and awareness of coopetition, which

serves as an antecedent for developing coopetitive relationships. Thus, coopetition can be considered a strategic alliance characterized by cooperative and competitive interactions between firms (Bengtsson and Kock 2000; Brandenburger and Nalebuff 1996). The development of business relationships has been the prevalent phenomenon studied in the coopetition literature and has remained an important area of future research (Devece et al. 2019). However, coopetition dynamics are becoming more complex due to companies developing multiple relationships within broader networks that involve many actors (Czakon and Czernek 2016). Thus, network-level studies have found that coopetition takes place not only at the interfirm level but also within and between networks or ecosystems (Dorn et al. 2016). At the same time, these networks can also emerge within an organization where different units or individuals cooperate and compete at the same time (Tsai 2002). Following this argument, networks are necessary for coopetition in a context where two or more actors are interrelated(Bengtsson and Raza-Ullah 2016).

Finally, a key antecedent for coopetition is the interplay between actors that simultaneously cooperate and compete to achieve the expected results (Gnyawali and Charleton 2018; Hoffman et al. 2018; Leite et al. 2018). "The notion of interplay refers both to how competition and cooperation interrelate and to their interaction in driving outcomes" (Hoffman et al. 2018, p. 3035). According to Minà et al. (2020), the coopetition process follows different logics depending on how cooperation and competition interplay and, because of this, the dynamics and the results derived will be different.

4.2.2 Coopetitive dynamics

Coopetition is a phenomenon characterized by two opposing yet complementary forces, like the concept of yin and yang, so coopetitive relationships can generate tensions that must be managed (Crick and Crick 2021b; Fernandez et al. 2014). Raza-Ullah (2020, p. 3) defines paradoxical tensions as "the cognitive difficulty experienced by managers when they pursue the multiple and simultaneous contradictory demands that are inherent in coopetition." Our results reveal that recent literature has focused on analyzing how to manage these paradoxical tensions (Chai et al. 2020; Jakobsen 2020). In this sense, three theoretical principles for managing "coopetitive tensions" are identified: the separation, integration, and co-management principles (Fernandez and Chiambaretto 2016; Gernsheimer et al. 2024; Le Roy and Fernandez 2015). However, due to the challenge inherent in managing tensions, in many cases, a combination of these principles is required to achieve the expected results (Rouyre et al. 2024). As Bouncken et al. (2015, p. 578) point out, "coopetition may combine the best of both worlds of cooperation and competition, there is still an inherent paradox."

The literature has also focused on specific aspects, such as the "coopetition paradox," where it is either dominated by cooperation or competition, depending on which force's intensity exceeds the other (Bengtsson et al. 2016b). Thus, if one of these forces dominates over the other, the relationship becomes unstable and performance decreases, so it is crucial to strike a balance between cooperation and competition (Peng et al. 2018; Raza-Ullah 2021). Therefore, great efforts have been made to

understand this paradox, as well as to identify the "dark side" of coopetitive dynamics (Crick and Crick 2021a), since the interaction between actors in coopetitive relationships can create tensions and conflicts, mistrust, and opportunism, which threaten performance (Bouncken et al. 2015; Le Roy and Fernandez 2015; Raza-Ullah and Kostis 2020). Moreover, knowledge management has become increasingly relevant in analyzing relationships between two actors as they recognize the value of collaboration as an essential source of knowledge acquisition and sharing (Agostini et al. 2020; Bacon et al. 2020). However, it must be balanced with knowledge protection (Gast et al. 2019).

4.2.3 Facilitators and barriers

Coopetition facilitators and barriers are mechanisms that help to explain coopetitive relationships and their results (Czakon and Czernek 2016). Several moderating factors can positively or negatively impact coopetitive dynamics when managing coopetition. Trust and commitment are among the most relevant factors, as they can reduce tensions and enhance communication in relationships between competitors. Since collaboration implies interdependence between partners, a vulnerable environment is created in which trust helps to solve conflicts and tensions, as well as avoid opportunistic behavior (Czakon and Czernek 2016; Yu 2019). Trust is a crucial relational mechanism that helps reduce conflict and facilitates knowledge exchange (Lascaux 2020). According to Baruch and Lin (2012) and Tidström (2014), trust is a key element in ensuring the success of the coopetitive relationship and reducing tensions, while Ritala et al. (2009) suggest that it can also enhance communication and knowledge sharing. Commitment is also essential in strategic alliances, as it can satisfy coopetitors' needs and reduce uncertainty (Pesämaa et al. 2013). Moreover, it can foster relationships between coopetitors and ensure agreement compliance, leading to mutual development activities (Fang et al. 2011).

Absorptive capacity can have a significant influence on coopetitive dynamics as well. Following Ritala and Hurmelinna-Laukkanen (2013), coopetitors tend to possess high levels of potential absorptive capacity, which allows them to capture knowledge and use it for their own benefit. Thus, according to Pereira and Leitão (2016), dynamic capabilities theory considers absorptive capacity to be necessary for achieving a competitive advantage. In coopetitive relationships, where competitors collaborate to acquire knowledge, absorptive capacity can be a key element.

Embeddedness and coopetition strategy are also relevant factors to consider. Coopetitive relationships may tend more towards collaboration or competition depending on the degree of embeddedness. When embedded ties exist, stronger and more frequent interactions develop, resulting in a more trusting collaboration (Luo et al. 2006). Nevertheless, too much embeddedness may lead to static coopetition, thus affecting coopetitive dynamics (Bengtsson et al. 2010). Finally, coopetition strategy is also crucial in understanding coopetitive objectives, as it enhances comprehension of the strategy's goals. Thus, the coopetition strategy helps actors learn and integrate the skills and knowledge of their competitors in order to achieve a higher level of performance (Wang and Chen 2022). Therefore, developing a strategy is crucial for improving coopetition outcomes (Bouncken and Fredrich 2012; Ferreira et al. 2021).

4.2.4 Outcomes

According to Ritala and Tidström (2014) and Bouncken et al. (2015), coopetition differs from collaborative relationships between noncompetitors because it refers to a strategy that involves creating value through cooperation yet competing to capture part of that value. Therefore, one of the main outcomes of coopetition is creating, capturing, and appropriating value. Moreover, the benefits related to coopetition include using partners' resources to enhance the organization's performance and improving the use of internal resources (Czakon et al. 2020b). Following Huang and Chu (2015, p. 813), "the essence of coopetition is to realize the complementary use of the advantageous elements of the businesses, enhance the competitiveness of both sides and, thus, contribute to the establishment and consolidation of both their competitive positions in the market." Hence, coopetition allows actors to develop competitive advantages by obtaining strategic resources they could not acquire without collaborating with competitors. As Gnyawali and Charleton (2018) suggest, firms' main motivation in cooperating with their competitors is to create value. However, as Bouncken et al. (2018) state, coopetition is also characterized by individual appropriation or value capture. According to these authors, value appropriation is a "zero-sum game," where actors seek to grab a bigger slice of an existing pie, whereas value creation is a "positive-sum game," as it seeks to make a bigger pie altogether.

Additionally, Bengtsson and Raza-Ullah (2016) stated that innovation, which has been extensively studied in recent years (Bacon et al. 2020; Bouncken et al. 2020a; Chai et al. 2020), is one of the main outcomes of coopetition. Several works haverevealed that the effect of coopetition on innovation may be different for radical and incremental innovation (Bouncken and Fredrich 2012; Vanyushyn et al. 2018). Klimas and Czakon (2018) show that the literature has identified several innovation outcomes, with product, technological, and strategic innovations being the most prominent. Likewise, Wang and Chen (2022) provided evidence that coopetition enables firms to acquire complementary resources that will enhance service innovation to provide value to their customers. Therefore, as Roig-Tierno et al. (2018) point out, coopetition offers the opportunity to increase a firm's capability to develop innovative products or services, as it is a mechanism that can increase organizational learning.

4.2.5 Research contexts

Coopetition has been studied in various contexts. Collaboration among competing R&D firms has become increasingly prevalent, particularly when costs and risks are high (Gnyawali and Park 2011). In this type of organization, actors cooperate and share their knowledge to innovate and outperform, but they simultaneously compete for resources and competitive advantages (Bouncken and Kraus 2013; Estrada et al. 2016). Although R&D activities involve risks and challenges, there is growing evidence that competing organizations collaborate to create and bring innovations to market (Ritala and Sainio 2014). According to these authors, coopetition is also common in technology sectors due to the nature of their networks. Thus, technological coopetition refers to "various types of technology-related collaborative arrangements

between competitors covering R&D, new product development and technology improvement" (Ritala and Sainio 2014, p. 156). Additionally, SMEs or entrepreneurship networks often collaborate with their competitors to achieve competitive advantages and increase their sectorial and geographical influence (Chevallier et al. 2016; McGrath et al. 2019). Thus, the benefits of developing coopetitive strategies for small firms or entrepreneurs include gaining access to markets that they would not otherwise be able to access by themselves (Roig-Tierno et al. 2018). Finally, other contexts where coopetitive strategies are likely to develop include value chain activities, particularly long-term outsourcing and supply agreements (Luo 2007). Within the supply chain, actors often depend on each other to deliver their services or products, paving the way for coopetitive alliances (Li and Zhao 2022).

5 Conclusion

The growth of scientific production in some areas (e.g., coopetition research) highlights the need for bibliometric analyses to structure and organize existing research (Oztürk et al. 2024). This paper analyzes the coopetition literature to discover how the study of coopetition has evolved and what the relevant themes in the coopetition management process are. To answer these research questions, the literature was analyzed through the evolution map and strategic diagram provided by SciMAT. The findings reveal that coopetition research has evolved to cover several topics in recent years. From 1996 until 2015, the literature studied more general topics, cooperation being the most important, and few articles focused on defining and integrating the concept's duality (Bengtsson et al. 2010; Bouncken et al. 2015). Starting from 2016, cooperation was still the most developed theme related to coopetition, and absorptive capacity and capabilities emerged as themes of interest during this period. Additionally, in this second period, the literature began to emphasize coopetitive dynamics, such as tension management. In the last period from 2020 until 2022, the concept of coopetition was finally solidified. Due to this progress and previous studies, recent coopetition literature emphasizes the importance of combining cooperation and competition, focusing on managing both contradictory forces simultaneously (Raza-Ullah 2021). The present study has also discovered that seven subthemes have always been linked to the concept of coopetition over the years: *cooperation*, *competition*, *networks*, *alliances, innovation, knowledge*, and *management* (see Appendix VI). Considering that the simultaneous presence of competition and cooperation is essential in coopetitive relationships (Czakon et al. 2020a), these two concepts have been the ones most developed in articles over the years. The literature also reveals that actors must develop networks or alliances to obtain outcomes that they would not achieve separately (Peng et al. 2018). In addition, our research shows that knowledge plays a crucial role in achieving competitive advantage and value creation between partners in a network (Agostini et al. 2020; Chiambaretto et al. 2019). Finally, it is noted that effective coopetition management is essential for achieving shared objectives and minimizing potential risks.

In recent years, coopetition management has been studied as a process in which numerous dynamics must be considered (Kostis and Näsholm 2020). Therefore,

knowing the relevant aspects involved in the coopetition management process has become an important theme of analysis in the literature (Czakon et al. 2020a). For that reason, and to answer our second research question, we have identified and organized the relevant themes in the coopetition management process into five categories: *antecedents*, *coopetitive dynamics*, *facilitators and barriers*, *outcomes*, and *research contexts*. The antecedents are what trigger coopetition, so if there are alliances, business relationships, networks, and interplay, coopetition and coopetitive dynamics are likely to be generated. Thus, our paper shows that previous literature has analyzed coopetition as a relationship in which multiple organizations are interlinked (Bengtsson and Kock 2014). Following Bengtsson and Raza-Ullah's (2016) work, during the evolution of coopetition, numerous papers have studied coopetition as a context on the network level, which is called the "Actor School of Thought." However, in recent years, scholars have proposed the "Activity School of Thought," which focuses on studying dyadic coopetitive relationships rather than the network context. This approach has focused on the coopetitive paradox and tensions that consequently arise, which leads us to the next category: coopetitive dynamics.

Once the coopetitive relationship has been developed, it needs to be managed and reshaped to achieve the expected results (Dorn et al. 2016). Thus, when coopetition takes place, numerous coopetitive dynamics emerge, such as *tension*, *paradox*, *dark side*, *conflicts*, *opportunism*, and *knowledge management decisions*. Following Tidström (2014), when coopetitive relationships develop, actors face numerous tensions arising from conflicts and power imbalances. These tensions appear due to the paradoxical nature of coopetition as it implies the existence of contradictory yet interrelated elements of cooperation and competition (Le Roy and Czakon 2016; Raza-Ullah 2020). Since "tension between simultaneous cooperation and competition may be responsible for the high failure rate of strategic alliances" (Das and Teng 2000, p. 86), the coopetition literature has focused on how to manage these paradoxical tensions (Bengtsson et al. 2020; Kostis et al. 2024). Thus, the role of coopetition capability is increasingly highlighted as a core skill for managing this paradox and achieving a coopetitive balance (Czakon et al. 2020a; Peng et al. 2018; Rai et al. 2023; Raza-Ullah 2020). Additionally, control mechanisms also contribute to coopetition management and performance (Séran et al. 2024). The results of this work and the abovearguments reflect the relevance of properly managing the paradox of coopetition, since, if a balance between cooperation and competition is not achieved, positive outcomes and value creation will not be obtained. Thus, for example, Bouncken and Fredrich (2025) found that very low or very high market overlap can reduce novel value configuration, highlighting the importance of achieving balanced levels in coopetition in order to attain the expected outcomes. Moreover, the results of our work indicate that one of the most studied paradoxes involved in coopetition is knowledge sharing vs knowledge protection. Thus, coopetitors must carry out effective knowledge management, which involves making decisions about when, how, and with whom to share it (Gast et al. 2019; Raza-Ullah et al. 2023).

To manage the tensions arising from the coopetitive paradox, facilitators and barriers can be useful. Our results show that the relevant elements analyzed so far are *trust*, *commitment*, *absorptive capacity*, *embeddedness*, and the *coopetition strategy*. These elements can both enhance and hinder coopetition management, so maintaining a proper balance between them is essential to maximize the benefits (Crick and

Crick 2021a; Hoffmann et al. 2018). Finally, different outcomes could be achieved depending on how the coopetition process is managed, allowing the partners to create, capture, or appropriate value, or obtain strategic resources to innovate and gain a competitive advantage (Bouncken et al. 2015; Klimas and Czakon 2018). Furthermore, based on these outcomes, actors should be able to assess the success of the coopetition management process and adjust their strategies to maximize performance in future coopetitive relationships.

In conclusion, this study has followed the four main stages of a bibliometric analysis (definition of the research objective, data collection, analysis and visualization, and interpretation of findings) (Oztürk et al. 2024) to organize the previously fragmented coopetition research, as well as highlighting the coopetition management process from an integrative point of view. Thus, this research has focused on discovering the most relevant themes, providing a guide for future research.

5.1 Research agenda

This bibliometric and content analysis has revealed that coopetition management is a growing field of study, but many aspects remain unexplored. As Klimas et al. (2024) point out, because the number of studies regarding coopetition and performance is increasing, more work is still required to understand how coopetitive relationships should be managed, as well as what factors contribute towards successful performance in coopetitive scenarios. Furthermore, a better understanding of coopetitive dynamics and their effect on performance is also necessary (Gelei and Dobos 2024). Therefore, this section presents future research lines according to the categories of the previously identified coopetition management process.

5.1.1 Antecedents

Research on the elements that determine the existence and nature of a coopetitive relationship remains an interesting research topic (Gernsheimer et al. 2021). The relationships between coopetitors have been analyzed at the interorganizational level, but other levels of analysis need further research. This approach can help us to understand how competition and collaboration between departments or functional units are determined and how individuals drive organizational outcomes. Despite some authors emphasizing the need to examine coopetition at the intraorganizational and individual levels, our findings reveal that there is still much ground to cover in the literature (Bengtsson et al. 2016a; Bouncken et al. 2015; Carayannis et al. 2014). Therefore, we call for future research to analyze intraorganizational and individual-level coopetition, taking into consideration the antecedents of the coopetitive management process.

Moreover, our findings indicate that the relationships between coopetitors still require a more in-depth analysis (Baruch and Lin 2012). Although some articles have analyzed the role of trust in the coopetitive management process, further research could consider social capital theory (Nahapiet and Ghoshal 1998) as a framework for studying how the structural, relational, and cognitive dimensions foster coopetition.

5.1.2 Coopetitive dynamics

Our study has revealed that although great efforts have been made to understand coopetitive dynamics (Fernandez and Chiambaretto 2016; Raza-Ullah and Kostis 2020), many studies have focused on identifying the dark side of coopetition (Crick and Crick 2021a) without considering the positive side of the paradox. However, future research should consider how different coopetitive dynamics (tensions, paradox, dark side, conflicts, opportunism, and knowledge management decisions) are balanced in order to trigger creative tension without affecting value creation.

In this sense, because coopetition simultaneously involves sharing and protecting knowledge, future research should carry out an in-depth exploration of how actors can protect their strategic knowledge while sharing information for fruitful, long-term coopetitive relationships. Moreover, since coopetition is a psychological and behavioral phenomenon, it would be necessary to explore coopetitive tensions while considering emotional ambivalence (Raza-Ullah 2020; Raza-Ullah et al. 2018). Therefore, a future line of research could examine actors' positive and negative emotions and how they must be managed in the coopetition management process.

5.1.3 Facilitators and barriers

Analyzing the facilitators and barriers determining how coopetitive dynamics are managed will be relevant to future research. Thus, coopetition capability remains an important topic (Bengtsson et al. 2016a, b; Raza-Ullah et al. 2018). In this regard, it would be relevant to analyze how the individual characteristics of actors, such as age, gender, culture, and nationality, can determine their coopetition capability (Bengtsson et al. 2020; Czakon and Czernek 2016; Raza-Ullah 2020). Moreover, we suggest that future works could study how leaders' behaviors can help employees to manage coopetitive tensions in interorganizational and intraorganizational coopetition. In this sense, future studies could follow the approach of Chiambaretto et al. (2019) and identify the role of leaders as knowledge brokers who help to make decisions regarding knowledge sharing or protection. Finally, the study of trust and commitment among actors will remain a relevant research topic in the future due to the crucial role they play in balancing opposite and complementary coopetitive tensions. In this sense, the organizational behavior literature and social capital theory are fields of knowledge that can contribute to a better understanding of the coopetition management process.

5.1.4 Outcomes

In order to conclude whether the coopetition management process has been successful, it will continue to be necessary to identify which results contribute towards achieving a competitive advantage. Thus, it is still necessary to continue analyzing aspects such as open or social innovation (Bouncken et al. 2015) or explore how coopetition contributes towards achieving sustainability in businesses (Gernsheimer et al. 2021).

It is worth noting that research has focused primarily on analyzing organizational outcomes, so future studies should consider evaluating intermediate results that can influence organizational performance (team and individual levels).

5.1.5 Research contexts

For the coopetition literature to continue advancing in the coming years, results should be generalized and evaluated by analyzing different contexts (Crick 2020). Thus, one future research line could be to analyze coopetition at government level (Leite et al. 2018), examining the collaboration between public organizations that are in competition, or even between private and public ones. This approach would allow researchers to study coopetition from a new perspective and investigate whether the involvement of publicinstitutions changes the coopetition management process, given that their objectives tend to differ from those of the private sector (Chai et al. 2020). Additionally, coopetition dynamics may be different in large firms compared to SMEs or entrepreneurial ventures, as well as in family or nonfamily firms—or even in specific contexts such as the technological sector or the wine industry (e.g., Bouncken et al. 2018; Crick and Crick 2021c). Thus, future research could provide valuable insights into how to manage the coopetition process under different scenarios. In the same way, coopetition among nonprofit organizations could also be analyzed with a view to understanding the expected outcomes in such relationships. Another context for future research could be the tourism industry. While some research has focused on studying this environment (e.g., Bahar et al. 2022), it still needs to be explored. In tourism, multiple competing companies collaborate to make a tourist destination more attractive and achieve a higher number of tourists. Studying different contexts would not only help to refine the theoretical understanding of coopetition but also foster its practical application in different contexts, thereby contributing towards creating a robust and generalizable framework. Therefore, this could be a future research avenue that would lead towards a greater understanding of how the coopetition management process works.

5.2 Implications

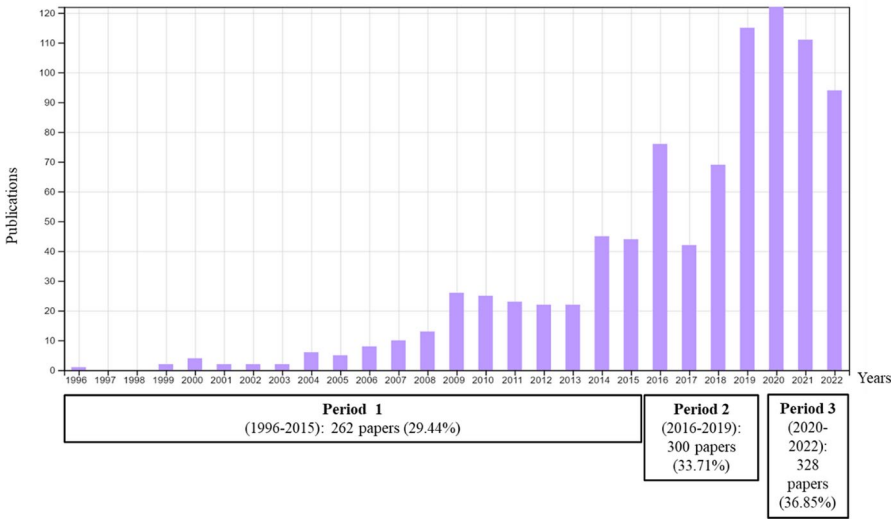
This bibliometric article is based on the quantitative and qualitative analysis of coopetition literature, and thus some implications are presented. Researchers can identify strategic information to help guide their decisions regarding publication and future collaborations by analyzing the most relevant authors, journals, and highly cited articles. Additionally, through a study of the evolution of the research field, readers can comprehend how the concept of coopetition has evolved and how the themes have gained relevance. This can help in identifying emerging trends in literature, as well as the most significant topics, allowing research strategies to be adapted accordingly. Lastly, researchers can use this work to identify the main themes studied concerning the coopetition management process, emphasizing the importance of considering them when analyzing coopetitive relationships and dynamics. Thus, this article can guide researchers who seek to understand the phenomenon of coopetition, paving the way for them to study this field and understand the published research, as well as the elements involved in achieving positive results when cooperating with competitors. In this sense, the proposed research agenda can help researchers identify topics they can study in future work in order to contribute towards improving the literature on coopetition. Moreover, these findings have important implications for managers, who may use them

to develop successful alliances with their competitors. In summary, this study provides valuable insights for business decision-making and future research.

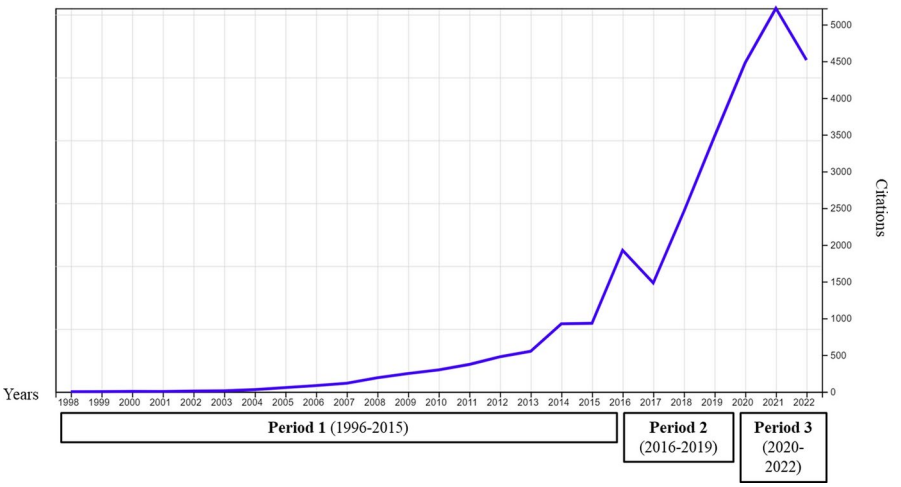
5.3 Limitations

This study has some limitations that must be considered. First, although this article has analyzed a larger sample of articles than other bibliometric analyses, one limitation of this work is the use of a single database, which may not provide a complete picture of the subject matter. Second, although the co-word analysis has contributed towards answering the research questions, conducting a co-citation analysis would have complemented the results, so this is an idea to consider in future research. Third, since this work has focused on the most relevant themes, some studies and emerging themes may not be reflected in this bibliometric analysis. This could hinder gaining a comprehensive view of emerging topics within the coopetition literature. Future studies could expand the scope by including a broader selection of works and recent issues to explore additional themes and diverse perspectives. The fourth limitation concerns the selected keywords and the scope of the database. Although this study enhances the data quality by including title and abstract information alongside keywords, many journal references, especially those from earlier years, lack keywords, and some documents may need to include more precise keywords to fully capture essential aspects of their content. Finally, it is worth noting that the articles published to date have focused on interorganizational coopetition, with limited analysis of intrafirm or interindividual relationships.

Appendix I. WoS publications in the coopetition field of study from 1996 to 2022



Appendix II. Number of citations in the coopetition field of study from 1996 to 2022



Appendix III. Top 10 most prolific journals in coopetition

	Journal	Number of documents	5-Year impact factor[a]
1	Industrial Marketing Management	95	8.89
2	Journal of Business and Industrial Marketing	35	3.32
3	Journal of Business Research	33	10.97
4	International Journal of Technology Management	17	1.53
5	Long Range Planning	16	7.83
6	Technovation	14	11.37
7	European Journal of Operational Research	13	6.36
8	Review of Managerial Science	13	5.44
9	IEEE Transactions on Engineering Management	12	8.70
10	Technology Analysis and Strategic Management	12	3.75

[a]2021 Journal Impact Factor

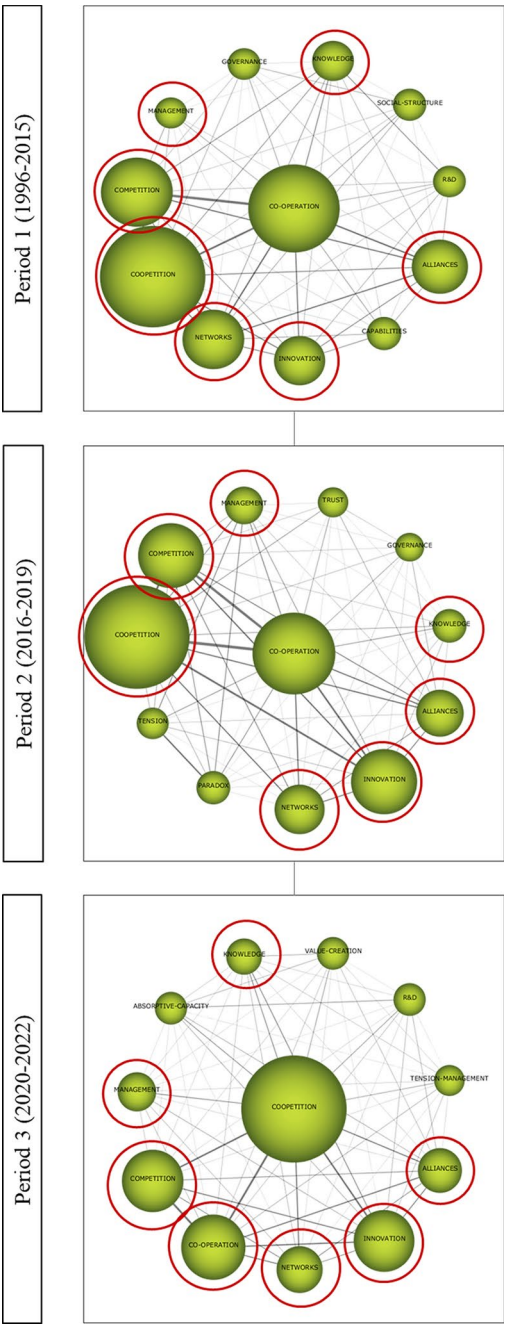
Appendix IV. Top 10 most prolific authors in coopetition

	Name	Publications	Year and publications	Citations	Country
1	Ritala, P	25	2008 (2), 2009 (3), 2010 (1), 2012 (1), 2013 (1), 2014 (6), 2016 (1), 2017 (2), 2018 (3), 2019 (3), 2020 (2)	1884	Finland
2	Crick, J.M	23	2016 (1), 2018 (1), 2019 (4), 2020 (1), 2021 (11), 2022 (5)	427	England
3	Bengtsson, M	19	2010 (2), 2011 (1), 2014 (4), 2015 (1), 2016 (4), 2018 (1), 2019 (3), 2020 (3)	1432	Sweden
4	Le Roy, F	18	2010 (1), 2013(1), 2014 (1), 2015 (1), 2016 (2), 2017 (1), 2018 (4), 2019 (5), 2021 (1), 2022 (1)	555	France
5	Crick, D	16	2016 (1), 2019 (1), 2020 (1), 2021 (9), 2022 (4)	280	Canada
6	Bouncken, R.B	15	2012 (1), 2013 (1), 2016 (3), 2018 (3), 2019 (2), 2020 (3), 2021 (1), 2022 (1)	984	Germany
7	Fernandez, A.S	14	2014 (2), 2015 (1), 2016 (2), 2018 (1), 2019 (5), 2020 (1), 2021 (1), 2022 (1)	556	France
8	Czakon, W	14	2010 (1), 2014 (1), 2016 (3), 2017 (1), 2018 (1), 2019 (2), 2020 (3), 2022 (2)	400	Poland
9	Kraus, S	14	2013 (1), 2015 (1), 2018 (2), 2019 (3), 2020 (5), 2022 (2)	944	England
10	Chiambaretto, P	13	2016 (3), 2018 (2), 2019 (5), 2020 (2), 2021 (1)	312	France

Appendix V. Top 10 most cited publications and authors in coopetition

	Title	Author name	Publication year	Number of citations
1	Social structure of "coopetition" within a multiunit organization: coordination, competition and intraorganizational knowledge sharing	Tsai, W.P	2002	1019
2	"Coopetition" in business networks—to cooperate and compete simultaneously	Bengtsson, M. & Kock, S	2000	935
3	'Mode 3' and 'Quadruple Helix': toward a twenty-first century fractal innovation ecosystem	Carayannis, E.G. & Campbell, D.F.J	2009	645
4	Co-opetition between giants: Collaboration with competitors for technological innovation	Gnyawali, D.R. & Park, B.J	2011	537
5	Firm networks: external relationships as sources for the growth and competitiveness of entrepreneurial firms	Lechner, C. & Dowling, M	2003	456
6	Co-opetition and technological innovation in Small and Medium-Sized Enterprises: a Multilevel Conceptual Model	Gnyawali, D.R. & Park, B.J	2009	424
7	Coopetition-Quo Vadis? Past accomplishments and future challenges	Kock, S. & Bengtsson, M	2014	326
8	Incremental and Radical Innovation in Coopetition—The Role of Absorptive Capacity and Appropriability	Ritala, P. & Hurmelinna-Laukkanen, P	2013	320
9	What's in it for me? Creating and appropriating value in innovation-related coopetition	Ritala, P. & Hurmelinna-Laukkanen, P	2009	306
10	Firm networks and firm development: the role of the relational mix	Lechner, C., Dowling, M. & Welpe, I	2006	297

Appendix VI. Evolution map of coopetition concept: from cooperation to coopetition



Appendix VII. Most important papers for each theme of coopetition management process

Theme	Papers
Antecedents	
Business relationships	Luo, X. M., Slotegraaf, R. J., & Pan, X. (2006). Cross-functional "coopetition": The simultaneous role of cooperation and competition within firm Bouncken, R.B., Gast, J., Kraus, S. & Bogers, M. (2015). Coopetition: a systematic review, synthesis, and future research directions Castañer, X. & Oliveira, N. (2020). Collaboration, Coordination, and Cooperation Among Organizations: Establishing the Distinctive Meanings of These Terms Through a Systematic Literature Review
Networks	Lechner, C., Dowling, M. & Welpe, I. (2006). Firm networks and firm development: The role of the relational mix Afuah, A. (2000). How much do your co-opetitors' capabilities matter in the face of technological change? Sanou, F.H., Le Roy, F. & Gnyawali, D.R. (2015). How Does Centrality in Coopetition Networks Matter? An Empirical Investigation in the Mobile Telephone Industry
Interdependence	Bouncken, R.B. & Fredrich, V. (2012). The race is on: Configurations of absorptive capacity, interdependence and slack resources for interorganizational learning in coopetition alliances Chai, L., Li, J., Clauss, T. & Tangpong, C. (2019). The influences of interdependence, opportunism and technology uncertainty on interfirm coopetition Bengtsson, M., Eriksson, J. & Wincent, J. (2010). Coopetition: new ideas for a new paradigm
Interplay	Hoffmann, W., Lavie, D., Reuer, J.J. & Shipilov, A. (2018). The interplay of competition and cooperation Minà, A., Battista Dagnino, G. & Vagnani, G. (2020). An interpretive framework of the interplay of competition and cooperation Leite, E., Pahlberg, C. & Åberg, S. (2018). The cooperation-competition interplay in the ICT industry
Coopetitive dynamics	
Tensions	Bengtsson, M. & Kock, S. (2014). Coopetition-Quo vadis? Past accomplishments and future challenges Raza-Ullah, T., Bengtsson, M. & Kock, S. (2014). The coopetition paradox and tension in coopetition at multiple levels Fernandez, A.S., Le Roy, F. & Gnyawali, D.R. (2014). Sources and management of tension in co-opetition case evidence from telecommunications satellites manufacturing in Europe
Paradox	Bengtsson, M. & Kock, S. (2014). Coopetition-Quo vadis? Past accomplishments and future challenges Raza-Ullah, T., Bengtsson, M. & Kock, S. (2014). The coopetition paradox and tension in coopetition at multiple levels Chen, M.J. (2008). Reconceptualizing the Competition-Cooperation Relationship A Transparadox Perspective
Dark side	Chowdhury, I.N., Gruber, T. & Zolkiewsky, J. (2016). Every cloud has a silver lining—Exploring the dark side of value co-creation in B2B service networks Crick, J.M., Crick, D. & Chaudhry, S. (2018). The dark-side of coopetition: it's not what you say, but the way that you do it Crick, J.M. (2020). The dark side of coopetition: when collaborating with competitors is harmful for company performance

Table (continued)

Theme	Papers
Conflicts	Tidström, A. (2014). Managing tensions in coopetition Chai, L., Li, J., Tangpong, C. & Clauss, T. (2020). The interplays of coopetition, conflicts, trust, and efficiency process innovation in vertical B2B relationships Rajala, A.N & Tidström, A. (2021). Unmasking conflict in vertical coopetition
Opportunism	Chowdhury, I.N., Gruber, T. & Zolkiewsky, J. (2016). Every cloud has a silver lining—Exploring the dark side of value co-creation in B2B service networks Fernandez, A.S., Le Roy, f. & Chiambaretto, P. (2018). Implementing the right project structure to achieve coopetitive innovation projects Lacam, J.S. (2017). Opportunism Sanctions in Diverse and International Co-Opetition: The Case of French Boating Companies
Knowledge management	Carayannis, E.G. (1999). Fostering synergies between information technology and managerial and organizational cognition: the role of knowledge management Loebbecke, C., Van Fenema, P.C. & Powell, P. (2016). Managing inter-organizational knowledge sharing Ghobadi, S. & D'Ambra, J. (2012). Knowledge sharing in cross-functional teams: a coopetitive model
Facilitators and barriers	
Trust	Czernek, K. & Czakon, W. (2016). Trust-building processes in tourist coopetition: The case of a Polish region Czakon, W. & Czernek, K. (2016). The role of trust-buildingmechanisms in entering into network coopetition: The case of tourism networks in Poland Lascaux, A. (2020). Coopetition and trust: what we know, where to go next
Commitment	Fang, S.R., Chang, Y.S., & Peng, Y.C. (2011). Dark side of relationships: A tensions-based view Pesämaa, O., Pieper, T., Vinhas da Silva, R., Black, W.C. & Hair Jr., J.F. (2013). Trust and reciprocity in building inter-personal and inter-organizational commitment in small business co-operatives Czernek, K. & Czakon, W. (2016). Trust-building processes in tourist coopetition: The case of a Polish region
Absorptive capacity	Ritala, P., & Hurmelinna-Laukkanen, P. (2012). Incremental and Radical Innovation in Coopetition-The Role of Absorptive Capacity and Appropriability Frederich, V., Bouncken, R.B. & Kraus, S. (2019). The race is on: Configurations of absorptive capacity, interdependence and slack resources for interorganizational learning in coopetition alliances Pereira, D. & Leitão, J. (2016). Absorptive capacity, coopetition and generation of product innovation: contrasting Italian and Portuguese manufacturing firms
Embeddedness	Luo, Y.D. (2007). A coopetition perspective of global competition Bengtsson, M., Eriksson, J. & Wincent, J. (2010). Coopetition: new ideas for a new paradigm Haugland, S.A., Ness, H. & Aarstad, J. (2021). Triadic embeddedness, sources of relational rents, and interfirm performance

Table (continued)

Theme	Papers
Coopetition strategy	Bengtsson, M., Kock, S., Lundgren-Henriksson, E.L., & Näsholm, M.H. (2016). Coopetition research in theory and practice: Growing new theoretical, empirical, and methodological domains Lundgren-Henriksson, E.L. & Kock, S. (2016). A sensemaking perspective on coopetition Lundgren-Henriksson, E.L. & Kock, S. (2016). Coopetition in a headwind—The interplay of sensemaking, sensegiving, and middle managerial emotional response in coopetitive strategic change development
Outcomes	
Value creation/capture/ appropriation	Ritala, P. & Hurmelinna-Lukkanen, P. (2009). What's in it for me? Creating and appropriating value in innovation-related coopetition Ritala, P. & Tidström, A. (2014). Untangling the value-creation and value-appropriation elements of coopetition strategy: A longitudinal analysis on the firm and relational levels Yami, S. & Nemeh, A. (2014). Organizing coopetition for innovation: The case of wireless telecommunication sector in Europe
Competitive advantage	Afuah, A. (2000). How much do your co-opetitors' capabilities matter in the face of technological change? Della Corte, V. & Aria, M. (2016). Coopetition and sustainable competitive advantage. The case of tourist destinations Song, J., Lee, K. & Khanna, T. (2016). Dynamic capabilities at Samsung: Optimizing internal co-opetition
Strategic resources	Czakon, W., Klimas, P. & Mariani, M. (2020). Behavioral antecedents of coopetition: A synthesis and measurement scale Johansson, M., Kärreman, M. & Foukaki, A. (2019). Research and development resources, coopetitive performance and cooperation: The case of standardization in 3GPP, 2004–2013 Huang, H.C. & Chu, W. (2015). Antecedents and consequences of co-opetition strategies in small and medium sized accounting agencies
Innovation	Gnyawali, D.R. & Park, B.J.R. (2011). Co-opetition between giants: Collaboration with competitors for technological innovation Ritala, P., & Hurmelinna-Laukkanen, P. (2012). Incremental and Radical Innovation in Coopetition-The Role of Absorptive Capacity and Appropriability Ritala, P. (2011). Coopetition Strategy—When is it Successful? Empirical Evidence on Innovation and Market Performance
Research contexts	
R&D	Wu, J. (2014). Cooperation with competitors and product innovation: Moderating effects of technological capability and alliances with universities Ritala, P. & Sainio, L.M. (2014). Coopetition for radical innovation: technology, market and business-model perspectives Cassiman, B., Di Guardo, M.C. & Valentini, G. (2009). Organising R&D Projects to Profit From Innovation: Insights From Co-opetition
Technology	Quintana-García, C. & Benavides-Velasco, C.A. (2004). Cooperation, competition, and innovative capability: a panel data of European dedicated biotechnology firms Ritala, P. & Sainio, L.M. (2013). Coopetition for radical innovation: technology, market and business-model perspectives Niculescu, M.F., Wu, D.J. & Xu, L. (2018). Strategic Intellectual Property Sharing: Competition on an Open Technology Platform Under Network Effects

Table (continued)

Theme	Papers
Entrepreneurship	Lechner, C. & Dowling, M. (2010). Firm networks: external relationships as sources for the growth and competitiveness of entrepreneurial firms Ansari, S., Garud, R. & Kumaraswamy, A. (2015). The disruptor's dilemma: TiVo and the US television ecosystem Bouncken, R.B., Laudien, S.V., Fredrich, V. & Görmar, L. (2017). Coopetition in coworking-spaces: value creation and appropriation tensions in an entrepreneurial space
SMES	Gnyawali, D.R. & Park, B.J. (2009). Co-opetition and Technological Innovation in Small and Medium-Sized Enterprises: A Multilevel Conceptual Model Bouncken, R.B. & Kraus, S. (2013). Innovation in knowledge-intensive industries: The double-edged sword of coopetition Levy, M., Loebbecke, C. & Powell, P. (2003). SMEs, co-opetition and knowledge sharing: the role of information systems
Supply chain	Wilhelm, M.M. (2011). Managing coopetition through horizontal supply chain relations: Linking dyadic and network levels of analysis Li, Y. & Liu, H. (2011). Co-opetition, distributor's entrepreneurial orientation and manufacturer's knowledge acquisition: Evidence from China Gurnani, H., Erkoc, M. & Luo, Y. (2007). Impact of product pricing and timing of investment decisions on supply chain co-opetition

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