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COOPETITION AND INNOVATION: A REVIEW AND RESEARCH AGENDA

Abstract

The proliferation of research on innovation-related coopetition calls for a more unified understanding of the current state of knowledge in this domain. Previous reviews on coopetition, however, fall short when it comes to putting innovation at the core of their analysis, often relegating the topic to one of the research themes/dimensions of coopetition, or considering innovation to be a promising area for future research. We fill this gap by systematically reviewing two decades of research on coopetition and innovation. We apply Multiple Correspondence Analysis (MCA) methods to a sample of 128 articles from academic journals published in the field of coopetition and innovation, revealing the major research themes, the theories and methods used, the levels of analysis, and the contexts explored. The holistic representation of coopetition and innovation research hinges upon multiple theories, including the resource-based view, the knowledge-based view, the network view, and the behavioral view, while predominantly focusing on strategy; innovativeness; value creation, appropriation and performance; appropriability and protection; and organizational culture. Given the increasing scholarly interest in both coopetition and innovation, this study proposes fruitful research avenues, and discusses their implications for both theory and practice.

Keywords: coopetition, innovation, systematic literature review, multiple correspondence analysis.

HIGHLIGHTS

- Innovation-related coopetition has long been recognized as a source of competitive advantage.
- This review provides a synthesis and systematization of the fragmented literature at the intersection between coopetition and innovation.
- The systematic literature review is made up of 128 articles, revealing the key contributions to the field and outlining emerging themes and promising future research avenues.

COOPETITION AND INNOVATION: A REVIEW AND RESEARCH AGENDA

1. Introduction

Innovation, which is built on the development and integration of new knowledge, is typically considered a key source of competitive advantage (Bouncken et al., 2018b). However, many firms either lack sufficient resources or do not have the internal capabilities required to pursue innovation successfully. Typically, this tension is managed by sourcing the knowledge needed to innovate from outside of the firm, through inter-organizational agreements and partnerships (Feranita et al., 2017). These collaborations often take place between competing firms and involve the standardization of existing solutions or the creation of new ones, with both firms sharing the risks and costs of research and development (e.g., Arranz & Arroyabe, 2008; Tether, 2002). These partnerships are, therefore, characterized by a mix of collaboration and competition, and are influenced by trade-offs between fairness and opportunism, sharing and control, and engagement versus rivalry (Ricciardi et al., 2021). The simultaneous presence of both competitive and cooperative logics has been labeled “coopetition” (Brandenburger & Nalebuff, 1996).

Previous research has revealed several benefits of coopetition in relation to innovation. Coopeting relationships are characterized by a balance between cooperative and competitive forces (Park et al., 2014; Bouncken et al., 2020b), and coopetition strategies have been revealed to be more conducive to innovation than purely cooperative or competitive strategies (Quinta-García & Benavides-Velasco, 2004). Coopetition facilitates the acquisition and exchange of knowledge between partners, enables the joint development of technologies, and offers companies the opportunity to share the risks and costs associated with innovation (Gnyawali & Park, 2011; Ritala, 2012; Yami & Nemeh, 2014; Bouncken et al., 2020a). Evidence against collaborating with competitors has suggested that the competitive nature of cooperative agreements can give rise to

opportunism, generating knowledge leaks that could prevent or limit each partners' potential to innovate (Rouyre & Fernandez, 2019). Coopetition has been found to be more suitable for incremental rather than radical innovation (Nieto & Santamaria, 2007).

Despite these potential drawbacks, an abundance of empirical and anecdotal evidence supports the idea that innovation-related coopetition is beneficial for firms involved in such activities. An exemplary case of collaboration between competitors orientated towards technological innovation is the LCD TV collaboration between Sony and Samsung. Sony contributed its brand recognition in the television domain and its technological know-how, while Samsung contributed with its know-how in LCD technology (Gnyawali & Park, 2011). The edX platform represents another interesting example of innovation-related coopetition, this time in the field of higher education. In 2012, two traditionally competing universities - Harvard and MIT - joined forces to build and launch one of the first virtual learning initiatives through a platform that would grant online access to their courses seamlessly. A more recent example is the collaboration between Apple and Google, which sought to create contact-tracing technology to combat the spread of COVID-19 (Brandenburger & Nalebuff, 2021).

The relevance of coopetition and innovation is reflected in the proliferation of research on this topic, especially in recent years. Between 2000 and 2020, 128 publications on this subject were produced; 70% of which appeared in the last five years (see Section 2). The prominence of innovation in coopetition research has also been highlighted in a recent bibliometric analysis of coopetition research, which revealed that 'innovation' is the most frequently used term in this field after 'coopetition' (or 'co-opetition'), 'competition', and 'cooperation' (Yadav et al., 2022). Despite the advances made in the innovation-related coopetition research field, most previous review studies have adopted a generalist approach to coopetition, offering little guidance for scholars interested in the intersection between coopetition and innovation research. For example, Bouncken

et al. (2015) consider innovation to be a promising topic of future research in the field of coopetition. Similarly, Gernsheimer et al. (2021) assert that innovation is an emerging trend in coopetition literature. Bengtsson and Raza-Ullah (2016) instead discuss the link between coopetition and innovation by limiting their discussion to innovation as one of the outcomes of coopetition, thus offering a limited account of coopetition as an innovation strategy per se (e.g., Gnyawali & Park, 2009).

Given our study's explicit focus on innovation-related coopetition, it fundamentally differs from past literature reviews that examine coopetition research more generally (e.g., Bengtsson & Kock, 2014; Bengtsson & Raza-Ullah, 2016; Gernsheimer et al., 2021). By bridging the two research fields of coopetition and innovation, our literature review makes several new contributions. Firstly, our review provides a unified understanding of 20 years' worth of knowledge in the domain of coopetition and innovation by systematically reviewing how coopetition and innovation relate to and integrate with each other. As a corollary of the previous point, we offer a systematization of this research field through the analysis of underlying theoretical and methodological approaches, major research themes, and contextual elements (i.e., geographical scopes and industries) utilized by the reviewed studies. Secondly, the systematic analysis of innovation-related coopetition research reveals both contemporary research trends (e.g., appropriability regimes, coopetition strategies, typologies of innovation, and value creation and appropriation) and future research avenues pertaining to topics (e.g., governance, sustainability), methodologies (e.g., mixed-method approaches), and contexts (e.g., service industries). Thirdly, by employing content analysis with Multiple Correspondence Analysis (MCA), our study offers a more objective account of the development of coopetition and innovation research and allows us to outline the intellectual structure of the field (Obradović et al., 2021; Vlačić et al., 2021). Lastly, our study offers critical discussions and suggestions for promising future research streams with regards to coopetition and

innovation, serving as a springboard for advancing theory in the respective fields, whilst simultaneously delivering valuable implications for practice.

2. Methodology

2.1. Sampling and data

In order to conduct a systematic literature review, the data collection process needs to be performed in a structured, comprehensive, and transparent way (Kraus et al., 2021; Hiebl, 2021). Structured data collection refers to the clear identification of search terms and phrases. In line with Ritala et al. (2016), our search string consisted of the terms “co(?)opete*” and “innovate*” appearing in the manuscripts titles, abstracts, keywords, or automated indexed keywords.

Comprehensive data collection requires that all relevant research items be covered. As such, in order to ensure comprehensiveness, the data was collected on 17th March 2021 from leading databases, such as the Clarivate Social Sciences Citation Index (SSCI), the Science Citation Index Expanded (SCIE) list of journals, or those indexed in the Elsevier Scopus database. Additionally, to ensure robustness, the data collection was limited to articles and reviews published in peer-reviewed journals written in the English language. Moreover, in order to holistically map the intellectual structure of coopetition and innovation research, no time constraint was imposed with regards to the initial date of publication, until the end of 2020. Finally, in order to ensure the transparency of the data collection process, each step is shown in Figure 1.

[Insert Figure 1 about here]

The final list includes 128 articles published in academic journals between 2000 and 2020. The publication frequency suggests a growing academic interest in the intersection of the coopetition and innovation research fields. The distribution of the publications is as follows: 3.1% between 2000 and 2007, 25% between 2008 and 2015, and 71.9% from 2015 to 2020. The

increasing recognition of this field and the amount of research papers appearing in high-quality journals (all selected manuscripts are published in outlets with an impact factor of above 1), such as *Industrial Marketing Management*, *Long Range Planning*, and *Technovation*, to name but a few (see Table 1 for an overview of the most common journal sources)¹, comes as no surprise given the importance of coopetition in finding innovative solutions across a variety of industries, including aviation, pharma, biotech, and more (Crick & Crick, 2020).

[Insert Table 1 about here]

2.2. The building of the codebook

The content analysis process involved identifying the main codes (i.e., keywords and phrases), categorizing them, and generating a codebook. López-Duarte et al. (2016) stated that this stepwise process consists of “(I) extracting the key content from the articles’ titles, abstracts, and keywords; (II) classifying it in order to build a reduced list of the core descriptors; (III) revising the codebook by merging the similar categories in order to obtain a meaningful list of descriptors in terms of content and frequency” (p. 512).

In order to identify the codes and generate the codebook, we used QDA Miner v.5 and Wordstat v.8 software. Following an in-depth analysis, assisted by text-analytic software and based on previous literature in the field of coopetition (Bouncken et al., 2015; Dorn et al., 2016; Yadav et al., 2022) and innovation (Calabrò et al., 2019; De Massis et al., 2016; Gonzalez-Loureiro et al., 2017), as well as introductory notes on the intersection of coopetition and innovation by Ritala et al. (2016), the authors extracted the key codes and built the final codebook, which consisted of 917

¹ The full list of articles reviewed and generated codebook is available from the authors upon request.

codes classified into 20 descriptors.² The descriptors were then further sorted into broad categories with regards to theory, research themes, methodology, level of analysis, geographical context, and industry.

2.3. Multiple Correspondence Analysis

In order to map the intersection of the coopetition and innovation research fields and answer calls for improved graphical representation in research findings (Greve, 2018), we used MCA. MCA is an explorative and quantitative technique for analyzing qualitative data (Hoffman & De Leeuw, 1992) and is recognized for its suitability in terms of its ability to assess the relationships between dichotomous variables which, in this study, referred to the occurrence of the defined codes – if these were present, a value of “1” was entered, and if these were absent, a value of “0” was given (Gifi, 1990). Essentially, MCA represents a form of correspondence analysis that involves three or more variables related to a common space (Hair et al., 2018). MCA has the ability to “create only a few dimensions capable of reproducing most of the inertia present among the category-variables analyzed in a small number of factors expressing combinations of all the active categories” (Di Franco, 2016, p. 1305).

Building upon the objective of this study – to reveal the intellectual structure of coopetition and innovation – the MCA analysis was performed in SPSS (v.26). The low-dimensional proximity map is presented in Figure 2 and the descriptors (variables) are positioned along the two axes. A

² Although 25 different descriptors were identified in the beginning, the assembling process led to a final set of 20 descriptors. The assembling process was conducted in accordance with the guidelines set out by López-Duarte et al. (2016), in which researchers (a) merge different inter-related descriptors into an integrative one; and (b) exclude the descriptors that have a particularly low numbers of hits. In our case, some of those descriptors were Entrepreneurial View, Southern Hemisphere, and Mixed Methods which, in turn, represent an opportunity for future research outside of the general intellectual field and the presented illustration.

closer positioning of the descriptor indicates higher interdependence, while a closer proximity to the center of the map indicates a larger number of articles investigating the particular descriptor/variable (Bendixen, 1995).

3. Findings

Given the importance of innovation-related coopetition for the achievement of competitive advantage, it is not surprising that the number of researchers focusing on this topic has increased over time. Inspired by tenets of the coopetition research field (Brandenburger & Nalebuff, 1996) and the need to continuously seek more innovative solutions (Gnyawali & Park, 2011), practitioners and scholars have delved ever deeper into the intersection of these two areas. However, this emerging interest from academics and practitioners has resulted in a large variety of different sub-topics, ultimately revealing the need for researchers to synthesize the overall research field (Snyder, 2019).

In order to pave the way forward, the systematic synthesis and analysis of up-to-date findings serves as a reference point, enabling the further development of the research field (Mariani et al., 2021; Jabbour et al., 2013). This systematic review, performed by means of content analysis combined with homogeneity analysis by means of alternating least squares (HOMALS), offers a more robust and considerate way of identifying and associating variables (i.e., content regarding theoretical foundations, major research themes, methodological approaches, levels of analysis, industry, and geographical context) within the matrix of cases. However, as the illustration of the intellectual domain through HOMALS analysis (see Figure 2) provides a synthesis of k variables (20 descriptors) in just two dimensions, the variance estimation tends to be misleadingly deflated (in our case, dimension one accounts for 11.72% and dimension two accounts for 9.17% of the total variance). Therefore, Hair et al. (1998) and Furrer et al. (2008; 2020) noted that an overall keyword

mean per article estimate provides better validity and higher degrees of robustness. Conclusively, to validate the adoption of a multivariate approach, the overall keyword mean per article should be greater than 1. In our case, it is 1.71.

[Insert Figure 2 about here]

In line with the recommendations of Hoffman and De Leeuw (1992) and López-Duarte et al. (2016), in order to elucidate the intellectual domain through the HOMALS analysis, we must first label the poles. López-Duarte et al. (2016) noted that labelling should be guided by “the most-extreme-located descriptors, but also considering that [sic.] the most frequent descriptors. Therefore, the label should combine both issues” (p. 515).

The analysis revealed the dimension related to risk and uncertainty management on the far-left horizontal line. The publications within this part of the intellectual domain addressed issues of trust and appropriability (Henttonen et al., 2016), as well the risks associated with innovation-related coopetitive partnerships (Cassiman et al., 2009). The far-right horizontal line displayed contributions related to behavioral and innovativeness approaches. Given that coopetitive agreements are recognized for their capacity to tackle shrinking product life cycles and the need for heavy investments in research and development (Gnyawali & Park, 2011; Jakobsen & Steinmo, 2014), behavioral approaches examining willingness to embark upon competitive agreements and how to manage coopetitive relationships (Jakobsen, 2020; Dorn et al., 2016; Selitto et al., 2018) are relevant to the intellectual domain.

The upper part of the vertical axis recognizes the relevance of organizational development and resource orchestration in coopetitive agreements orientated towards innovation. The research in this part of the intellectual domain includes the organizational challenges associated with resource scarcity (Fredrich et al., 2019) and the coopetitive dynamics attracting talented employees

(van den Broek et al., 2018). The lower part of the vertical axis highlights the relevance of organizational capabilities when it comes to absorbing knowledge and enhancing learning through coopetitive agreements (Ritala & Hurmelinna-Laukkanen, 2013). In short, strategic approaches and variation in types of coopetitive agreements enable organizations to move towards competitive advantages in subsequent innovative processes. Table 2 provides exemplary references for labelling procedures, while the following sub-sections provide a detailed overview of coopetition and innovation research topics by reviewing their theoretical foundations, major research themes, methodological approaches, levels of analysis, industries, and geographical contexts.

[Insert Table 2 about here]

3.1.Theoretical foundations

One of the aspects at the intersection of the two research fields' intellectual structure is their theoretical foundations. Earlier reviews of coopetition research have revealed a stream of studies that consider coopetition in terms of game theory (Bengtsson & Kock, 2014), viewing it as a set of balanced or win-win relationships. Our analysis reveals the existence of theoretical foundations that are shared by such studies, including the behavioral view (Cyert & March, 1963; Simon, 1972), the network view (Gulati et al., 2000); the resource-based view (RBV; Barney & MacKey 2005, 2016), and the knowledge-based view (KBV; Grant, 2002) (see Table 3).

[Insert Table 3 about here]

Several studies examining coopetition and innovation are built upon the behavioral theories of the firm (Cyert & March, 1963) and the concept of bounded rationality (Simon, 1972). These studies mostly investigate the individual level and the cognitive and behavioral components of coopetitive relationships (e.g., Czakon et al., 2020b). The behavioral view offers three conditions that can affect these relationships. Firstly, causal ambiguity regarding the action-outcome

relationship makes it difficult for people to evaluate courses of action (Levitt & March, 1988). Secondly, individuals are prone to cognitive bias, such as over-confidence, which may cause dysfunctional outcomes due to asymmetry between subjective evaluations and actual abilities (Raza-Ullah & Kostis, 2020). Thirdly, individuals struggle to evaluate outcomes due to the subjectivity of the definitions of key indicators and the time deference of the realized outcomes (Dorn et al., 2016).

In this vein, Chai et al. (2020) investigated the interplay between coopetition, conflicts, trust, and process innovation in business-to-business (B2B) relationships, confirming a positive relationship between vertical coopetition and process innovation in terms of efficiency. Conflict, defined as partners' perceptions of the clash between divergent perspectives, interests, objectives, or behaviors (Caputo et al., 2019), has been found to be contingent on trust in coopetitive relationships. Selitto et al. (2018) explored the relationships subjacent to coopetitive behaviors via qualitative modeling based on in-depth interviews. The authors provide a model that identifies how failure to meet customers' requirements can be a trigger, while learning and public policies are desirable conditions. In this context, sustainability, mitigation of risks and uncertainties, knowledge and resource sharing, and increased sales are all reinforcing feedback factors.

The perspective of the network position of firms involved in coopetitive relations has also formed a theoretical stream of research, commonly known as the network view (Gulati et al., 2000). Strategic networks enable specialization in value chain activities, which is essential in forming a sustainable competitive advantage through a range of formal and informal arrangements. Coopetition via networks also allows firms to be more flexible. In this vein, Hani and Dagnino (2020) found that global network coopetition improves innovation and firm performance, with the structural characteristics of the network (i.e., network size, network position, and network diversity) playing an important role.

The RBV of the firm (Barney & MacKey 2005, 2016) constitutes a major theoretical framework for the study of coopetition. The RBV posits that competitive advantage is created and sustained over time when firms possess resources that are simultaneously valuable, rare, non-substitutable, and inimitable. The underlying assumption of RBV is the conceptualization of firms agglomerations of resources, which are heterogeneously distributed across firms. Eisenhardt and Martin (2000) revealed that capabilities are needed to integrate, reconfigure, gain, and release resources, consisting of identifiable and specific routines that put these resources into use. The RBV is a valid framework that has been used to explain coopetition activities. Fredrich et al. (2019) looked at configurations of strong and weak interfirm learning in coopetition alliances, while Attour et al. (2015) revealed that inter-organizational co-innovation is a successful strategy for mobile payment service innovation.

Scholarly literature on coopetition and innovation also relies on the relationships between knowledge, learning, and performance. The KBV of the firm is highly influenced by the RBV and is a relatively new perspective within the field of strategic management, which has spawned a growing amount of research aimed at understanding how knowledge is developed and protected in a system of formal and informal relationships, wherein partners both compete and cooperate to improve innovation (Grant, 2002). The KBV served as a prominent theoretical framework with which to account for the knowledge and learning factors shaping coopetition and innovation (Bouncken & Kraus, 2013; Bacon et al., 2020). The knowledge element of coopetition and innovation is particularly important in the context of small and medium-sized enterprises (SMEs), where resources are limited, and firm sizes and network positions may hinder the cooperative benefits arising from innovation. Bouncken and Kraus (2013) found that coopetition triggers radical innovation and, at the same time, can be detrimental to novel innovation, particularly when SMEs share knowledge with their partners. In these cases, inlearning (i.e., sharing knowledge and learning

from partners) and technological uncertainty can play important roles in reversing negative effects. More recently, Bacon et al. (2020) advanced the concept of effective knowledge management to support open innovation in coopetitive ecosystems by identifying the conditions necessary for knowledge transfer success. The authors found that organizations need to tailor knowledge exchange practices to the competitive nature of each relationship.

3.2. Themes

In this section, we provide an overview of the main research themes derived from the categorization of the descriptors through HOMALS analysis. Table 4 provides a summary of the main themes and subthemes in the coopetition and innovation research field.

[Insert Table 4 about here]

Strategy

The topic of strategy within coopetition and innovation literature can be divided into three main clusters of research: 1) coopetition as a strategy; 2) incumbent-challenger coopetitive dynamics; and 3) types of coopetition. Coopetition strategy and its link to innovation is well-established in scholarly literature. Coopetition has been considered to be a firm-level strategy that reveals how firms manage their portfolio of alliances (Ritala, 2012) and their interactions with regards to other industry incumbents and new entrants (Ansari et al., 2016). Coopetition strategy has been said to have “a certain number of competitors in the total portfolio of alliance partners” (Ritala, 2012, p. 308). The adoption of a coopetition strategy is useful when collaborating with competitors, as it can become a means for radical or incremental innovation through the creation of entirely new products or the improvement of existing ones (e.g., Tether, 2002). Through coopetition, new technological trajectories can be drawn within an industry, such as those arising from the aforementioned collaboration between Samsung and Sony (Gnyawali & Park, 2011).

Therefore, coopetition can be considered an innovation strategy, as one of the driving forces behind embracing coopetition is innovation (e.g., Gnyawali & Park, 2009). While the majority of studies on coopetition strategy have focused either on relational or organizational levels (the so-called meso-level), recent research has called for a multi-level perspective on coopetition (Bengtsson & Kock, 2014). Viewing coopetition from a strategy-as-practice perspective, Tidström and Rajala (2016) showed that coopetition strategy evolves over time as a result of praxis and practice (coopetitive activities) occurring within and between firms, and that such evolution is influenced by micro-, meso-, and macro-levels of praxis and practice. While coopetition strategy has often been studied in terms of its implementation within large firms, the study of coopetition as a small business strategy is equally important (Morris et al., 2007). For these firms, pursuing technological innovation is often more challenging given the limited resources and capabilities they possess compared to their larger counterparts. Therefore, coopetition – collaboration between competing SMEs – can help SMEs to pursue technological innovations more effectively (Gnyawali & Park, 2009).

While coopetitive dynamics often take place between industry incumbents, disruptive new entrants also become interesting targets for cooperation from time-to-time. For example, in the case of telephony; wherein the rise of the Internet and a new technology called *Voice over Internet Protocol* (VoIP) put incumbent telecom providers in a position where they had to cooperate with challengers such as Skype to obtain the technological know-how they lacked (Ansari & Krop, 2012). A similar pattern was found in a longitudinal study of the global advertising ecosystem, which explored how incumbent firms pivoted competitive and cooperative strategies in response to technology-disruptive entrants, going through three strategies of adaptation over time that the authors labelled “selective cooperation”, “allied competition”, and “selective coopetition” (Cozzolino et al., 2021). Coopetitive dynamics between incumbents and challengers have also been

found in a study of TiVo's entrepreneurial journey in the US television industry ecosystem (Ansari et al., 2016). According to these authors' findings, new entrants introducing innovations that disrupt existing ecosystems need the support of the incumbents they disrupt to survive and prosper, giving rise to what the authors term the "disruptor's dilemma". Using qualitative data from 35 cooperative relationships between start-ups and large firms, Hora et al. (2018) found that the firms share mutual benefits. Start-ups benefit from cooperative agreements with corporate firms as they grow their sales figures and obtain recognition, while large corporations benefit from cooperating with start-ups by obtaining access to the smaller firm's innovative technologies and capabilities. Velu (2016) found that dominant incumbent firms use cooperation to implement radical changes in their business models as an offensive strategy, while less dominant firms – assuming a challenger position – use cooperation to innovate their business model in an evolutionary manner as a defensive strategy.

Cooperation has also been studied as a strategy by researchers looking at the different typologies of cooperative agreements in relation to innovation. A study of 222 SMEs pursuing innovation in cooperation partnerships revealed the usefulness of formalizing cooperation (Bouncken et al., 2020c): formal cooperation strategies provide goals, aspiration levels, and behavioral guidance for the individuals and organizations included in the cooperative coalition. While the majority of cooperation studies typically explore horizontal agreements (e.g., Estrada et al., 2016; Park et al., 2014), an emerging area of research is the examination of vertical cooperation (e.g., Mariani, 2007) and its implications for innovation (Chai et al., 2020). Another typology of cooperation is the distinction between direct and indirect cooperation (Klimas & Czakon, 2018), wherein the latter is understood to be cooperation with firms offering different products or services but satisfying the same customers' needs (Kraus et al., 2018). Besides the direction (vertical versus horizontal) and the nature (direct or indirect) of cooperation, researchers have also investigated the level of intensity of cooperation required for innovation. Using data from the semiconductor

industry, Park et al. (2014) put forward the concept of balanced coopetition, suggesting that a balance between cooperation and competition is important in realizing the innovation benefits of coopetition. Finally, besides coopetition between firms, recent studies have examined coopetition at an intraorganizational level. This form of internal coopetition has been explored by assessing how individuals and functional areas within a firm cooperate but also compete for the internal resources (Chiambaretto et al., 2019), or by exploring how internal cross-functional coopetition is associated with ambidextrous innovation (Strese et al., 2016). Internal coopetition can also enhance a firm's dynamic capabilities, as in the case of Samsung, which has successfully caught up with Apple in the global smartphone industry. Through practices such as dual sourcing and parallel development, Samsung was able to seize new business opportunities more promptly, amplifying its sensing capacity and enabling it to adapt more rapidly to environmental changes (Song et al., 2016).

Innovativeness

Innovativeness in cooperative relationships is mostly explored through the examination of different types of innovation. One area of research in this domain has explored how coopetition relates to products, services, and processes of innovation. Bouncken et al. (2016) explored the impact of governance mechanisms on product innovativeness in coopetition alliances in the context of the European medical device industry. They found that transactional governance in interparty exchanges, which is based on explicit and formal contracts, decreases product innovativeness when coopetition is high. Instead, relational governance, which is based on trust and commitment in interparty exchanges, has a positive effect on product innovativeness in cooperative alliances. Chai et al. (2020) found that coopetition in vertical B2B relationships positively impacts innovative processes that seek to improve operational efficiency (i.e., efficiency process innovations). This relationship, however, is influenced by inter-firm characteristics, conflict, and trust. The results indicate a negative indirect effect via affective conflict, despite inter-firm trust, and a negative

indirect effect via cognitive conflict in the presence of high inter-firm trust. Using a cross-industry sample of more than 16,000 firms, Markovic et al. (2020) explored whether or not firms could improve service innovation through coopetition and if this relationship would be affected by product innovation. Their findings reveal that service innovation is 1.38 times more likely to take place when firms cooperate with competitors than when they do not, and that product innovation does not affect this relationship.

Another distinction related to innovation types often explored in academic literature is the distinction between incremental and radical or breakthrough innovation. Ritala and Hurmelinna-Laukannen (2013) discuss the role of knowledge acquisition (absorptive capacity) and knowledge protection against imitation (appropriability regime) in innovation-related coopetition. Their findings indicate that, in cases of incremental innovation, both knowledge acquisition and protection are relevant while, in cases of radical innovation, the emphasis should be on knowledge protection. Bouncken and Kraus (2013) showed that horizontal coopetition could trigger radical innovation but could also harm extremely novel revolutionary innovation, particularly when partners share knowledge with each other. Focusing on a more in-depth analysis of radical innovation, Ritala and Sainio (2014) distinguish between three different types of innovation; namely technological, market, and business-model radicalness, testing how technology-related coopetition (i.e., R&D, new product development, and technology improvement) relates to them. While no effect was found on market radicalness, R&D coopetition was found to negatively affect technological radicalness, while coopetition in new product development had a positive effect on business-model radicalness.

Value creation, appropriation, and performance

Scholarly work on coopetition and innovation has focused on the effect of these principles on performance outcomes (e.g., Gnyawali & Park, 2009; Ritala, 2012; Bouncken & Kraus, 2013).

Despite mixed results and contingency-based arguments developed to address the issue, there is a general consensus that firms can benefit from innovation-related coopetition (Ritala et al., 2016). Among the desirable outcomes of innovation-related coopetition is the value created during the course of innovation activities (value creation) and the value sharing a firm can capture from innovation itself (value appropriation). Focusing on SMEs, Bouncken et al. (2020c) used a fuzzy-set qualitative comparative analysis (fsQCA), coupled with necessary condition analysis, to derive different value capture configurations affecting the value firms can extract from coopetition arrangements. Ritala and Hurmelinna-Laukannen (2009) outlined the effects of coopetition on innovation as collective and individual action on value creation and appropriation. They developed a framework and a set of propositions identifying the conditions (contingencies) in which innovation-related coopetition allowed firms to create and appropriate value. While generally considered two independent outcomes, value creation and value capture have been brought together in what Bouncken et al. (2020a) term the “value creation capture equilibrium” (VCCE). These authors found that coopetition intensity (i.e., the simultaneous presence of both coopetition and competition) can drive firms involved in new product development alliances towards situations in which they encounter less imbalance between value creation and capture. A similar conclusion was reached by Bouncken et al. (2020b), who advocated a “balancing act between inputs to value creation and the relative share of value captured” (p. 7). While less explored, the tension between value creation and value capture is also relevant to intraorganizational coopetition. For instance, using the case of STMicroelectronics as an example of internal coopetition, Cassiman et al. (2009) found that a balance between competitive and cooperative forces in R&D projects can be achieved through the alignment of project knowledge attributes, the governance structure of the project, and project partner selection.

The rich body of literature exploring coopetition and innovation performance has examined both coopetition's direct effect on innovation performance, and the mediating and moderating factors affecting this relationship. Su and Bao (2020) studied the separate roles that cooperative and competitive behaviors have on the performance of R&D collaboration, using data from a survey administered to 249 Chinese firms. Their findings indicate that cooperative and competitive behaviors have a positive and a negative impact on the performance of R&D collaboration, respectively. One implication of these findings is that, once in place, R&D alliances should preferably be guided by cooperating rather than a competing logic. Focusing on the intensity of cooperation and competition, Park et al. (2014) proposed that there were four types of coopetition, based on the intensity of cooperation and competition. They found that a balanced-strong coopetition (high competition and high cooperation) is most beneficial alliance for innovation performance. Using survey data from a panel of Chinese firms, Yuan et al. (2020) found that coopetition can produce a negative indirect effect on innovative performance by weakening firms' market orientation (i.e., a firm's cross-functional processes and activities, which serve to provide superior value for customers relative to competitors). Estrada et al. (2016) found that coopetition has a positive effect on product innovation performance only when both knowledge protection and knowledge sharing mechanisms are in place. While firm- or network-level contingencies have been seen to affect the coopetition-innovation performance relationship, Ritala (2012) also advocated the need to focus on environmental contingencies as well. Using cross-industry data from Finnish firms, coopetition was found to be beneficial for innovation in instances of high degrees of market uncertainty, high network externalities, and low competition intensity.

Human Resources and Organization Culture

A key tenet of coopetition studies is that firms collaborate and compete for valuable and scarce resources. While this literature has often predominantly focused on pooling complementary

resources, such as product components or software (Song et al., 2016; Klimas & Czakon, 2018), the management of human resources is an equally important aspect for firms competing and cooperating for the same human resources. For example, it has been found that, even within the same company, teams allocated to different cooperating projects might not share information or knowledge internally, as this would require the allocation of specific human resources to facilitate the task (Chiambaretto et al., 2019). In a study of four Dutch hospitals, van den Broek et al. (2018) investigated how coopetition between hospitals located in the same region affects the adoption of innovative practices in Human Resource Management (HRM). These authors' findings reveal cooperative tension between hospitals, driven by a lack of talented human resource teams and the desire to achieve similar goals. Differences were found to exist in terms of coopetition perceptions, depending on the roles that managers have within the company, with line managers stressing competitive aspects while HR managers were more focused on cooperation. The analyzed hospital cultures (i.e., internal and short-term focus, risk averse) were found to play a role in how coopetition for the talent management pool was perceived, revealing an interesting interplay between organizational culture and HRM.

Organizational culture can be an important source of stability and competitive advantage in interorganizational cooperation (Lavie et al., 2012; Schilke & Cook, 2015). At an individual firm level, organizational culture serves to express how things are done, revealing what factors are prioritized by the firm's employees (Barney & Hansen, 1994). This affects the ways in which relationships with outside actors are managed (Adler et al., 1999). The role of organizational culture has also been explored in high-velocity, high-tech contexts, in order to develop our understanding of how it relates to coopetition. A study of the Polish aviation industry distinguished between three different dimensions of culture in coopetition. With respect to organizational models – and contrary to expectations pointing towards adhocracy and clan cultures – it was found that hierarchy culture

is typical of coopetitors. The study's findings also confirm the proximity hypothesis for culture, showing that there are cultural similarities between cooperating competitors located within the same region. Moreover, culture was found to be a positive yet indirect factor when it came to the creation of alliances with competitors (Klimas, 2016).

Appropriability and Protection

Collaboration with competitors often requires one or both parties involved in a partnership to absorb as much knowledge as possible in the shortest time frame before dissolving the alliance. Such behavior partly explains why alliance termination rates are generally high: a phenomenon that previous scholarship has addressed by viewing alliances as 'learning races' (Khanna et al., 1994). Opportunistic behavior in coopetitive alliances is highly likely to emerge, particularly in alliances involving technology, because access to know-how is a key element in a firm's ability to innovate. Therefore, to retain their own core proprietary assets, protection from a partner's opportunistic behavior becomes a priority for firms involved in such alliances (Kale et al., 2000). To determine who might benefit from innovation in alliances between competitors, it is important to look at the appropriability regimes (Teece, 1986), such as legal protection mechanisms (e.g., patents and copyrights), and whether knowledge is tacit or codified. If the underlying intellectual property (IP) is protected by patents, the exchange of knowledge between partners might work well, as it takes place within the confines of a strong appropriability regime (Gans & Stern, 2003).

Cozzolino and Rothaermel (2018) suggest that coopetitive dynamics between incumbents and new entrants are affected by both the appropriability regime of an industry and the type of technological discontinuity (core-knowledge versus complementary-asset). For instance, the authors put forward the idea that, when the appropriability regime is strong (weak), and incumbents face a core-knowledge discontinuity, incumbents tend to cooperate with (dominate) new entrants. Pitelis et al. (2018) explored the influence of IP regimes in the context of coopetitive agreements

between firms from emerging countries and multinational enterprises in advanced countries' pharmaceutical industries. Instead of competing or engaging in types of cooperative behavior that aim to take advantage of extant market shares, Pitelis et al. argue that coopetition to create new market spaces can be beneficial for both firms from emerging countries and multinational enterprises from advanced countries. Their cooperative, game-theoretic model also suggests that robust IP law interpretation and enforcement can also influence the extent to which coopetition becomes the preferred option by both parties. Using survey-based methods and multi-industry data from Finnish firms, Henttonen et al. (2016) found that appropriability mechanisms (i.e., contracts and lead time) in R&D alliances with competitors can help to resolve inherent collaborative and competitive tension. Alongside its ability to implement mechanisms for protecting knowledge against imitation, a firm's ability to learn from its partners is also relevant to its successful collaborative innovation. Ritala and Hurmelinna-Laukkanen (2013) addressed the paradox of the simultaneous need for learning and protection by exploring the joint effects of the absorptive capacity and appropriability regime. Their study found that the appropriability regime positively moderates the relationship between absorptive capacity and radical innovations. Going beyond bilateral collaborations, Holgersson et al. (2018) adopted an ecosystem view to explore the concept of appropriability in relation to cooperative and competitive actor relationships. Using the evolution of the mobile telecommunication systems between 1980 and 2015 as an illustration of coopetition in a large innovation ecosystem, the authors highlighted IP strategies that could be used to shape weak or strong appropriability regimes in order to enable companies to benefit from open and closed innovation.

The importance of knowledge protection mechanisms was further highlighted in a study of more than 300 Flemish firms (Estrada et al., 2016). The study found that formal knowledge protection mechanisms (i.e., patents, industrial designs, trademarks, and copyrights) influenced the

benefits that firms could obtain from competition, as they limited or prevented unintended knowledge spillovers and defined knowledge-sharing boundaries between competing partners. Alongside formal mechanisms of knowledge protection, firms often adopt informal mechanisms or a combination of the two. In the study of Galileo, a project seeking to develop a European satellite positioning system, both mechanisms were explored. The study found that the creation of a common project team between coopetitors, through which knowledge was protected through informal mechanisms, such as trust, meant that individual capabilities did not meet expectations. Instead, the adoption of a new project structure – a centralized project team – and the set-up of formal knowledge protection mechanisms encouraged coopetitors to formally share their knowledge (Rouyre & Fernandez, 2019).

3.3. Methodology and levels of analysis

As a complex phenomenon, the relationship between coopetition and innovation has been empirically assessed from multiple angles. Although conceptual models exist and continue to guide empirical analyses (Gnyawali & Park, 2009; Carayannis et al., 2018), our review of the field reveals that a lot of attention has been paid to empirical validation.

The first layer of our investigation is made up of qualitative studies that explore the foundations of the phenomenon, uncovering the effective mechanisms underpinning the relationship. The case study methodology is frequently used for qualitative inquiries. In some instances, data for case studies on coopetition dynamics is obtained through semi-structured interviews, such as in a particular study of Dutch hospitals, wherein interview data was gathered through questions posed to talent management pools (van den Broek et al., 2018). In other cases, longitudinal case studies have also been used. Here, archival materials and market data, in addition to qualitative interviews, make up the overall database of analysis. This approach has been used to

explain business model innovations in the US investment bank sector (Velu, 2016). Furthermore, coding and thematic analyses seeking relevant elements of coopetition have proved to be valid methods when explaining how innovation is stimulated in craft beer breweries (Kraus et al., 2019). These methods are pursued by managers and business owners (Galkina & Lundgren-Henriksson, 2017).

Of course, having sketched interpretative models based on qualitative research, quantitative validation is still required in order to assess the intensity of relationships and establish their actual measurements. When assessing models, regression and structural equation models (SEM), including mediating and moderating effects, have been the most popular tools used (e.g., Bouncken et al., 2018b). However, other less traditional quantitative designs have also been employed, such as the scenario-based experiment conducted by Czakon et al. (2020a), which assessed how factors pertinent to coopetition dynamics may affect radical innovation. Configurational approaches – specifically those involving fsQCA – serve as additional examples. This technique tends to be more explicative than linear models, especially when coupled with preliminary qualitative interviews, which better structure the set of conditions related to coopetition (Bacon et al., 2020).

From an analytical point of view, one debate focuses on finding a proper way to gauge the interrelated and contrasting dynamics of the phenomenon. For example, Rai (2016) developed and validated a three-dimensional scale made up of common benefits, private benefits related to cooperative behaviors, and private benefits related to competitive behaviors. Instead, Ghobadi and D'Ambra (2012) developed a five-dimensional construct to depict cross-functional teams' dynamics. Cooperative behaviors result in task orientation, communication, and interpersonal relationships, while competitive ones occur over tangible and intangible resources. Both studies acknowledge the coopetition concept and, consequentially, its measurement and its impact on

innovation performance, as bound to the context and level of analysis in which it occurs. Accordingly, these scales may need to be adjusted in order to accommodate several contingencies.

For this reason, it is also necessary to stress the level of analysis of the relationship between coopetition and innovation. The results of coopetition may impact upon innovation at several levels: the individual level (micro level), the firm level (meso level) involved in the process, and the systems of firms or overall ecosystems (macro level) in which coopetition and innovation take place (Pattinson et al., 2018). Our review analysis reveals a balanced distribution across these levels, even though the overall literature on coopetition seems to favor a firm-centric focus (Tidström & Rajala, 2016). The micro level is mostly related to individuals adopting coopetitive strategies. The individuals in question are typically those in leading positions, e.g., entrepreneurs or managers, or those in self-managed teams with specific responsibilities. These individuals' characteristics and motivations can stimulate coopetitive behaviors and, in turn, innovation; for instance, with regard to R&D alliance team members (Wang et al., 2019). However, in only in a few cases, the unit of analysis considers the entire team as a collective (e.g., Ghobadi & D'Ambra, 2012).

The meso level instead concerns the factors, mechanisms, and consequences of coopetition related to the overall organization. For example, Gnyawali and Park (2009) are interested in the coopetition phenomenon in SMEs. Their model combines industry-, firm-, and dyadic-specific elements that stimulate the engagement of SMEs in coopetitive strategies, with different impacts occurring in relation to innovative outcomes (e.g., new product development). Similar approaches have also been used to evaluate the impact of coopetition, cooperative, and competitive behaviors adopted by firms on innovative performance in the context of alliances (Park et al., 2014; Rai, 2016).

The macro level of analysis began to garner attention later than other perspectives (Pattinson et al., 2018). Despite this, our results show that innovation systems and clusters are pervasively

affected by cooperative and competitive behaviors alike. Phenomena of coopetition are registered in terms of the appropriability and compatibility of intellectual property rights, and this molds market dynamics and innovation across the whole telecommunication sector (Holgersson et al., 2018). Coopetition also occurs across innovative clusters around the globe. Overall, coopetitive dynamics encourage the growth of emerging clusters, thanks to spillovers of established clusters arising as a result of reverse fertilization (Harmancioglu & Tellis, 2018). However, coopetition and innovation are also analyzed behind the borders of industries and systems encompassing private and public sector agents – specifically firms, academia, and regional government – in what is called the triple helix approach (Hernández-Trasobares & Murillo-Luna, 2020). This approach has been further integrated considering the additional role played by the civil society, citizens, and final users, i.e., the quadruple helix approach (MacGregor et al., 2010), and the environmental embeddedness (e.g., the cultural and entrepreneurial imprinting) in which these interactions take place, sometimes known as quintuple helix approach (Carayannis et al., 2018).

From this brief examination, coopetition is clearly shown to affect innovation at several levels. For this reason, some studies analyze this relationship across multiple levels. For example, Pattinson et al. (2018) relate the coopetitive behavior of individuals (micro), especially in terms of sense-making, to the innovative performance of the organization (meso level). Instead, a complete set of contingencies comprising individual-, firm-, and overall industry-related factors, are used to understand craft beer breweries coopetition behaviors (Kraus et al., 2019) and the exploration and execution of coopetition toward innovation (Tidström & Rajala, 2016).

3.4. Context & Industry

Even though companies increasingly employ coopetitive strategies to develop their degrees of innovation, this approach is predominantly adopted among manufacturers. One of the more plausible reasons for the paucity of studies on innovation-related coopetition in service providers

arises from the challenges associated with coopetitor selection (de Faria et al., 2010) and the risks posed by horizontal alliances (e.g., knowledge leaks, opportunistic behavior, and tension, among others) (Cassiman et al., 2009). The scarcity of research in the service sector is ongoing, as contemporary findings yield inconclusive results. For example, some scholars have recently acknowledged that coopetition is beneficial for service innovations (Markovic et al., 2020), while others have suggested that there is a negative association between coopetition and service innovation (Chen et al., 2020).

Two decades of studies on coopetition and innovation have generated literature predominantly focused on coopetitive strategies between manufacturers in the northern hemisphere. For example, Beckeman et al. (2013) investigated coopetitive arrangements between food manufacturers in Sweden; Lee et al. (2019) studied the pharmaceutical industry in the US; Klimas (2016) focused on Polish companies in the aviation industry; and Quintana-Garcia and Benavides-Velasco (2004) explored coopetition and innovation in the biotech industry in Europe. This predominance of research conducted by manufacturers located in the northern hemisphere can be partially explained by access to data (e.g., European Community Innovation Survey, CIS; see research by Pereira and Leitão, 2016, on Portuguese and Italian manufacturers), the pace of technological change, and the relative progress of the northern hemisphere.

4. Future research avenues

In order to obtain further information on current and potential future research streams, Figure 3 shows the recurrent frequency of each topic and its particular distance from the center of the research field. Accordingly, those descriptors positioned closer to the origin of the horizontal axis in Figure 3, and further on the vertical axis, indicate a larger number of articles investigating the descriptor/variable (Bendixen, 1995). In line with the guidelines presented by Dabić et al. (2020b), the top left quadrant concerns topics representing the cornerstone of the research fields'

intersection. As such, this quadrant represents tenets upon which further studies in the field could be developed (high frequency, low distance). However, future studies interested in the further investigation of those descriptors/variables should be reconsidered, given that they are considered well-researched. The bottom left quadrant concerns emerging topics and reveals possible gaps in scholarly literature. The bottom right quadrant reveals relevant gaps in the field. The most promising of the resulting avenues for future research are outlined below.

[Insert Figure 3 about here]

In recent years, innovation studies have greatly advanced beyond the more traditional focus on topics such as new product development or innovation performance. Promising developments in innovation research that could inform future research on innovation and coopetition are – among others – green and sustainable innovation, the development of new technologies (such as artificial intelligence and machine learning), innovation ecosystems, and open innovation.

Recent works have investigated the role of coopetition in sustainable competitiveness in R&D collaborations (Ko et al., 2020), coopetition-related dilemmas in sustainable development (Planko et al., 2019), or the role of coopetition in facilitating green innovation (Albord-Morant et al., 2018). Sustainability is increasingly encroaching on every part of our lives, and it is clear that this is also affecting innovation. The question of how cooperative arrangements might influence any form of sustainability-related innovation is therefore deserving of further investigation.

It is now well-established that technologies such as artificial intelligence (AI) and machine learning (ML)-based AI systems play a pivotal role in a firm's ability to remain innovative and competitive (Haefner et al., 2021). These forms of radical innovation have long been recognized as common outcomes of coopetition in knowledge-intensive industries (Ritala & Hurmelinna-Laukkanen, 2009). However, there is dearth of research on the nexus between AI and cooperative

innovation. While it has been suggested that AI is profoundly reshaping competition beyond the boundaries of traditional industries (Iansiti & Lakhani, 2020), AI-driven innovations often arise from collaborative efforts between rivals, such as in the case of the recently launched partnership examining AI in healthcare, which includes the Duke Institute for Health Innovation, the Mayo Clinic, and UC Berkeley. Future research should investigate the role of AI as a source and driver of innovation-related coopetition more thoroughly.

Coopetition is often explored through the examination of the simultaneous presence of competition and cooperation between firms. Moving beyond dyadic observations, a systems approach has more recently attracted scholarly attention, through the analysis of ecosystem-wide implications of coopetitive dynamics between incumbents and new entrants (Ansari et al., 2016; Cozzolino et al., 2021), or the study of the conditions enabling successful knowledge transfer between coopetitive and non-competitive partners in innovation ecosystems (Bacon et al., 2020). As both collaboration and competition are inherent characteristics of innovation ecosystems, it is still unclear how firms balance coopetitive tension over time in innovation ecosystems. Recent attempts to address this intriguing question have been mostly qualitative in their approach (e.g., Hannah & Eisenhardt, 2018). This presents an opportunity for researchers to advance knowledge on innovation ecosystems through quantitative studies on the interplay of competition and cooperation within ecosystems.

Another fruitful avenue for future research would be the exploration of how the adoption of open innovation practices enables or hinders the benefits of coopetition. This question is particularly fascinating and deserves further attention, particularly in unbalanced coopetitive partnerships between large corporations and SMEs or start-ups, such as in the recent partnership between Pfizer and BioNTech for the joint development of a COVID-19 vaccine. Moreover, while previous studies have clearly suggested that a link exists between collaboration and open innovation, the adoption

of open innovation involving full collaboration with competitors – what Le Roy and Chesbrough (2018) recently termed as “open coopetition” – is yet to be explored further.

So far, very few studies adopt a governance view with regards to coopetition and innovation. The governance view is concerned with research questions pertaining to how and which governance mechanisms might influence innovation and coopetition, and how competing and divergent interests are managed by governance mechanisms. More research is needed to enable us to better understand whether singular or plural governance forms (see Bouncken et al., 2016) improve innovation-related coopetition and, if so, under which circumstances (Bicen et al., 2021). Some predominantly regional studies have already investigated this topic in Spain and France (e.g., Granata et al., 2018; Ribeiro-Soriano et al., 2016), revealing the obvious dominance of studies in the “Western” world (as mentioned in the previous chapter). Very few studies (such as e.g., Sellitto et al., 2018) have investigated this topic in the southern hemisphere. This presents another interesting opportunity for future researchers, as comparative studies could be conducted to compare results across different countries.

The entrepreneurial view also seems to be a promising area of research. Acknowledging coopetition as an entrepreneurial process, using theories from the entrepreneurship field, is helpful when it comes to examining the coopetition process from a micro-perspective of individual agency (Galkina & Lundgren-Henriksson, 2017). The paradox of coopetition – which is a mechanism for decreasing risk and uncertainty and also a source of these issues as well – and the tendency of cooperative relations to generate novel opportunities are both considered key features of entrepreneurial behavior. As such, coopetition could be viewed as an entrepreneurial process focusing on how the theories of effectuation and causation (Sarasvathy, 2001) explain managerial decision-making in the development of coopetition (Galkina & Lundgren-Henriksson, 2017). As the relationship between innovation and entrepreneurship is evident, and innovation seems to play

a major role in the context of coopetition, it is surprising that so few papers have employed an entrepreneurial view of the topic. More studies could be conducted to investigate coopetition in an “entrepreneurial space”, using contexts in which coopetitive dynamics take place, such as co-working spaces (Bouncken et al., 2018a) or start-up/corporate incubators and accelerators.

From a methodological standpoint, our review analysis reveals an almost equal split between conceptual and empirical papers, using either qualitative or quantitative methods. Previous qualitative research mainly centers around case studies (e.g., van den Broek et al., 2018), while quantitative approaches often revolve around survey-based studies (e.g., Bouncken et al., 2016). Recent review articles call for “extending the amount of qualitative-empirical studies” (Ritala et al., 2016, p. 6) – a call that is consistent with our frequency map (Figure 3). Less research, however, has examined coopetition and innovation by employing mixed-methods or combining surveys with qualitative interviews (Bouncken & Kraus, 2013). We echo Ritala et al.’s (2016) call for additional research in this direction, using less employed methods such as fsQCA, stochastic actor-oriented models, experiments, etc.

During the COVID-19 pandemic, innovation was considered a way out of the crisis for many companies, as recent research on different industries and company types shows (e.g., Breier et al., 2021 in the hospitality industry, or Kraus et al., 2020 for SMEs in general). In this respect, and building upon the existent dearth of research on the topic in the service industries (Velu, 2016, and Hurmelinna-Laukkanen & Ritala, 2010, being two notable exceptions), up-to-date research has thus far not formed an overarching conclusion to explain what drives coopetition and innovation in various industries, what happens during coopetition and innovation across multiple geographical contexts, and what the outcomes of such strategies are. Hence, these issues highlight the need for further specification regarding coopetitive innovation with respect to different industries across the globe.

Another interesting area for future research could pertain to the size and type of organizations. Most research on coopetition and innovation has thus far focused on large enterprises. However, the predominant form of companies worldwide is in fact SMEs, the majority of which are family-run and/or owned. For SMEs in general, but especially for this intersecting group – family SMEs (Filser et al., 2018) – innovation is crucial for long-term survival, renewal, and success. In this respect, in their recent conceptual work, Roig-Tierno et al. (2019) call for more works investigating the relationships between coopetition and innovation in SMEs empirically. We would like to extend or rather concretize this call. We suggest that future researchers not only concentrate on SMEs, but rather specifically focus on combinations of SMEs, new ventures, and large firms engaging in coopetition-oriented forms of innovation between each other or in networks. Similar efforts should be made towards differentiating between family and non-family firms and/or taking into account the ownership type and age of the companies under scrutiny.

5. Conclusion

This study has focused on reviewing and synthesizing the fragmented intersection between the fields of coopetition and innovation. Building upon a systematic review of 128 manuscripts published in academic journals, we outline theoretical underpinnings, major research themes, employed methodologies, levels of analysis, geographical contexts, and predominantly explored industries. The methodological approach performed, by means of content analysis and MCA, facilitated the robust assessment of extant studies and formed a representation of the research domain and its emerging topics, while identifying promising streams for further research. This holistic overview provides new lenses of study for scholars interested in the intersection of coopetition and innovation. Our article identifies a number of promising topics which will not only be incredibly relevant to the advancement of theory in the fields of coopetition or innovation, but will also be applicable to adjacent areas of study, such as strategy, entrepreneurship, and SME or

family firm research, in which innovation is a major driver of survival, renewal, and success. This directly translates back into the practice of the respective firms, as well as into policy-making (e.g., Mariani, 2018).

Given that our study fundamentally differs from past literature reviews that examine coopetition research more generally, it offers practitioners numerous recommendations for adopting and governing innovation-related cooperative collaboration. This review reveals that coopetition is recognized in finding innovative solutions across a variety of industries. This has been seen through collaborations between competing telecommunications operators and competing vendors, the collaboration between KONE and Toshiba to develop high-tech elevators, and the alliance between OHB, Thales Alenia Space, and Airbus Defence and Space (ADS) to build a satellite positioning system (Ritala & Hurmelinna-Laukannen, 2009; Rouyre & Fernandez, 2019). Thus, in light of the reviewed manuscripts, we highlight the perks of opening up innovation processes and gaining access to complementary knowledge but, at the same time, recognize potential risks and uncertainty involved in partners' opportunistic behaviors (e.g., Rouyre & Fernandez, 2019). Relating the findings to the tenets of the RBV, the KBV, the network view, and the behavioral view, while predominantly focusing on strategy; innovativeness; value creation, appropriation, and performance; appropriability and protection; and organizational culture, innovation-related coopetition is beneficial for the firms involved in these activities as long as the partner is a strategic fit and has the capacity to share and source knowledge. Hence, practitioners may recognize additional value in the synthesis provided when it comes to effectively managing innovation-related coopetition.

In spite of its contributions, the review has certain limitations. Essentially, the adopted methodological approach, despite its robustness, is subject to author bias through the process of the codebook's creation (Furrer et al., 2020). Moreover, the holistic approach, although valuable and

far-reaching, does not allow for the in-depth analysis of the identified research gaps. Despite these limitations, we hope that this novel and clear roadmap will influence and instigate further research on the topic of coopetition and innovation.

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FIGURES AND TABLES

Figure 1: Methodology protocol

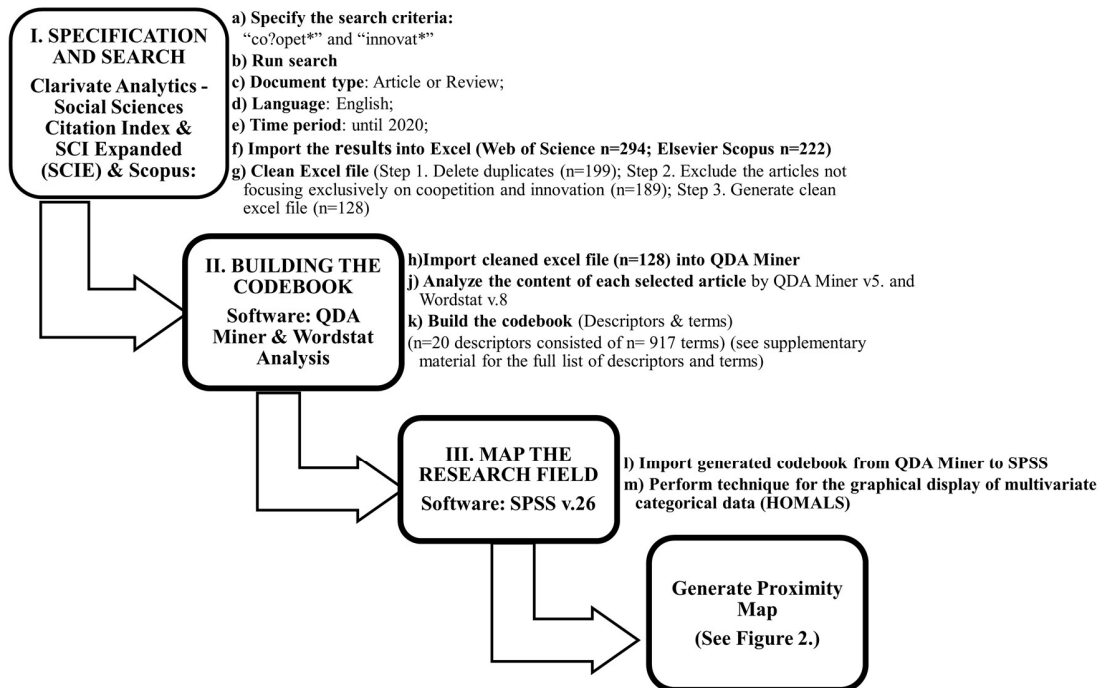


Table 1: Overview of most frequent journal sources by the number of articles.

No.	Publications	Frequency of articles
1	Industrial Marketing Management	19
2	International Journal of Technology Management	10
3	Journal of Business & Industrial Marketing	9
4	Long Range Planning	7
5	Technovation	5
6	Journal of Business Research	5
7	Review of Managerial Science	5
8	Journal of Strategy and Management	4
9	R&D Management	4
10	British Journal of Management	3
100% of articles with IF greater than 1.0 (JCR 2020)		

Figure 2: Map of the competition and innovation research field.

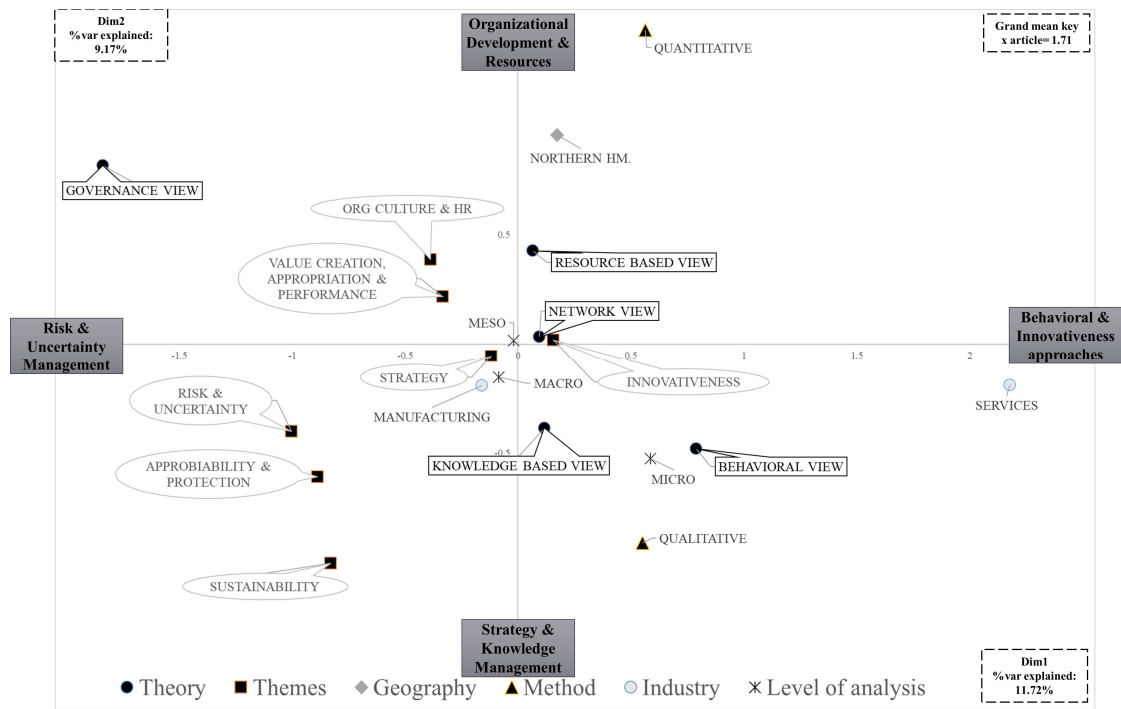


Table 2: Descriptors that represent the poles of the axes.

Axis	Descriptor	Origin of the axes descriptor	Exemplary references
X Left	Risk & Uncertainty Management	Risk & Uncertainty; Appropriability & Protection	Cassiman et al., 2009; Henttonen et al., 2016
X Right	Behavioral & Innovativeness approaches	Behavioral view; Innovativeness	Czakon et al., 2020a; Jakobsen & Steinmo., 2014; Pattinson et al., 2018
Y Upper	Organizational Development & Resources	Organizational Culture & Human Resources; Resource-Based View	Fredrich et al., 2019; van den Broek et al., 2018; Attour et al., 2015
Y Lower	Strategy & Knowledge Management	Strategy; Knowledge-Based View	Bouncken & Kraus, 2013; Bacon et al., 2020; Chiambaretto et al., 2019

Table 3: Main theoretical foundations in coopetition and innovation.

Theoretical foundations	Foundational concepts	Main level of investigation	Main focus	Main investigated areas	Examples of contributions
Behavioral View (Cyert & March, 1963; Simon, 1972)	Behavioral theory of the firm; Bounded Rationality	Individual	Cognitive and behavioral components of coopetitive relationships and innovation	Conflicts; Trust; Efficiency of Innovation Processes; Knowledge and resource sharing; Sustainability	Chai et al. (2020); Selitto et al. (2018)
Network view (Gulati et al., 2000)	Network strategy	Organizational	Institutional and structural components of coopetitive relationships and innovation	Strategic networks; Value chain; Sustainable Competitive Advantage	Hani and Dagnino (2020); Zhang and Cheng Guan (2019)
Resource-based view (Barney & MacKey, 2005, 2016)	Resources, Capabilities, Competitive Advantage	Organizational	Resources and capabilities in coopetitive relationships and innovation	Resources; Capabilities; Interfirm learning; Co-innovation	Fredrich et al. (2019); Attour et al. (2015)
Knowledge-based view (Grant, 2002)	Knowledge; Organizational learning	Organizational	Knowledge and learning components shaping coopetition and innovation	Knowledge sharing; SMEs; Inlearning; Knowledge management	Bouncken and Kraus (2013); Bacon et al. (2020)

Table 4: Main themes and subthemes in coopetition and innovation.

Main theme	Sub-themes	Exemplary references
Strategy	Incumbent-challenger coopetitive dynamics	Ansari & Garud, 2016; Cozzolino & Rothaermel, 2018; Hora et al., 2018
	Coopetition strategy	Gnyawali, 2009; Le Roy & Czakon, 2016; Morris et al., 2007; Ritala, 2012; Ritala et al., 2016; Tidstrom & Rajala, 2016
	Types of coopetition	Bouncken et al., 2020c; Chiambaretto et al., 2019; Klimas & Czakon, 2018; Strese et al., 2016
Innovativeness	Product, service, and process innovation	Bouncken et al., 2016; Chai et al., 2020; Markovic et al., 2020
	Incremental and radical innovation	Bouncken & Kraus, 2013; Ritala & Laukkanen, 2013; Ritala & Sainio, 2014
Value creation, appropriation, and performance	Value creation and appropriation/capture	Bouncken et al., 2020a, Bouncken et al., 2020b; Ritala & Laukkanen, 2009; Su & Bao, 2020
	Performance	Estrada et al., 2016; Ritala, 2012; Park et al., 2014; Yuan et al., 2020
Human resources and organizational culture	HRM and talent management	Song et al., 2016; van den Broek et al., 2018
	Organizational culture	Klimas, 2016
Appropriability and protection	Appropriability regimes	Henttonen et al., 2016; Holgersson et al., 2018; Pitelis et al., 2018
	Knowledge protection mechanisms	Ritala & Hurmelinna-Laukkanen, 2013; Rouyre & Fernandez, 2019

Figure 3: Topic distance to the center of coopetition and innovation research field.

