ELEMENTS OF COOPETITION STRATEGY: AN OVERVIEW OF MODELS BY DESCENDING HIERARCHICAL CLASSIFICATION

ELEMENTOS DA ESTRATÉGIA DE COOPETIÇÃO: UMA VISÃO GERAL DOS MODELOS A PARTIR DA CLASSIFICAÇÃO HIERÁRQUICA DESCENDENTE

ELEMENTOS DE LA ESTRATÉGIA DE COOPETICIÓN: UNA VISIÓN GENERAL DE LOS MODELOS POR CLASIFICACIÓN JERÁRQUICA DESCENDENTE

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AN OVERVIEW OF MODELS BY DESCENDING HIERARCHICAL CLASSIFICATION Rodrigo Oliveira-Ribeiro; Adriana Fumi Chim-Miki

Abstract

The research examines 129 coopetition models through a qualitative-quantitative study performed using the IRAMUTEQ software to provide the dimensions and variables with more representativeness in the coopetition strategy literature. We used three techniques: Lexical analysis, Descending Hierarchical Classification, and Similarity Analysis. The results showed one macro dimension and two subdimensions divided into six classes. The elements hierarchy was the Creation of coopetitive value, Coopetitive orientation, Strategic adjustment, Coopetitive alliances as determinants, Perceived benefits, and Organizational profile. Similarity analysis results validated both the hybrid nature of coopetition and applications of the construct in market environments and related to cooperative knowledge sharing.

Keywords

coopetition; coopetition variables; descending hierarchical classification; similarity analysis; Iramuteq.

Resumo

A pesquisa examina 129 modelos de coopetição mediante um estudo qualitativo-quantitativo realizado com o software IRAMUTEQ para proporcionar as dimensões e variáveis de maior representatividade na literatura sobre estratégias de coopetição. O estudo aplica três técnicas: análise léxica, classificação hierárquica descendente e análise de similitude. Os resultados mostraram uma macro dimensão e duas subdimensõesdividadas em seis classes. A hieraquia de elementos foi: Criação de valor coopetitivo Orientação coopetitiva, Ajuste estratégico, Alianças de coopetição como determinantes, Beneficios percebidos e Perfil organizacional. Os resultados da Análise de similitude validaram tanto a natureza híbrida da coopetição como as aplicações do constructo em entornos de mercado e relacionadas com o intercambio cooperativo de conhecimentos.

Palavras-chavees

coopetição; variáveis de coopetição; análise hierárquica descendente; análise de similitude; Iramuteg.

Resumen

La investigación examina 129 modelos de coopetición mediante un estudio cualitativo-cuantitativo realizado con el software IRAMUTEQ para proporcionar las dimensiones y variables de mayor representatividad en la literatura sobre estrategias de coopetición. El estudio aplica tres técnicas: análisis léxico, clasificación jerárquica descendente y análisis de similitud. Los resultados mostraron una macro dimensión y dos subdimensiones divididas en seis clases. La jerarquía de elementos fue Creación de valor coopetitivo Orientación coopetitiva, Ajuste estratégico, Alianzas de coopetición como determinantes, Beneficios percibidos y Perfil organizacional. Los resultados del análisis de similitud validaron tanto la naturaleza híbrida de la coopetición como las aplicaciones del constructo en entornos de mercado y relacionadas con el intercambio cooperativo de conocimientos.

Palavras-claves

coopetición; variables de coopetición; analisis jerarquico descendente; analisis de similitud; Iramuteg.

1 INTRODUCTION

Strategic management studies increasingly use the term coopetition, which indicates a research agenda in the academic field (ALBERT-CROMARIAS; DOS SANTOS, 2020; LASCAUX, 2019). Since the seminal work published by Nalebuff and Brandenburger (1996), coopetition has been consolidating through organizational actions as a hybrid alliance type (WALLEY, 2007) that recognizes win-win strategic scenarios (DANA et al., 2013; NALEBUFF; BRANDENBURGER, 1996). Dyadic relations between competition and cooperation have become common among organizations where partners adopt simultaneous postures (GNYAWALI et al., 2006; BOUNCKEN et al., 2015; KIM, 2017). Together they took advantage of synergies, shared goals, and strategic adjustments (BENGTSSON; KOCK, 2000; BENGTSSON; RAZA-ULLAH, 2016; CZAKON et al., 2020).

Coopetition is conceptualized in several ways and applied from different perspectives or levels of analysis. According to scholars, its operationalization comes from convergents and mutual interests favourable to cooperation between partners (DELLA CORTE; ARIA, 2016) and maintains the divergent interests that generate a level of competition among partners (RAZA-ULLAH et al., 2014). These characteristics are present in relationships at the intraorganizational level (BENDIG et al., 2018; HAN; LIANG, 2020; LUO et al., 2006), interorganizational (CHAI et al., 2019; RAZA-ULLAH, 2018; YU, 2019) and the network level (BENGTSSON et al., 2010; PARK et al., 2014).

Due to the dynamic and paradoxical profile of coopetition, scholars in the field characterize it as a multidimensional, multifaceted, and complex concept (BENGTSSON; KOCK, 2000; 2014; GNYAWALI; PARK, 2011; RAZA-ULLAH, 2018). At the same time, its base isin the intrinsic tension and the search for a balance to minimize the adverse effects of cooperation or competition (SANTOLAYA-SANZ et al., 2017; CHIM-MIKI; BATISTA-CANINO, 2017a).

Coopetition research considers the construct as dual, sometimes a process, and other times a result. This twofold view generated the analysis of coopetition with different approaches. For instance, as a result of coopetition, there are studies related to innovation (FREDRICH et al., 2019; KLIMAS; CZAKON, 2018), creation and appropriation of value (HU et al., 2020), tourism networks (CZAKON et al., 2020; CZAKON; CZERNEK-MARSZAŁEK, 2020; DELLA CORTE; ARIA, 2016), education sector (NAIR et al., 2011; DAL-SOTO; MONTICELLI,

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2017), health care (PENG; BOURNE, 2009), sustainability (MANZHYNSKI; FIGGE, 2019) and Non-Governmental Organizations - NGOs (FATHALIKHANI et al., 2018, 2020), among others.

In turn, there are many qualitative studies considering coopetition as a process. They explore characteristics of coopetition through Case studies that analyze real contexts of coopetition strategy. For instance, reviews about tensions between the creation and appropriation of value and coworking spaces (BOUNCKEN et al., 2018), the use of cooperative and competitive actions in the craft beer market (MATHIAS et al., 2018), management of coopetitive agreements in the Enterprise Resource Planning sector (PELLEGRIN-BOUCHER et al., 2018), evaluation of the role of coopetition for the supply chain in the interorganizational context (ZACHARIA et al., 2019), among others. On the other hand, the quantitative studies of coopetition as a process, most of the times they investigate the correlations between different variables of the coopetitive relationship, such as the works of Czernek andCzakon (2016) or Dana et al. (2013) focused on identifying the variables and contexts that influence coopetition behaviour.

The main challenge of research in coopetition is to enshrine it as a new paradigm and a subfield of strategy, whether by process or result (RAZA-ULLAH, 2018; YAMI et al., 2010). It is a priority to delimit its dimensions, elements, and variables to both organizational and societal levels. However, the variety of applications of the construct generated an assortment of models and consequent associations of variables to measure coopetition in different scenarios. Our research intends to show that researchers use different theoretical approaches or empirical contexts; nevertheless, they share dimensions of the construct, which have hierarchical elements to evaluate contexts of coopetition.

In order to contribute to the scientific field, our research aimed to identify the elements expressed in the coopetition models that represent greater representativeness in the area's literature. Our research fills a theoretical gap in compiling theliterature regarding the authors' consensus on the dimensions of coopetition. The methodological design has two steps. Firstly, we identified all models of coopetition published during 1996-2019 in the Scopus and Web of Science databases. We performed a Content Analysis to extract the variables or elements used by the authors. In the second phase, we played a quantitative methodology for qualitative data based on the techniques of the Analysis Lexicon, Descending Hierarchical Classification – DHC, and Similarity Tree. The IRAMUTEQ software and its interface with Software R gave the support to perform these techniques. This set of analyses classified the research as a scientometric with a descriptive and exploratory approach (SERENKO et al., 2010).

2 COOPETITION MODELS: DETERMINANTS AND LEVELS

Since its introduction in the management literature, coopetition has been closely linked to the strategy and understanding of a firm's environment. The Coopetition mindset focuses on the ability to manage strategies through the simultaneous action between cooperation and competition that results in mutual benefits between the partners involved (KUMAR et al., 2017), a process named coopetitive dynamics (CHOU; ZOLKIEWSKI, 2018).

Several studies point to coopetition as a new PARADIGM (BENGTSSON et al., 2010; DELLA CORTE, 2018; LE ROY; CZAKON, 2016) that can replace or complement the traditional competitiveness paradigms (CHIM-MIKI; BATISTA-CANINO, 2018). On the one hand, scholars have a shared view on the definition of coopetition (CZAKON; MUCHA-KUŚ, 2014). On the other hand, scholars point out a lack of integrative models involving several contexts of analysis (BENGTSSON; RAZA-ULLAH, 2016). Despite its concept sharing some similarities, the scientific literature highlights different dynamics according to the levels of application (PATTINSON et al., 2018; RAJALA; TIDSTRÖM, 2017).

Recent research has shown that various approaches are credited to coopetitive behaviour characterized as multilevel (GNYAWALI; PARK, 2009; RAJALA; TIDSTRÖM, 2017). Previous studies show the applicability of this concept in management has had a considerable impact on the levels of individual, intra-organizational, inter-organizational, and network-level analysis (PATTINSON et al., 2018; RAJALA; TIDSTRÖM, 2017).

Research at the individual level seeks to understand the coopetitive mindset of the agents and their ability for cooperation, competition, or coopetition (GERAUDEL; SALVETAT, 2014; PAAVO RITALA; HURMELINNA-LAUKKANEN, 2013). At the intraorganizational level, studies focus mainly on the investigation of the need and effects of coopetition in business units, functional units and teams (ALBERT-CROMARIAS; DOS SANTOS, 2020; BENDIG et al., 2018; HAN; LIANG, 2020), and studies on corporate support and delegation of power (Luo, 2005).

Regarding the interorganizational level, the contributions are diverse. For example, Daidj and Jung (2011), Chim-Miki and Batista-Canino (2017b), Kumar (2011), and Raza-Ullah (2018) studied the experiences of companies that, despite sharing the same level in the value chain or the same sector, cooperate. Other scholars studied the factors of complementarity, such as resources or knowledge sharing, and constructing interorganizational projects (LUO, 2005; D'ARMAGNAC et al., 2019). Concerning network-level approaches, most research addresses the behaviour of competitive practices within cooperative networks (GNYAWALI et al., 2006A; TIDSTRÖM; RAJALA, 2016) and the performance of coopetition networks (CHIMMIKI; BATISTA-CANINO, 2017; RIPOLLÉS; BLESA, 2018; GAST et al., 2019).

Other important characteristics are highlighted by coopetition researchers, such as its dynamic character (BOUNCKEN et al., 2015; YAMI et al., 2010) and multifaceted (SANTOLAYA-SANZ et al., 2017). Also, coopetition is a complex phenomenon with distinct properties but interconnectedness (LUNDGREN-HENRIKSSON; KOCK, 2016; Pellegrin-BOUCHER et al., 2018). The simultaneous cooperative and competitive nature ratifies its paradoxical profile (DEVECE et al., 2019; FERNANDEZ et al., 2014; SANOU et al., 2016). It involves contradictory actions but is interrelated to generate mutual benefits and common interests for all partners (BENGTSSON; KOCK, 2000; FATHALIKHANI et al., 2020; KIM, 2017).

The literature review provided a synthesis of the 129 models published in the literature and showed a new context of analysis on the coopetition field - coopetition on the societal level that is multilevel because it is applied simultaneously at different organizational levels. In Table 1, the models are the majority at the interorganizational level (47%); 29% of the coopetition models are at the network level; 12% analyzed the construct at the intraorganizational level; 6% study coopetition at the individual level; and 7% of research on coopetition is at the level of society (Table 1). These percentages reveal more literature towards coopetition for the business and organizational contexts, both inter and intraorganizational; however, it is less studied at the individual and societal levels.

Regarding the contexts, the studies are varied but highlight research aimed at small and microcompanies and multinational firms centred on environments of technological companies and tourism. However, studies aimed at non-profit organizations are sparse. Indeed, coopetition increases both as a field of knowledge and behaviour. That indicates an imminent need to develop and strengthen a Coopetition Theory (CZAKON; MUCHA-KUŚ, 2014). Thus, this research intends to contribute to the in-progress paradigm by extracting a consensus about coopetition model variables defined in the literature.

ELEMENTS OF COOPETITION STRATEGY:

AN OVERVIEW OF MODELS BY DESCENDING HIERARCHICAL CLASSIFICATION Rodrigo Oliveira-Ribeiro; Adriana Fumi Chim-Miki

Table 1 - Categorization of coopetition models by levels and context of analysis

INDIVIDUAL LEVEL

Context: Biotechnology Company; Teaching; Coworking spaces; Construction Industry; Technology Industry; Small and Medium Enterprises and multisectoral studies; Hospital Care

Authors:(BOUNCKEN et al., 2018); (ERIKSSON, 2008); (CRICK, 2019); (LIN and SHI, 2020);(LUO et al., 2006);(LIU et al., 2015);(HUANG and CHU, 2015); (WANG et al., 2017); (WESTRA et al., 2017).

INTRA ORGANIZATIONAL LEVEL

Context: Knowledge Sharing; Manufacturing Company; IJV (Joint Venture International) companies; Multisectoral studies; Beer Industry; Technology Industry; Forestry Industry Port Industry; Luxury market; Streaming Services (Netflix); Outsourcing; Space Industry.

Authors: (BARUCH and LIN, 2012); (BENDIG et al., 2018); (DAIDJ and EGERT, 2018); (DEPEYRE et al., 2018); (ESTRADA et al., 2016); (GHOBADI and D'AMBRA, 2012); (KAVIRATHNA et al., 2019); (KNEIN et al., 2019); (LE ROY and FERNANDEZ, 2015); (LIN et al., 2010); (NAIDOO and SUTHERLAND, 2016); (RIPOLLÉS and BLESA, 2018); (RUSKO, 2011); (STRESE et al., 2016A); (SHU et al., 2017); (TSAI, 2002); (XU et al., 2017).

INTER-ORGANIZATIONAL LEVEL

Context:B2B; Airlines; Several; Education; ICT companies; Aerial Industry; Fishing Industry; Technology Industry; Craft Beer Industry; Medical device industry; Digital Games Industry; Semiconductor Industry; Tourism Industry; Space Industry; Pharmaceutical industry; Manufacturing Industry; Naval Industry; Oil industry; Port Industry; Multisectoral Industries; Retail Market; Multinationals; Non-profit organizations; Small and Medium Enterprises; Real Estate Sector; Startups; Theoretical; Outsourcing; Air Transport; Maritime Transport; Wineries. Authors: (BACON et al., 2019); (BENGTSSON and KOCK, 2000); (BENGTSSON and RAZA-ULLAH, 2016); (BENGTSSON and JOHANSSON, 2014); (BOUNCKEN et al., 2016); (BOUNCKEN et al., 2019); (BRANDENBURGER and NALEBUFF, 1996); (CEPTUREANU et al., 2018); (CHAI et al., 2019); (CHANG and CHIU, 2016); (CHEN et al., 2019); (CHIN et al., 2008); (CUSIN and LOUBARESSE, 2018); (D'ARMAGNAC et al., 2019); (FELZENSZTEIN et al., 2018); (FERNANDEZ et al., 2014); (FOERSTER-METZ et al., 2019); (FREDRICH et. al., 2019); (GAST et al., 2019); (GONZÁLEZ et al., 2015); (GNYAWALI and PARK, 2009;2011);(GRANATA et al., 2019);(HAMEED and NAVEED, 2019); (HUNG and CHANG, 2012); (JAKOBSEN and STEINMO, 2016); (KLIMAS and CZAKON, 2018); (KRAUS et al., 2018); (LACOSTE, 2012); (LECHNER et al., 2016); (LIN et al., 2017); (LUO et al., 2007); (mathias et al., 2018); (NIU et al., 2019);(PARK et al., 2014); (PATTINSON et al., 2018);(PELLEGRIN-BOUCHER et al., 2018); (PEKOVIC et al., 2019); (PITELIS et al., 2018); (PORTO-GOMEZ et al., 2018); (RAJALA and TIDSTRÖM, 2017); (RAZA-ULLAH et al., 2014); (RITALA and HURMELINNA-LAUKKANEN, 2009; 2013); (ROBERT et al., 2018); (SANTOLAYA-SANZ et al., 2017); (SAHLAN et al., 2019); (SONG et al., 2015); (STRESE et al., 2016B); (SCHIAVONE and SIMONI, 2016); (WANG and KRAKOVER, 2008); (WILLIAMS et al., 2017); (WITEK-HAJDUK and NAPIÓRKOWSKA, 2017); (WEMMER et al., 2016); (YAN et al., 2019); (YU, 2019); (ZACHARIA et al., 2019);

NETWORK LEVEL

Context: Commerce; Air Industry; Auto Industry; Technology Industry; Intensive Knowledge Industry; Medical device industry; Yacht industry; Manufacturing Industry; Mobile Telephone Industry; Tourism Industry; Gastronomic Industry; Naval Industry; Multisectoral Industries; Multinationals; Sports Organizations; Small and Medium Enterprises; Railway Transport; Maritime Transport; Road transport.

Authors:(ALEXANDERSSON et al., 2018); (ASADABADI and MILLER-HOOKS, 2018); (BAIERL et al., 2016); (BENGTSSON et al., 2016); (BOUNCKEN and FREDRICH, 2016); (BOUNCKEN et al., 2018); (CHEVALLIER et al., 2016); (CHIM-MIKI and BATISTA-CANINO, 2018); (CHOU and ZOLKIEWSKI, 2018); (CHUNG and CHENG, 2019); (CRICK and CRICK, 2019); (CZAKON and CZERNEK, 2016); (CZAKON et al., 2020); (DELLA CORTE and SCIARELLI, 2012); (DELLA CORTE and ARIA, 2016); (ESTEVE-PEREZ and GARCIA-SANCHEZ, 2018); (FONG et al., 2018); (HERMES et al., 2013); (KIM et al., 2013); (KLEIN et al., 2020); (LACAM, 2018); (LINDSTRÖM and POLSA, 2016); (LIU et al., 2019); (LUO, 2004; 2005); (NAVÍO-MARCO et al., 2019); (NGUYEN-DUC et al., 2019); (PAPAKONSTANTINOU et al., 2019); (PEREIRA and LEITÃO, 2016); (RESENDE et al., 2018); (RIBEIRO-SORIANO et al., 2016); (SANOU et al., 2016); (STENTOFT et al., 2018); (SUHARTANTO, 2017); (VANYUSHYN et al., 2018); (WILHELM, 2011).

LEVEL OF SOCIETAL

Context: Carbon Credits; Logistics; Multisectors; Non-governmental organizations; Real Estate Sector; Sustainability.

AUTHORS:(FATHALIKHANI et al., 2018);(FATHALIKHANI et al., 2019); (HATTORI and YOSHIKAWA, 2016); (LIMOUBPRATUM et al., 2015); (LUO et al., 2016); (MANZHYNSKI and FIGGE, 2019); (ZHANG et al., 2017).

Source: Elaborated by the authors

3 METHODOLOGICAL PROCEDURES

This theoretical research review used scientometric methodology because it is a literature review method often used to delimit frontiers of knowledge, enabling advances in filling its gaps (SERENKO et al., 2010). The determining elements of the models of coopetition with more significance were identified and analyzed through a mixed methodology to perform quantitative analyzes based on qualitative data (CAMARGO; JUSTO, 2013).

The methodological design followed four stages. Firstly, we searched scientific papers published during 1996-2019 in the two most extensive databases of revised scientific literature, Web of Science - WOS, and Scopus. The result was 267 and 129 papers after eliminating overlap cases. The second step was a Content analysis to exclude papers without coopetition models. The exclusions reduced the sample to 128 scientific papers that contained models of coopetition. Due to being the start of the field, the model of Brandenburger and Nalebuff (1996) was added to this contingent, totalling 129 scientific papers as sample research (Figure 1).

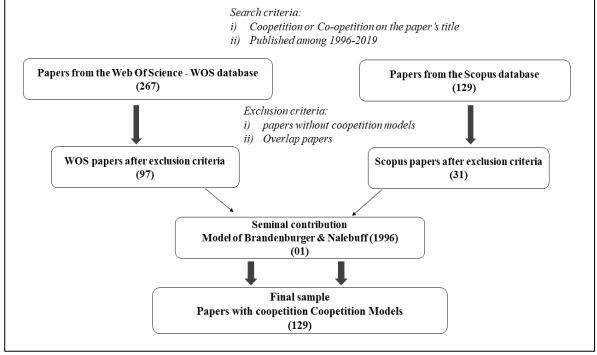


Figure 1 - Literature review Process

Source: Elaborated by the authors

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In the third methodological stage, we performed a descriptive analysis to demonstrate the academic knowledge growth of coopetition over the past two decades. The fourth stage is divided into substeps due to the use of different techniques of scientometric analysis by the IRAMUTEQ software with the R Interface for Multidimensional Analysis by Textes et de Questionnaires (CAMARGO; JUSTO, 2013). Two analysis techniques were used from a Lexical analysis of variables expressed in coopetition models in the last decades: 1) Analysis of Descending Hierarchical Classification (DHC). It is a technique proposed by Reinert (1983) that allows the classification of text segments based on the repetition of stem words, that is, reduced to their radical (mottos). Also, this technique clusters the words into classes using the Chi-square (X²), a method that measures the co-occurrence of words within a class and the maximum distinction between classes. 2) Similarity analysis. It is a technique based on the Graph Theory that identifies semantic nuclei detected by the co-occurrences between words and signals their connections based on their degree of hierarchical importance between them (SALVIATI, 2017). The result shows a sociogram formed by elements called nodes or vertices, with connections between themcalled relations or edges. These vertices and relationships between words show the illustrated content structure as a tree-shaped graphic.

4 RESULTS AND ANALYSIS

The publishing of papers on coopetition increased during 1996-2019. However, only 32.5% of the articles presented a coopetition model. Figure 2 shows the timeline of papers with models and indicates that 64.2% of research on coopetition models was between 2016-2019. This result highlighted the field's evolutionin recent years and confirmed the assumption of Bouncken et al., 2018 and Lascaux, 2019, which recognize coopetition as a field in increasing development.

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30 25 20 15

Figure 2 -Timeline of coopetition models published in WOS and Scopus (1996-2019)

Source: Elaborated by the authors

The lexicographic analysis performed by IRAMUTEQ software resulted in 2312 occurrences classified, which represented 81.1%. It is a satisfactory degree of reliability and guarantees the processing of the Descending Hierarchical Classification (DHC). According to Camargo and Justo (2013), the minimum index suitable for treating the base of this software is 70%. The results generated 90 text segments which 73 were classified. The software divided the 73 text segments into 943 textual forms (lemmas), and 201 types (21.3%) have a recurrence equal to or greater than three times. Hápax index, the number of lemmas divided by the total of terms with frequency=1, was 60.45%, indicating that 570 slogans were used only once in the textual corpus. Table 2 summarizes the lexical analysis of the stratified data.

Table 2 - Characteristics of the textual corpus resulting from the Lexical Analysis

Occurrences	Forms	Average Forms per text segment	Formsfreq uently≥ 3	Lemmas	Text Segments (ST)	Sorted text segments
2312	943	25.70	201	856	90	73 (81.1%)

Source: Elaboreted by the Authors from the IRAMUTEQ software

Results of the Descending Hierarchical Classification (DHC) divided the text segments forming six classes of words associated according to their relevance and statistical significance. According to the analysis of textual domains, these classes came from a single dimension called Aspects of Coopetition, subdivided into two subdimensions. The first one represents the Results of Coopetition with a unique group A that contains class 6. The second subdimension is related to the Coopetitive Processes and has threegroups. Group B was titled Dynamics of Coopetition and included classes3 to 5; Group C was Coopetitive Context and covered classes 1 and 2.

Figure 3 presents the Dendrogram resulting from the DHC analysis with its classes, relations, and hierarchical structures. As the parameter for the Dendrogram was defined, words simultaneously showed p-value <0.0001 and Chi-square (X^2) > 3.85. The hierarchic of Classes was as follows: class 5 achieved 20.55% of utilization, which means 13 segments of text (ST) among the total (73 ST) were classified; class 4 comprehended 19.18% (14 ST); class 1 achieved 17.8% of utilization, which means 13 segments of text ranked; class 2 obtained 16.4% (12 ST); class 6 obtained 13.7% (10 ST); and class 3 comprised 12.33% (9 ST).

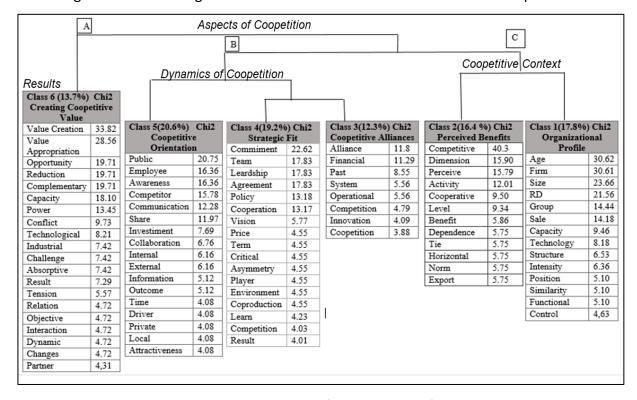


Figure 3 - Descending Hierarchical Classification of the Elements of Coopetition

Source: Elaborated by the Authors based on the results of the IRAMUTEQ software

Group 'A' (Results of Coopetition) comprises Class 6 called 'Creating Coopetitive Value.' It showed the debates among coopetition scholars toward the balance of value creation and value appropriation (e.g., ESTRADA et al., 2016; HU et al., 2020; RITALA; TIDSTRÖM, 2014). Studies in this theoretical line provided many approaches, for instance, coopetition in coworking spaces (BOUNCKEN et al., 2018), dynamics of coopetition in value networks (CHOU; ZOLKIEWSKI, 2018), tensions in coopetitive environments for the creation and appropriation

of value (BOUNCKEN et al., 2018), the absorption capacity between industrial firms (FREDRICH et al., 2019), coopetition agreements to increase technology transfer flows that result in value creation and appropriation (BENGTSSON et al., 2016), and others.

In turn, Group B, named 'Dynamics of Coopetition,' comprises three classes of elements, namely 'Coopetitive Orientation' (Class 5), 'Strategic Fit' (Class 4), and 'Coopetitive Alliances' (Classes 3). The 'Coopetitive Orientation' (Class 5) achieved the highest explanatory potential of DHC (20.6%). Class 5 focuses on the degree of coopetitive awareness of the government and its employees to compete or collaborate (CZAKON et al., 2019), as well as the role of internal and external drivers, essential to understanding the phenomenon of coopetition and its typologies (CHRIST et al., 2017). Besides, this class displays resource sharing as a contributing and inherent factor in coopetitive environments (BOUNCKEN et al., 2018; DORN et al., 2016); for example, resource sharing in programs such as R&D consortia for the construction of financial projects by public institutions (SCHIAVONE; SIMONI, 2016).

Class 4 is the second Class in the hierarchic classification. It was called 'Strategic Fit' to indicate that coopetitive actions need partners with congruent strategic interests (CZAKON et al., 2019). This Class also highlights the well-defined objectives towards a convergent vision, commitment, co-production, and shared goals. According to the authors, these elements generate agreements among players that obtain coopetitive learning based on symmetrical win-win strategies (LE ROY et al., 2018). On the other hand, the asymmetry can lead to unbalance in the coopetition strategy, as some players have more competitive advantages than the other partners (BAGLIERI et al., 2010; JAKOBSEN, 2020).

In turn, Class 3, entitled 'Coopetitive Alliances,' reinforces the current research focused on alliances that in the coopetition environment are much varied and complex (DEVECE et al., 2019). The studies on coopetition alliances aim to optimize production capacity, reduce risks and uncertainties, improve market potential, combine resources, and reduce operating costs (CHAHARBAGHI et al., 2005). Rai's (2016) approach indicated how coopetition based on shared benefits influences the measurement of value creation in inter-firm alliances. Besides, in this class, elements centred on economic partnerships that result in innovation prevailed. This approach has been strengthened through experiments by Bouncken et al. (2016), which show how coopetition alliances can innovate products through governance.

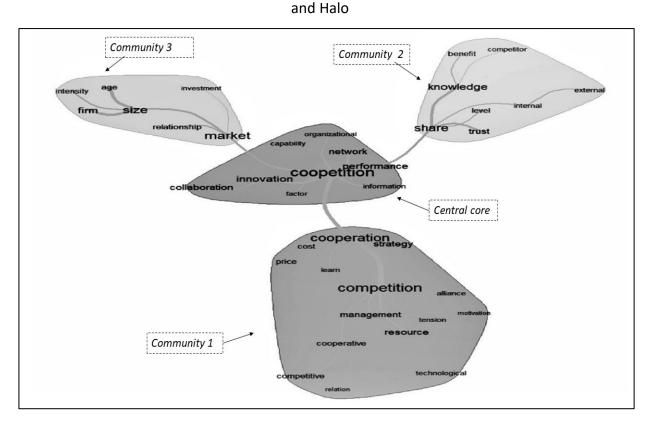
Finally, Group C, named 'Coopetitive Context,' consists of 'Perceived Benefits (Class 2) and 'Organizational Profile' (Class 1). 'Perceived Benefits' is a class that portrays the goals,

capabilities, and strategic potentials achieved through coopetition—for instance, Bengtsson and Raza-Ullah's (2016) approach follows this view. Along the same line, Czakon et al. (2020) related perceived benefits to access to resources, opportunities, reduction of costs, control of competition, the advantage over rivals and the effective implementation of the strategy. Czakon and Czernek (2020) added that the level of ties contributes to strengthening mutual benefits between partners, that is, the context of coopetition.

Class 1, in Group C, focused on the characteristics of the Organizational Profile that favour coopetition—for instance, organizations' age, size, and technological capacity of organizations influence the level of coopetitive skills. Indeed, the study of Bengtsson et al. (2016) confirmed that the location and size of the company impacted the coopetition capacity. The classification provided by DHC also revealed previous experiences in coopetition as a determinant of strategic behaviour (PEREIRA; LEITÃO, 2016; SCHIAVON; SIMONI, 2016; CZAKON et al.,2020). Besides, Class 1 highlighted the studies on coopetition in R&D in the context of high technology and communication (LINDSTRÖM; POLSA, 2016a; PELLEGRINBOUCHER et al., 2018).

The second technique employed was the Similarity Analysis based on graph theory. It explores the connections between the central axes and branches and, therefore, the co-occurrence and relations of words (MARCHAND; RATINAUD, 2012). The result of the Similarity Tree presented evidence of the connection between the correlated words with coopetition. The tree was generated in Communities style using the Halo option, as they favour the identification of the central axis and its ramifications. This configuration optimizes the outline of the corpus structure and its relationship between words for a better interpretation of the similarity tree. Thus, Figure 4 showed a semantic range of terms with higher frequency in the textual corpus, grouped in central and peripheral areas.

Figure 4 - Tree of similarity of the elements of coopetition by co-occurrence of Communities



Source: Elaborated by the Authors from IRAMUTEQ

The similarity analysis was generated from the variables extracted from 129 coopetition models published in 1996-2020. Figure 5 illustrates the expressions used in the coopetition construct and their links. The tree is composed of the main branch whose ramifications characterize the relations of coopetition with market investments, sharing knowledge, and cooperation strategies. Competition and cooperation appear as elements concerning the central axis and Community 1, making sense since the coopetition construct is a hybrid of these two behaviours (BRANDENBURGER; NALEBUFF, 1996). The similarity analysis generated a tree in a community way, providing robustness in interpreting the results.

The word coopetition is the central axis. The primary connections derived from this construct are *performance*, *collaboration*, *organizational networks*, and *capacity for innovation* (Community 1). This axis strongly connects with the word 'Cooperation,' which shows the importance of strategy in relationships involving risks (prices and costs). The connexion is more definite with 'Competition,' which indicates relationships with contexts involving tension, competitive alliances, and motivation located in the tree's first community.

The coupling between these three main concepts in the similarity tree reinforces what the literature has been debating since Brandenburgerand Nalebuff (1996). The ramifications showed contributions from studies on coopetition strategies for improving a firm's performance in innovation (KLIMAS; CZAKON, 2018) and about manage of coopetitive tensions.

The terms *Share, Trust, and Knowledge* are part of the Community 2 of the similarity tree. They presented a more accentuated connection with the core term *Coopetition* and less connected with terms such as *level, internal, external, competitor,* and *'benefits.* These results follow the literature. For instance, studies by Gast et al., (2019) and Chim-Miki and Batista-Canino (2018) presented a model that measures cooperative knowledge sharing and an integrated model based on a set of indicators, including trust and Coopetition at the internal and external levels.

Finally, the word *market* supports the similarity tree in Community 3, showing a strong connection with the core and joining the terms *relationship*, *size*, *company*, *age*, *intensity*, and *investment*. In theory, the results perceived at this cluster are found, for instance, in Robert et al. (2018) studies. These authors created a model to understand the importance of market-oriented coopetition and its association with trade performance.

5 CONCLUSIONS

This research identified the main elements in the coopetition models through a comprehensive view of the scientific field of coopetition (1996-2019) published in the Scopus and Web of Science databases. Two relevant contributions emerged from our analysis. First, the systematic literature review mapped many scientific publications that presented models of coopetition. The results confirmed Bengtsson and Raza-Ullah's (2016) assumptions about the absence of integrative coopetition models. We found 129 models of coopetition proposed by 102 authors divided into 05 categories of levels, namely, individual, intra-organizational, inter-organizational, network level, and society levels. The focusin the coopetition models are on the intraorganizational and interorganizational levels, which together represented 76% of the published models. Also, coopetition is more studied in business environments. The results also revealed a lack of coopetition research at the individual and societal levels.

Second, the Descending Hierarchical Classification (DHC) and Similarity Tree techniques showed complementary research findings. The hierarchy of the coopetition elements based on DHC represented the dimensions and elements of greater consensus by scholars according to the p-value and Chi-Square. The findings indicated four significant dimensions for the models of coopetition: General aspects, contexts, dynamics, and results, that unfold into six sub-dimensions following this hierarchy: Coopetitive orientation, Strategic fit, Organizational profile, Perceived benefits, Value creation, and Coopetitive alliances.

The categories obtained through our analysis showed a sequence of conditions for coopetition. The findings are in line with Baruch and Lin (2012), Bengtsson and Kock (2014), and Lindström and Polsa (2016) that proposed a categorization of coopetition studies in multilevel approaches. It is important to note that our DHC results demonstrated an approximation with Czakon et al. (2020) study in terms of antecedents of coopetition. These authors also showed that perceived benefits are associated with goals and strategies potential achieved from a coopetitive behaviour (Bengtsson et al., 2016). Besides, Czakon et al. (2020) highlighted the variable strategic fit of the coopetitors, and shared objectives favour the success of the coopetition.

On the other hand, the similarity tree through communities and the halo option, a technique based on Graph Analysis, showed the connection and interaction degree between the words in the textual corpus. The findings showed the coopetition construct in the central axis of the tree and its high connection with the term's cooperation and competition. That result was expected. The coupling consolidates the theoretical assumptions that indicate the emergence of a hybrid behaviour as a strategy subfield, as defended by Yami et al. (2010) and other thinkers in the field.

Besides, similarity in the Communities related to knowledge sharing and market relations indicated factors aligned coopetition with a more practical profile and focused on processes and results—another finding in line with the literature. For instance, Estrada et al. (2016) assessed the role of knowledge-sharing mechanisms by coopetition on product innovation performance; and Robert et al.(2018) addressed the role of the market and tradeoriented coopetition. In summary, the similarity tree indicates coopetition is a central element for companies to optimize knowledge-sharing processes, improve market relations, and balance the effects of competition with cooperation.

Our results contribute to the coopetition field, providing a unified view on the topic based on identifying the most representative elements and their connections. From these findings, new models can be proposed to consolidate current knowledge. The research limitations were the exclusion of published scientific works outside of Scopus and WoS databases. However, to minimize this limitation, it must be recognized that the most prestigious journals are present in the Web of Science and Scopus. Therefore, the models used in this research tend to be remarkable in the field.

Concerning the reliability of our results, it was optimized by the techniques adopted. First, we performed an extensive literature review; second, we reduced the researcher's subjectivity using software of analysis that allows the application of quantitative methods to qualitative data. Third, the study applied two techniques to analyse results that allowed the confirmation of findings.

To identify the elements from the models of coopetition validated in the literature was the main contribution of this study. There is an absence of previous studies that compiled the components with greater representativeness on the coopetition models based on the authors' consensus. We suggest further research on developing and application of a coopetition scale that captures the dimensions and sub-dimensions identified in this study to contribute to this in-progress paradigm and subfield of the strategy.

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