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Critical success factors in coopetition: Evidence on a business network

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ABSTRACT

Coopetition in the literature of business networks has been discussed as a base strategy to potentiate competitiveness. This research investigates the main inter-relationship factors among the companies that are part of a network involving cooperation and competition, as well as their relationship in coopetition. This research discusses these questions through a review of the literature on coopetition and its application in business networks, basing the analysis on the critical success factors (CSF). Our analysis is conducted in the gastronomic industry, obtaining results through an exploratory investigation, conducted by applying the model suggested by Petter (2014) in a business network, attesting the means of the critical success factors and their correlations on the suggested dimensions and on coopetition. The main results for the critical success factors in coopetition indicate the importance of governance to maintain business networks, of cooperation to leverage innovative competencies, and that companies that have lower competencies regarding financial resources are more engaged in cooperation.

1. Introduction

Inserted into a competitive environment, small and medium-sized companies have chosen to create business networks, congregating companies from the same operation sector in order to overcome common limitations, generating competitive advantages (Chennamaneni & Desiraju, 2011). The constitution of business networks involves procedures and aspects that need to be observed and managed according to the need of the network and its objectives (Elbers & Schulpen, 2011). Among them, one highlight is the evaluation and observation of the criteria to select the partners for the creation of the network, with the purpose of identifying the value-adding potential of the participants for the larger group (Park, Srivastava, & Gnyawali, 2014; Wu, Shih, & Chan, 2009).

The compatibility and congruence among the partners is an essential factor that determines the behavior, the strategy, and structure of network businesses. Thus, the potential of the partners regarding the complementation and addition of value in terms of processes, competencies and resources are aspects that promote benefits on the coopetition process (Bravo, Squazzoni, & Boero, 2012; Dorn, Schweiger, & Albers, 2016; Meuleman, Lockett, Manigart, & Wright, 2010; Moeller, 2010).

The literature on coopetition discusses the several factors that influence inter-organizational cooperation and competitiveness (Hu, 2014). In addition, the analysis of which factors prevail for the success of coopetition in business networks is still scarce in the literature. In that sense, this study discusses the existing research gap, suggesting the following questions: (a) what are the main factors for the inter-relationship among companies (cooperation)? (b) what are the main internal factors among companies (competition)? (c) what is the necessary relationship among these factors in coopetition?

This research discusses the above-mentioned questions through a review of the literature on coopetition and its application in business networks, basing the analysis on the critical success factors (CSF). More specifically, in order to analyze the coopetitive interactions (on the network level), an existing model was applied in order to evaluate the coopetitive maturity on a network of companies from the gastronomic industry sector, located in the South region of Brazil, calculating the means of the CSF and then making a correlation among them regarding the cooperation and competence dimensions, as well as the correlation

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between these dimensions – coopetition.

From these premises, in order for coopetition to occur, the objective of the study is to analyze the critical success factors (CSF) related to coopetition on a business network. This is an investigation of the existing coopetitive relationships in the analyzed network of companies through the model suggested by Petter et al. (2014) and, from the obtained diagnosis, the prevailing critical success factors.

Our study contributes to the studies related to coopetition, investigating the main inter-relationship factors among the companies that are part of a network within the dimensions of cooperation and competition, as well as the relationship among them in coopetition. The current focus has been to manage the tensions resulting from coopetition (Fernandez & Chiambaretto, 2016; Raza-Ullah, Bengtsson, & Kock, 2014; Tidstrom, 2014) or to create a systematics for the inter-organizational coordination on coopetitive interactions (Gnyawali, Madhavan, He, & Bengtsson, 2016; Mariani, 2016). Another relevant notion is the influence of the process to select companies, used by the studied network, for the participation of new members. This fact, allied to the integration practices, maintains the network at similar coopetition levels, and the coopetitive practices are leveled.

Therefore, a conceptual parameter was developed, assisting in the perception of the prevailing characteristics in the coopetitive process in business networks. This offers a solid basis to move forward in understanding the formalization and coordination procedures and criteria for business networks. With the purpose of answering to the suggested questions, the article shows the following structure: the first section implies the theoretical review around coopetition in business networks and their critical success factors; the second section illustrates the research method used; the following section describes and discusses the results; the fifth and last section offers the conclusions and describes suggestions for further research.

2. Literature review

2.1. Coopetition

In competitive markets, an alternative to potentiate the competitiveness of rival organizations is the complementarity of their competencies through collaboration. Hence, this is the concept of coopetition, based on the premise that it is possible to compete and cooperate concomitantly, allowing the mutual cooperation, with the purpose of potentiating the competitive forces (Hermes, Resende, & Andrade Júnior, 2013).

In their seminal works, Brandenburger & Nalebuff (1996) (also Nalebuff & Brandenburger, 1997) conceptualized the term coopetition based on game theory concepts. According to the authors, business is simultaneously war and peace, that is, firms cooperate to bake a bigger pie and then compete in order to take a larger slice. Moreover, the authors assert that coopetition is a complex and somehow a contradictory strategy, since competitors have to cooperate aiming mutual benefits and compete at the same time, but without eliminating each other. Bengtsson & Kock (2000) convey that these two interaction logics (cooperation and competition) should be separated adequately by companies in different activities in order to make possible coopetitive relationships. In this vein, some authors (Devece, Ribeiro-Soriano & Palacios-Marqués, 2017, Petter et al., 2014) developed further this view by delineating the scope of cooperation and competition relationships separately.

More recently, Bengtsson & Raza-Ullah (2016) identified two main approaches on coopetition studies: the actor school and the activity school of thought. The former sees coopetition in a broader sense such as a context involving the network level, wherein cooperation and competition are generally divided among actors (e.g., Damayanti, Scott & Ruhanen, 2017). The latter focuses on the coopetitive relationship instead of the network context, that is, it generally focuses on the tensions of the paradoxical one-to-one relationship (either vertical or horizontal), which is simultaneously cooperative and competitive (e.g., Chim-Miki, Batista-Canino, 2017). The authors also propose a novel overarching approach, named as the blended school of thought, which encompasses a multilevel analysis of coopetition. In their model, drivers at external, relational, and internal levels may influence coopetition on the inter-firm, intra-firm, dyadic, network, and inter-network levels.

As stated by Hung & Chang (2012), alliance partners with market overlap are current direct competitors, while current non-competitor partners with similar technological competencies may become competitors in the future as they enter the same market. The authors verified by hypotheses testing that partners prefer contractual agreements to joint ventures when they are current competitors or potential competitors because of coopetition risks such as knowledge leakage. On the other hand, joint ventures are preferred in technological environments characterized by high sophistication and volatility, notwithstanding the coopetition risks. Complementarily, Schmoltzi & Wallenburg (2012) warn that when cooperation is low and competition is high, coopetition risks such as opportunism and conflicts may arise, thus mining the coopetitive relationship.

Adopting the concept of coopetition refers to some critical points. Since its very basis is the intensity of competition and cooperation, it is important to examine each one and their effects before investigating the simultaneous effects. A very intense competition and very poor cooperation (or vice-versa) may make the relationship unstable and create limited benefits (Raza-Ullah, Bengtsson, and Kock, 2014). In coopetition, therefore, there is a dynamic balance between two opposing forces, and the transparency and reciprocal transfer of knowledge must be maintained in order to prevent dissolution (Pathak, Wu, & Johnston, 2014).

Balancing competition and cooperation relates to several types of tensions that may be managed in several ways. There are underlying issues as to the nature of this relationship, such as trust and commitment (Tidström, 2014). The social capital must be considered in order to improve the results when managing the tensions of the team, through cooperation. Trust within the team must be the most critical factor for the social capital, since cooperation and competition are simultaneously managed, becoming essential for the success of coopetition (Baruch & Lin, 2012). Another aspect related to the social capital takes into consideration the individual and inter-individual dimensions. In fact, behind every contract, transaction, and convention, people are the ones who create different relationships among their companies. Coopetitive relationships are like a contract in a win-win situation. This contract is celebrated due to the individual characteristics and the inter-individual connections. Despite the competitive environment, it is possible to find a cooperative method to work together, if common interests exist. Coopetition must be the product of a common desire for cooperation, aiming at greater competitiveness (Geraudel & Salvetat, 2012).

Due to the simultaneous existence of cooperative and competitive interactions, the development of contrasting experiences is clear. Hence, managers must acknowledge the value of exchanging these different experiences within the organization, in order to avoid cooperative and competitive interactions as two separate inter-organizational learning processes (Dahl, 2014). Conflicting interests develop impacts in the relationship among the partners and may decrease their mutual dependence. This state stimulates companies to get further away from each other; that is, they may focus only on competition. However, the competitive involvement allied to cooperation among the companies implies a juxtaposed limit, which, in turn, determines the internal frontiers between competition and cooperation. Thus, the paradox of coopetition is materialized.

2.2. Coopetition in business networks

By analyzing the roots of a competitive advantage, there is the need to make strategic choices. The analysis may be conducted on the level

of the individual company or collectively: in the first case, it focuses on the specific coopetition strategies adopted by the analyzed company; in the collective case, it refers to the impact of coopetition across the entire performance of the system (Della Corte & Aria, 2016). The success of the coopetition strategy is strongly affected not only by the alliance and specific factors of the companies, but also by the industrial and economic context in which they are inserted (Ritala, 2012).

Cooperation and competition are two typical interaction relationships in business network systems (Hu, 2014). The strategic alliance is a type of competitive action among competing companies. It may attenuate the competitive intensity between both entities, because it creates a direct relationship between the companies, reflecting an alliance oriented toward cooperation, which limits the competition between them. The alliances with a cooperative orientation contribute to improving the performance more than the competitive orientation between competing companies. The probability of creating an alliance with a competitor is greater when the similarity of resources between the company and its rival is high, indicating that the purpose of the alliance is to attenuate the competitive intensity between them when they have similar resources (Kim, 2016). It is not desirable to have many alliances with strong competitors. In that sense, the company needs more resources, in order to estimate the costs and benefits of the coopetition in progress, in order to keep the balance of the power of negotiation and make the necessary adjustments in the proportion between cooperation and competition (Park et al., 2014).

Several companies make alliances as a tactic in their competitive strategy in order to obtain technological benefits from their competitors. In coopetition, the participants must keep a certain interdependence without losing their organizational individuality, and there is a wide room for the cooperation and competition levels to change, in addition, the relationship is affected by external conditions. That is why the cooperative and competitive combination element does not necessarily remain as a constant element throughout time. Whenever the market conditions and the internal needs associated with coopetition change, the intended level of cooperation or competition changes (Hung & Chang, 2012).

Those companies that have a specific knowledge enjoy benefits and unique positions that could be lost by sharing. The competitive advantage of knowledge may lead them to accumulate important knowledge or to offer an incomplete transfer of knowledge within the context of business networks. This characteristic affects the knowledge-sharing practices, and it may be solved by the notion of coopetitive knowledge sharing (Hong & Vai, 2008).

Another condition for coopetition is the need companies have to protect the market share they were able of capturing and to conquer a greater share. This reason suggests that the use of coopetition affects the dynamic of the sector – by getting involved in coopetition, companies are able to co-opt their main rivals, defend their positions and competitive interests, and support new technological pathways. It is also potential strategy when the number of clients increases, helping to assure the compatibility between the individual offer of the company and the offers from the main competitors, making it possible for the clients to enjoy interoperable products and services (Ritala, 2012).

When participating in the coopetition process, in relation to collaboration, companies are concerned about operating in a passive manner, while their competitors operate aggressively, conquering a larger market share. As to competition, some may aim at short-term gains, while others may aim at the relationship between the parties, with intangible long-term gains. This is why a managerial measure is needed in order to organize the several interests, showing the rights and responsibilities of the involved companies (Sauaia & Kallás, 2007). There is the need for adequate governance mechanisms in order to provide a basis for cooperation (Schmoltzi & Wallenburg, 2012).

Hong & Vai (2008) show that the competition for tangible resources has a positive effect on the cooperative communication, while the competition for intangible resources has a negative impact in relation to communication and cooperative tasks. This observation suggests the mediating role of cooperative behaviors in the relationship between the competition for intangible resources and the results of the group. The authors state that managers must promote cooperative behaviors oriented toward the task, communication, and interpersonal relationships, aiming at an efficient knowledge sharing (Hong & Vai, 2008). The guidance toward the cooperative task reflects the attitudes of the multifunctional members in conducting joint activities, such as the will to help one another. Cooperative communication reflects the discussion and communication patterns among the members of the team. In turn, cooperative interpersonal relations are like close bonds and gratifying relationships (Ghobadi & D'Ambra, 2012).

The coordination mechanisms with different degrees of formality perform a fundamental role to manage competitive interactions. Although the agreements seem to perform a fundamental role in inter-network competition relationships, other forms of governance, such as coordination entities and mechanisms are relevant. Informal coordination mechanisms (such as the social and trust bonds), roles and formal coordination mechanisms (such as plans and rules) are more efficient to determine how joint activities must be conducted in coopetitive networks. Since the evolutionary trajectories of the inter-network interactions may not be constrained by highly formalized agreements, identifying coordination entities (for example, direction committees and technical boards) and mechanisms (for example, social bonds, trust, roles, plans, and rules) may contribute to the sustainability of the relationship. In addition, the trust accumulated through the experience of working together may work as an impulse to reach higher levels of coordination and, furthermore, greater sustainability of the relationship (Mariani, 2016).

There is a growing tendency to apply coopetition among the partners of the supply chain as an efficient strategy to create value (Kafi & Fatemi Ghomi, 2014). The main occurrences combine cooperation and competition in form of transactions with competitive prices, opening the path for “vertical coopetition” as a new and hybrid way of managing the relationship with suppliers (Lacoste, 2012). Buyers and suppliers get involved into coopetitive relationships when cooperating creates a higher common value and competing extracts more from the total gain with sales. The coopetitive perspective acknowledges that buyers and suppliers may simultaneously seek individual and common objectives. Competition affects the transaction costs; the effects of cooperation on transaction costs are more pronounced at low levels of competition (Liu, Luo, Yang, & Maksimov, 2014).

Horizontal relationships diverge from relationships between vertical buyers and suppliers. A possible explanation for this difference of vertical cooperation is related to the idiosyncrasy of horizontal cooperation, where inter-company relationships are simultaneously characterized by collaboration and competition. In addition, in horizontal configurations, the area for which the involved parties are responsible is clearly defined. Within that context, a formalized guidance helps to avoid overlapping or operational redundancies, making shared results possible (Schmoltzi & Wallenburg, 2012). Given the scarce efficiency of agreements in finding a balance between the creation of value and appropriation in coopetitive relationships, it is advisable that business networks find common reasons, such as cultural, functional and organizational similarities, for efficient coordination mechanisms (Mariani, 2016).

The simultaneous search for cooperation and competition among companies creates tensions on individual, organizational and inter-organizational levels (Raza-Ullah, Bengtsson, & Kock, 2014).

In that sense, the competitive advantage, therefore, is focused on the main strategic factors that induce competitors to cooperate, as well as on the relative intensity and the interactions between cooperation and competition (Della Corte & Aria, 2016).

2.3. Critical success factors in coopetition

The feasibility of a coopetition strategy depends on its capacity to create better results than those available through individual operation (Kim, Kim, Pae, & Yip, 2013). In the dynamics of coopetition, competition and cooperation are integrating parts of the global strategy of the company. Cooperating with the competitors may make it possible to reach performance levels beyond what would have been possible (Peng, Pike, Yang, & Roos, 2012). The performance of a business network may be measured through coopetition. For such, it is necessary to identify and structure the factors that are considered as Critical Success Factors (CSF) that influence the coopetitive performance and the competitiveness of business networks in a systematic manner.

The recurring literature points toward different interpretations and concepts on what may be called Critical Success Factors (CSF). Some authors consider them as necessary key factors for an organization to prosper; others, as critical factors, therefore, configuring a neologism on a set of divergences of a semantical order (Dubelaar, Sohal, & Savic, 2005; Wilson & Daniel, 2007). Since the conceptual differences between the expressions critical success factors and key factors are subtle, the expression Critical Success Factors (CSF) was adopted, as used by most authors. They are considered as aspects that, if managed, influence in a significant manner the position and competitive performance of an organization, within the sector in which it operates. This level may vary considering the segment in which this company operates (Colauto, Gonçalves, Beuren, & Dos Santos, 2004).

CSF help the decision-makers to focus their attention on critical processes, understood as those that are capable to define and guide the direction and orientation that the management must follow in order to optimize the decision-making processes (Chen & Karami, 2010; Dasanayaka, 2012; Road, 2010). Within the context of business networks, analyzing the conditions that allow the objectives one intends to reach encompasses what may also be referred to as Critical Success Factors (CSF), defined as the set of existing potentialities in the process of reaching a goal, based on premises that, when favorable, assure a positive result, and, when not favorable, lead to dissatisfaction (Besser & Miller, 2011; Kee, 2012; Lin, 2016).

As the name itself indicates, CSF are the factors that determine the success or failure of a business network, which includes conducting certain activities and encouraging it to avoid situations (Hoffmann & Schlosser, 2001). CSF are characteristics, conditions or variables that, when adequately managed, may have a significant impact on the success of a business network, considering its competition environment (Singh & Shrivastava, 2013).

Håkansson & Ford (2002) point out that there are no standardized behaviors or a single solution for alliances to be successful, and that some factors have a greater or lower influence on the success of the business networks (Håkansson & Ford, 2002). However, in the opinion of the authors, it is valid to consider the points that may affect the future of a network. In that sense, Petter et al. (2014) suggest a structure for CSF, as shown in Fig. 1, that tries to translate the hierarchy of the interference levels and the scope of each one of the groups of factors on the others and on the coopetition of business networks, in addition to separating them into two large families of factors: (1) factor that condition the systemic competitiveness and (2) factors that condition the competitiveness of the network (Petter et al., 2014) (Fig. 1).

In line with other coopetition studies (e.g., Della Corte & Aria, 2016) identified by Bengtsson & Raza-Ullah (2016) as composing the actor school of thought, this research analyzes the main coopetitive CSF of a business network. Particularly, two analysis levels are employed: the company level and the network level. With regard to the company level, companies' internal competencies factors are analyzed, which are related to competitiveness (i.e., competition). Companies are also analyzed in terms of collaboration relationships vis-à-vis the whole network (i.e., cooperation). With regard to the network level, the individual results obtained by each company individually are gathered and compose the general network results in terms of cooperation and competition. In one hand, Petter's et al. (2014) model does not include CSF in the dyad level, as employed by research aligned with Bengtsson & Raza-Ullah's (2016) activity school of thought, which analyzes, for instance, the tensions of the paradoxical coopetitive dyad. On the other hand, this research analyzes the tensions (and positive relations) between cooperation and competition CSF by means of correlation tests. Thus, by analyzing coopetition on company and network levels, this research moves a first step toward Bengtsson & Raza-Ullah's (2016) multilevel blended school of thought.

Moreover, Petter's et al. (2014) model also includes external CSF such as systemic and sectorial factors, which could influence both cooperation and competition. The systemic factors are related to system constraints or incentives (such as regulation, commercial agreements etc.) that influence all companies and people from a region or nation. The sectorial factors are related to constraints or incentives that are specific to each industry (e.g., agribusiness, manufacturing, IT, biotechnology etc.). As this research mainly focuses on companies related to the gastronomic industry from the same region in Southern Brazil, the systemic and sectorial factors were not taken into consideration in the analysis, as they are similar to the whole sample. Notwithstanding, comparing the impact of these external critical success factors in different regions and industries is a venue for future studies.

3. Methods

This study uses the method by Petter et al. (2014) to investigate the existing coopetitive relationships on a business network. From the obtained diagnosis, an attempt was made to verify the prevailing critical success factors. This is an exploratory investigation research, conducted by applying the model on the business network called Rede Gastronômica dos Campos Gerais, constituted by 26 participating companies in the area of food provision and lodging. Located in the South region of Brazil, it is in operation since 2014, from a strategic sectorial project.

The study sample comprises 21 out of 26 companies that compose the business network (a response rate of approximately 81%). Based on Brazil's law (Brazilian Micro and Small Business Support Service – SEBRAE, 2017), all interviewed companies are classified as small businesses, that is, companies with annual revenues between 360,000 and 3,600,000 BRL (approximately 115,000 and 1,150,000 USD, respectively, considering the exchange rate of August 2017). The 21 interviewed companies related to the gastronomic industry perform activities such as restaurants (8), pubs (4), coffee shops (2), buffet events (3), microbreweries (5), hotels (2), museum (1), and gourmet butcher shop (1). Particularly, it is worth mentioning some companies perform more than one activity concomitantly.

The justification for choosing the studied network is that it uses procedures and criteria to select the participating companies. In that context, the agency that promoted the creation of the network diagnosed one hundred and twenty-five companies, according to internal criteria (participation in offered courses, lectures, workshops, and programs), market time and market differentiation. After the application of the diagnosis, a group of forty companies was defined, receiving individual Consulting and participating in courses for the qualification of the establishments, aiming at strengthening the business and event sector.

Approximately thirty companies decided to participate, and from the beginning of 2014, the consultation and qualification work began. Sectorial and strategic actions for regional development were conducted. Some businesspeople started to rise as leaders, they got organized and, at the beginning of 2015, Rede Gastronômica dos Campos Gerais/PR had been legally and formally constituted.

A peculiar factor that also guided the choice is that it has defined criteria for the participation of new associates, and the main one is to reach a performance of at least 35% in the Management Excellence Model (first steps) of the National Quality Foundation.

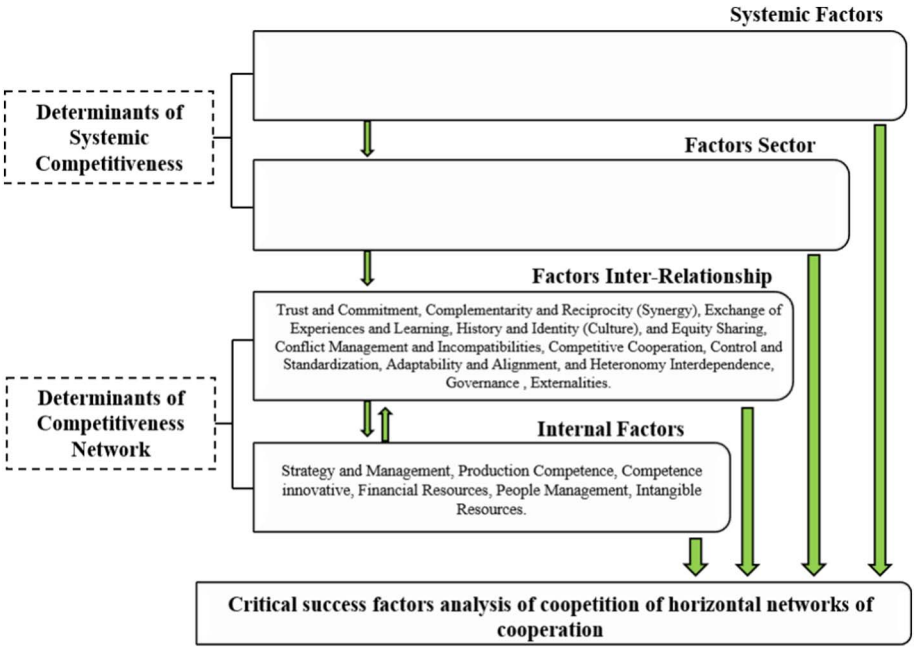

Fig. 1. Coopetition structure in horizontal business networks.
Source: Petter et al (2014, p. 164).

For the data collection, the standard questionnaires were applied to the network manager directed toward the governance of the model as a structured interview, with the purpose of establishing the consistency of the criteria according to the multiple-criteria method to support decisions, the Analytic Hierarchy Process (AHP). Then, the managers of each company of the network were interviewed, through the standard questionnaires of the model.

The measuring model is built based on 18 Critical Success Factors (CSF) and 46 variables related to both analysis levels of this research: the Inter-Relationship Level (Cooperation) and the Internal Level of the companies of the network (Competencies). These CSF and variables are shown on Chart 1.

Based on the collected data and with the help of electronic spreadsheets, it was possible to build Petter's et al. (2017) Cooperation X Competencies Diagram for the model, which positions each company and the network initially at three large coopetitive maturity sites:

1st – Risk site: companies/networks which show a low coopetitive performance, with low gain or synergy on inter-company relationships, in need for major adjustments and strategic realignment of the network, or, which show major dystonia between cooperation and internal competencies, whether in one or the other dimension. The risk site includes the following quadrants:

IICC - Cooperative and Competencies Immaturity: This quadrant is characterized by both low cooperation and low internal competencies, representing a high mortality risk not only to the network but also for each company individually;

DICC - Cooperative Development and Immaturity of Competencies: This quadrant indicates medium inter-company cooperation, but low internal competencies;

MICC - Cooperative Maturity and Immaturity of Competencies: This quadrant is characterized by high inter-company cooperation, but still low internal competencies. Still, inter-company cooperation may support the development of internal competencies over time. However, companies (and consequently the whole business network) still face the risks of failure (and disintegration);

IDCC - Cooperative Immaturity and Development of Competencies: This quadrant indicates low inter-company cooperation, but medium internal competencies;

IMCC - Cooperative Immaturity and Maturity of Competencies: This quadrant encompasses highly competitive companies (i.e., with high internal competencies), but with a low level of cooperation within the business network. In this case, the business network possesses a higher disintegration risk than the individual companies.

2nd – Transition site: it shows the beginning of the value generation through coopetition, with the evolution of the competitiveness levels of the network through coopetition. Networks located on this site have already had some gain, however, there are still points of failure or evolution limitations. The transition site includes the following quadrants:

DDCC - Cooperative Development and Development of Competencies: This quadrant features medium levels of both cooperation and internal competencies. Hence, companies and the business network as a whole still may improve both aspects.

MDCC - Cooperative Maturity and Development of Competencies: This quadrant indicates high inter-company cooperation, but medium internal competencies;

DMCC - Cooperative Development and Maturity of Competencies: This quadrant indicates medium inter-company cooperation, but high internal competencies. Companies in this quadrant

Chart 1
CSF and variables on the Inter-Relationship Level inherent to Coopetition on a business network.
Source: Adapted from Petter et al. (2014).

Inter-relationship factors		Internal factors	
Dimension: cooperation		Dimension: competencies	
CSF			
CSF1	Trust and commitment	CSF_A	Strategy and management
CSF2	Complementarity and reciprocity (synergy)	CSF_B	Production competence
CSF3	Exchange of experiences and learning	CSF_C	Innovation competence
CSF4	History and identity (culture)	CSF_D	Financial resources
CSF5	Sharing and equity	CSF_E	People management
CSF6	Management of conflicts and incompatibilities	CSF_F	Intangible resources
CSF7	Competitive cooperation		
CSF8	Control and standardization		
CSF9	Adaptability and alignment		
CSF10	Interdependence and heteronomy		
CSF11	Governance		
CSF12	Externalities		

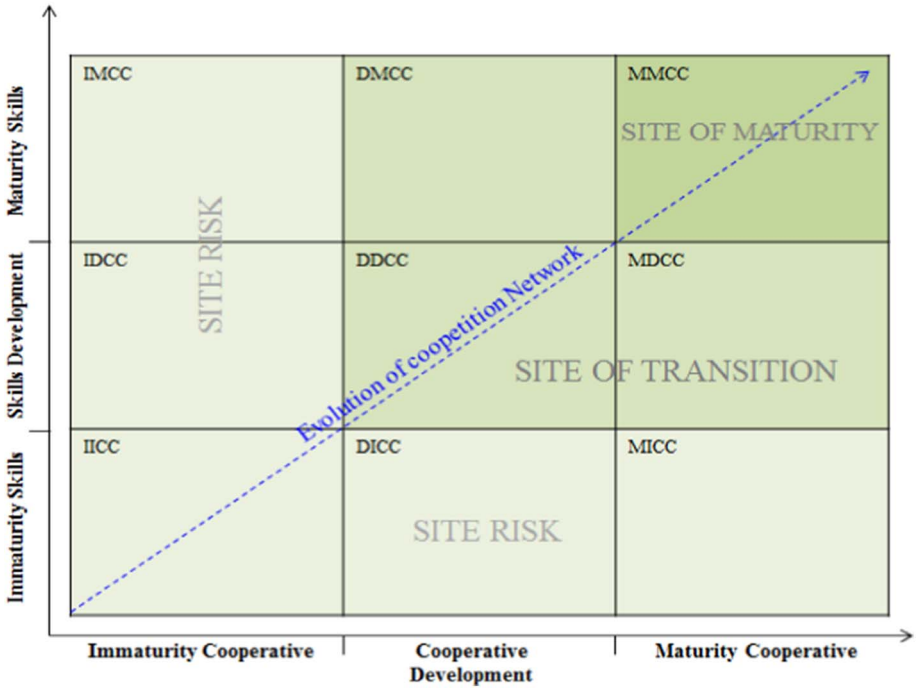

Fig. 2. Cooperation × Competencies Diagram of the model.
Source: Petter et al. (2017, p. 49).

are highly competitive (i.e., with high internal competencies), but still do not cooperate intensively to the business network.

3rd – Maturity site: attests the high coopetitive performance, with mature and complex actions both for cooperation and internal competencies. The companies located on this site have considerable positive interferences on their competitiveness levels, as a result of joint work and the synergy of the network. The maturity site includes one quadrant:

MMCC - Cooperative Maturity and Maturity of Competencies: This is the greatest evolution stage of a coopetition network, wherein both internal competencies and inter-company cooperation are high.

. Based on these quadrants, the performance of the business network is a distributive weighting of the performance of the core companies, shown by the Cooperation vs. Competencies Diagram of the model, structured under a common dispersion diagram, making it easier to read the diagnosis. The base axes for this diagnosis are the cooperation levels (as axis X) and the levels of internal competencies (as axis Y) of the core companies. The structure of the diagram is shown in Fig. 2.

After obtaining the diagram above, since the network is constituted by companies that have participated since its beginning and by new-coming companies, tests were conducted to verify the sample in order to observe significant differences among these companies. Then, the means of the critical success factors (CSF) were calculated for the cooperation and competencies dimensions and their correlations among CSF. Finally, the correlation between both dimensions was obtained, that is, the coopetitive correlations.

4. Results and discussion

Fig. 3 shows graphically the results regarding the coopetitiveness of the companies that constitute Rede Gastronômica dos Campos Gerais. The sample was constituted by 21 companies: 17 companies that were part of the network since its beginning (green lozenges) and 5 companies that joined in 2016 (blue lozenges). It is possible to observe that the means (circles on Fig. 3) were similar for both groups. In addition, the general mean of the network (grey square on Fig. 3) was high for competitiveness and medium for cooperation.

Individually, companies showed a medium level of cooperation and medium or high levels of competitiveness, that is, they remained within the DDCC (Cooperative Development and Development of Competencies) and DMCC (Cooperative Development and Maturity of Competencies) quadrants (Petter et al., 2014).

On the DDCC stage, there is a reduction of the mortality risk of companies or their disconnection of extinction of the network, since the stage involves the start of the evolutionary development of the coopetition among the companies, and this is a decisive stage on the evolution process of the companies and the network. The positive aspect of this quadrant is the existing balance of the cooperation actions and the internal competencies created by the companies, facilitating their development and the development of the network in order to reach the maturity stage.

The DMCC stage shows companies with high skills and internal competencies, however, with initial cooperative actions, demanding greater efforts in that aspect. This is the beginning of the execution of cooperative actions, and efforts must be made for the coopetitive development by improving the inter-company cooperativeness, even when they are competitively self-sufficient. This stage indicates some level of formalization and the reflex of the results generated by cooperativeness; however, potential gains are still possible if intracompany actions are improved (Petter et al., 2014).

In order to verify significant differences between new-coming companies and older companies from the network in relation to the cooperation and competitiveness levels, Student's *t*-test was conducted (). The results indicated that there were no significant differences ($p > 0.05$) between the groups. That is, the new-coming companies showed cooperation and competitiveness levels that were similar to the levels of older companies. The companies of the network need to reach a minimum level of maturity in management in order to be part of it. Maturity is analyzed through the business diagnosis. Secondly, the invitation to be part of the network is made by the older companies. Therefore, these results attest that the tactic used by the studied network to adopt the selection criteria to choose its partners, as well as the integration practices among the participating companies, level the coopetitive practices. It is observed that, in this case, perpetuity is higher on an alliance between competing companies with similar resources (Kim, 2016) and that, therefore, it is possible to make the necessary adjustments in the proportion between cooperation and competition (Park et al., 2014) by adopting selection criteria for the

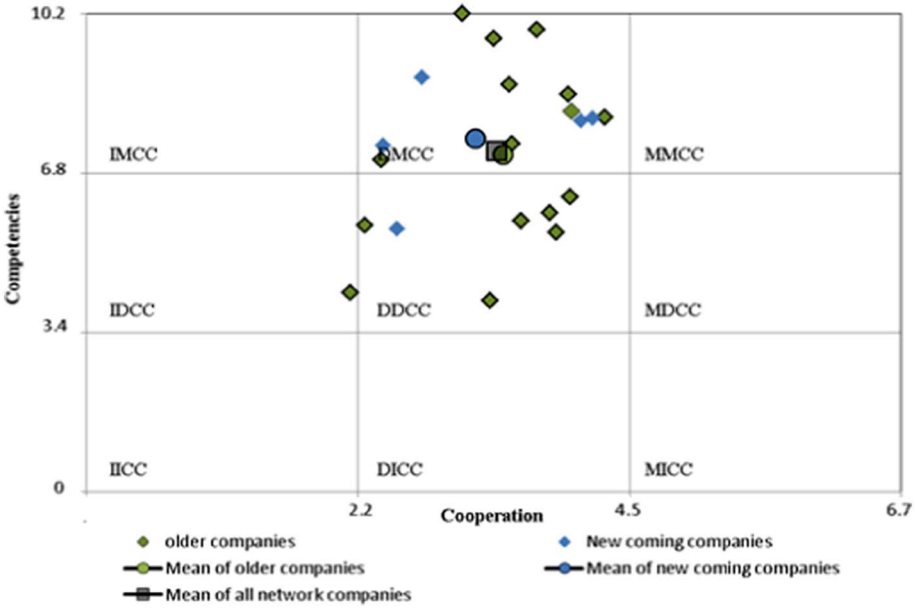

Fig. 3. Coopetitive diagnosis of RGCG.
Source: Authors.

Table 1
Differences (*t*-test) between new-coming and older companies.

	Levene's test for equality of variances		*t*-test for equality of means		
	F	Sig.	t	df	Sig. (2-tailed)
COOP	1.866	0.188	0.646	19	0.526
COMP	2.664	0.119	− 0.376	19	0.711

Table 2
Differences (Mann-Whitney test) between new-coming and older companies.

CSF	Mann-Whitney U	Z	Exact Sig. (2-tailed)	CSF	Mann-Whitney U	Z	Exact Sig. (2-tailed)
1	24.0	− 1.338	0.200	10	33.0	− 0.628	0.543
2	31.0	− 0.746	0.479	11	19.5	− 1.737	0.092
3	12*	− 2.359	0.018	12	22.5	− 1.518	0.148
4	9.5**	− 2.607	0.007	A	33.0	− 0.597	0.618
5	29.0	− 0.953	0.391	B	35.5	− 0.374	0.726
6	22.5	− 1.507	0.180	C	34.0	− 0.528	0.701
7	38.0	− 0.174	0.905	D	28.0	− 1.041	0.347
8	29.0	− 0.970	0.342	E	36.0	− 0.332	0.763
9	37.0	− 0.262	0.828	F	29.5	− 0.902	0.417

* $p < 0.05$.
** $p < 0.01$. (The symbols (**) refer to the level of significance between 0.01 to 0.001, treated as "very significant").

partners. The role of coordination mechanisms is also clear o contribute to the sustainability of the relationship (Mariani, 2016) (Tables 1 and 2).

Since the results indicated that there are no significant differences between older and newer companies ($p > 0.05$), the subsequent analyses considered the whole set of 21 companies. Figs. 4 and 5 show the means of critical success factors for cooperation and competitiveness, respectively.

Fig. 4 shows a dispersion in relation to the means of CSF, since some show high means (over 60%) while others show low means (lower than 40%). The critical factors that stood out the most in a positive manner were: Management of conflicts and incompatibilities (CSF 6) with 79%; Trust and Commitment (CSF 1) with 68%; History and Identity/Culture

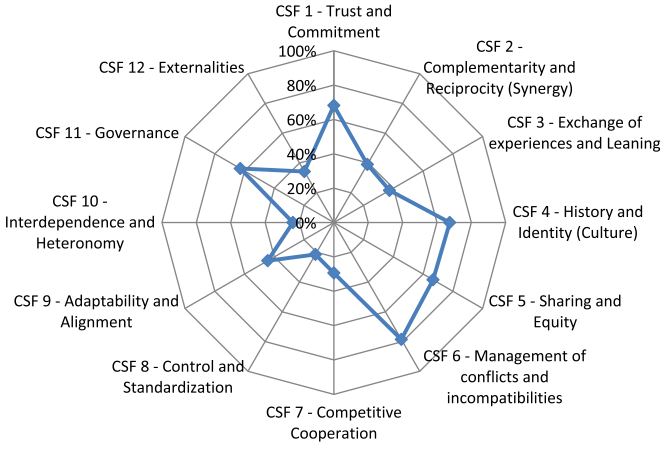

Fig. 4. Mean of critical success factors for cooperation.

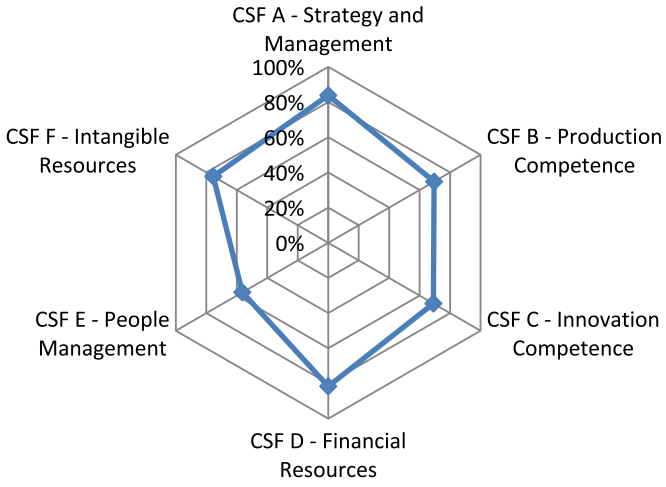

Fig. 5. Mean of critical success factors for competitiveness.

(CSF 4) and Sharing and Equity (CSF 5) with 67%; and Governance (CSF 11) with 63%. These results suggest that companies have high trust on each other and have no major divergences, since they count on

a good management of conflicts and governance, confirming the need for a governance agent (Hong & Vai, 2008; Mariani, 2016; Sauaia & Kallás, 2007; Schmoltzi & Wallenburg, 2012), and that the trust acquired when working on a network drives the level of coordination and maintains the relationships between the companies (Mariani, 2016), which is an underlying aspect of the nature of the relationship (Tidström, 2014).

The critical factors that stood out the most in a negative manner were: Control and Standardization (CSF 8) with 21%; Interdependence and Heteronomy (CSF 10) with 24%; Competitive Cooperation (CSF 7) with 29%; Exchange of experiences and Learning (CSF 3) with 37%; and Complementarity and Reciprocity (Synergy) (CSF 2) with 39%. These results suggest that the network is still maturing in relation to sharing knowledge and resources. Such fact is in agreement with what was reported by Hung & Chang (2012), stating that companies may change their levels of cooperation in terms of knowledge and technologies due to the interdependence and individuality. The solution for such a fact is that the involvement of companies in coopetition is the alliance between defending their positions and competing interests and the support for other companies in order to reach new technological advances, with a common desire for cooperation aiming at greater competitiveness (Ritala, 2012; Salvetat & Geraudel, 2012). Therefore, a balance is necessary between transparency and the reciprocal transfer of knowledge in order to prevent dissolution (Pathak et al., 2014).

In addition to the descriptive analysis, the normality test and the variable correlation test were also conducted. The Kolmogorov-Smirnov normality test was significant ($p < 0.05$) for most variables, indicating that they do not have a normal distribution. Hence, we chose to conduct the Spearman correlation test, since this is a non-parametric test.

Table 3 shows the correlations among the critical success factors for cooperation. The CSF with a higher number of correlations were: Complementarity and Reciprocity (Synergy) (CSF 2) with 4 strong correlations ($\rho > 0.5$) and 1 medium correlation ($\rho > 0.3$); Control and Standardization (CSF 8) and Adaptability and Alignment (CSF 9), both with 2 strong and 2 medium correlations. The main highlight was that companies with a higher level of synergy (CSF 2) also showed higher levels for trust (CSF 1),exchange of experiences and learning (CSF 3), sharing (CSF 5), control and standardization (CSF 8), and adaptability and alignment (CSF 9). This result suggests that synergy acts as a catalyzer for other types of cooperation, and it is the balance element for coopetitive actions, which is corroborated by the literature (Pathak, Wu, & Johnston, 2014; Raza-Ullah et al., 2014).

Table 4 shows the correlations among the critical success factors for competitiveness. The main highlight was the critical factor related to intangible resources (CSF F), which showed strong correlations ($\rho > 0.5$) with other 3 critical factors for competitiveness: production competence (CSF B); innovation competence (CSF C); and people management (CSF E). This result indicates the importance of intangible resources, which are related to a specialized knowledge, for the general competitiveness of companies. This is in opposition to what is suggested by Hong & Vai (2008), who relate the competition for intangible resources with cooperative behaviors, aiming at an efficient knowledge sharing.

Table 4
Spearman correlation for CSF of competitiveness.

	CSF_A	CSF_B	CSF_C	CSF_D	CSF_E	CSF_F
CSF_A	1					
CSF_B	0.503*	1				
CSF_C	0.192	0.214	1			
CSF_D	0.175	0.002	− 0.225	1		
CSF_E	0.000	0.316	0.453*	0.224	1	
CSF_F	0.287	0.590**	0.537*	− 0.146	0.546*	1

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Table 5 shows the correlations between the critical success factors for cooperation and competitiveness. In general, the number of significant correlations was low. A possible explanation is the small size of the sample, which does not allow the identification of reduced effects, i.e., weak correlations. However, some strong correlations were identified, indicating the importance of cooperation for competitiveness.

In special, the innovation competence (CSF C) was correlated to 4 cooperation CSF: culture (CSF 4) ($\rho = 0.52$; $p < 0.05$); sharing (CSF 5) ($\rho = 0.708$; $p < 0.01$); adaptability and alignment (CSF 9) ($\rho = 0.594$; $p < 0.01$); and interdependence (CSF 10) ($\rho = 0.497$; $p < 0.05$). In short, companies with a higher level of cooperation on these critical factors also showed a higher level of competence toward innovation. These results corroborate the importance of coopetition for the innovation capacity of the companies, mainly sharing. This fact is in agreement with what was suggested by Dahl (2014), who report the contrast between cooperative and competitive behaviors, which is valuable for the exchange of different experiences inside the network, considering the cooperative and competitive interactions must be avoided, as two separate learning processes. In addition, considering the inter-organizational basis of the relationships, coopetition offers to the partners a competitive advantage, increasing the creation and transfer of knowledge (Salvetat, Géraudel, & d'Armagnac, 2012).

Another unexpected highlight was the competitiveness CSF related to financial resources (CSF D), which showed 4 negative correlations with the cooperation CSF: synergy (CSF2), exchange of experiences and learning (CSF3), control and standardization (CSF8) and adaptability and alignment (CSF9). A possible explanation for this result would be that companies with less competence for financial resources are more engaged with cooperation, especially for these 4 CSF, in an attempt to overcome the financial difficulty. Thus, coopetition occurs in order to

Table 3
Spearman correlation for CSF of cooperation.

	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSF8	CSF9	CSF10	CSF11	CSF12
CSF1	1											
CSF2	0.625**	1										
CSF3	0.325	0.669**	1									
CSF4	− 0.041	0.092	0.395	1								
CSF5	0.376	0.479*	0.330	0.486*	1							
CSF6	0.342	0.152	0.009	0.123	0.255	1						
CSF7	− 0.082	0.187	0.113	− 0.269	− 0.309	− 0.312	1					
CSF8	0.270	0.550**	0.483*	0.176	0.110	0.020	− 0.018	1				
CSF9	0.426	0.653**	0.444*	0.181	0.438*	− 0.102	− 0.042	0.636**	1			
CSF10	0.517*	0.389	0.135	0.175	0.272	0.079	− 0.165	0.474*	0.389	1		
CSF11	− 0.197	0.098	0.430	0.003	− 0.134	− 0.087	0.160	− 0.162	− 0.195	− 0.425	1	
CSF12	− 0.364	− 0.251	0.286	0.153	− 0.154	− 0.090	0.004	0.163	− 0.058	− 0.425	0.205	1

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Table 5
Spearman correlation between cooperation and competitiveness CSF.

	CSF1	CSF2	CSF3	CSF4	CSF5	CSF6	CSF7	CSFC8	CSF9	CSF10	CSF11	CSF12
CSF_A	0.112	− 0.105	− 0.022	0.176	0.204	0.549**	− 0.014	− 0.160	− 0.143	− 0.180	0.036	− 0.076
CSF B	0.122	0.014	0.035	0.119	− 0.042	0.126	0.130	0.049	− 0.046	0.212	0.069	− 0.212
CSF_C	0.244	0.315	0.175	0.520*	0.708**	0.021	− 0.076	0.235	0.594**	0.497*	− 0.325	− 0.218
CSF_D	− 0.416	− 0.697**	− 0.708**	− 0.164	− 0.422	0.115	− 0.085	− 0.584**	− 0.545*	− 0.272	− 0.213	0.071
CSF_E	0.187	0.021	− 0.064	0.322	0.334	0.164	− 0.066	− 0.115	0.010	0.358	− 0.137	0.016
CSF_F	0.704**	0.370	0.141	0.164	0.363	0.229	− 0.002	0.169	0.231	0.721**	− 0.298	− 0.446*

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

generate better results than the ones obtained individually (Kim et al., 2013) and, due to the high external competition, the best tactic becomes cooperating within the network, aiming at obtaining performance levels beyond what would have been possible (Peng et al., 2012).

5. Conclusions

The objective of this article was reached, which was analyzing the critical success factors (CSF) related to coopetition on a business network. Hence, this research contributes to coopetition theory as it performs an in-depth analysis of coopetition within a business network by means of the correlations among cooperation and competition critical success factors. By applying Petter's et al. (2017) model, which was based on a systematic review regarding networks and coopetition, the results of this study suggest that there are preponderant factors for coopetition to occur in a business network, which in turn depend upon cooperation and competition CSF.

Moreover, akin to the literature on critical success factors, which aims to identify the set of conditions and capabilities that help businesses achieve their objectives (Besser & Miller, 2011; Chen & Karami, 2010; Dasanayaka, 2012; Kee, 2012; Lin, 2016; Road, 2010), the identification of coopetition CSF may help managers focus on what is really important to leverage their businesses within a coopetitive context, and even improve the network coopetition dynamics as a whole.

Overall, the network results showed high competitiveness and medium cooperation. However, the critical success factors (CSF) that constitute cooperation showed high dispersion in relation to the mean. On one hand, the network showed high indexes for cooperation CSF such as conflict management (CSF 6), trust (CSF 1), culture (CSF 4), sharing (CSF 5), and governance (CSF 11), corroborating the importance of trust and governance to maintain a business network. On the other hand, the network still needs maturation, mainly in relation to the Exchange of knowledge (CSF 3) and resources (CSF 2), in order to leverage competitiveness.

With regard to correlations among cooperation critical success factors, several CSF stood out: Synergy (CSF 2), Control and Standardization (CSF 8), and Adaptability and Alignment (CSF 9). Particularly, Synergy (CSF 2) presented positive significant correlations with other 5 cooperation CSF, namely, trust (CSF 1), exchange of experiences and learning (CSF 3), sharing (CSF 5), control and standardization (CSF 8), and adaptability and alignment (CSF 9). This result suggests that synergy acts as a catalyzer or underpinning for other types of cooperation, which is in accordance with the literature (Pathak, Wu, & Johnston, 2014; Raza-Ullah et al., 2014). With regard to correlations among competition CSF, intangible resources (CSF F) presented positive significant correlations with production competence (CSF B); innovation competence (CSF C); and people management (CSF E), corroborating the importance of intangible resources for companies overall competitiveness.

With regard to coopetition correlations, that is, correlations among cooperation and competition CSF, several significant positive strong correlations were identified, suggesting the importance of cooperation for competitiveness. Particularly, the results indicated a positive correlation between innovation competence (CSF C) and four cooperation CSF, namely, culture (CSF 4), sharing (CSF 5), adaptability and alignment(CSF 9), and interdependence (CSF 10), confirming the importance of cooperation for innovation, especially by means of resources sharing (Dahl, 2014, Salvetat, Géraudel, & d'Armagnac, 2012).

Finally, another result showed that companies with less competence regarding financial resources are more engaged in cooperation. Specifically, financial resources (CSF D) presented negative significant correlations with four cooperation CSF: synergy (CSF2), exchange of experiences and learning (CSF3), control and standardization (CSF8) and adaptability and alignment (CSF9). This result suggests companies engage in coopetitive relationships in order to obtain better results than those they would obtain individually by sharing resources and valuable knowledge (Hung & Chang, 2012, Hong & Vai, 2008), and particularly for small businesses, in order to overcome common limitations (Chennamaneni & Desiraju, 2011) such as financial constraints.

In summary, the results show a business network with a high competition level and a medium cooperation level, but with high levels in several cooperation CSF (trust, culture, sharing, conflict management and governance), wherein businesses engage in coopetitive relationships in order to overcome their limitations (e.g. financial) mainly by sharing resources and knowledge and, as consequence, benefit most from these relationships by achieving higher levels of innovation competence.

6. Limitations, implications and future research directions

In line with other coopetition studies identified by Bengtsson & Raza-Ullah (2016) as composing the actor school of thought, this study analyzes the main coopetitive CSF of a business network. Particularly, two analysis levels are employed: the company level and the network level. In one hand, Petter's et al. (2014) model does not include CSF in the dyad level, contrary to research aligned with Bengtsson & Raza-Ullah's (2016) activity school of thought, which focuses on the tensions of the paradoxical coopetitive dyad. On the other hand, this research analyzes the tensions (and positive relations) between cooperation and competition CSF by means of correlation tests. Thus, by studying coopetition on company and network levels, this research moves a first step toward Bengtsson & Raza-Ullah's (2016) multilevel blended school of thought. Future research could deepen even further this multilevel approach in different ways. For instance, future research could explore CSF differences between levels, such as comparing CSF that are important for specific business dyads, network subgroups, and the network as a whole.

Besides, it is worth mentioning that Petter's et al. (2014) model also includes external CSF such as systemic (regional limited) and sectorial factors (industry limited), which could influence both cooperation and competition. However, as this research mainly focuses on companies related to the gastronomic industry from the same region in Southern Brazil, the systemic and sectorial factors were not analyzed as they are similar for all companies. Notwithstanding, comparing the impact of these external critical success factors on coopetition between different

regions or industries is a venue for future studies.

Moreover, the limitations of the methodology include the use of the model and the questionnaire originally elaborated by Petter et al. (2014, 2017) and the AHP method itself for the general analysis of competitiveness, which attributes the weight of critical factors according to the governance of the studied network. Despite that fact, it is believed that the methodology was adequate, since the questionnaire is based on a bibliometric analysis on the theme of coopetition, and most analyses conducted were on the level of CSF, i.e., before applying the weights of the AHP methods, allowing more direct comparisons with other studies. The statistical tests, especially Spearman correlation, were also considered adequate even though the relatively small sample size, since statistically significant effects were indeed found. Future research could also employ more robust statistical tests such as regression or structural equations modeling, but these would demand larger samples.

Finally, it is worth noting that this research contributes to the theory as it analyzes the coopetitiveness of a business network through the correlations between the critical success factors for cooperation and competitiveness. The research also contributes to the practice, since the analysis of CSF may be replicated by the managers of business networks with the purpose of leveraging coopetitiveness.

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