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MARCOS VINÍCIUS BITENCOURT FORTES

**MANAGING PARADOXICAL TENSIONS TOWARD RELATIONSHIP VALUE IN
INTERORGANIZATIONAL NETWORKS**

PORTO ALEGRE

2022

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Thesis presented as a partial requirement to obtain the title of "Doutor em Administração", by the Universidade do Vale do Rio dos Sinos – UNISINOS and the title of “Dottore di Ricerca in Management Engineering and Real Estate Economics” by the 'Università degli Studi di Padova.

Advisor: Prof. Ph.D. Douglas Wegner

Co-advisor: Prof. Ph.D. Lara Agostini

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ABSTRACT

This thesis explored the themes: of paradox management, paradoxical tensions, and relationship value. The thesis objective was to investigate how paradox management contributes to the relationship value in interorganizational networks. In particular, the research explored how tensions emerged from paradoxical elements in interorganizational networks, the role of paradox management in preventing and managing tensions, and the effects of paradoxical tensions on the relationship value in interorganizational networks. A systematic literature review that combined the interorganizational and the paradox literature showed research gaps that guide this study through an inductive approach. Multiple case studies were conducted to meet the objectives. The theoretical sample was composed of two R&D Networks and two Retail Networks. Through within-case analyses and cross-case analyses, the study could present propositions regarding the paradox management contribution to the relationship value in interorganizational networks. Data from the empirical field showed that: (a) contextual factors influence the strength of paradoxes' poles, which indicates the best response to prevent latent tensions from escalating; (b) paradox management practices may prevent tensions by reframing paradox poles to network members; (c) tensions may emerge when a paradox pole fail to meet network members' expectations; (d) paradox management may mediate the conflicts to keep paradoxes in an equilibrium state, where tensions may not emerge; (e) effective paradox management may prevent paradoxical tensions from harming relationship value in interorganizational networks. These findings contribute to the literature by a paradigm break, which expands the knowledge of previous models and answers a call by the literature regarding which conditions would guide the choice of the best response to paradoxes. Managerial contributions were presented, as well as recommendations for future studies, which may enable the management of paradoxes.

Keywords: paradox, tensions, contradiction, relationship value, interorganizational relationships, interorganizational networks

RIASSUNTO

La presente tesi è incentrata sui i temi: la gestione del paradosso, delle tensioni paradossali e del valore relazionale. L'obiettivo di questo studio era di rispondere alla domanda su come la gestione del paradosso contribuisce al valore della relazione nelle reti interorganizzative. Inoltre, la ricerca ha esplorato come le tensioni emergono degli elementi paradossali nelle reti interorganizzative, il ruolo della gestione dei paradossi nella prevenzione e gestione delle tensioni e gli effetti delle tensioni paradossali sul valore della relazione nelle reti interorganizzative. Una revisione sistematica della letteratura che ha combinato la letteratura interorganizzativa e paradossale ha evidenziato lacune nella ricerca che guidano questo studio attraverso un approccio induttivo. Sono stati condotti studi di casi multipli per rispondere alle domande di ricerca. Il campione teorico era composto da due Reti R&D e due Reti Retail. Attraverso analisi interne dei casi e analisi incrociate, lo studio potrebbe presentare proposte riguardanti al contributo della gestione del paradosso al valore della relazione nelle reti interorganizzative. L'analisi dei dati ha permesso evidenziare che: (a) che i fattori contestuali influenzano la forza dei poli dei paradossi, che indica la migliore risposta per evitare che le tensioni latenti diventino salienti; (b) le pratiche di gestione del paradosso possono prevenire le tensioni riformulando i poli del paradosso ai membri della rete; (c) possono emergere tensioni quando un polo paradosso non riesce a soddisfare le aspettative dei membri della rete; (d) la gestione dei paradossi può mediare i conflitti per mantenere i paradossi in uno stato di equilibrio, in cui le tensioni potrebbero non emergere; (e) un'efficace gestione del paradosso è in grado di impedire che le tensione possono danneggiare il valore della relazione nelle reti interorganizzative. Questi risultati contribuiscono alla letteratura con una rottura di paradigma, che espande la comprensione dei modelli precedenti e risponde a una domanda della letteratura su quali condizioni guiderebbero la scelta della migliore risposta ai paradossi. Sono stati presentati contributi manageriali, che possono consentire la gestione dei paradossi. Inoltre, vengono presentate raccomandazioni per studi futuri.

Parole chiave: paradosso, tensioni, contraddizione, valore relazionale, relazioni interorganizzative, reti interorganizzative

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1 INTRODUCTION

1.1 THEME AND PROBLEM DEFINITION

The effective management of paradoxes (competitive forces) in interorganizational relationships has developed into an effective mechanism to leverage firms' performance (e.g., Bills et al., 2021; Runge et al., 2022; Úbeda-García, 2020). Regardless of its advantages, tensions' contradictory and risky emergence transforms paradoxes into a challenge for interorganizational relationships (Gnyawali et al., 2016; Gernsheimer et al., 2021). Given its complexity and potentially damaging nature, certain paradoxes, such as cooperation-competition (coopetition), are recognized as one of the most complex and demanding organizational phenomena (Jakobsen, 2020; Gernsheimer et al., 2021).

The presence of tensions emerging from paradoxes in interorganizational literature (e.g., Dyer et al., 2018; Schrage & Rasche, 2021) may impact interorganizational performance negatively (e.g., Niesten & Stefan, 2019; Raza-Ullah, 2020). Consequently, these require attention from researchers and practitioners, as tensions may interfere with the interorganizational relationship value. This thesis examines these paradoxical tensions in interorganizational networks.

There is evidence of relationship value in a variety of interorganizational contexts, e.g., collaborative innovations (Zhang et al., 2017; Patrucco et al., 2022; Juo & Wang, 2022), corporate venture capital (Weber et al., 2016), and supply chain (Terpend & Krause, 2015; Cislighi et al., 2021; Vanpoucke et al., 2021). However, the literature on interorganizational relationships has also highlighted that tensions originating from paradoxes may harm value creation, value appropriation, and competitive advantage (Dyer et al., 2018). Consequently, these may decrease the relationship value.

Previous studies identified that ineffective tension management might lead to the failure of interorganizational relationships (Casey & Lawless, 2011; Niesten & Stefan, 2019), cause a deterioration in cooperative performance (Raza-Ullah, 2020), spark interorganizational conflicts (Van Fenema & Loebbecke, 2014), and cause deficiencies in value creation (Dyer et al., 2018), and value distribution (Van Fenema & Loebbecke, 2014). On the other hand, effective tension management may influence interorganizational relational performance (Bills et al., 2021; Runge et al., 2021; Úbeda-García, 2021)

Although such tensions may occur in interorganizational relationships, as noted by previous studies (Das & Teng, 2000; Van Fenema & Loebbecke, 2014; Vangen et al., 2015; Gnyawali et al., 2016; Ahola, 2018; Pinkse et al., 2018), there is a dearth of literature exploring ways in which manage them (Van Fenema & Loebbecke, 2014; Henry et al., 2020, Bills et al., 2021; Schrage & Rasche, 2021). Regarding coopetition, although the importance of knowledge can be exchanged for value creation and appropriation, only a limited number of studies investigated the way in which firms manage the paradoxical elements (Gernsheimer, 2021). Additionally, the need to manage certain types of tensions, innately paradoxical tensions, such as coopetition, already requires organizations to develop suitable frameworks (Van Fenema & Loebbecke, 2014) and specific expertise (Wilhelm & Sydow, 2018).

Certain studies address the way in which organizations and their members cope with conflicting demands and paradoxes. However, no studies in the interorganizational literature regarding paradoxes and contradictions address a broader sample of responses to paradoxes (Carlson et al., 2016). Examples of understanding the dynamic behind the emergence of tensions, regardless of the paradox, arise from organizational literature (e.g., Smith & Lewis, 2011). Smith and Lewis (2011) proposed that a dynamic equilibrium between paradoxical forces would solve paradoxes through virtuous cycles, which would lead to long-term performance.

Despite the wealth of organizational literature, no general framework exists in the case of paradoxical situations to explain the relationship between paradoxes, tensions, and firms' outcomes in an interorganizational context. Additionally, no comprehensive framework is proposed to systematically examine the tensional or paradoxical factors in networks (Wang & Ran, 2021). According to Niesten and Stefan (2019), an imbalance between paradoxical elements will lead to failure, while a paradox balance will lead to resolution. However, little is known about the factors that influence this process.

Scholars have advocated more precise and process-oriented theorizing regarding the emergence, evolution, and implications of paradoxes (Carlson et al., 2016), as well as the need for more systemic research into the dynamics of paradoxical tensions (Szentés, 2018). The integration between the relational perspective (e.g., Biggemann & Buttle, 2012; Dyer et al., 2018; Crick & Crick, 2021; Patrucco et al., 2022; Juo & Wang, 2022) and the paradox theory (e.g., Smith & Lewis 2011; Niesten, & Stefan, 2019; Cunha & Putnam, 2019) may advance the comprehension regarding the role of paradox management in preventing tensions from harming the relationship value of interorganizational networks (Biggemann & Buttle, 2012)

In line with the previous discussion, the question that guides this research is the following: How does paradox management contribute to the relationship value in interorganizational networks? Efficient paradox management may be achieved by better understanding the dynamics behind the emergence of tensions from paradoxical elements. Hence, the objectives of this thesis are as follows:

1.2 OBJECTIVES

According to the previous research gaps, this thesis has a general objective to identify the way in which paradox management contributes to the relationship value in interorganizational networks. Moreover, the specific objectives are: (a) to identify how tensions emerge from paradoxical elements in interorganizational networks; (b) to identify the role played by paradox management before and after the emergence of paradoxical tensions and; (c) to analyze the effects of paradox management practices on the relationship value.

1.3 JUSTIFICATION AND DELIMITATION

The investigation into the paradox's management roles in terms of the relationship value of interorganizational networks' is relatively under-researched. Hence, due to the previous gaps in knowledge, this research is justified due to its potential contribution to expanding the literature on paradoxes and interorganizational relationship fields. Previous literature has investigated and proposed models to explain certain paradoxes, such as decision-making inclusiveness-efficiency (Henry et al., 2020) and coopetition (Gnyawali et al., 2016). Despite the efforts of the organizational literature in tackling generic models (e.g., Smith & Lewis, 2011), the research gaps necessitate a detailed investigation into a more general model applied to a variety of paradoxes in interorganizational contexts.

Previous investigations in interorganizational contexts have provided models that help to explain certain paradox types, such as coopetition (Gnyawali et al., 2016; Raza-Ullah, 2020), unity-diversity (Saz-Carranza & Ospina, 2010), and the decision-making efficiency-inclusiveness paradox (Schmidt, 2019; Henry et al., 2020). However, the literature still lacks studies regarding a variety of paradoxes (Carlson et al., 2016). This thesis is justified, as it addresses research gaps and expands the literature through propositions that may be applied to

different paradox types. Additionally, despite the highlighted importance of paradoxical tensions and their potential to damage relationship value (Biggemann & Buttle, 2012), previous studies did not elaborate sufficiently on the role of paradox management in preventing tensions from influencing the relationship value.

Regarding managerial contributions, this research is justified as it provides insights into the management of competitive forces. Despite the advantages of collaborating, managers face challenges regarding the management of competitive forces (paradoxes) in interorganizational relationships. The interorganizational literature has a close relationship with the empirical field. Hence, the issue of paradox resolution represents a concern that emerges from the firms' difficulties in managing competing demands. For example, regarding the decision-making inclusiveness-efficiency paradox, in interorganizational networks where there is no hierarchy, tensions may be solved without an imposed decision. The lack of hierarchy challenges managers to provide solutions to cope with the interest of network members. As a consequence, the investigation regarding paradox management and its contribution to the relationship value may improve the management of competitive forces in interorganizational relationships.

Interorganizational networks were selected to investigate the phenomenon. According to the thesis objectives, interorganizational networks represent an effective context to investigate the phenomenon, as they constitute a complex arrangement in which paradoxical tensions may emerge (Provan & Kenis, 2008). Different from dyad relationships, interorganizational networks are "*three or more legally autonomous organizations that work together to achieve not only their own goals but also a collective goal*" (Provan & Kenis, 2008, p.231). The number of actors may increase the complexity, which may require more effort to manage the paradoxes.

Researchers and practitioners may take advantage of this thesis since the resolution of these paradoxical tensions may facilitate the achievement of relationship value. Accordingly, preventing tensions from emerging can lead to the avoidance of conflicts, which are a negative result of paradoxes (Chung & Beamish, 2010, Smith et al., 2012) and may undermine relationship value.

1.4 Chapter structure and thesis structure:

The thesis is organized into seven chapters. Chapter One presents the theme, the research gap, and the thesis objectives. Chapter Two presents the theoretical background, introduces the paradox theory, and explores the study of paradoxes in interorganizational

contexts. Chapter Three presents the research method and design used in the study. Chapter Four presents the within-case analysis consisting of the four case studies: R&D Network A, R&D Network B, Retail Network C, and Retail Network D. Chapter Five presents the cross-case analysis and propositions emerging from the field. Finally, Chapter Six concludes the thesis with theoretical and managerial implications, as well as future research directions.

2 THEORETICAL BACKGROUND

This chapter introduces the theme of interorganizational relationships and relationship value to contextualize the literature field, understand the interorganizational relationship types and identify the empirical setting. Additionally, the chapter introduces the main aspects of the paradox theory. Besides an introduction to Paradox Theory, this chapter presents a systematic literature review regarding the paradoxes in the interorganizational literature.

2.1 INTERORGANIZATIONAL RELATIONSHIPS AND RELATIONSHIP VALUE

The interorganizational relationships literature has been receiving attention from researchers and practitioners. Interorganizational relationships (IOR) include a variety of arrangements, such as strategic alliances and various forms of interorganizational networks (Ring & Van de Ven, 1994). Common arrangements that appear in IOR literature are (1) strategic alliances, which stands for “*voluntary arrangements between firms involving exchange, sharing, or co-development of products, technologies, or service*” (Gulati, 1998, p.293), and (2) interorganizational networks, which may be defined as “*three or more legally autonomous organizations that work together to achieve not only their own goals but also a collective goal*” (Provan & Kenis, 2008 p.231). This study focuses on interorganizational networks, which have been an object of study in management literature during the last decades. This study investigates two types of interorganizational networks: R&D Networks and Retail Networks. The former refers to networks that have research or product development purposes, while the latter refers to networks with strategic purposes, which include collective purchasing, collective negotiation, and other collective operations.

Scholars in the strategy field attempt to explain the difference in firms’ performance through competitive advantage (Dyer & Singh, 1998). Competitive advantage has long been the central focus of managerial literature. The debate has concentrated on Porter's (1980) industrial approach and Barney's (1991) resource-based view (RBV) for a considerable time. More recently, Dyer and Singh (1998) proposed the relational view, an extension of RBV, which focus on relational rents as a source of competitive advantage.

Barney (1991) defines resources as the total assets, capabilities, organizational processes, attributes, information, and knowledge that enable the implementation of the firm's strategies and improve its efficiency and effectiveness. These resources can be grouped into

three categories: (a) physical capital resources, (b) human capital resources, and (c) organizational capital resources. The competitive advantage - and its sustainability – derives from the firm's resources, heterogeneity, and immobility. The unique resources that lead to a competitive advantage must have four attributes: they must be (a) valuable, (b) rare, (c) imperfectly imitable, and (d) without strategically equivalent substitutes.

Complementary to the RBV perspective, Dyer and Singh (1998) assert that these resources can be obtained or developed beyond the firm's boundaries. The relational view assumes that interorganizational relationships play an essential role in developing unique resources, which leads to value creation and competitive advantage. The main difference between intraorganizational and interorganizational approaches arises from the perception that interorganizational relationships may expand the firm's boundaries. By expanding the firm's boundaries, the organization can develop resources that create value for the organization.

Interorganizational relationships have an intrinsic value that may be defined as relationship value (Biggemann & Buttle, 2012). Different perspectives on relationship value have been proposed in the literature, capturing economic or utility-related factors (tangible) and factors related to strategic, social, or behavioral (intangible) (Tzempelikos, 2020). This thesis focuses on Biggemann and Buttle's (2012) taxonomy. Biggemann and Buttle (2012) proposed that actors identify and classify the business-to-business relationship value according to the historical and social context of the focal relationship, other relationships, and expectations of the future. Additionally, they propose a taxonomy to classify the relationship value. Figure 1 illustrates the categories.

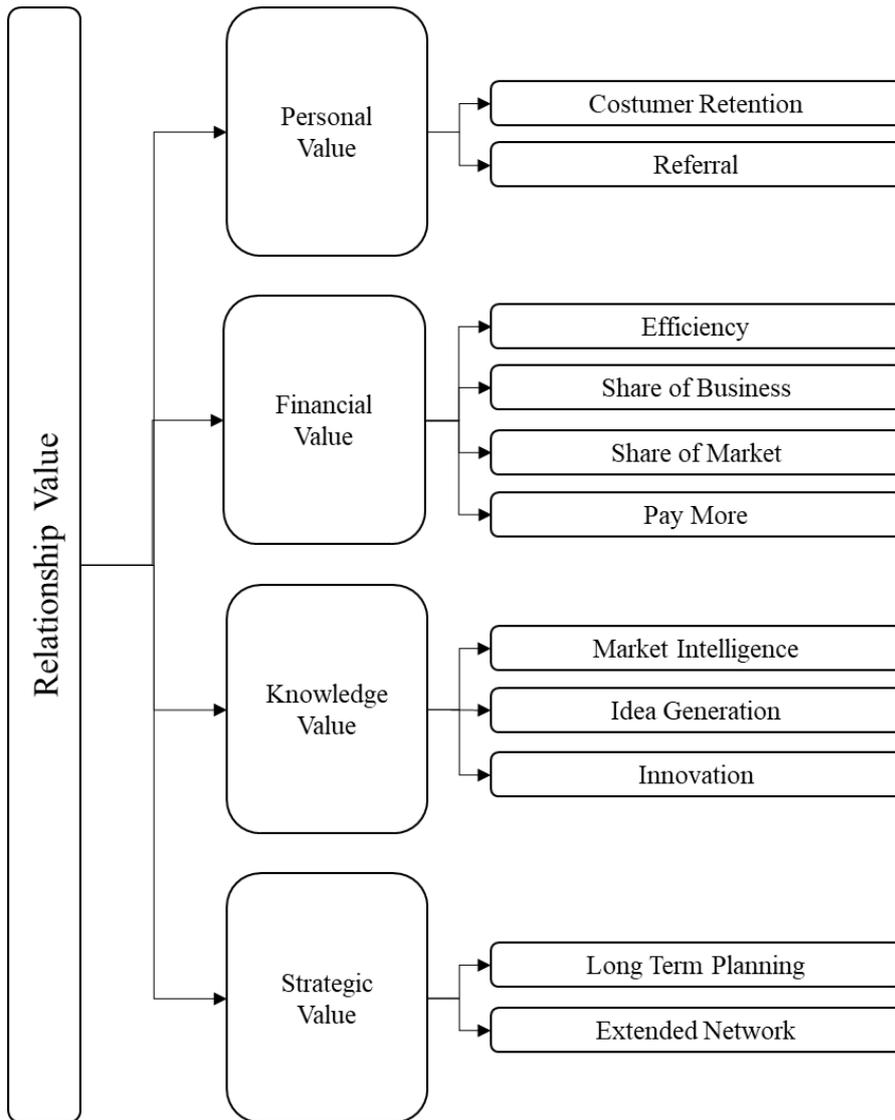


Figure 1. Relationship Value Dimensions (Biggemann & Buttle, 2012).

According to Biggemann and Buttle (2012), the relationship value is perceived differently by the actors in a relationship. Accordingly, relationship value is a subjective construct that may vary for each firm according to the historical and social context, other relationships, and expectations of the future. Biggemann and Buttle (2012) proposed four categories of relationship value: **Personal Value** is composed of two subdimension: (a) customer retention, which is the expectation to keep the customer or supplier for the long-term; and (b) referral, which is the counterpart's willingness to share positive experiences with other parties; **Financial Value** is composed of four subdimensions: (a) Efficiency, which is the difference or ratio between inputs and outputs; (b) Share of business, which is the percentage of the business that is shared with the counterpart; (c) Share of the market, which is the

percentage of the market that is captured; and (d) Price differential, which is the customer's willingness to pay more before switching to the competitor or the supplier's willingness to reduce the price before seeking another customer; **Knowledge Value** is composed of three subdimensions: (a) Market intelligence, which is the information related to the market that comes from the counterpart; (b) Idea-generation, which is the outcomes of participating and discussing ideas together; (c) Innovation, which refers to opportunities created to introduce a new or improved product or services ; **Strategic Value** is composed of two subdimensions: (a) Long-term planning, which represents an increased time horizon for planning, scheduling, and demand forecasting; and (b) Extended network, which are the benefits that come from third parties through the relationship.

A set of studies confirmed that the relationship goes beyond the financial dimensions, including the personal, knowledge, and strategic value perceived by firms in interorganizational relationships (e.g., Cislighi et al., 2021; Tzempelikos, 2020). In other words, the value of a relationship is more relation-specific than transaction-specific (Tzempelikos, 2020). As proposed by Biggemann and Buttle (2012), the relationship value is a multidimensional construct. In other words, the value of a relationship is more relation-specific than transaction-specific.

Further investigations identified that formal and informal governance mechanisms contribute to the generation of value in relationships at different stages of the IORs development process (Cislighi et al., 2021). Formal governance resides in third-party enforcement agreements (e.g., contracts), and informal governance relies on self-enforcing agreements generated by the growth of goodwill trust between the members of the interorganizational relationship (Dyer & Singh, 1998). Sometimes formal arrangements (explicit contracts) work better, though, in other situations, relational (informal) governance may be superior to achieving better performance (Sjödén et al., 2019) or enough to influence interorganizational network performance (Wegner & Koetz, 2016).

According to Dyer et al. (2018), formal governance is important in a new relationship when the connection is not mature enough for a trust-based bond to develop; contrastingly, in mature relationships, informal governance mechanisms can prove more effective. Hence, governance is a determinant of relational value because the ability of members to establish the proper governance structure can minimize transaction costs and maximize value creation initiatives (Dyer & Singh, 1998).

The relationship value may be affected by the presence of tensions emerging from paradoxes, which according to previous studies, negatively impact interorganizational performance (e.g., Niesten & Stefan, 2019; Raza-Ullah, 2020).

2.2 PARADOXES THEORY

2.2.1 Defining Paradoxes, Tensions, and Contradictions

A challenge faced by interorganizational networks refers to the management of paradoxes. Competition versus cooperation (e.g., Chou & Zolkiewski, 2018, Das & Kumar, 2010, Das & Teng, 2000), rigidity versus flexibility (e.g., Schmidt, 2019, Vangen, 2017; Tóth et al., 2018), and knowledge sharing versus knowledge-protection (e.g., Anokhin et al., 2011; DeFillippi & Sydow, 2016; Fernandez & Chiambaretto, 2016; Fernandez, 2019) are examples of paradoxes that pose challenges to interorganizational relationships. The conceptual distinction among paradoxes, contradictions, and tensions (Putnam et al., 2016) is vital to this discussion. Although part of the literature suggests that the terms paradox and tension are interchangeable and synonymous (Putnam et al., 2016), there is no consensual adoption or differentiation of these concepts. Scholars frequently use "tensions" or "paradoxical tensions" (Schrage & Rasche, 2021) to signify all paradoxical dynamics (Putnam et al., 2016). Hence, it is necessary to carefully disentangle these concepts because of the subtle differences in their meanings.

In this thesis, tensions are understood as negative consequences, such as strain and conflict, that result from contradictory goals and interests between collaborating actors and can hamstring, aggravate, or even break up business relationships and network partnerships (Tura et al., 2019). Therefore, tensions may be classified as conflicts (Tidström, 2014). Tensions may emerge especially in paradoxical elements because paradoxes represent *"contradictions that persist over time, impose and reflect back on each other, and develop into seemingly irrational or absurd situations because their continuity creates situations in which options appear mutually exclusive, making choices among them difficult"* (Putnam et al., 2016, p. 8). The management literature defines paradoxes as at least two contradictory elements that impact on and reflect each other, which represents their contradictory and interdependent nature (Schad et al., 2016). Consequently, paradoxes emphasize poles of distinction and inconsistencies between elements (Vangen, 2017) and focus on contradiction. Contradiction "refers to polar opposites that are interdependent, define each other, and can potentially negate one another" (Putnam et al., 2016, p. 10).

Accordingly, firms may notice tensions since it is experienced in empirical settings. In contrast, paradoxes refer to phenomena that occur at a higher level of abstraction and arise from the contradiction and logical interdependence between elements. Firms may not even recognize the paradox but notice the tension that emerges from it. Table 1 presents the key definition used in this thesis.

Table 1. Paradox, Tension, and Contradiction definitions

Concept	Description
Tension	“as negative consequences, such as strain and conflict, that result from contradictory goals and interests between collaborating actors, and can hamstring, aggravate or even break up business relationships and network partnerships” (Tura et al., 2019, p. 221)
Paradoxes	"Contradictions that persist over time, impose and reflect back on each other, and develop into seemingly irrational or absurd situations because their continuity creates situations in which options appear mutually exclusive, making choices among them difficult" (Putnam et al., 2016, p. 8).
Contradiction	"Polar opposites that are interdependent define each other, and can potentially negate one another" (Putnam et al., 2016, p. 10)

Source: elaborated by the author.

Tensions are not restricted to a specific interorganizational relationship and may occur in different contexts (Das & Teng, 2000; Gnyawali et al., 2016; Ahola, 2018; Pinkse et al., 2018). Every organization and interorganizational relationship may encounter tensions, which may be necessary to stimulate action and resist inertia. Otherwise, they can also damage relationships (Kilelu et al., 2017). Hence, the literature poses the question of how to manage paradoxes and consequently tensions that may emerge from these contradictory yet interrelated elements, thus preventing or coping with tensions.

2.2.2 Paradox Negative and Positive Outcomes

The dominant literature highlights negative outcomes from paradoxes. Previous studies identified negative outcomes arising from the contradiction between paradoxical elements (e.g., Chung & Beamish, 2010, Smith et al., 2012). Effective paradox management has been demonstrated to influence the firm’s performance through conflicts (Chung & Beamish, 2010; Smith et al., 2012) and organizational decline (Chung & Beamish, 2010; Smith et al., 2012;

Das & Teng, 2000). In addition, previous studies identified that an imbalance between exploitative and explorative innovation strategies influences the sales growth rate negatively (Raisch & Birkinshaw, 2008).

Although the current dominant literature thinking highlights negative outcomes from paradoxes, there are studies that identify positive outcomes arising from the contradiction between paradoxical elements (e.g., Smith & Lewis, 2011; Rosso, 2014). Effective paradox management has been demonstrated to influence the firm's performance by fostering ambidexterity (Raisch & Birkinshaw, 2008), innovation (Rosso, 2014), learning (Huxham & Beech, 2003), and long-term performance (Smith & Lewis, 2011).

Previous studies identified that the balanced interaction between exploitative and explorative innovation strategies is positively related to the sales growth rate (Raisch & Birkinshaw, 2008), and a dynamic paradox equilibrium fosters sustainability. Firms achieve short-term improvement while ensuring long-term performance because firms learn how to adapt and to growth (Smith & Lewis, 2011; Schmitt & Raisch, 2013). More specifically, a dynamic equilibrium enables long-term performance through three mechanisms (Smith & Lewis, 2011): (1) enabling learning and creativity, (2) fostering flexibility and resilience, and (3) unleashing human potential.

2.2.3 Dynamic Equilibrium Model

The Dynamic Equilibrium Model explains the paradoxes dynamics and the emergence of tensions. According to Smith and Lewis (2011), the model has three primary characteristics: (1) paradoxical tensions that are both latent and salient, (2) responses to tensions that entail iterating among management strategies, and (3) the outcome or impact of management strategies on sustainability. Figure 2 presents the Dynamic Equilibrium Model.

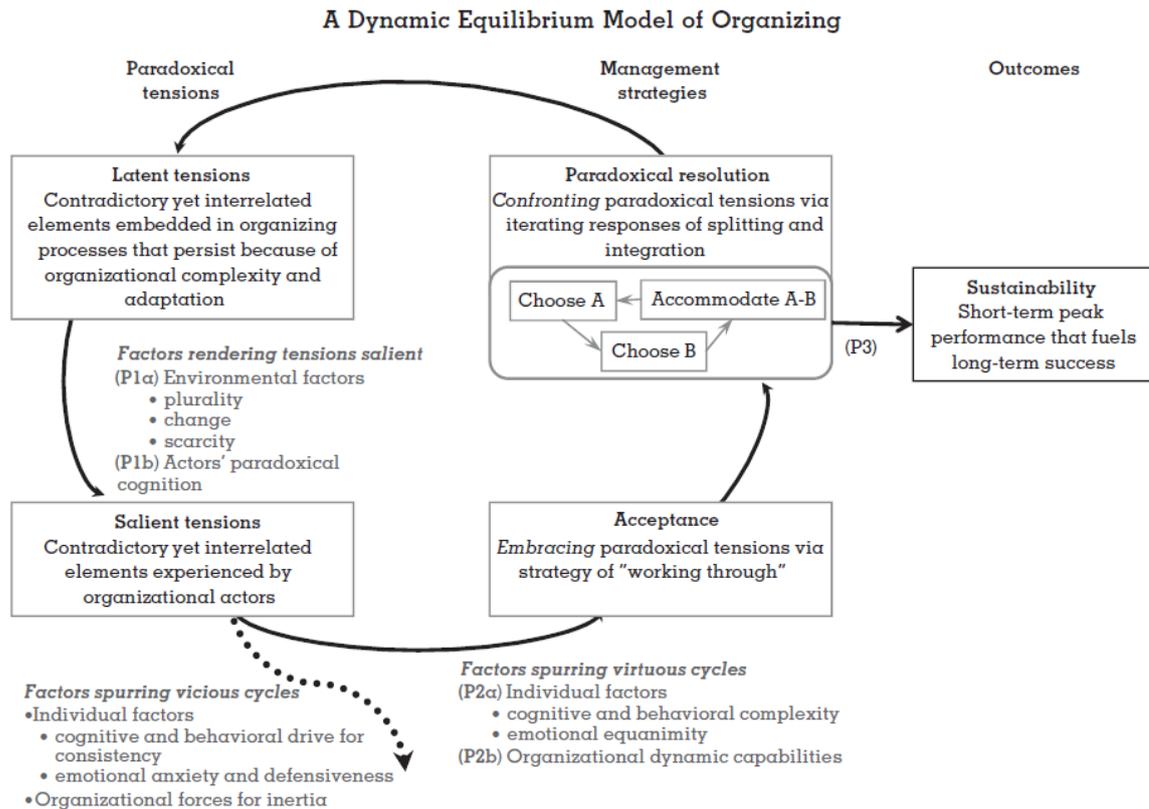


Figure 2. Dynamic Equilibrium Model (Smith & Lewis, 2011).

According to the model, tensions are inherent to the paradoxes (latent) and socially constructed by actors' cognition (salient). The process that makes actors experience tensions receives the influence of management decisions and environmental factors.

Firms must decide "what they are going to do, how they are going to do it, who is going to do it, and in what time horizon. By defining what they are trying to do, the leaders define what they are not trying to do" (Smith & Lewis, 2011 p. 388). For example, due to the contradictory interdependence between paradoxical elements, once a firm decides to increase knowledge-sharing, actors may perceive a decrease in knowledge protection.

According to the model, environmental factors contribute to making latent tensions become salient. The environmental factors are categorized into three dimensions: plurality, change, and scarcity. **Plurality** refers to a multiplicity of views in contexts of diffuse power. This expands uncertainty and contributes to the formation of competing goals. Similarly, a context of **change** spurs new opportunities for sensemaking as actors deal with conflicting short- and long-term needs. Finally, **scarcity** refers to temporal, financial, or human resource limitations (Smith & Lewis, 2011). As stated above, firms make decisions regarding what they

are focusing on and what they are not. The resource limitation may trigger tensions regarding the neglect of a need.

In addition to plurality, change, and scarcity, actors' paradoxical cognition plays an essential role in accommodating the contractor logic in individuals' sensemaking process. Despite the literature that explores the challenge of coping with contraction, there is a scarcity of paradox and IOR literature that cope with sensemaking processes. Studies regarding the coopetition, recognize the importance of sensemaking and paradox resolution (Lundgren-Henriksson and Kock, 2016; Lundgren-Henriksson and Tidström, 2021).

Sensemaking relates to the process of assigning meaning to experiences. Sensemaking explores the meaning of an experience to the participants. Another way to say this is that sensemaking occurs when actors collectively come to a common understanding regarding the meaning of an event they experienced (Weick, 1995; Kramer, 2016). Previous studies connect the sensemaking process to a dissonance between expectations and experiences. Sensemaking involves managing the equivocality of experiences that are different than expected by selecting one interpretation for the experience out of the many possible interpretations (Kramer, 2016). Events as changes spur opportunities to reframe experiences and may trigger tension episodes (Smith & Lewis, 2011). Therefore, the cognitive aspect is important to understand paradoxes.

Since Smith and Lewis (2011) recognize paradoxes as a dynamic phenomenon, the paradox management grapples with paradox towards a reinforcing cycle, which may be a virtuous or a vicious cycle, according to the management response. The dynamic equilibrium model focuses on a positive response to paradoxical tensions. *“It depicts a virtuous cycle, with awareness of tensions triggering a management strategy of acceptance rather than defensiveness”* (Smith & Lewis, 2011, p.389).

Once the management accepts the paradox, the paradox resolution happens through iterating responses of splitting and integrating the paradox poles (in Figure 2, represented by A and B). Smith and Lewis (2011) propose that the equilibrium is achieved through interwoven strategies of acceptance and resolution. Acceptance provides comfort with tensions, while resolution involves looking for responses to solve the paradoxical tensions or to prevent latent tensions from becoming salient.

2.2.4 Management Responses to Paradoxes

Paradoxes may variate in terms of press and balance (Carlson et al., 2016). Hence, paradox types are more likely to escalate from latent tension to salient tension. Carlson et al. (2016, p. 7) define press as "the pressure that the dilemma places on the organization to respond. It is a function of the strength of the pull of the two poles and the urgency of the need to respond to their demands". On the other hand, balance "is the degree to which two poles are equal in strength."

Balancing the paradox poles has been considered an effective mechanism to prevent latent tensions from becoming salient (Smith & Lewis, 2011; Carlson et al., 2016; Niesten & Stefan, 2019). Balancing a paradox requires the identification of factors that influence paradox poles. Examples of factors that may influence the paradox's press and balance are governance mode (e.g., Provan & Kenis, 2008), level of consensus (e.g., Woo, 2019), market-level uncertainty (e.g., Beckman et al., 2004), dynamic capabilities (Best et al., 2021), lack of trust in the knowledge environment (Morris et al., 2020); level of engagement (Savarese et al., 2020); mutual dependency and asymmetry between firms (Jakobsen, 2020); previous relationship (Gillett et al., 2019) and knowledge asymmetry, institutional distance, absorptive capacity, reciprocal commitment (Ho & Wang, 2015).

According to certain factors, paradox management may choose one, another, or both paradox poles in order to respond to the paradox. This decision has been labeled as a response to paradoxes by a variety of authors (e.g., Carlson et al., 2016, Poole and Van de Ven, 1989; Schmidt, 2019). Poole and Van de Ven (1989) discuss the paradox and tensions management at an abstract level, which ignores the dynamic behind the tension emergence and goes directly to the paradox response. For instance, Poole and Van de Ven (1989) propose four methods to deal with paradoxes: (1) keep X and Y separate and appreciate their contrasts, (2) situate X and Y at two different levels or locations in the social world, (e.g., micro and macro levels), (3) separate X and Y temporally in the same location or (4) find some new perspective which eliminates the opposition between X and Y.

There is an overlap in organizational and interorganizational literature regarding responses to paradox. In general, the literature presents six different responses to deal with paradoxes. Table 2 summarizes the main responses to paradoxes:

Table 2. Organizational responses to paradoxes.

Response	Description
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Denial	When organizations ignore or refuse to recognize the dilemma. In this case, the organization simply proceeds as if there were no dilemma and either does not experience the tension or denies it.
Cosmetic Response	When organizations take actions that appear to address the tension but are not actually responsive. For example, an organization may hold a retreat in which the dilemma is discussed and approved measures to address it but never follow through or implement the measures.
Selection	When organizations respond to or embrace one pole of the dilemma and ignore the other. In this case, the demands and tensions associated with the other pole go unaddressed, and pressure for dealing with the omitted pole is likely to increase over time.
Alternation	When organizations switch from one pole to the next over time. In this case, both poles of the dilemma are addressed, but not simultaneously. Instead, the organization focuses most of its effort on handling one side of the dilemma until the pressure from the other builds up. At this point, the organization switches its focus to the other pole. This swing between poles continues over time.
Segmentation	When some of the units in the organization deal with one pole of the dilemma, while others deal with the other pole. In organizations, segmentation is often accomplished by assigning responsibility for different poles to distinct departments or units.
Transcendence	When organizations openly acknowledge the dilemma and tensions confronting them, accept it as a paradox, and attempt to work out creative responses. Organizations adopting this approach would emphasize continuous vigilance, adaptability, learning, creativity, improvisation, and "going with the flow." These organizations would have flexible structures, communication-intensive processes, and experimental approaches to problem-solving.

Source: Carlson et al. (2016)

In the next chapter, a literature review regarding paradoxes in interorganizational relationships is presented. Though the research focuses on interorganizational networks, there are scarce studies that deal with paradoxical tensions in the field. Consequently, mapping paradoxical tensions may contribute to a better comprehension of the phenomena and answer the research question.

2.3 LITERATURE REVIEW ABOUT PARADOXES IN INTERORGANIZATIONAL RELATIONSHIPS

2.3.1 Methodology

Aiming to carry out the literature review, a methodological approach based on Liao (2003), Durst and Runar Edvardsson (2012), and Agostini et al. (2020) was followed. Aiming to identify articles with a focus on paradoxes and tensions in interorganizational contexts, a search the main Web of Science (WoS) collection using keywords related to the context of IORs and the topic of interest was performed. Following previous studies (Liao, 2003; Durst and Runar Edvardsson, 2012; Agostini et al., 2020), the procedure was to research the terms tension, paradox, and contradiction in the publication title using the following syntax: ((tension* OR paradox* OR contradiction*)). In the topic field, the procedure was to research terms already used in other studies to identify the area of interorganizational relationships (e.g., Agostini et al., 2019; Agostini et al., 2020). Hence, this research followed the syntax: ((alliance* OR network* OR "inter-organi* relationship*" OR "interorgani* relationship*" OR partnership*)). Additionally, filters were used: language (English) and document type (article OR review OR editorial material). This search resulted in 1,849 documents. Finally, applying the field filter “business and management” and “public administration” resulted in a sample of 205 documents.

The sample of 205 documents went through an analysis of each abstract. The analysis eliminated documents that did not address the research topic of this thesis, and the initial sample was reduced to 114 articles. The most significant motivation for exclusion was because the paper did not focus on an interorganizational context (58). For instance, the word network appears in the abstract of Zhao et al.'s (2020) study as one entrepreneur’s resource for market entry timing. The second most significant motivation to exclude articles was that they addressed tensions unrelated to paradoxical elements (12). For example, Allen and Kim (2005) examine the influence of information technology (IT) on the video game industry. The word “tension” appears to describe the relationship between the industries, with no relation to a paradox. Wang et al. (2021) analyze tensions in governing megaprojects, but the tensions they analyze arise when governance mechanisms that “make sense individually present inconsistencies in combination” (p. 800). Hence, such articles were excluded since the tensions they analyze do not derive from paradoxes.

As a final step, we read the full text of those 114 articles and excluded the other 19 documents for the same reasons identified in the previous analysis. The final sample of this research consisted of 95 documents for further analysis.

2.3.2 Descriptive Analysis

The 95 documents analyzed showed a predominance of empirical studies (84.2%) over theoretical articles (15.8%), which is likely to be caused by the fact that the discussion about paradoxes has been the focus of previous organizational studies for a long time and the concepts are already consolidated (e.g., Lewis, 2011). Additionally, some studies in interorganizational relations have extensively explored and consolidated previous studies on paradoxes in management (e.g., Schad et al., 2016).

Figure 3 shows the temporal evolution of the sampled articles. The first article in the sample was published in 1997 by Uzzi, and it focuses on how social structure facilitates or derails economic action. There was an increase in articles regarding paradoxes and tensions in IORs over the last few years, which may be associated with the growing interest in this topic in the management area (Schad et al., 2016). More than half of all articles (52,6%) on the topic were published between 2016 and 2021.

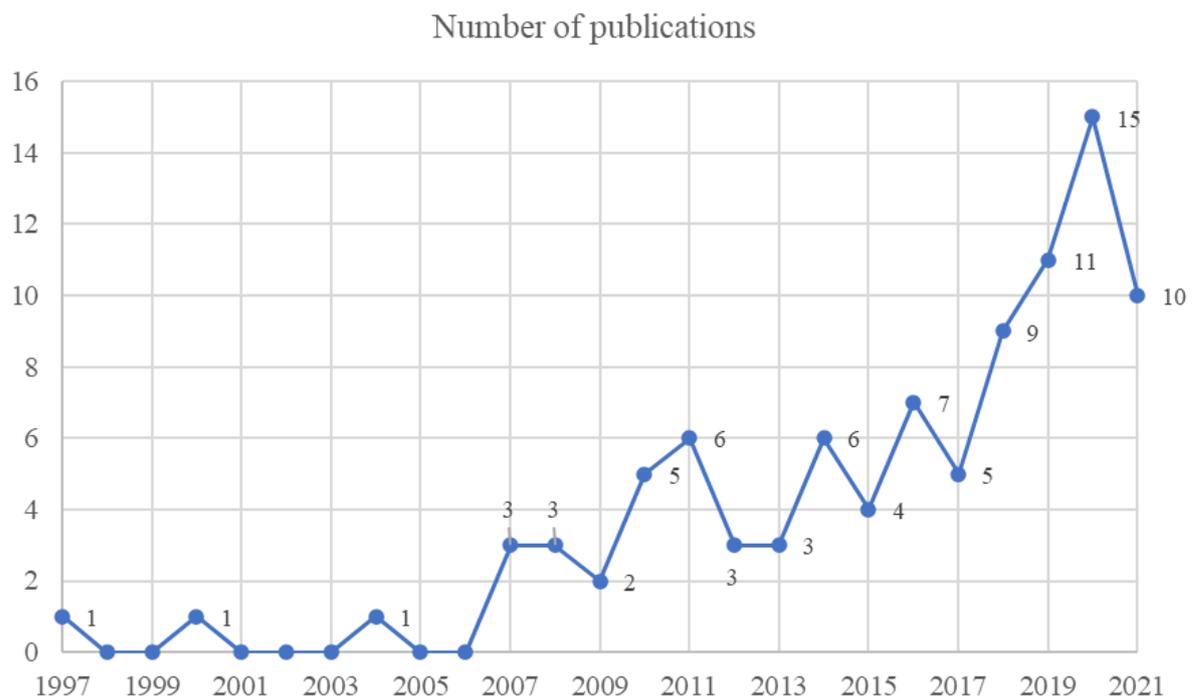


Figure 3. Temporal evolution of sampled articles.

In addition to the growing number of publications, there is an interest among researchers in adopting the case study approach as a research strategy (68.8% of empirical studies), followed by quantitative methods based on surveys (16.3%) and secondary data analysis

(8.8%). The characteristics of the phenomenon may explain the larger adoption of the case study approach since case studies are recommended to capture complex social phenomena (Yin, 2009).

By analyzing the number of citations in the WoS principal collection (January 2022) is possible to identify the most influential articles in the field. The most cited article was the seminal one by Uzzi (1997) mentioned above, which contributes to the IOR literature significantly. The discussion on how embeddedness, social structure, and networks shape organizational and economic outcomes explains the paradox of embeddedness. “While embeddedness creates a fit with the environment, it can paradoxically reduce an organization’s ability to adapt” (Uzzi, 1997, p. 57). Besides its focus on the paradox of embeddedness, the paper offers a broad explanation of the links between social structure and economic outcomes within the context of organizational networks. This focus beyond paradoxes may help explain its large number of citations (4,852 in total). Table 3 presents the ten most referenced documents in our sample.

Table 3. Mostly cited documents in the sample and number of citations since 2017

p	Reference	2017	2018	2019	2020	2021	2022	Citations per year	Total number of citations
1	Uzzi (1997)	318	317	346	302	239	10	186.62	4,852
2	Das and Teng (2000)	29	44	41	39	33	5	25.52	587
3	Jay (2013)	63	58	98	83	80	5	48.9	489
4	Raza-Ullah et al.(2014)	9	35	40	41	35	1	22,00	198
5	Fernandez et al.(2014)	8	32	43	30	20	2	19,00	171
6	Hutter et al. (2011)	28	17	22	13	18	0	12.83	154
7	Dushnitsky and Shaver (2009)	15	14	22	14	23	2	10.93	153
8	Tidstrom (2014)	8	26	26	38	22	2	16.89	152
9	Lin et al. (2013)	17	20	26	26	27	1	14.7	147
10	Lado et al. (2008)	8	10	17	15	12	1	8.87	133

Date: January 31st, 2022

2.3.3 Major Themes and Research Approaches

2.3.3.1 Paradoxes in Interorganizational Relationships

The most common paradoxes found in the literature review are cooperation vs. competition (e.g., Gnyawali et al., 2016), rigidity vs. flexibility (e.g., Fang et al., 2011), and

exploration vs. exploitation (e.g., Brown & Head, 2019, Dooley & Gubbins, 2019; Lin et al., 2013). However, many others emerged as research interests, such as autonomy vs. accountability (e.g., Vangen & Winchester, 2014), unity vs. diversity (e.g., Saz-Carranza & Ospina, 2011), economic vs. social logic (e.g., Gillet et al., 2019), and short-term vs. long-term orientation (e.g., Pajunen & Fang, 2013). Table 4 presents the paradoxes with two or more occurrences in the sample.

Table 4. Paradoxes studied in the sample.

Count	Paradox	Authors
21	Cooperation versus Competition	Chou and Zolkiewski (2018), Das and Kumar (2010), Das and Teng (2000), Dooley and Gubbins (2019), Fang et al. (2011), Fernandez and Chiambaretto (2016), Gnyawali et al., (2016), Hahn and Pinkse, (2014), Hutter et al., (2011), Prashantham et al. (2018), Pressey and Vanharanta (2016), Qian et al. (2020), Rey-Garcia et al. (2020), Ritala et al. (2017), Stadler and Van Wassenhove (2016), Tidstrom (2014); Tóth et al. (2018), Thelisson (2021), van Duijn et al. (2021), Best et al. (2021), Munten et al. (2021), Runge et al. (2021)
10	Rigidity versus Flexibility	Chou and Zolkiewski (2018), Das and Kumar (2010), Das and Teng (2000), Fang et al., (2011), Pajunen and Fang (2013), Pressey and Vanharanta (2016), Schmidt (2019), Vangen (2017), Vangen and Winchester (2014); Tóth et al., (2018)
8	Exploration versus Exploitation	Brown and Head (2019), Dooley and Gubbins (2019), Konsynski and Tiwana (2004), Lannon and Walsh (2020), Ritala et al. (2017), Ramneland Wikhamn (2020), Lin et al. (2013), Rey-Garcia et al., (2020)
7	Short-term versus Long-term Orientation	Chou and Zolkiewski (2018), Das and Kumar (2010), Das and Teng (2000), Fang et al., (2011), Pajunen and Fang (2013), Pressey and Vanharanta (2016); Tóth et al., (2018)
6	Unity versus Diversity	DeFillippi and Sydow (2016), Lindgren et al., (2015), Ospina and Saz-Carranza (2010), Rey-Garcia et al., (2020), Saz-Carranza and Ospina (2011), Sedgwick (2016)
5	Autonomy versus Accountability	Dooley and Gubbins (2019), Rey-Garcia et al. (2020), Ritala et al. (2017), Vangen (2017), Vangen and Winchester (2014)
5	Knowledge Sharing versus Knowledge-Protection	Anokhin et al., (2011); Dushnitsky and Shaver (2009), Rouyre and Fernandez (2019), Stadler and van Wassenhove (2016), Huang and Chiu (2020)
5	Value Creation versus Value Appropriation	Elfenbein and Zenger (2017), Niesten and Stefan (2019), van Fenema and Loebbecke (2014), Remneland Wikhamn (2020), DeFillippi and Sydow (2016), Stefan et al., (2021)
4	Conflicting Demands Paradox	Gillett et al. (2019), Jay (2013), Pryor and Adkins (2019), Tura et al. (2019)

5	Economic versus Social Logic	Gillett et al. (2019), Prashantham et al. (2018), Sharma and Bansal (2017). Stal et al. (2021), Best et al. (2021), Ahmadsimab and Chowdhury (2021)
3	Trust versus Distrust	Andersson-Cederholm and Gyimothy (2010), Pajunen and Fang (2013), Pressey and Vanharanta (2016)
3	Embeddedness Paradox (Economic Relations versus Social Relations)	Lazzarini et al., (2008), Meuleman et al., (2010), Uzzi (1997)
3	Centralization versus Discentralization	Määttä and Eriksson (2015); Schmidt (2019); van Duijn et al., (2021)
3	Goal Congruence versus Goal Diversity	Rey-Garcia et al., (2020), Vangen (2017), Galati et al., (2021)
2	Information Sharing versus Information Protection	Six et al., (2007), Fernandez and Chiambaretto (2016)
2	Temporary versus Permanent	DeFillippi and Sydow (2016), Stjerne and Svejenova (2016)
2	Standard versus Standard Flexibility	DeFillippi and Sydow (2016), Van den Ende et al. (2012)
2	Proximity versus Distance	Andersson-Cederholm and Gyimothy (2010), Zaheer and Hernandez (2011)
2	Power versus Trust	Horak and Long (2018); Sedgwick (2016)
2	Individualistic versus Collective Social Structure	Dooley and Gubbins (2019), Pajunen and Fang (2013)
2	External R&D versus Internal R&D	Aubert et al., (2015); Wang et al., (2017)
2	Complexity versus Simplification	Vangen (2017), Vangen and Winchester (2014)

The central discussion in this thesis is paradox management and the paradoxical tensions that may harm the relationship value in interorganizational networks. Paradox management is important due to the dynamic, contradictory, and interdependent relationship among these elements, which requires attention to prevent tensions. The mapping and definition of paradoxes and tensions may contribute to the literature because detecting and naming a paradoxical relationship may facilitate comprehension and aid sensemaking (Van Fenema & Loebbecke, 2014; Vangen, 2017).

An accurate description of the paradoxes theoretically contributes to the construction of knowledge relating to collaborative governance. It also provides conceptual support for emphasizing the importance of effective organizational management practices to manage

paradoxes (Vangen, 2017). Consequently, in this chapter, there is the description of the paradoxes that focuses on this thesis, which is: cooperation versus competition, decision-making inclusiveness versus decision-making efficiency, and knowledge-sharing versus knowledge-protection.

Cooperation-competition (coopetition) paradox is an endogenous paradox that appears in interorganizational networks because although firms engage in collaboration, they remain competitors. The dual logic that arises from competition raises managerial complexities (Raza-Ullah et al., 2013). The coopetition paradox manifests through sub paradoxes, i.e., knowledge sharing-protection, value-creation-appropriation (Van Fenema, 2014; Dyer et al., 2018). Coopetition may result in tensions arising from the knowledge sharing-protection paradox (Fernandez and Chiambaretto, 2016). Tensions may occur regarding the knowledge sharing-protection paradox due to firms' concern about protecting their knowledge from competitors. The concern of knowledge protection is not exclusive to competitors, but it increases when competitors are involved in the same IOR.

The paradox between efficiency and inclusion in decision-making may contribute to tensions because, on the one hand, the more inclusive the decision-making process, the more time-consuming it tends to be (Provan & Kenis, 2008). On the other hand, reducing members' participation decreases decision-making resources. It speeds up the process, yet it can also weaken the long-term legitimacy of decisions. These elements are contradictory and interdependent and may lead to the emergence of tensions. The elements that make up this paradox have a high impact on interorganizational networks because collaboration requires internal and external legitimacy (Provan & Kenis, 2008). Thus, the inclusion of members in the decision-making process contributes to their sense of belonging, which is necessary for imbuing collective actions with legitimacy in the eyes of their members and third parties. On the other hand, the interorganizational network may demand quick responses to environmental changes, which favors efficient decision-making processes. For instance, interorganizational networks created for civil emergencies (Berthod et al., 2017) need a rapid response in times of crisis, which may be incompatible with facilitating the participation of all members in the decision-making process: this tips the balance toward efficiency.

2.3.3.2 Research on Factors that influences paradoxes

The Dynamic Equilibrium Model states that latent tensions become salient according to plurality, change, and scarcity (Smith & Lewis, 2011). The literature review provided a set of factors that do not fit in these dimensions but still influence the paradox poles' relational strength. In this chapter, four factors are presented and discussed: network governance mode, trust, partner selection, and problem-solving processes.

Network Governance Mode: Provan and Kenis (2008) present three modes of network governance: (a) participant-governed networks, (b) lead organization, and (c) network administrative organization. Each of these modes represents a distinct type of organizational networking that defines how strategic decision-making happens. Participant-governed networks are a simple and common form of interaction in which the interorganizational network is governed directly by its members. Interorganizational networks governed by a lead organization are common in vertical buyer-supplier relationship settings (Provan & Kenis, 2008). In this kind of governance, all major network-level activities and key decisions are coordinated through and by the lead organization (Provan & Kenis, 2008). The third mode of network governance is called a network administrative organization (NAO). This interorganizational network is governed by an administrative entity specifically created to govern the network and its activities (Provan & Kenis, 2008). NAO implies the participation of an independent and neutral administrative body, acting as a broker that coordinates the interorganizational network activities (Berthod et al., 2017).

The governance mode chosen by an interorganizational network may influence the relative strength between paradoxical elements. For example, despite the advantages of an NAO, this governance mode may diminish member participation in collective activities and weaken their overall commitment (Wegner et al., 2018). Table 5 illustrates the relationship between various manifestations of tensions and modes of governance - advanced by Provan and Kenis (2008), Saz-Carranza, and Ospina (2011), and Berthod et al. (2017).

Table 5. Governance Mode and Paradoxes

Paradoxes	Shared Governance	Lead Organization	Network Administrative Organization
Efficiency versus Inclusion	Inclusion	Efficiency	Efficiency
Internal versus External Legitimacy	Internal Legitimacy	External Legitimacy	External Legitimacy
Flexibility versus Stability	Flexibility	Stability	Stability
Unity versus Diversity	Diversity	Unity	Unity
Autonomy versus Accountability	Autonomy	Autonomy	Accountability

Source: adapted from Provan and Kenis (2008), Saz-Carranza and Ospina (2011), and Berthod et al. (2017).

According to Provan and Kenis (2008), the mode of network governance inversely influences one of the paradoxical poles: the positive influence on one pole, directly or indirectly, impacts the other negatively. This negative pressure may trigger off tension in the adversely affected element. For example, NAO governance increases efficiency but negatively affects the inclusion level in the decision-making process. Hence, interorganizational network members are more likely to experience lower than expected inclusion levels, which may escalate and manifest as tension.

Trust: Another element that may influence the balance between paradoxical elements is trust. Trust is broadly a multidimensional concept and a social construct phenomenon (Onyango, 2019). Rousseau (1998, pp. 395) defines trust as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior." In general, trust is "often defined as one party's optimistic expectations of the behavior of a second party under conditions of personal vulnerability and dependence" (Austen, 2018, p. 3). At the organizational level, trust is "the extent to which organizational members have a collectively held trust orientation toward a partner firm" (Huff & Kelly 2003, p. 82).

In the coopetition paradox, if two or more organizations share resources and capabilities, the degree of trust between rivals may influence the extent to which coopetition drives the firm's performance (Crick, 2019). Trust may provide support to balance contrasting demands in interorganizational networks (Austen, 2018). Accordingly, the trust may affect elements such as inclusion, internal legitimacy, and accountability, which may change the balance between them and their opposite pose, respectively. For example, Onyango (2019) identifies trust as a critical concept that potentially influences interagency relations during the implementation of accountability reforms counties of Kenya. Accordingly, trust is likely to aid inter-agency power relations and tensions that tend to influence the coordination and internalization of public policies negatively.

Problem-solving Processes: the literature review indicates that when tensions are not prevented, interorganizational relationships may cope with them through problem-solving processes (Uzzi, 1997; Best et al., 2021). Uzzi (1997), after 113 hours of ethnography, found that embedded relationships have problem-solving agreements as components that regulate the expectations and behaviors of exchange partners, which contributed to fostering embeddedness

(economic and social logic). Moreover, Best et al. (2021) studied dynamic capabilities that could cope with tensions in social purpose organizations and found that when frustrations across network partners arose, they could mitigate it through joint problem solving and dialogical interaction within the network, which fostered a shared sense of commitment to the partnership.

Partner Selection: Data from the literature review shows that partner selection is an important step toward the control of paradoxical tensions. Jee and Sohn (2020) found that firms may leverage their limited resources and manage the tension between learning and protection by selecting the right partners to prevent risk from knowledge protection in R&D Networks. In addition, Stefan et al. (2020) found that checking and selecting the right partners may increase the value capture and value creation paradox potential in open innovation projects. The findings suggest that working with non-competing partners with highly asymmetric knowledge bases may be explored to balance the value creation and capture paradox.

Despite the illustrative factors presented in this section, the literature review also showed factors that influence paradoxes: dynamic capabilities (Best et al., 2021), lack of trust in the knowledge environment (Morris et al., 2020); level of engagement (Savarese et al., 2020); mutual dependency and asymmetry between firms (Jakobsen, 2020); previous relationship (Gillett et al., 2019) and knowledge asymmetry, institutional distance, absorptive capacity, reciprocal commitment (Ho & Wang, 2015).

2.3.3.3 Research on Paradox Outcomes

In the literature review, there is a small number of papers dealing with the effects of tensions or paradox management on the interorganizational relationship and member firms' performance. Raza-Ullah (2020) sought to understand why paradoxical tensions deteriorate cooperative performance and when such debilitating effects can be managed. He found that a blend of higher balancing capability and lower emotional capability produces a positive indirect effect of tension on performance (mediated by emotional ambivalence). The cooperative performance was captured by measuring (i) expected results, (ii) increased revenues, (iii) improved quality, and (iv) access to new customers, products, or services.

Managing cooperation is often seen as managing tensions (Czakoń et al., 2020). According to Gernsheimer (2021), the literature on cooperation identified organizational structures (Chiambaretto et al., 2020), knowledge brokers (Chiambaretto et al., 2019), governance models, and cooperation capabilities (Niesten & Stefan, 2019) as effective ways to manage the tensions that emerge from cooperation. Although tensions may be considered

harmful to cooperation as a strategy, recent research highlights its positive aspects. Tensions may reduce complacent behavior and prevent inertia in such interorganizational relationships. (Gernsheimer, 2021).

Lin et al. (2013) investigated practices facilitating learning and knowledge transfer, leading to innovation ambidexterity and business performance. Innovation ambidexterity is the simultaneous achievement of incremental and radical innovation and represents a paradoxical relationship between both poles. The results showed a positive association between innovation ambidexterity and business performance. Ho et al. (2015) investigated knowledge transfer and learning processes in international strategic alliances. According to Ho et al. (2015), knowledge protection is negatively related to absorptive capacity, which is positively associated with alliance performance. Consequently, knowledge protection indirectly affects alliance performance. Finally, Huang and Chiu (2020) highlight that knowledge tension (sharing-protection) affects the relationship between management control and multinational enterprise satisfaction. Knowledge tension decreases the effects of management control on multinational enterprise satisfaction.

2.3.3.4 Models that Explain Paradox Dynamics

The literature review showed models that help to explain the paradox dynamics. In this section, I present models from Gnyawali et al. (2016), Van Fenema and Loebbecke (2014), and Schmidt (2019).

Gnyawali et al. (2016) propose a framework that does not ignore the difference between paradox and tensions in a cooperation context. They argue that paradoxical situations precede tensions. Thus, paradoxes and tensions are different concepts. Besides, the authors facilitate understanding by calling the phenomenon of tensions as “felt tension.” The framework proposes that paradox management happens through analytical capabilities and execution capabilities. Analytical capabilities refer to the “firm's capacity to obtain a clear and accurate understanding of the cooperation situation, including how specific contradictions and dualities differentially impact the relationship” (Gnyawali et al., 2016, p. 7). On the other hand, execution capabilities refer to “the focal firm's ability to manage the tension in a cooperation relationship productively that emerge as critical contingency factors to achieve good results in the cooperation strategy” (Gnyawali et al., 2016, p. 8).

Gnyawali et al. (2016) propose that the analytical capability moderates the relationship between paradoxical situations and how tensions are perceived, while the executional capability

moderates the relationship between tensions and cooperation performance. In other words, analytical capability influences how firms perceive tensions, while executional capability is the capacity of management to deal with tensions and their impact on performance.

Van Fenema and Loebbecke (2014) proposed another framework to deal with tensions between value creation and value appropriation, which includes the definition of tensions as the difference between intended and experienced value. The authors propose three alternatives for tension management: organizational strategies for managing tensions, structures (governance mechanisms), and behavioral processes (stages of tension management). Their conceptual framework assumes the influence of some factors on tension management: task uncertainty, role ambiguity, feedback, conflict, leadership, discrepancies in social comparison, routines, and consensus on behavioral processes. Finally, firms may adopt organizational strategies to face tensions, which may be variations of passive and active standings.

Schmidt (2019) proposes three positive responses to tensions: alternation, segmentation, and transcendence. Alternation occurs when interorganizational network members shift between the paradox poles. Firstly, they enact the qualities signified by one pole (e.g., efficiency) before switching to those represented by its opposite pole (e.g., inclusion). Segmentation occurs when some actors behave in accordance with one polar quality while others adhere to the traits encapsulated by the opposite pole. Transcendence occurs when interorganizational network members openly acknowledge the tensions confronting them, accept the paradoxical nature of the issue, and attempt to formulate creative responses (Lewis et al., 2000; Carlson et al., 2016).

2.3.3.5 Literature Gaps

Paradoxes are not a problem *per se* but a persistent challenge in IOR's daily management. There is a small number of studies linking paradox management to IOR effectiveness (e.g., Muradli & Ahmadov, 2019). According to the literature, tensions may negatively impact relationships, but few studies tried to identify how harmful tensions are (Huang & Chiu, 2020; Xu & Kim, 2021). The lack of studies may indicate that the paradox alone is not enough to affect relationship value directly. Instead, the emergence of tension in one pole of a paradox may be a problem (e.g., lack of knowledge sharing and lack of cooperation).

According to the literature review, there is a small number of studies addressing the interdependence between paradoxes. Lannon and Walsh (2020) identified some sub paradoxes

that may influence the emergence of tensions between recursive and adaptive practices in non-governmental organizations. Best et al. (2021) identified sub paradoxes that contribute to the balance between social and economic logic in social purpose organizations participating in interorganizational relationships.

The last gap found in the literature review relates to the dynamics behind the paradoxical tensions (e.g., Szentes, 2018), especially about how actors dynamically respond to paradoxes (Henry et al., 2020). A few studies analyze how management practices that avoid or minimize tensions lead to different tensions later. Such an understanding could provide a better comprehension of the dynamic nature of tensions that emerge from paradoxes and how they change over time in IORs.

Previous chapters represent blocks that led to the inductive methodology. The theoretical background showed that paradoxes might lead to positive outcomes or negative outcomes. Tensions might influence the generation of relational rents, which can be understood as relationship values (Dyer et al., 2018). Studies have already mapped a variety of paradoxical tensions that vary in terms of press and balance and demand a managerial strategy to deal with the paradox. In the next chapter, the methodological approach is presented.

3. METHOD

The research strategy followed Eisenhardt's (1989) method of building theories from case study research. This strategy is suitable, as little is known about the phenomenon, and the deductive approach seems inadequate since there is little empirical substantiation regarding a dynamic perspective (Eisenhardt, 1989). Several empirical studies regarding paradoxes have been published in the last decade (e.g., Ospina & Saz-Carranza, 2010; Lannon & Walsh, 2020). However, few empirical studies analyze the effects of paradoxes and paradoxes management in interorganizational relations and their impact on relationship value (e.g., Ho & Wang, 2015; Huang & Chi, 2020; Raza-Ullah, 2020). Additionally, the research meets the three requirements of the case study strategy (Yin, 2005): a) the study answers the question regarding “how” paradox management contributes to the relationship value in interorganizational networks; b) the study does not require control of behavioral events and c) the study focuses on contemporary rather than historical events.

3.1 RESEARCH QUESTION AND PRIORI CONSTRUCTS

The case study focuses on answering the following research question: “how” does paradox management contribute to the relationship value in interorganizational networks? According to Eisenhardt (1989), the researcher must define constructs before entering the field, though the construct may subsequently change. Defining constructs is essential because the researcher shall have a theoretical foundation.

The constructs previously used in the empirical investigation were defined as: paradox, paradox press, paradox balance, tensions, and relationship value. Table 6 presents a description of each construct.

Table 6. A Priori Constructs.

Category Subcategory	Author	Description
Paradox	Putnam et al. (2016).	Contradictions that persist over time, impose and reflect on each other, and develop into seemingly irrational or absurd situations because their continuity creates situations in which options appear mutually exclusive, making choices among them difficult
Paradox Press	Carlson et al. (2017)	The pressure that the dilemma places on the organization to respond. It is a function of the strength of the pull of the two poles and the urgency of the need to respond to their demands
Paradox Balance		The degree to which two poles are equal in strength.
Contextual Factors		Contextual factors that may influence the paradox press and balance
General	-	

Category Subcategory	Author	Description
Tension General	Tura et al. (2019)	Tensions as negative consequences, such as strain and conflict, that result from contradictory goals and interests between collaborating actors and can hamstring, aggravate, or even break up business relationships and network partnerships
Relationship value Personal	Biggemann and Buttle (2012)	(a) customer retention, which is the expectation to keep the customer or supplier for the long-term, and (b) referral, which is the counterpart's willingness to share positive experiences with other parties.
Relationship value Financial	Biggemann and Buttle (2012)	(a) Efficiency, which is the difference or ratio between inputs and outputs (b) Share of business, which is the percentage of the business that is shared with the counterpart (c) Share of the market, which is the percentage of the market that is captured and (d) Price differential, which is the customer's willingness to pay more before switching to the competitor or the supplier's willingness to reduce the price before seeking another customer.
Relationship value Knowledge	Biggemann and Buttle (2012)	(a) Market intelligence, which is the information related to the market that comes from the counterpart (b) Idea-generation, which is the outcomes of participating and discussing ideas together (c) Innovation, which are opportunities created to introduce a new or improved product or services.
Relationship value Strategic	Biggemann and Buttle (2012)	(a) Long-term planning, which represents an increased time horizon for planning, scheduling, and demand forecasting, and (b) Extended network, which are the benefits that come from third parties through the relationship.

3.2 CASE SELECTION

I considered four criteria for case selections: the number of participants, the management maturity (processes, roles, structures), the purpose of the interorganizational network, and the presence of relationship value. The number of network participants was an essential characteristic, as a larger number of participants (three or more) could indicate a plurality (Smith & Lewis, 2011) and, consequently, the need to manage the multiplicity of views in the context of diffusing power (Smith & Lewis, 2011). Additionally, the management maturity could indicate a structured action toward paradox management. Processes, roles, and structures indicated network maturity. In addition, I researched interorganizational networks with different purposes to establish a broad approach to paradox responses, which was highlighted as a gap in previous literature (Carlson et al., 2016). Finally, the presence of relationship value was required in order to answer the research question.

The network literature on interorganizational relationships shows different paradoxes according to the network purpose. Hence, the interorganizational network purpose may influence tension emergence from different paradoxes. Different from R&D networks, retail

networks face different paradoxes. The focus on different paradoxes may contribute to a better understanding of the phenomenon and how paradox management prevents or manage tensions that would harm the relationship value. According to their purposes, the case selection made the cross-case analysis feasible between pairs with different purposes (i.e., two R&D and two retail cases). The final case samples were composed of retail networks and R&D networks.

For each purpose, two interorganizational relationships were selected, a total of four cases: (a) an R&D Network in the Aluminum Sector, (b) an R&D Network in the Gear Sector, (c) a Retail Network in the Furniture Sector, and (d) a Retail Network in the Building Materials Sector. According to Eisenhardt (1989), there is no ideal number of cases, but a number between four and 10 cases may be sufficient. Before defining a case as suitable for empirical research, the network manager was interviewed to identify any possible paradoxical tensions. This step was essential so as to design the interview script according to the paradoxes previously identified in each interorganizational network. Though paradoxes can be present in almost every interorganizational relationship, tensions can not. Hence, I used a preliminary step to identify emerging tensions and relevant paradoxes in the studied networks. Finally, all selected cases were identified as potential cases, with any emerging or actual tensions being prevented by paradox management practices. Table 7 presents a summary of information regarding the four selected cases.

Table 7. Cases Selection.

	Case I R&D Network in Aluminum Sector (Network A)	Case II R&D Network in Gear Sector (Network B)	Case III Retail Network in the Furniture Sector (Network C)	Case IV Retail Network in the Building Materials Sector (Network D)
Number of Participants	18	21	126	49
Starting Year	2019	2017	2002	2001
IOR Purpose	R&D	R&D	Collective Action in the Retail Sector	Collective Action in the Retail Sector
Objective	Develop a comparative study of the performance of aluminum alloy joints in automotive vehicle structures as a pre-competitive strategy for the aluminum and automotive sectors	Enhance research prospection and dissemination of knowledge relating to gears and power transmission systems.	Develop network members, seek results that satisfy members' interests, partners, and customers, and create a strong brand in the furniture market.	Strengthen the members' business through good associative practices in the building materials market.

	Case I R&D Network in Aluminum Sector (Network A)	Case II R&D Network in Gear Sector (Network B)	Case III Retail Network in the Furniture Sector (Network C)	Case IV Retail Network in the Building Materials Sector (Network D)
Reason to be Selected	This case involves big players in the aluminum chain. The network is relevant to the national development of the Aluminum Sector. Moreover, the network is part of the Rota 2030 ¹ Program. The case has defined structures, roles, and processes to achieve its objective.	This case has well-defined processes and roles. The network is conducted by a Technology Institute, a reputable Brazilian institution. The network contains big players from different sectors related to the gear engineering sector.	The retail network has structured processes and roles and uses formal structures to facilitate decision-making and strategic actions. The network's high number of participants and services indicates a fertile area in which to investigate paradoxes related to decision-making processes.	The building materials network has structured processes and roles and uses formal structures to facilitate decision-making and strategic actions. The high number of participants, albeit less than in previous retail cases, contributes to an investigation of the differences in decision-making processes.

A preliminary interview with the network manager indicated the presence of emerging tensions regarding paradoxes. In Case I and Case II, the preliminary interview indicated the presence of cooperation-competition and knowledge sharing-protection paradoxes. Both interorganizational networks are composed of competitors. Some firms compete, while others do not. Cases I and II have product and solution overlaps (different technologies to joint aluminum and steel in Case I). The coopetition paradox is an endogenous paradox that appears in interorganizational networks because firms remain competitors. The dual logic that arises from coopetition raises managerial complexities (Raza-Ullah et al., 2013).

Coopetition may result in tensions arising from the knowledge sharing-protection paradox (Fernandez & Chiambaretto, 2016). Tensions may occur regarding the knowledge sharing-protection paradox due to firms' concern about protecting their knowledge from competitors. The concern of knowledge protection does not occur exclusively between competitors but increases in the presence of competitors. Additionally, the manager from Network A highlighted that firms are concerned about knowledge spillover due to each firm's external relationships. Therefore, there was a risk of network partners resisting sharing

¹ Federal program for the automotive chain with the objective of supporting technological development, competitiveness, innovation, vehicle safety, environmental protection, energy efficiency and the quality of automobiles

knowledge or cooperation, which could harm the relationship. This risk created an opportunity to investigate the cases in this thesis.

The interorganizational networks of cases III and IV are composed of competitors and firms competing in their market with product overlap. Although the interorganizational network operates in a different domain, network members remain competitors. Hence, the dual logic of interaction also appears in Network C and Network D. Despite the networks' rules regarding a minimum distance between network firms (to prevent competition), network managers reported competition events that resulted in conflicts. In the preliminary interview, network manager C reported a recent conflict due to the competition between network members. During this event, Firm A invaded Firms B's area. Contrary to previous cases, knowledge sharing protection seemed not to be a problem in Networks C and D since they have a different purpose from the R&D networks. Network managers related conflicts and tension events regarding concerns relating to decision-making inclusiveness and decision-making efficiency.

In Networks C and D, network managers were concerned about including network members in the network decisions while being efficient in decision-making processes. The incompatibility between decision-making inclusiveness and efficiency appeared in the literature, as the network might face a loss of decision-making efficiency due to inclusiveness. Building materials and furniture sectors faced increasing competitiveness, mainly because of the e-commerce growth in the sector. Both networks were aware of the market's pressure to make faster decisions. Network C manager reported a concern about decision-making inclusiveness because, in his words, "*they are all owners, they must decide. Therefore, you cannot exclude network members from the process.*" Network D manager reported a concern about decision-making efficiency in the past and detailed a current concern regarding network members' decision-making inclusiveness in the present. Network managers assign importance to inclusiveness and efficiency, and since decision-making inclusiveness and efficiency are essential to the network firms, there was pressure to solve the paradoxes in Networks C and D.

The trade-off between decision-making inclusiveness-efficiency paradox poles represents a risk. Tensions may arise if network members are not included in the decision-making process or if the decisions are not efficient enough. This risk provides the opportunity to investigate the cases in this thesis.

3.3 DATA COLLECTION

I collected data from two different sources: semi-structured interviews and documents. The observation was not possible due to the pandemic restrictions and was not authorized by the interorganizational networks. I interviewed the manager responsible for the interorganizational networks and network members. Moreover, the documental analysis provided data with which to triangulate with interviewees. Table 8 summarizes the information required in each category.

Table 8. Data collection categories.

Main Authors	Category
Xu and Kim (2021); Galati et al. (2021); Stal et al. (2021)	Contextual Factors -Contextual factors that may influence paradox balance and press.
Tura et al. (2019)	Tension - Tension as negative consequences, such as strain and conflict, that result from contradictory goals and interests between collaborating actors and can hamstring, aggravate, or even break up business relationships and network partnerships
Biggemann and Buttle (2012)	Relationship value - Personal; - Financial; - Strategic; - Knowledge.

According to the data collection categories, I proposed questions for the case study protocol. The protocol was validated and modified in accordance with commentaries from five IOR experts: a professor, researcher, and associated journal editor with a Ph.D. in Business Administration; a professor, post-doctorate researcher, and a professional Programs Coordinator in Personnel Improvement Coordination in higher education in Brazil, with a Ph.D. in Business Administration; a professor and researcher with a Ph.D. in Business Administration and Information and Communication Science; a professor and researcher with a Ph.D. in Business Administration and a professor, researcher and associated journal editor with a Ph.D. in Management Engineering. The experts primarily recommended reducing the number of questions in the protocol, adding examples to facilitate interviewee understanding, and reformulating questions to capture the intended idea. I worked on experts' recommendations and reduced the questions from 33 to 24. Moreover, once I reached data saturation regarding objective aspects, I did not ask the next interviewees the same questions; instead, I reduced the number of questions and focused on those that addressed paradoxes.

Before starting data collection for each case, the protocol was validated by the manager responsible for the interorganizational network (Case I and II) as well as the network manager

(Case III and IV). This validation was an important step in terms of identifying whether the used terms were comprehensible for the target audience. No significant issues were identified.

The final protocol included questions regarding the cooperation and decision-making efficiency-inclusiveness paradox, questions regarding contextual factors and management practices that might influence the paradoxes, as well questions regarding the relationship value. Since the interviews were conducted according to interorganizational network guidelines, questions were added related to knowledge sharing-protection and inclusive/efficient decision-making processes for the R&D and retail networks, respectively.

Detailed information regarding the interviewees is available in Table 9. This table presents data from the data collection period, using codenames to protect individuals' personal details, and also gives details of interviewees' job titles and the interview duration in minutes.

Table 9. Interviews.

Cases	Data Collection Period	Name	Position	Duration (min)
I	April to May 2021	Interviewee 01	Product Development Engineer	42
		Interviewee 02	Application and Development Coordinator	36
		Interviewee 03	Innovation and Management Coordinator	21
		Interviewee 04	Technical Manager	52
		Interviewee 05	Innovation Manager	40
		Interviewee 06	MKT Manager	50
		Interviewee 07	Expert - Regulatory Compliance	48
		Interviewee 08	Technical Director*	50
		Interviewee 09	Application Engineer	44
II	September to November 2021	Interviewee 01	Technical Manager	51
		Interviewee 02	Engineering & Development Manager	81
		Interviewee 03	Technical Manager	39
		Interviewee 04	Head of Customer Service	54
		Interviewee 05	Engineering supervisor	26
		Interviewee 06	Manager Director	30
		Interviewee 07	R&D Manager	45
		Interviewee 08	Manager, Development & Application Engineering	61
		Interviewee 09	Researcher	64
III	Z o v	Interviewee 01	Chairman	46

Cases	Data Collecti on Period	Name	Position	Duration (min)
		Interviewee 02	Network Manager	83
		Interviewee 03	Network Member	38
		Interviewee 04	Network Member	55
		Interviewee 05	Network Member	38
		Interviewee 06	Network Member	35
IV	November 2021 to January 2022	Interviewee 01	Board Director	56
		Interviewee 02	Board Director	66
		Interviewee 03	Board Director	48
		Interviewee 04	Board Director	48
		Interviewee 05	Network Member	66
		Interviewee 06	Network Member	48
		Interviewee 07	Network Member	63
		Interviewee 08	Network Manager	55

* This interview was not recorded. Additionally, the interviewee sent textual answers.

Detailed information regarding the data collected in each is available in Table 10. This table presents data by document type and provides the number of pages of each document.

Table 10. Documents from interorganizational networks.

Cases	Document	Pages
(I) R&D Network in Aluminum Sector	Partnership term between ABAL, Embrapii, and IPT	20
	1st addendum to the partnership term	6
	Adhesion form	2
	Partnership	48
(II) R&D Network in Gear Sector	R&D Network partnership term	15
	Application for admission	01
	Book Chapter about the network ²	12
	Website	-
(III) Furniture Network	Associative Constitution	9
	Network regiment	18
	Ethical code	3
	General assembly minute	4
	Website	-

² Rego, R. R. (2021). Open innovation alliances in technology colonies. In *Managing Collaborative R&D Projects* (pp. 223-234). Springer, Cham.

Cases	Document	Pages
(IV) Building Materials Network	Associative Governance Constitution	49
	Network regiment	18
	Expansion regiment	29
	Website	-

3.4 DATA ANALYSIS

I analyzed data using within-case and cross-case analyses. The within-case analysis was conducted by means of a narrative description of the recent networks' history. A cross-case analysis was conducted using the common patterns and divergences among cases. Finally, I examined how those patterns and divergences could influence the relationship between the constructs.

The steps followed to analyze data were:

- a) **Data Transcription:** all recorded interviews were transcribed to make posterior analysis feasible after the interview process.
- b) **Interviews and Documents Import:** after transcribing every interview, I imported the data to NVivo 12, which was used for data analysis.
- c) **Categorizing and Coding:** all documents were classified according to their case and type. The coding strategy followed the method proposed by Corbin and Strauss (2008) and was recently adopted for inductive research (e.g., Kramer et al., 2017), which consists of (1) data reduction; (2) unitizing; (3) open coding; (4) focused coding; and (5) axial coding. Firstly, I removed unrelated information (data reduction). Next, I divided passages into separate units if they represented more than one idea or theme (unitizing). Then, I assigned an initial code to each passage (open coding). Finally, I recorded the data according to the initial codes and previous data collection categories (focused coding).
- d) **Data Analysis:** I analyzed the data according to the identified categories in the coding step. I looked for relationships between the codes (axial coding) in the previous categories: (a) main paradoxes and tensions, (b) contextual factors, (c)

management practices, and (d) relationship value. Each case was analyzed individually. I analyzed the process in which tension emerged from paradoxical elements, the practices adopted to prevent or manage tensions, and the effects on relationship value. Moreover, I proceeded to compare cases in the cross-case analysis and looked for convergences or divergences that could explain the emergence of tensions and their impact on the relationship value of the interorganizational networks

The following chapter presents the results in each case: the R&D network in the aluminum sector, the R&D network in the aluminum in the gear sector, the retail network in the furniture sector, and the retail network in the building materials sector. The next chapter introduces each network with its history and general data. After introducing each case, networks are analyzed according to previously defined categories and information from the collected data.

4. RESULTS

This chapter describes the four cases through the analysis of theoretical elements presented in chapter 3. Initially, I explore the cases individually and, later, comparatively.

4.1 R&D NETWORK A: COOPERATION IN THE ALUMINUM SECTOR

The R&D Network among the Brazilian Aluminum Association (ABAL), Brazilian Research and Industrial Innovation Company (EMBRAPII), and the Technological Research Institute de Sao Paulo (IPT) was made official on October 1st, 2019. The R&D Network aims to compare the performance of aluminum alloy joints in automotive vehicle structures as a pre-competitive strategy for the aluminum and automotive sectors. This network was born thanks to several actors' interests. First, in 2013, the Brazilian Association of Industrial Research and Innovation - EMBRAPII and the Federal government signed a management contract to promote and encourage the realization of research, development, and innovation projects - RD&I. The management contract aimed at national industrial development through cooperation with organizations. The partner organizations should be public, private scientific, and technological research institutes. Later, in 2014, the Technological Research Institute (IPT) entered into a cooperation agreement with EMBRAPII to obtain partial funding for the costs of RD&I. The R&D Network might be developed in specific contracts by the IPT with companies from various sectors.

The cooperation between the IPT and EMBRAPII created a favorable scenario for research in the manufacturing sector. The Brazilian Aluminum Association started to explore this opportunity. The idea behind ABAL's action was to encourage the use of aluminum in the automotive sector through a demonstration of the feasibility of aluminum structures in automotive vehicles. ABAL's strategy was to promote the articulation of companies in the aluminum, automotive, and transport sectors.

Although the discussion among ABAL, IPT, and EMBRAPII occurred at the institutional level, interpersonal relationships influenced the cooperation agreement. For example, the technical director of ABAL and articulator of the cooperation agreement had already been a researcher at IPT with direct contact with the current IPT Project Manager. The previous interpersonal relationship facilitated communication and discussion about possible research projects to be explored. Interviewee 4 reported the previous relationship with interviewee 9 as follows:

I joined the IPT replacing Interviewee 9, which was a researcher there for several years. She left as soon as I joined IPT. Since she went to ABAL, we have been in contact, sometimes more sparsely, but we have always had this contact. When ABAL started negotiating with EMBRAPPI, to make the cooperation agreement, she had already talked to me so we could think about topics to work on (Interviewee 4)

In addition to this connection between former co-workers, there is also a connection between an ABAL's technical consultant and IPT's Project Manager (Interviewee 4). They had a hierarchical relationship when both worked at IPT. This proximity allowed a discussion about the feasibility of welding aluminum and steel. The discussion started at a congress organized by ABAL.

I went to the ABAL congress, I think in 2018 or 2019. They presented the work they did with a dry load truck with built-in aluminum. I found it very interesting, and I was lucky that they spoke to me about the same topic, built and put to the test three dry load trucks that they wanted to make a larger truck. An ABAL technical consultant, who was my head at IPT and is now a consultant at ABAL, discussed the feasibility of using this process on a larger truck with me, but he said, "oh, there are some restrictions that people have put. They don't want welding because they say it's tough to weld aluminum". However, in my opinion, you can weld aluminum... (Interviewee 4)

Due to her technical knowledge, the Project Manager at IPT defended the feasibility of using aluminum to assemble larger trucks. Thus, ABAL's Technical Consultant took the discussion to ABAL's Transport Committee, which approved the idea. Shortly after that, ABAL and IPT began negotiations with companies in the aluminum chain. In these meetings, ABAL and IPT defended that aluminum alloy joints in automotive vehicle structures would be a pre-competitive strategy for the aluminum and automotive sectors, which would expand the aluminum market for all industries.

... ABAL's Technical Consultant took this idea to the ABAL transport committee, which has ABAL member companies. They liked the idea, and we started building this project. I presented this idea to him [the technical consultant] on the transport committee. We presented a structured proposal. The proposal included the reason to make a comparative chart based on modeling the phenomena, traction efforts,

bending, and fatigue of the joined components. And we thought it would be important to have direct information about who makes things because there were only people there who make aluminum, and there was no one who made cars, who made rivets and such. So we started to invite companies to call their partners, and it was a period of a lot of meetings, a lot of negotiation. (Interviewee 4)

Network A has a cooperation agreement signed among ABAL, EMBRAPII, and IPT, and adhesion forms signed by the partners. The R&D Network comprises eighteen organizations, including ABAL, EMBRAPII, IPT, and fifteen other partner companies. Among the partner companies, there is a large international car maker with annual revenue exceeding €100 billion and approximately 400 thousand employees worldwide, a large Brazilian company in the transport sector, with an annual income exceeding € 800 million and more than 11 thousand employees, and aluminum suppliers of joining technologies. Figure 4 illustrates how each category contributes to the network purpose.

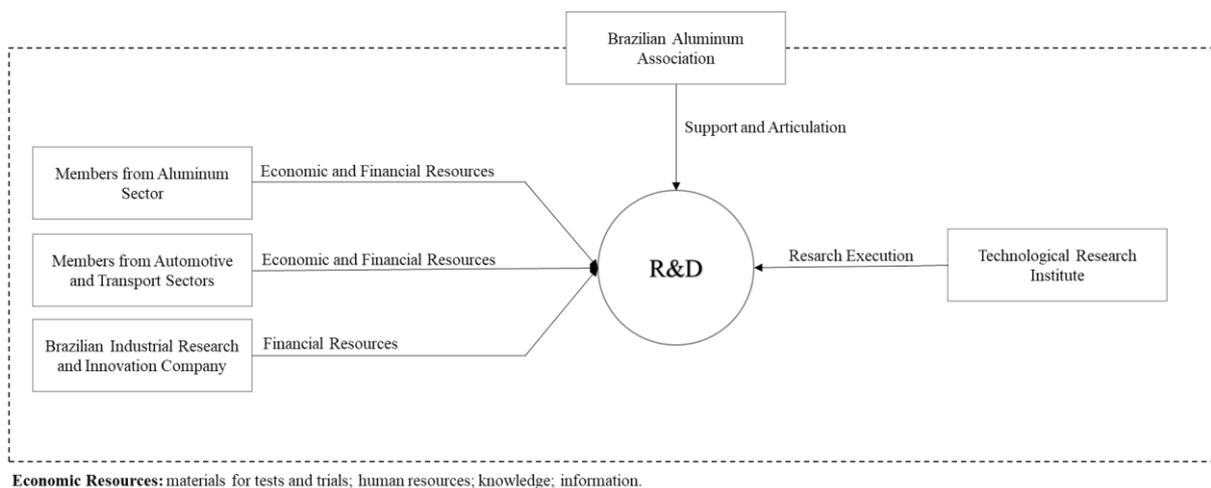


Figure 4. R&D Network A workflow.

The R&D Network operates through two groups: (a) a management group, which discusses managerial concerns about the network, and (b) a technical group, which participates directly with IPT in the research execution. This composition was intentional since the network design was due to previous IPT experiences. According to Interviewee 4, the segregation between management and technical groups facilitates knowledge sharing and increases efficiency in the network.

The R&D Network is composed of competitors. Some network members compete with different technologies that provide the same solution (join aluminum and steel), while others compete as aluminum suppliers in the market. Hence, network members have a dual logic of interaction. The dual logic that arises from cooptation raises managerial complexities and increases interorganizational relationship failure rates (Raza-Ullah et al., 2013). Cooptation may result in tensions arising from the knowledge sharing-protection paradox (Fernandez and Chiambaretto, 2016).

Cooperation-competition and knowledge sharing-protection paradoxes are endogenous to Network A because they have been present since the competitors decided to cooperate through knowledge sharing in the R&D Network. Since the beginning, network members have been aware of competition and knowledge protection.

IPT, ABAL, and aluminum firms associated with ABAL defined the network composition. Initially, they decided on resource complementarity. After that, they decided to invite firms who had: (1) a good reputation in the market, (2) previous interorganizational relationship with the initial group, (3) a known contact (person), and (4) local production since it was a requirement to access the public funding. According to Interviewee 4, interpersonal relationships (3) facilitated the invitation process.

Network members were aware of the possible competition and resistance to sharing sensitive knowledge. The initial network composition discussed the concern of competition in the network design phase, where network members decided to implement a protocol for knowledge-sharing to protect sensitive information from firms. The protocol would enable sensitive knowledge transference through individual meetings with IPT. The formal contract contained a non-disclosure agreement (NDA) clause to protect firms' knowledge. The IPT should use the information to execute the research without spilling it over to competing firms. Interviewees (1,4,6,7,8) reported that IPT's reputation and neutrality facilitated knowledge sharing and research execution.

Despite the paradoxes in Network A, there is no signal of significant tensions that could harm the relationship value. Interviewee 4 reported two tension events that the IPT solved as a mediator. First, IPT faced resistance to receiving a technical draw. The tensions lasted for approximately one year when Firm A became recognized the importance of sharing knowledge. The second event happened when they had to define the technologies that would be tested in the research. Network members competed to include their products in the testing process.

Network members transferred the decision (select the technologies/products) to the aluminum users (assemblers' firms). Both tension events were punctual and represented a non-persistent tension in Network A.

Contextual factors and paradoxical management practices may explain the absence of persistent tensions emerging from cooperation-competition and knowledge sharing-protection. Contextual factors and paradox management practices made it possible for Network A to emphasize knowledge-sharing and cooperation without tensions regarding firms' concerns about knowledge protection and competition. In the following section, I present these contextual factors and the management practices that contributed to network members' sensemaking processes and prevented emerging tensions regarding cooperation-competition and knowledge sharing-protection paradoxes.

4.1.2 Paradoxes: Knowledge sharing-protection and Cooperation-Competition

In R&D Network A, I aimed to understand the paradoxical relation between knowledge sharing-protection and cooperation-competition. Thus, I gathered data regarding contextual factors and paradox management practices that could influence each pole of these paradoxes. The R&D network adopted effective paradox management practices to prevent paradoxical tensions that could harm the relationship's value.

Contextual factors from network design and operation influenced the sensemaking processes in Network A, as they facilitated knowledge-sharing and cooperation among network members. Additionally, Network A adopted management practices to deal with knowledge protection, making feasible sensitive knowledge share among network members. The sensemaking process favorable to knowledge sharing allowed network A to accommodate expectations even without focusing on knowledge protection. Figure 5 illustrates the contextual factors and management practices and how they influenced the knowledge sharing-protection and competition-cooperation paradox.

	Network Design	Network Operation
Contextual Factors	<ul style="list-style-type: none"> ➤ Previous Interpersonal Relationships ➤ Previous Interorganizational Relationships ➤ Organizational Culture of Cooperation ➤ Government Financial Incentive ➤ Legal Security ➤ Partner Reputation 	<ul style="list-style-type: none"> ➤ Sensitive Knowledge-Sharing
Paradox Management Practices	<ul style="list-style-type: none"> ➤ Criteria for Member Selection ➤ Neutral Mediator ➤ Protocol to Share Knowledge ➤ Formal Contract 	<ul style="list-style-type: none"> ➤ Technical and Management Committees ➤ Communication and Alignment Practices



Figure 5. Paradox Management Practices and Contextual Factors influence knowledge sharing-protection and cooperation-competition paradoxes.

Figure 6 represents two different periods in Network A history. Since this is not a longitudinal study, there is no attempt to define a sequence of events in each block but to classify when each contextual factor and management practice emerged in Network A: during the network design or network operation.

Initially, competitors in the aluminum market met at the Aluminum Brazilian Association. Then, in 2018 ABAL became aware of possible cooperation that could increase the aluminum market and benefit the whole aluminum supply chain. Additionally, there was an opportunity to get public funding through EMBRAPIL. Thus, there was an incentive to cooperate. In Addition, the context in which the network was designed and operated has some characteristics that influenced the knowledge sharing-protection and cooperation-competition paradox. Seven contextual factors (first-order categories) emerged from the collected data, namely: **(a) legal security; (b) interpersonal relationships; (c) previous interorganizational relationship; (d) partners reputation; (e) organizational culture of cooperation; (f) government financial support; (g) characteristics of shared knowledge/information.** I organized these first-order categories into three second-order categories: external environment (**legal security and government financial support**), actors' characteristics (**interpersonal relationships, previous interorganizational relationship, partners' reputation, and organizational culture of cooperation**), and network characteristics (**characteristics of shared knowledge/information**).

(a) Legal security: Brazilian legislation contributed to an environment of legal security in which there is a legal guarantee for the preservation of network members' knowledge and information. Thus, it represents an incentive to cooperate and share knowledge in the network. Additionally, after the network design, the Brazilian government enacted a national law (LGPD) on data protection in the public and private sectors. Hence, legal security facilitated knowledge sharing because it reduced network members' concerns about knowledge protection. According to interviewees, technical knowledge flows more easily and without so many restrictions: *“when it is in the technical discussion, it is easy to share knowledge due to a common sense. After all, everyone wants to see it works”* (Interviewee 2). Network A structured firm's relations through two different groups: a Management Group and a Technical Group. Legal security contributes to a favorable environment for knowledge sharing, especially when it involves discussions in the management group, where there is great concern with knowledge protection.

We had legal protection that was well covered in the partnership agreement. The companies revised the partnership terms. Although we only signed with ABAL, as soon as the LGPD came out, we made an amendment to include the terms of the LGPD as well. I think our sharing security is out there. (Interviewee 4)

(b) Previous interpersonal relationships: The network involves people who have previous professional experiences. Some respondents reported having already worked together. Professionals working at IPT, ABAL, and one associated company have already worked together in previous professional experiences (Interviewees 4, 9 and a consultant who works in Network A). Furthermore, there was an academic relationship between the ABAL consultant and Interviewee 2 (an advisor and student relationship). Interviewees reported this relationship as a facilitator for interaction between members.

Regarding the studied paradoxes, previous interpersonal relationships among network members facilitate knowledge sharing and reduce concerns about the actors' knowledge protection, increasing cooperation among firms. A reason for interpersonal relationships to favor knowledge sharing is that these professionals have developed trust. According to Interviewee 5, *“There is a greater bond of trust among technical teams and the IPT. People are always in the same meeting. They are always meeting.”* Although there is a legal premise for sharing knowledge (contracts), the proximity of people makes it easier for this sharing to occur more fluidly.

(c) Previous interorganizational relationships: Despite the importance of interpersonal relationships for the network, there were also previous relationships among firms. Some companies that compose the network also participate in the Brazilian Aluminum Association (ABAL). Thus, their business relationship precedes the R&D network. Interviewees mentioned this prior relationship as a facilitator of cooperation among firms. The interviews revealed that some companies had already participated in joint projects before, primarily due to ABAL participation. In addition, the aluminum market has few players in Brazil. Many firms knew each other from previous market relationships. There is evidence of a positive influence on cooperation because the companies had previous relationships through the ABAL, facilitating cooperation and knowledge sharing.

(d) Partner's reputation: The network comprises companies renowned in the market. Though some known companies are on the national and international scene, many companies are known for participating in the Brazilian Aluminum Association. There is trust among participating companies. Respondents reported the importance of collaborating with reputable and renowned companies in the market. The presence of reputable companies in the network positively influences knowledge sharing and reduces the concern for the actors' knowledge protection. The main reason for the companies' reputation to favor the sharing of knowledge and cooperation among members is because reputation generates trust. According to Interviewee 5, *“the reputation and how these organizations act in the network gives them a high degree of trust.”*

Additionally, Interviewee 8 reported that *“There is no legal contract capable of guaranteeing the protection of knowledge but trust between the partners.”* Hence, the agreement generates a commitment to the legal system that creates a legal guarantee, but nothing prevents the misuse of acquired knowledge or information. Thus, trust in other members due to their reputation acts as a facilitator for knowledge sharing.

(e) Organizational culture of cooperation: organizational culture of cooperation facilitated firms entering Network A. ABAL and IPT chose only one representative of the automotive and transport sector because they believed there would be difficulties in the relationship between competitors in this industry. Accordingly, each member's culture and sector seem to influence cooperation among actors. Interviewee 5 reported a change in his firm's organizational culture that allowed him to join the network. *“Our company is in a very fast transformation process, it was a much more closed company, in the last few years it started to open up and collaborate with startups, it started to collaborate with other companies in a more open way”* (Interviewee

5). Hence, the organizational culture of cooperation acts as a facilitator for cooperation and knowledge-sharing.

(f) Government financial incentive: Network A received funding from a Brazilian public policy. Thus, there is public financing with co-participation from the private sector. The **financial resource** is accessible only to those willing to cooperate and share knowledge on the network. Hence, this characteristic influences the companies' decision to join the network. Regarding the studied paradoxes, government financial incentives in the network positively influence knowledge sharing between network members and reduce the concern about knowledge protection. Also, it contributes positively to cooperation. Facilitating cooperation and knowledge sharing lies in the lack of financial resources among network members and the shortage of engineering hours. The cost of such research is high and would demand a tremendous financial effort from the participating companies if they try by themselves. Therefore, even the big players recognize the importance of maximizing public incentives to preserve their organizations' internal resources.

(g) Characteristics of shared knowledge/information: There are two types of knowledge sharing. One type refers to common knowledge that anyone can obtain through research and study. In contrast, another type relates to knowledge acquired through the experience of companies, which can be considered the know-how of the participating members. These characteristics have been shown to influence knowledge sharing in the network. Regarding the studied paradoxes, when the knowledge to be shared is common knowledge, it may positively influence sharing. Additionally, common knowledge may negatively affect the protection of knowledge among the actors. Otherwise, when the knowledge to be shared relates to companies' know-how, it may negatively influence knowledge sharing.

Respondents reported no barriers to sharing knowledge because most of the shared knowledge is in the public domain. Interviewee 1 commented that the knowledge he and his competitor share is in the public domain: *“Nowadays, much of the previously restricted knowledge has become accessible to anyone”* (Interviewee 1). On the other hand, knowledge of the production process is still unique to each company, making it challenging to share. Another aspect is the presence of multinationals and the impossibility of sharing the know-how of their international units. In general, knowledge and information of different characteristics circulate in the network. Despite resistance to sharing know-how and sensitive information, the management adopted a practice to make this happen. The concern about sharing sensitive knowledge should negatively influence knowledge sharing in Network A. However, the

network manager could deal with the knowledge protection concern through paradox management practices.

Table 11 describes the contextual factors and their influence on knowledge sharing-protection and cooperation-competition paradoxes in Network A

Table 11. Contextual Factors and their influence on knowledge sharing-protection and cooperation-competition paradoxes.

Category	Contextual Factor	Description	Effects on Paradoxes
Actors Characteristics	Previous Interpersonal Relationships (2,5,8)*	Refer to the previous relationships among people who work in the Network, including previous professional and academic experiences.	Fostering knowledge-sharing and cooperation because previous interpersonal relationships generate trust among network members.
	Previous Interorganizational Relationships (1,2,5,7)*	Refer to the previous relationship among firms in the Network, including market relationship and their participation in the Brazilian Aluminum Association.	Fostering knowledge-sharing and cooperation because previous interorganizational relationships generate trust among network members.
	Partners Reputation (5,6,8)*	Refer to the beliefs or opinions that network members hold about each other.	Fostering knowledge-sharing and cooperation because previous interpersonal relationships generate trust among network members.
	Organizational Culture of Cooperation (1,5,8)*	Refer to each network member's culture regarding cooperation.	Fostering knowledge-sharing and cooperation because an organizational culture of cooperation increases the perceived value of cooperation.
External Environment	Legal Security (4,8)*	Refers to the sense of security that the National legal system represents for network members	Fostering knowledge-sharing and cooperation because legal security reduces the concern about knowledge protection among network members.
	Government Financial Support (5,8)*	Refer to the disponibility of public funding to support the Network.	Fostering knowledge-sharing and cooperation because the financial support creates the opportunity to cooperate.
Network Characteristics	Characteristics of Shared Knowledge/Information (1,2,4,8)*	Refer to the type of knowledge that needed to be shared to operationalize the research in the Network.	Fostering knowledge protection and competition because needed knowledge is sensitive and could harm the firm's competitiveness in the market.

*The numbers refer to the interviewees' IDs.

Although the contextual factors mainly favor the balance of knowledge sharing-protection paradox, Network A uses a set of practices and structures that positively influence the balance between paradoxical elements. The set of practices was enough to prevent emerging tensions. Different management practices that positively influence knowledge sharing in the network emerged from the collected data, namely **(a) Formal Contract; (b) Member**

Selection Criteria; (c) Neutral actor as a mediator, (d) Segregation between Management and Technical Committees; (e) Protocol for Sensitive Knowledge-Sharing; and (f) Communication and Alignment Practices.

(a) Formal contract: the members formalized the network through the formal contract and adhesion forms. The contracts are instruments that enhance and clarify the relationship between network members. Therefore, the formalization aids the sensemaking process contributing to a unique interpretation of their cooperative relationship. The interviewees acknowledge the rules, especially those related to data protection. Interviewee 4 reported, *“according to the partnership agreement, company data will be protected, and project data will be published.”* The contract was updated after the introduction of the Brazilian general data protection law in July 2019. This action represents the company's concern about data protection and its contract alignment with the law. According to Interviewee 6, *“The contract makes a difference because it gives you greater freedom. You know that you can easily share information”*. Therefore, through the formalization, the management creates a connection between the network and the Brazilian legal system, contributing to exploring the legal security felt by network members.

(b) Member selection criteria: the network design was essential before the network formalization. ABAL and IPT members discussed how the competition in some industries could affect the network. They invited two aluminum users, one automobile assembler, and one firm from the transportation sector. The decision was to invite only one from each segment since the competition in their markets could make cooperation difficult. According to Interviewee 5, *“the network configuration was strategic. There are no manufacturers from the same sector. The company that I helped join would hardly enter if competitor number 1, 2 or 3 were present.”* The network considered avoiding competitors in selecting union technology companies. There are four different union technologies (aluminum steel) in the network, each one with a representative. There are no product competitors but competitors with different technologies. Hence, the solution of each company is unique and alternative. Interviewees acknowledge the member selection as a critical practice that avoided the problems that could have been raised from the competition and knowledge protection. Consequently, although it happened before the network's formalization, member selection can be considered a practice.

(c) Neutral actor as mediator: IPT leads the research execution. This institution ends up being a neutral actor outside the aluminum chain, which acts as a mediator in the network. As reported by the interviewees, IPT's reputation, neutrality, credibility, and technical competence proved to be facilitators for sharing knowledge among them. In addition, these characteristics

contribute to a sense of knowledge protection in the network. Regarding the studied paradoxes, an actor with these characteristics in the network positively influences sharing of knowledge and reduces the concern about knowledge protection.

IPT is an institution that only participates in technical research execution. There is no commercial interest in the products or technology explored in the R&D network. Thus, the neutral characteristic favors knowledge sharing because firms exclusively discuss know-how and technical information with IPT. In addition, IPT's technical competence also tends to foster knowledge exchange in the network, as the information and knowledge shared are understood and absorbed by the institution. The communication between the technical area of the companies and the IPT flows easily. Mainly due to its recognized technical competence, the interviewees perceive the credibility and reputation of IPT as facilitators for the exchange of information. An interviewee mentioned that IPT's competence in developing such projects is essential for carrying out the network. They had sought this solution in universities in other opportunities but with no success due to not finding the same technical competence identified in the IPT. Interviewee 10 reported, "*Firstly, IPT and ABAL are renowned companies in the market. There is certainly an interest beyond the technical improvement: a) the exchange of knowledge and b) the level of dissemination that this project gives ahead. We know that large companies are involved in this project*". Thus, in addition to favoring knowledge sharing, network coordination by the IPT is also seen as a factor that favors cooperation among network members to achieve the partnership's success.

(d) Segregation between Management and Technical Committees: network management has a management group and a technical group. Creating these groups enhanced collaboration and knowledge-sharing because the strategic concerns do not interfere in the technical discussion. According to interviewees, the debate about technical issues flows easier than the discussion at the strategic level. Based to Interviewee 2, "*when there is only the technical group, it favors knowledge sharing. Afterall, everyone wants to see it works, it does not matter if it was with A, B, C or D*". Thus, the segregation of groups with different concerns contributes to the speed of knowledge and information sharing on technical issues. Also, strategic concerns that could undermine the relationship do not interfere directly with research execution. Regarding the paradoxes studied in this research, creating workgroups and segregating the discussion contributed to improving cooperation and facilitating knowledge and information sharing between companies and the research executor.

(e) Protocol for Sensitive Knowledge-Sharing: Some interviewees (Interviewees 1 and 5) declared that knowledge sharing is not about their know-how, but others refer to the need to share sensitive information (Interviewees 2, 4, and 7). The network management created a specific routine to deal with the knowledge spillover concern. There are two categories of technical meetings in the network. First, the periodical meetings happen every fifteen days with all companies' participation. The second category refers to individual meetings. The individual meetings may be requested by IPT or companies that may share sensitive information or contribute with their knowledge to solve research issues. Interviewees reported that direct communication with IPT helps whenever they have to share information without sharing it with other companies. For example, in regular meetings, companies share general information as the joint's code on Brazilian standardization codification.

On the other hand, network members use individual meetings with IPT whenever the firm needs to share sensitive information (e.g., technical design). According to Interviewee 7, *“The exchange of information is always between the firm and IPT. We always share knowledge with the IPT. It does not go to another company. By this practice, everyone is protected.”* The practice of creating a specific channel for sensible knowledge-sharing makes the contribution of companies' know-how to the network feasible without the risk of spillover.

The protocol for knowledge sharing aligns with the management practice named "neutral actor as mediator." The IPT's reputation, neutrality, credibility, and technical competence made this practice feasible. Since network members trust IPT, they believe their knowledge is shared exclusively with the network objective. Regarding the studied paradoxes, the protocol for sharing sensitive information and know-how improves knowledge sharing and reduces the concern about companies' knowledge protection.

The IPT mediation process through the protocol to knowledge sharing worked as a sense-giving process, in which network members reframed their interpretation regarding the knowledge protection in the network activity. The protocol influenced network members' perceptions regarding their knowledge protection.

(f) Communication and Alignment Practices: The existence of a company or group of companies responsible for managing the network does not guarantee its effectiveness. Most interorganizational events are ambiguous, and experiences can be interpreted by individuals in different ways (Kramer, 2016). Therefore, communication and alignment practices give meaning and explanation to collective experiences, reducing misinterpretations. The

management shall act toward the achievement of network goals. The network has a management team working through communication and alignment practices. Though there is a management group, IPT proposes and conducts actions to guarantee that the network will continue and reach its objectives. Communication and alignment practices are present in this relationship and occur through regular meetings, technical reports, and workshops. Interviewees highlighted the existence of technical reports sent by IPT after each meeting. The technical reports keep network members informed about the research progress and equalize the actor's knowledge in the process.

Additionally, regular meetings between the technical and management groups, ongoing contact with technical representatives, and regular workshops contribute to a favorable environment for cooperation and knowledge sharing. According to Interviewee 6, “*IPT always leads periodic meetings with all the team, and this facilitates the sharing of information.*” These practices keep the network active and create interaction routines among members.

Table 12 describes the paradoxical management practices and their influence on knowledge sharing-protection and cooperation-competition paradoxes in Network A.

Table 12. Paradox Management Practices and their influence on knowledge sharing-protection and cooperation-competition paradoxes.

Phase	Paradox Management Practices	Description	Effects on Paradoxes
Network Design	Formal Contract (1,4,5,6,7,8,9)*	Refers to the document that formalizes the relationship among firms.	Fostering knowledge-sharing and cooperation because the formal contract provides safeguards and a link to the national legal system
	Member Selection Criteria (4,5,7)*	Refer to the member selection process, which includes selecting network members according to their previous relationship and resources complementarities	Fostering knowledge-sharing and cooperation because it explores previous relationships among network members and reduces the concern about competition
Network Operation	Neutral actor as Mediator (1,4,6,7,8)*	Refers to the actor who mediates the interaction between network members. The actor does not participate in the Aluminum market.	Fostering knowledge-sharing and cooperation because the dyadic relation between firms and the neutral actor does not follow the dual logic (cooperate and compete)
	Segregation between Management and Technical Committees (2,4,6,7)*	Refer to discuss managerial and technical topics separately in the Network.	Fostering knowledge-sharing and cooperation because the knowledge flows easily among the firm's technical teams.
	Protocol for Sensitive Knowledge-Sharing (2,4,6,7,9)*	Refer to the individual meetings among the neutral actor and network members to share sensitive knowledge without splitting over.	Fostering knowledge-sharing and cooperation because it reduces the concern about knowledge protection.

Phase	Paradox Management Practices	Description	Effects on Paradoxes
	Communication and Alignment Practices (1,2,4,6,7,8,9)*	Refer to the set of practices to improve the communication and the alignment of objectives in the Network.	Fostering knowledge-sharing and cooperation because the communication equalizes the network's knowledge and increases a sense of belonging among network members.

*The numbers refer to the interviewees' IDs.

4.1.3 Paradoxical Tensions and Relationship Value

The findings indicate an imbalance between knowledge sharing-protection paradox' poles and cooperation-competition paradox' poles. The contextual factors influence the sensemaking process towards a favorable scenario for cooperation and knowledge sharing. Network A members acknowledge the importance of knowledge sharing and accepts lowers levels of knowledge protection. Figure 6 illustrates the relation between paradox poles.

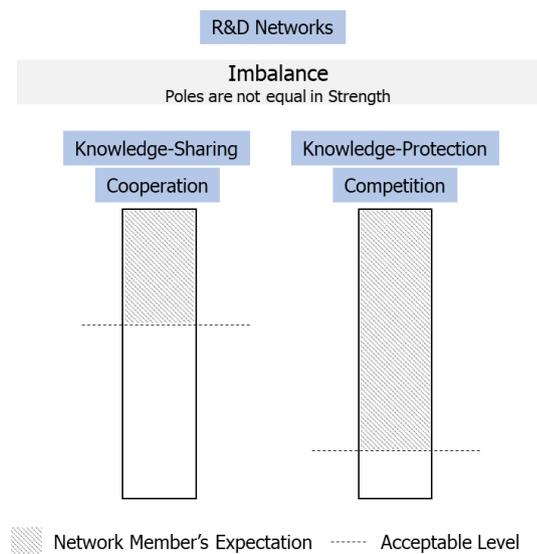


Figure 6. Paradoxes pole's expectation in Network A.

There are no significant tensions in Network A that could harm the achievement of its objectives. Thus, Network A effectively prevented any tension from the knowledge sharing-protection and cooperation-competition paradoxes. During the interviews, I identified a few events where there was a misalignment in knowledge-sharing expectations. The IPT resolved the mismatch of interests regarding knowledge sharing. The institute is aware of knowledge sharing and its importance for network effectiveness.

The alignment of paradox management practices may have favored knowledge sharing and, consequently, prevented the emergence of tensions. The knowledge sharing protocol

created for sharing critical information uses IPT's good reputation and neutral characteristics to enable knowledge sharing. Since IPT executes the research, its role as a neutral mediator enables the sensitive knowledge sharing necessary to achieve the network's objectives. Although there are competitors in the network, the protocol for sensitive knowledge sharing made the network members comfortable sharing knowledge and fostered cooperation.

The separation between technical and management groups appeared essential to facilitate knowledge sharing. The discussion in the technical group takes place after approval by both firm's management and the legal department. Thus, the individuals involved in the network technical execution can dedicate themselves almost exclusively to achieving results. Consequently, there are no barriers that could harm the achievement of the network objectives.

Knowledge sharing and cooperation are valuable from the network point of view. On the other hand, firms' knowledge protection and competition are essential for competitiveness. Consequently, the ideal paradox setting may have a high level of knowledge sharing and cooperation while preserving acceptable knowledge protection levels. Contextual factors facilitated knowledge sharing and cooperation in Network A, while paradox management practices improved the cooperation and knowledge sharing among network members. Consequently, management practices effectively prevented significant tensions that could deny the relationship value in Network A. The absence of emerging tensions favors the relationship value perception by network members.

Interviewees (1, 2, 4, 5, 6, 7, 8, 9) reported gains that could not be achieved isolated by firms. In addition, network members perceive personal, knowledge, financial and strategic gains. The network may provide the needed knowledge to increase aluminum use in vehicles. Therefore, there is a potential financial value gain for the whole aluminum supply chain (Interviewee 2, 7), and compared to individual research, the cost of cooperating represents a financial gain to firms (Interviewee 1), as reported by Interviewee 2 *"firm's gains by expanding the aluminum market"* and Interviewee 7 *"we are creating a new demand for a product that is our company's portfolio, This is the main value generated from the network"* During the network operation, the knowledge transference among network members provided an application to solve the firm's daily issues. Interviewee 1 reported knowledge transfer through an exchange of training between network members. Interviewee 6 perceived strategic gains due to the opportunity to spread the firm's name among network partners and increase the use of his technology. Network gains are not restricted to the firm's level. According to Interviewee 1, *"I*

am a better teacher since I joined the network.” Therefore, the network's knowledge sharing also improves the professionals.

Despite a tension episode, the general absence of tensions that could harm the relationship contributed to Network A members’ perception of relationship value. Figure 7 illustrates the relation between paradox pole levels perceived by network members.

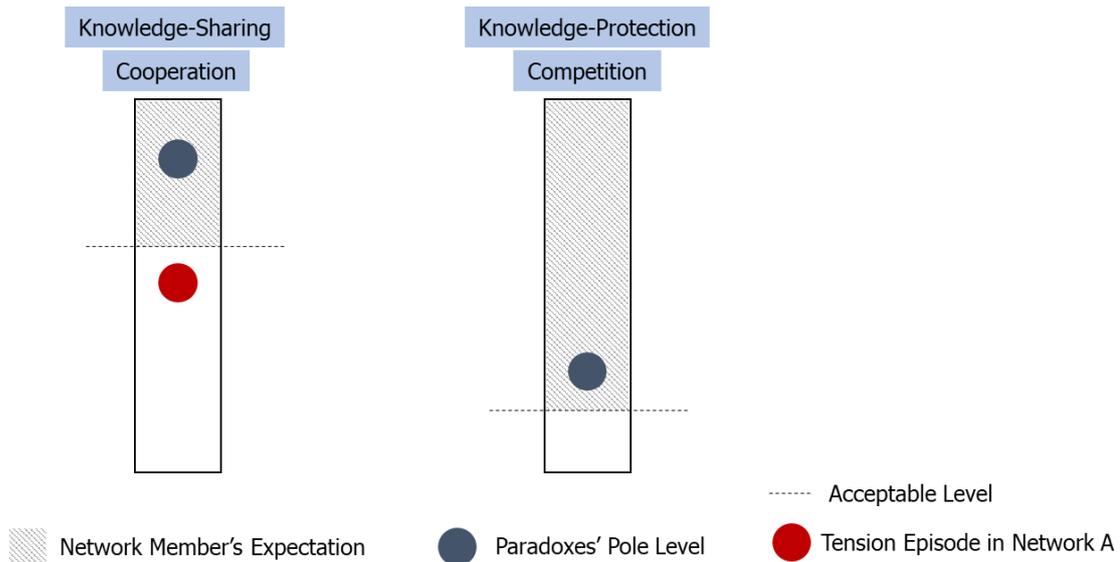


Figure 7. Network A member’s perception regarding paradox poles.

Contextual factors and paradox management practices reduced the concern about knowledge protection, making it possible to address knowledge sharing and cooperation without resulting in tensions regarding firms' knowledge protection and competitiveness. Therefore, the paradox management acted to prevent tensions. Figure 8 synthesizes the relation among contextual factors, paradoxes, and paradox management practices in Network A:

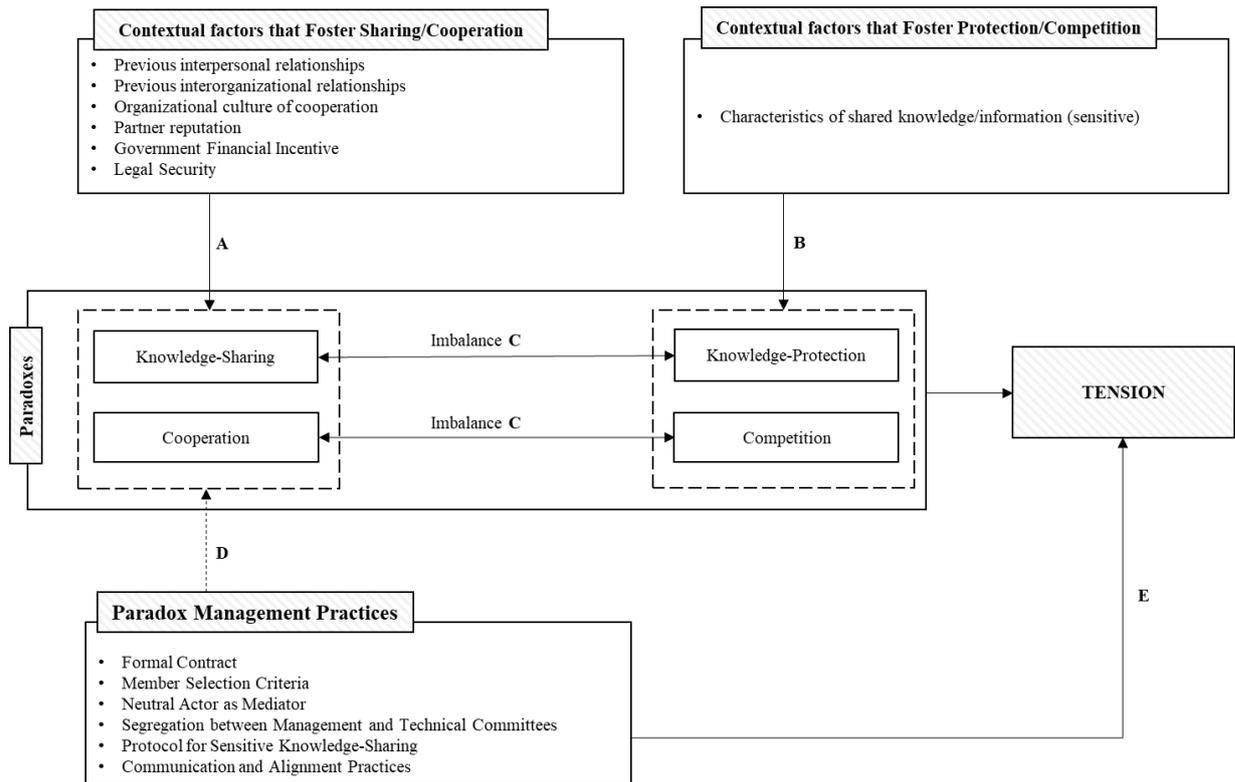


Figure 8. Paradox Management in Network A.

Network A context mostly fosters knowledge sharing and cooperation (**A**), while the requirement for sensitive knowledge sharing increases the concern about knowledge protection and competition (**B**). The context contributes to an imbalance between the paradox poles (**C**) as knowledge sharing became stronger than knowledge protection. Network A copes with the paradox through practices that prevent tensions (**D**) by increasing the knowledge-sharing and cooperation levels and practices that cope with emerging tensions (**E**). In this case, the paradox management contributed to preventing tensions from harming the relationship value perception.

4.2 R&D NETWORK B: COOPERATION IN GEAR SECTOR

Engrena ITA is a network to enhance research prospecting and disseminate knowledge about gears and power transmission systems. The network among the Aeronautics Institute of Technology (ITA) and 21 firms was made official in September 2017. Network B had its origins in establishing a regular and official connection between academia (ITA) and the business sector (firms). Rights and responsibilities are shared equally among all members. The initiative started with ITA and a few members with previous relationships, primarily through dyadic projects with ITA Competence Center in Manufacturing³.

³ <https://www.ccm.ita.br/>

Engrena ITA comprises 22 institutions, including ITA and twenty-one other partner companies. Among the partner companies, there is a large company from the steelmaker sector with annual revenue exceeding € 2.70 billion and approximately 10 thousand employees, a prominent company in the aeronautic industry, with annual revenue exceeding € 3.5 billion and around 20,000 employees, gear engineering companies, and gear supply suppliers (e.g., lubricants). Figure 9 illustrates the roles in the network.

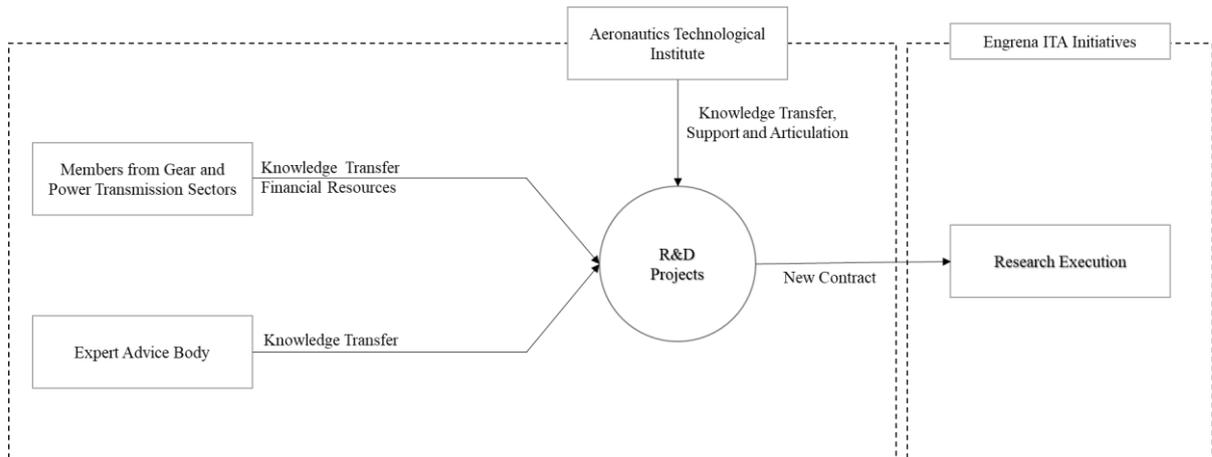


Figure 9. Network B Workflow.

In 2017 ITA tested a network management model that ITA and network members evaluated during the first year. According to the feedback, the model was adjusted. ITA uses this model to lead the network. The model includes meetings (RT), a discussion about ideas, and the definition of initiatives biannually. Each RT may result in a project or in a feasibility study. ITA and network members can suggest and vote on topics in the RT. Network B selects the most voted theme. In this step, each network member can decide if or he should join the project or not. A smaller group of network members start working together to analyze the project. In this step, firms share knowledge and information to define the project scope, and the knowledge sharing is restricted to the group. On the other hand, Network B selects themes to proceed with feasibility studies once a year. Feasibility studies last six months, and the results are shared among all network members.

ITA mediates firms' interaction and supports network members in producing a project proposal. The final document is an R&D project proposal. From 2017 to 2021, Engrena ITA has prospected 32 projects with public funding (6), private funding (21), and mixed (5). The R&D Network reaches approximately € 6.5 million in funding. After obtaining financial resources to start the prospected projects, Network B creates a new and smaller network between network members through a new contract.

Network members were aware of the possible competition and resistance to sharing knowledge among network members. ITA leads the meetings and mediates the interaction between network members. Network B discusses topics related to common difficulties and opportunities in gear and power transmission sectors. Interviewees reported that they know what they can expose to in the network. Although there is a concern about knowledge protection, Network B primarily requires common knowledge, facilitating knowledge sharing in the network. Additionally, the formal contract contained clauses to protect the firm's knowledge.

Network members are concerned about competition and perceive good practices that facilitate knowledge-sharing in Network B. Some interviewees (5,7,9) recognize separating competitors while discussing more than one topic. According to Interviewee 3, this practice improves the topic discussion, favoring knowledge sharing.

Despite the paradoxes in Network B, there is no signal of significant tensions that could harm the relationship value perception. Interviewee 1 reported a demand from some network members to create a platform to share information and knowledge among members. This concern was punctual and did not evolve into tension. Interviewee 6 reported punctual divergence among network members' opinions during the topic discussion, but without risking the network continuity. Interviewees recognize that ITA has an essential role in the adequate flow of knowledge among network members and in achieving the network objectives.

Contextual factors and paradoxical management practices may explain the absence of persistent tensions emerging from cooperation-competition and knowledge sharing-protection. Contextual factors and paradox management practices made it possible for Network B to emphasize knowledge sharing and cooperation without tensions regarding firms' concerns about knowledge protection and competition. In the following section, I present these contextual factors and the management practices that contributed to network members' sensemaking processes and prevented emerging tensions regarding cooperation-competition and knowledge sharing-protection paradoxes.

4.2.2 Paradoxes: Knowledge Sharing-protection and Cooperation-Competition

In Network B, I aimed to understand the paradoxical relation between knowledge sharing-protection and cooperation-competition. Therefore, I gathered data regarding contextual factors and paradox management practices that could influence each pole of these

paradoxes. The R&D network adopted effective paradox management practices to prevent paradoxical tensions that could harm the relationship's value.

Contextual network design and operation factors facilitated knowledge-sharing and cooperation among network members. Additionally, Network A adopted management practices to deal with knowledge protection, improving knowledge sharing among network members. Similar to the previous case, the sensemaking process favorable to knowledge sharing allowed network B to accommodate expectations without focusing on knowledge protection. Figure 10 illustrates the contextual factors and management practices and how they influenced the knowledge sharing-protection and competition-cooperation paradox.

	Network Design	Network Operation
Contextual Factors	<ul style="list-style-type: none"> ➤ Previous Interpersonal Relationships ➤ Previous Interorganizational Relationships ➤ Organizational Culture of Cooperation ➤ Partner Reputation 	<ul style="list-style-type: none"> ➤ Characteristics of shared knowledge/information
Paradox Management Practices	<ul style="list-style-type: none"> ➤ Criteria for Member Selection ➤ Neutral Mediator ➤ Protocol to Share Knowledge ➤ Formal Contract 	<ul style="list-style-type: none"> ➤ Technical and Management Committees ➤ Communication and Alignment Practices

Foster Knowledge-Sharing and Cooperation
 Foster Knowledge-Protection and Competition

Figure 10. Paradox Management Practices and Contextual Factors influence knowledge sharing-protection and cooperation-competition paradoxes.

Figure 10 represents two different periods in the Network B history. Since this is not a longitudinal study, there is no attempt to define a sequence of events in each block but to classify when each contextual factor and management practice emerged in Network B: during the network design or Network operation.

The context in which Network B operates has some characteristics that influence the knowledge sharing-protection paradox. I could identify different contextual factors that influence the knowledge sharing-protection processes from the collected data. Five different factors with consistent references emerged from the data: **(a) Previous interpersonal relationships, (b) Previous interorganizational relationships, (c) Partner reputation, (d) Organizational culture of cooperation, and (e) Characteristics of shared knowledge/information.** I organized the first-order categories into second-order categories: actors and network characteristics.

(a) Previous interpersonal relationships: Network B involves people who already had interpersonal relationships due to previous academic experiences. Some interviewees are former students from ITA: *“I studied there. I have a very close contact with the CCM (Manufacturing Competence Center) staff. Thus, we are always helping each other”* (Interviewee 5). Additionally, Interviewee 8 reported, *“I did my master's and a doctorate in the field at ITA, that's why we are so close to ITA initiatives. I can say that we are from the same home”*. Also, Interviewee 7 reported the presence of a relationship between companies and people *“We have a lot of relationships. we have a relationship with the people and with the companies that are there”*. Moreover, the relationship between people seems to influence cooperation and knowledge sharing positively. The presence of interpersonal relationships in the network positively influences knowledge sharing and reduces concerns about the actors' knowledge protection. A reason for interpersonal relationships to favor knowledge sharing and cooperation between companies is that these professionals have developed trust. According to Interviewee 1, *“The connection between people opens up opportunities for you to consult the specialist in a certain subject. You have contact with everyone, you can call”*. Although there is a legal premise for sharing knowledge (contracts), the proximity of people makes it easier for this sharing to occur more fluidly.

(b) Previous interorganizational relationship: According to Interviewee 4, his company entrance was due to their previous relationship *“they are people that I already knew, I already knew the structure of the Manufacturing Competence Center, so that's why we joined Engrena ITA.”* Due to the previous projects led by ITA, most companies already had previous experiences with the Manufacturing Competence Center. Thus, their business relationship precedes network creation. Respondents mentioned this prior relationship as a facilitator of cooperation between companies. According to Interviewee 2, *“we have a spectacular relationship with them because we have already supplied parts to them, we have already supplied to ITA.”* Interviewee 3 reported, *“we already knew the project mastermind from other small projects we had. So we ended up having contact and being invited to participate from the beginning”*.

Additionally, Interviewee 8 reported that *“In fact, there were projects that were established within the ITA, even before the work of Engrena ITA began, which were about gears.”* The existence of the previous relationship between members positively contributes to knowledge-sharing. The reports did not mention previous negative experiences. Hence, the positive influence may be related to positive previous experiences between members.

(c) Partner Reputation: Network B has renowned companies in the market. Though some companies are known on the national and international scene, many companies are known because there are few players in the Brazilian gear sector. Interviewees reported the importance of collaborating with reputable and renowned companies in the gear sector: *“when we say that you are going to apply Shot Peening and you have the support of ITA, it is valuable. People are much comfortable to work with you. Hence, it counts as marketing”* (Interviewee 5). Additionally, according to Interviewee 1, *“having the name of your company linked to an important group is very beneficial to your image.”* Reputable companies in the network positively influence knowledge sharing and reduce concerns about the actors' knowledge protection. Also, it contributes positively to cooperation. The main reason for the companies' reputation to favor the sharing of knowledge and cooperation among members is because these factors generate trust. According to Interviewee 3: *“We have a high level of trust. There are long-time customers in the network. So, it's logical that we have trust. Otherwise, we wouldn't even be there”*.

Additionally, *“Nothing prevents the participants who are part of the group today and tomorrow may not, from using that information. Hence, it depends on probability and on trust. I think it's hard for you to have any guarantees”*. (Interviewee 1). Hence, the agreement generates a commitment to the legal system, a legal guarantee. However, companies can not eliminate the risk inherent in sharing information. Therefore, trust in other members due to their reputation facilitates cooperation and knowledge sharing.

(d) Organizational culture of cooperation. Participation in a network may suffer influence according to the organizational culture of the participating companies. Engrena ITA has a process to invite members, including the indication of companies by network members. Therefore, invited companies usually had previous relationships with active members, including previous cooperation. Interviewee 1 highlighted his firm's previous experience in collaborations. Also, Interviewee 4 highlighted that *“our Firm likes to participate in all these events that promote the exchange of information, mainly between academia and industry. Hence our firm worldwide has a lot of that kind of cooperation”*. Another example emerges from Company 6, an international joint venture formatted by two competitors outside Brazil. According to Interviewee 6, this experience facilitates their cooperation with other companies. In Engrena ITA, the organizational culture of cooperation seems to facilitate knowledge sharing between companies and, consequently, their cooperation.

(e) Characteristics of shared knowledge/information. There are two types of knowledge sharing in Engrena ITA. The first refers to common knowledge that anyone can obtain through research. In contrast, the second refers to knowledge acquired through the experience of companies, which can be considered the know-how of the participating members. Equal to Case I, these characteristics have been shown to influence knowledge sharing in the R&D network. Regarding the studied paradoxes, when the knowledge to be shared is common knowledge, it influences knowledge sharing positively and reduces the concern about knowledge protection between the actors. Otherwise, when the knowledge to be shared relates to companies' know-how, it negatively influences sharing because firms may have organizational restrictions on sharing.

Respondents reported no barriers to sharing knowledge because most of the shared knowledge is in the public domain. Interviewee 1 commented that they share knowledge that is in the public domain. Additionally, Interviewee 1 highlights the importance of sharing sensitive knowledge: *“you have to be a little careful about the specificity of the manufacturing process, the know-how, the product development.”* Interviewee 3 reported that *“today, the meetings do not require so much knowledge sharing.”* He refers to the biannual meeting that helps them to define the topic and directions for future projects. Furthermore, the network requires more intense knowledge sharing in the execution phase. Hence, as a network that prospects R&D, Engrena ITA requires mainly technical information that network members could access by themselves through internal research.

An expertise advice board also provides technical knowledge sharing, composed of three renowned experts in the gears sector. The experts are not from firms or ITA but are invited according to their knowledge. Therefore, even if any firms could consider the required information sensitive and resist sharing, it may not apply to the expert board.

Since the network mainly does not require sensitive information, the characteristics of required and shared information/knowledge positively influence knowledge sharing and cooperation between partners. The need for common knowledge reduces the concern about knowledge protection. Table 13 present the contextual factors that influence the studied paradoxes.

Table 13. Contextual Factors and their influence on knowledge sharing-protection and cooperation-competition paradoxes.

Category	Contextual Factor	Description	Effects on Paradoxes
Actors Characteristics	Previous Interpersonal Relationships (1,2,3,4,5,7,8,9)*	Refer to the previous relationships between people who work on the Network, including previous professional and academic experiences.	Foster knowledge-sharing and cooperation because previous interpersonal relationships generate trust among network members.
	Previous Interorganizational Relationships (2,3,4,6,7,8,9)*	Refer to the previous relationship between firms in the Network, including market relationship and their participation in the Brazilian Aluminum Association.	Foster knowledge-sharing and cooperation because previous interorganizational relationships generate trust among network members.
	Partners Reputation (1,3,4,7)*	Refer to the beliefs or opinions that network members hold about each other.	Foster knowledge-sharing and cooperation because previous interpersonal relationships generate trust among network members.
	Organizational Culture of Cooperation (1,4,6,8)*	Refer to each network member's culture regarding cooperation.	Foster knowledge-sharing and cooperation because an organizational culture of cooperation increases the perceived value of cooperation.
Network Characteristics	Characteristics of Shared Knowledge/Information (1,3,4,5,6,7,8,9)*	Refer to the type of knowledge that needed to be shared to operationalize the research in the Network.	Foster knowledge sharing and cooperation because needed knowledge is from the public domain and may not affect a firm's competitiveness in the market.

*The numbers refer to the interviewees' IDs.

In general, Network B members receive different inputs in their sensemaking process. The recognition of their reality suffers the influence of contextual factors and management practices that influence the alignment of expectations.

Although contextual factors favor an imbalance of knowledge sharing-protection paradox, Network B uses a set of practices that positively influence the relation between paradoxical elements. The set of practices was enough to prevent emerging tensions. I could identify different management practices that positively influence knowledge sharing in the network from the collected data. Six different first-order categories with consistent references emerge from the data: **(a) Formal Contract; (b) Member Selection Criteria; (c) Systematic Methodology; (d) Project Management and Brokerage Competencies; (e) Expert Advice Board and; (f) Communication and Alignment Practices.** I organized the first-order categories into two second-order categories: Network Design and Network Execution.

Formal Contract. The Network members formalized their network through adhesion form. The contracts are instruments that enhance and clarify the relationship between network members. Therefore, the formalization aids the sensemaking process contributing to a unique interpretation through the alignment of expectations. The interviewees acknowledge the rules, especially those related to data protection, and each member's role. Additionally, the Interviewees report his agreement with the contract statements. According to Interviewee 1, *"there is a contract you sign. You commit to having a certain behavior in the project. We expect everyone to comply with what they signed"*. Interviewee 3 relates the importance of a formal contract *"it is very important to have a contract, legal guarantees because if you don't have that, it's difficult for you to get internal approval. We are a multinational company"*. The formalization through a contract seems to influence cooperation and knowledge sharing in the network positively.

Member Selection Criteria. The network design was an essential step before the network formalization. The objective was to systematize their relationships with the industry. Therefore, ITA started to invite companies that already had some ongoing or previous R&D projects. ITA invited members from the gears sector supply chain. Therefore, the member selection contributed to the resource complementarity in the network. According to Interviewee 3, the choice of members also has a ritual. So initially, the network was composed of a group of invited members. Then, new entrants may be approved by actual members. Interview 6 stated: *"We choose who can join the group very well. The group is special. You may participate or not, according to the permission of actual members. As a project member, you know who you are dealing with, and that helps a lot."*

The application for admission is a document that requires answers to two questions: (a) *how does your company's product and/or service portfolio align with the gear and transmission systems?* And (b) *What is your company's interest in participating in an R&I alliance in gears and transmission systems?* Though there are no requirements to join the group other than being invited and approved by the group, this step is essential to create a comfortable environment to share information. Since new members are approved, they tacitly agree to share knowledge and cooperate with them.

Systematic Methodology. A methodology used in Germany by universities and firms inspired Engrena ITA. A professor and researcher from ITA brought this methodology and used it to systematize the interaction between ITA Manufacturing Competence Center and the industry. The methodology systematizes actions for research prospection through work meetings (RT).

ITA leads work meetings. In RT, firms and IT bring topics for discussion. Each company has two votes, and ITA does not vote. The objective is to select one topic and start a deeper discussion. Once the group reaches the priority list, they start working in small groups to develop and submit a project for funding. Interviewee 5 highlighted this process: *“The topic is defined beforehand, then there is a vote that chooses the theme of greatest interest to the group. Then each participant checks what attracts them the most. Finally, we form groups.”* According to Interviewee 3, *“Engrena ITA has a very interesting methodology to encourage participants to contribute with ideas. The themes are the most varied, and they are not restricted only to the part of tools, it has the materials, steel, lubricants personnel, instrumentation personnel, measurement personnel, etc.”*

The methodology makes cooperation and knowledge feasible because firms are comfortable participating and exposing their ideas. The network environment seems under control. Interviewee 6 reported, *“the project is very good because you have the discussions there. The propositions of the themes. So everyone there knows what kind of information can be shared or not. It is not invasive. I understand that if I have something that I cannot expose, I do not expose it. So you are free. There is a calm environment to exchange information”*.

Project Management and Brokerage Competencies. ITA leads the network. The institute is responsible for conducting the meetings and tracking the RT projects. The network requires project management competencies to keep the work going on. According to the interviewees, I found evidence that supports a well-done lead by ITA. The interviewees reported ITA competencies related to project management and brokerage. Interviewee 2 mentioned: *“I see the result in the way Person A manages, how he creates the methodology and how he carries the methodology. He talks to people in such a delicate way. He minces his words so much that no one can leave and feel offended”*.

The methodology combined with ITA competencies in conducting the network favors collaboration and keeps members active. According to Interviewee 3: *“I consider ITA’s people great specialists in encouraging people to put their ideas out there. They really have some dynamics and methods. The cool thing is that in every meeting, they do something different. So the various meetings we had there are never repetitive meetings”*. The importance of ITA to lead the network is also reported by Interviewee 4: *“The way ITA conducts conversations, how the Engrena ITA group conducts conversations. I think this is very important to move forward”*.

The competence to mediate conflicts and manage projects seems not restricted to Engrena ITA but some structural competence developed by ITA in CCM. According to Interviewee 8, ITA seems to develop this competence in their academic programs: *“He is a good project manager. They have some guys there who end up being trained for this since their thesis are not only technical but about management too. Hence, ITA’s structure is fantastic”*.

Regarding the paradoxes analyzed in this research, the network management and brokerage competencies by ITA improved cooperation and facilitated knowledge and information-sharing between companies.

Expert Advice Board. Engrena ITA has an expert advisory board formed by three specialists invited due to their knowledge about gears and power transmissions. The experts contribute significantly to sharing information and knowledge and discussing the art state. However, it also contributes to facilitating knowledge sharing within the group. A variety of interviewees reported their importance to the network. For example, Interviewee 2 highlighted, *“It is a concentration of information point; it is like an antenna within the network.”* Interviewee 7 *“they are people who have worked in the gears sector and have a valuable contribution. It is always important. They contribute and enrich our work meetings”*. The advice board adds experts' previous experiences to the network, contributing to the improvement of knowledge-sharing.

Communication and Alignment Practices. ITA proposes and conducts actions to guarantee that the network will continue and reach its objectives. Communication and alignment practices are present in this relationship and occur through regular meetings, technical reports, workshops, and, recently, the creation of an online platform to share information between members. Regular meetings occur between all members (RT) and between a small number of interested members in ongoing projects. This communication and alignment between what is going on contribute to a favorable environment for cooperation and knowledge-sharing. These practices keep the network active and create interaction routines between members.

Interviewees highlighted the well-organized meetings (e.g., Interviewee 5) and favor knowledge sharing (e.g., Interviewee 3). Interviewees also reported the importance of the recent platform to share information about ongoing projects: *“the platform seems to be an important tool to encourage participation because you have online everything that is happening. You can go there and have the reports and technical meeting summaries. Hence this is something that keeps you informed and keeps you connected to the project”* (Interviewee 1). Therefore, the

communication and alignment practices contributed to sharing knowledge between network members, contributing to a cooperative environment.

Table 14 describes the management practices to manage paradoxes and their influence on Network B's knowledge sharing-protection and cooperation-competition paradoxes.

Table 14. Paradox Management Practices and their influence on knowledge sharing-protection and cooperation-competition paradoxes.

Phase	Paradox Management Practices	Description	Effects on Paradoxes
Network Design	Formal Contract (1,3,4,6,7,8,9)*	Refers to the document that formalizes the relationship among firms.	Foster knowledge-sharing and cooperation because the formal contract provides safeguards and a link to the national legal system
	Member Selection Criteria (1,3,4,6,8,9)*	Refer to the member selection process, which includes selecting network members according to their previous relationship and resources complementarities	Foster knowledge-sharing and cooperation because it explores previous relationships among network members and reduces the concern about competition
Network Operation	Systematic Methodology (2,3,5,6,7,9)*	Refers to the structured and systematic interaction between network members.	Foster knowledge-sharing and cooperation because the systematic interaction between network members contribute to a sense of commitment and control among partners.
	Project Management and Brokerage Competencies (1,2,3,4,6,7,8,9)*	Refer to ITA competencies to lead the network improving knowledge sharing and cooperation among network members.	Foster knowledge-sharing and cooperation because firms trust ITA's intentions and commitment to the network. ITA mediates the interaction among members, improving the knowledge sharing
	Expert Advice Board (1,2,3,4,7,9)*	Refer to the three expert consultants that contribute with their experiences in topic discussions.	Foster knowledge-sharing and cooperation because expert advice improves and accelerates the discussion among network members.
	Communication and Alignment Practices (1,2,3,4,5,9)*	Refer to the set of practices to improve the communication and the alignment of objectives in the Network.	Foster knowledge-sharing and cooperation because the communication equalizes the network's knowledge and increases a sense of belonging among network members.

*The numbers refer to the interviewees' IDs.

4.2.3 Paradoxical Tensions and Relationship Value

The findings indicate an imbalance between knowledge sharing-protection paradox' poles and cooperation-competition paradox' poles. The contextual factors influence the sensemaking process towards a favorable scenario for cooperation and knowledge sharing.

Network A members acknowledge the importance of knowledge sharing and accepts lowers levels of knowledge protection. Additionally, the network management adopted practices aligned with network members' expectations, preventing emerging tensions. Figure 11 illustrates the relation between paradox poles.

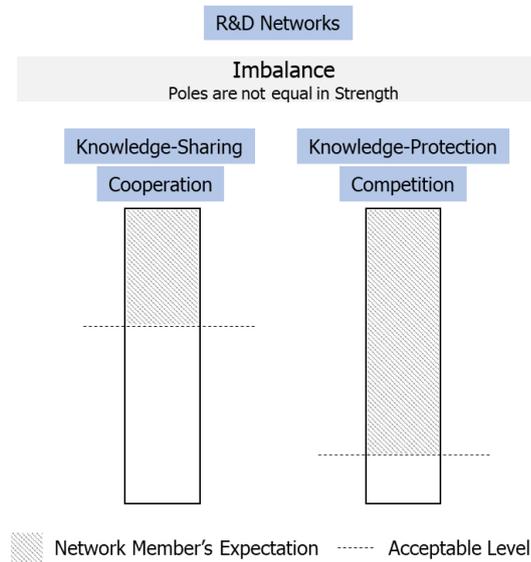


Figure 11. Paradoxes pole's expectation in Network B.

There are no significant tensions in the network that could deny the achievement of Network B objectives. The eventual conflict of interest in the group is manageable by ITA. Unlike the first Case, where contextual factors played an essential role in stimulating cooperation and knowledge sharing, Engrena ITA seems to be more based on management practices, especially on ITA's project management and brokerage competencies. ITA acts as an articulator and leads firms to select the most valuable topics for research. Also, ITA helps firms to reach their objective by supporting every activity in the network.

Knowledge sharing and cooperation are valuable from the network point of view. On the other hand, firms are concerned about their competitiveness and may resist sharing sensitive knowledge. Consequently, the ideal paradoxes setting can be defined as a high level of knowledge sharing and cooperation and lower, but acceptable, levels of knowledge protection and competition.

Network B is surrounded by positive contextual factors that favor knowledge-sharing and cooperation. Management practices improve the cooperation and knowledge-sharing between network members. The absence of emerging tensions favors the relationship value perception.

Interviewees (1,2,4, 6,7,8,9) reported gains that could not be achieved isolated by firms. In addition, network members perceive knowledge financial and strategic gains. The network provides the needed knowledge to solve firms' problems that they could achieve on their own (Interviewee 1). Therefore, network members perceive a learning and knowledge gain (e.g., Interviewee 7). Interviewees 3 and 4 highlight networking as an essential gain that arises from firms' participation in Network C. Interviewee 6 perceived strategic gains due to the opportunity to spread the firm's name and its product among network partners.

Network B members perceive relationship value due to the absence of tensions that could harm the relationship. Additionally, network management practices are aligned with the context, which contributes to maintaining paradoxical poles within network members' expectations. Figure 12 illustrates the relation between paradox pole levels perceived by network members.

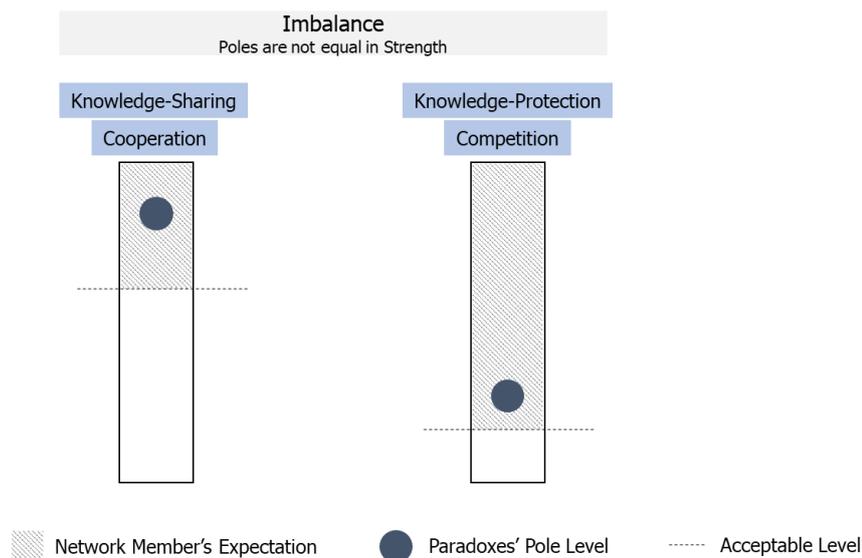


Figure 12. Network B members' perception regarding paradox poles.

Contextual factors and management practices reduced the concern about knowledge protection, making it possible to address knowledge-sharing and cooperation without resulting in tensions regarding firms' knowledge protection and competitiveness. Figure 13 synthesizes the relation among contextual factors, paradoxes, and paradox management practices in Network B.

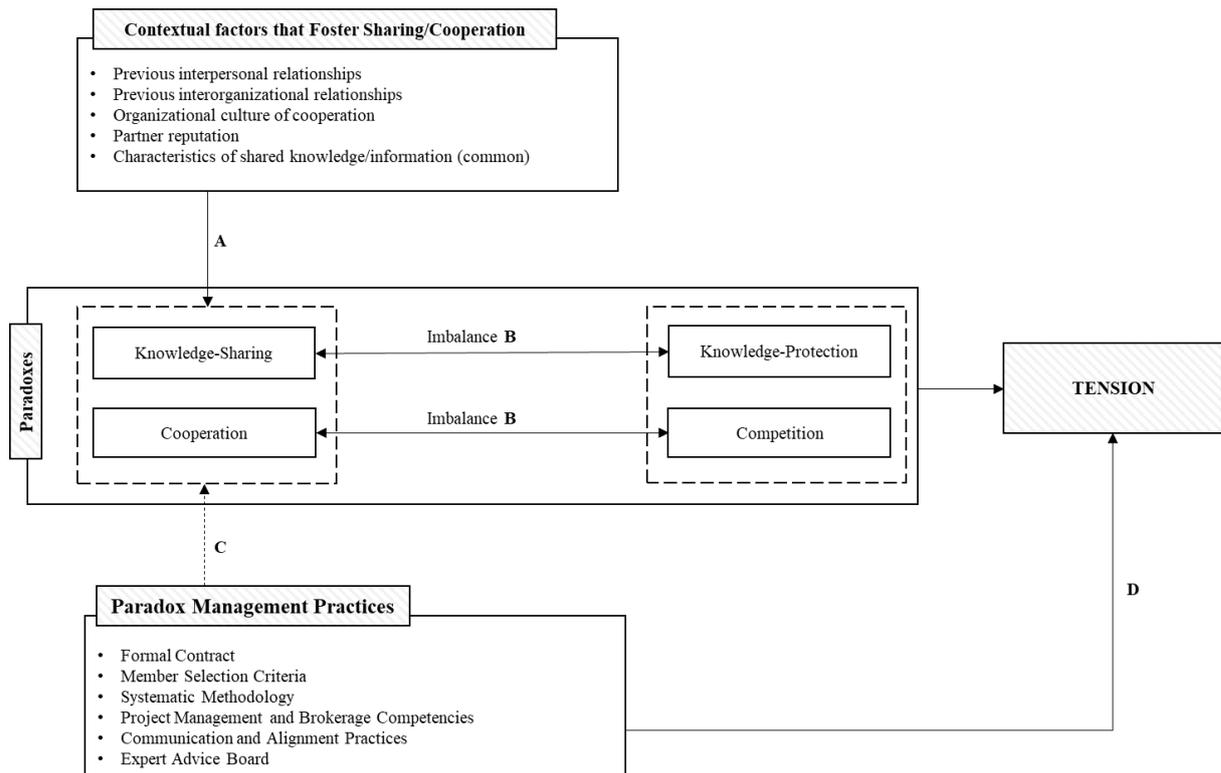


Figure 13. Paradox Management in Network B.

Network B context fosters knowledge sharing and cooperation (A). The context contributes to an imbalance between the paradox poles (B) because knowledge-sharing became stronger than knowledge-protection. Network B copes with the paradox through practices that prevent tensions (C) by increasing the knowledge-sharing and cooperation levels and practices that cope with emerging tensions (D). In this case, the paradox management contributed to preventing tensions from harming the relationship value perception.

4.3 RETAIL NETWORK C: COOPERATION IN IN RETAIL SECTOR

Network C aims to have a strong brand in the furniture sector. Network D started its activities in 2001 with 26 retail furniture stores in the northwest region of Rio Grande do Sul State. Network C was supported by a public program that aimed to encourage small businesses and promote local development through collaboration and joint action (Vershoore, 2010).

In 2021, Network C reached 125 members in the Parana, Santa Catarina, and the Rio Grande do Sul States. Network C is primarily present (60% of stores) in the Parana State, with an estimated population of 11.597.484 inhabitants. The per capita income of employed people is € 457,59, according to the Brazilian Institute of Geography and Statistics – IBGE (2022). The furniture sector reached a 0,3% decline in 2021, according to ABIMOVEL (Brazilian

Association of Furniture Industries). The total sector revenue reached € 1,6 billion⁴ in 2021. ABIMOVEL believes that the main reason for the sector decline was the furniture price inflation in 2021 (15,7%). The inflation weighed negatively on the Brazilian consumer's decision-making process.

The furniture sector faces a challenge due to the entrance of players focused on e-commerce into the sector. According to ABIMOVEL (2020),⁵ the popularization of internet access creates consumption possibilities. Consumers, when researching for products, have a larger repertoire and references in this new scenario. Therefore, the entrance of competitors offering online sales into the furniture sector increases the sector's competitiveness.

E-commerce has been in debate in the interorganizational network. Network C acknowledges the e-commerce advance in the retail furniture sector and has already started internal discussions about adopting e-commerce platforms. However, for now, Network C decided to keep the traditional sales channels. Network C benefits network members through partnerships with supplier industries, joint purchases with better conditions, unified marketing strategies, a strong network brand, and joint negotiation in general.

Network C has 125 members dispersed geographically. The distance between network members brings a multiplicity of views that represent a challenge. Network C acknowledges the challenge and adopts a series of practices to increase members' inclusiveness in decision-making processes. Network C adopts a traditional unpaid presidential system. Additionally, Network C has an Administrative Council, Fiscal Council, Director Board (president), Ethical Committee, and four working teams: Negotiation, Marketing, Strategy, and Expansion. Figure 14 illustrates the relationship among these structures.

⁴ <http://abimovel.com/nova-edicao-da-conjuntura-de-moveis-traz-dados-consolidados-da-performance-do-setor-moveleiro-no-final-de-2021/>

⁵ <http://abimovel.com/estudo-da-abimovel-traz-insights-sobre-o-novo-consumidor-de-moveis/>

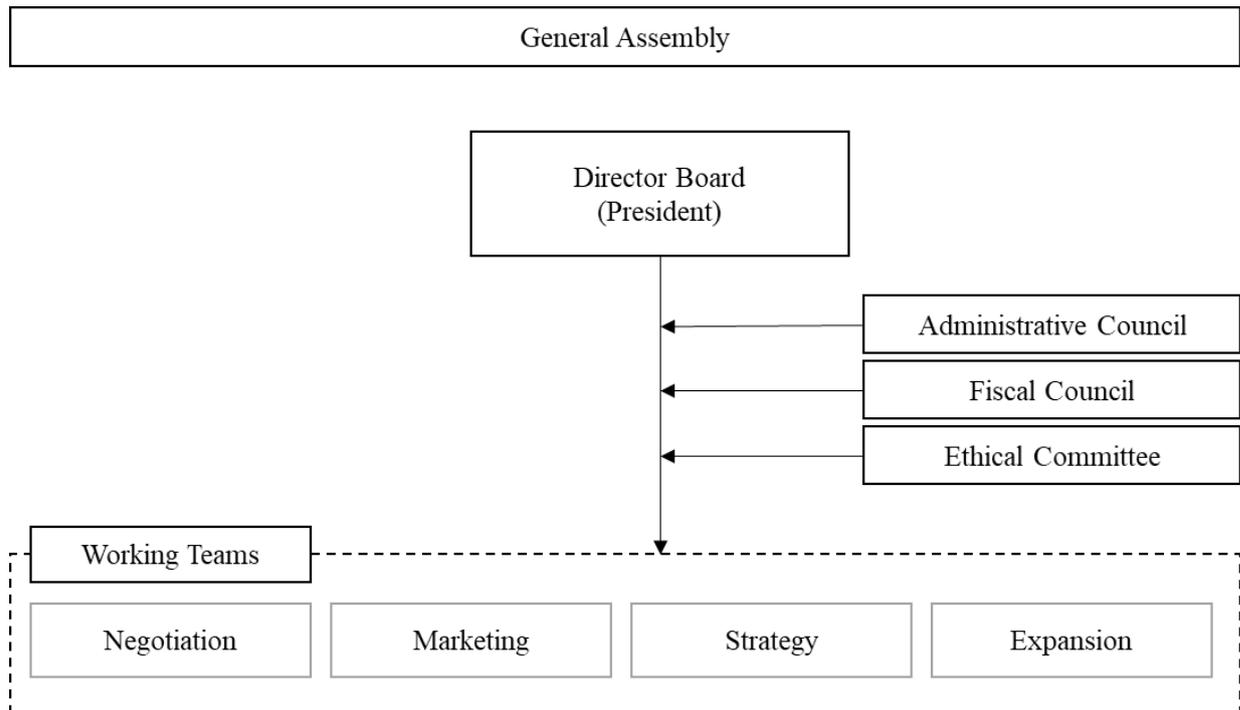


Figure 14. Network C organizational representation. Source: elaborated by the author from network documents.

Network C is composed of competitors. Since the beginning, Network C established a rule to limit one network member per city and define a minimum distance between network members to prevent competition. However, network members remain competitors. The dual logic of interaction may result in a conflict of interest in the network. Interviewees (1,4,6) reported that the rule to prevent competition was not enough to avoid conflict between network members. According to Interviewee 6, “*we see the aggressiveness (competition) of some network members that end up generating discomfort.*” Therefore, the desire for growth and expansion of some network members led to conflicts.

Network C members present a multiplicity of views that requires inclusiveness in the decision-making process. Network C is aware of the need for inclusiveness and uses a set of practices to make the participation of network members with different views possible. The inclusion of a diversity of thoughts led Network C to face conflicts, reducing decision-making efficiency. The multiplicity of views leads to different interpretations regarding the collective experience. The multiplicity of views represents different inputs in the sensemaking process, which lead Network C to face challenges in accommodating different interpretation regarding

the captured relationship value in the network. Hence, the decision-making inclusiveness-efficiency paradox is a persistent challenge for Network C.

Network C constantly rethinks and adapts its network management aiming for more inclusion and efficiency in decision-making processes. Network members were aware of the importance of the different points of view in the decisions. The concern with decision-making inclusiveness led Network C to search for representativeness in the working teams and the composition of the board of directors. Since Network C has members from three different states, there is a concern about including at least one member from each state in working teams and the director board. Additionally, Network C usually postpones meetings when a region representative is missing. According to Interviewee 5, *“We make decisions only when there are participants from the three states. If there are only members from two states, we postpone the decision to the next meeting.”*. The decision to postpone meetings to reach inclusiveness indicates that Network C favors decision-making inclusiveness at the efficiency cost.

Despite the preference for decision-making inclusiveness, Network C adopts practices to increase network efficiency and does not face persistent tension regarding efficiency. The focus on decision-making inclusiveness works because network members' mindsets acknowledge the importance of inclusiveness in their collective experience. The network solved punctual tensions related to decision-making efficiency through dialogue among network members. The dialogue worked as a sense-giving mechanism that aided network members' interpretation regarding their collective experience. Paradoxical management practices allowed Network C to emphasize inclusiveness and cooperation. Tensions did not emerge from network decision-making efficiency but regarding competition among network members.

In general, Network C members receive different inputs in their sensemaking process. The recognition of their reality suffers the influence of contextual factors and management practices that influence the alignment of expectations and experiences. In the following section, In the following section, I present these contextual factors and the management practices that contributed to network members' sensemaking processes and prevented the emergence of tensions regarding cooperation-competition and decisions making inclusiveness-efficiency paradoxes.

4.3.2 Paradoxes: Inclusiveness-Efficiency and Cooperation-Competition

In Network C, I aimed to understand the paradoxical relation between inclusiveness-efficiency in decision-making and cooperation-competition. Therefore, I gathered data

regarding contextual factors and paradox management practices that could influence network members' perceptions regarding each pole of these paradoxes. Network C adopted effective paradox management practices to prevent paradoxical tensions that could harm the relationship.

Contextual factors impose difficulties for network management and influence network members' sensemaking processes, pressing for inclusiveness and competition. Firms' heterogeneity, owner profile asymmetry, and goal incongruence influence network members' perception of inclusiveness. The multiplicity of views imposed by these characteristics presses the network management to accommodate network members' expectations, which are partially contradictory. This condition could lead network C to violate expectations related to efficiency or inclusiveness regarding each member's profile.

Network C adopted paradox management practices to deal with decision-making efficiency and inclusiveness and effectively control emerging tensions by accommodating different expectations. Table 15 illustrates the contextual factors and management practices and which paradox they influenced.

Table 15. Contextual Factors and Paradox Management Practices that influence inclusiveness-efficiency and cooperation-competition paradox

	Inclusiveness-Efficiency	Cooperation-Competition
Contextual Factors	<ul style="list-style-type: none"> ➤ Firms Heterogeneity ➤ Owner Profile Asymmetry ➤ Goal Incongruence 	<ul style="list-style-type: none"> ➤ Goal Incongruence
Paradox Management Practices	<ul style="list-style-type: none"> ➤ Communication and Alignment Practices ➤ Defined Rules ➤ Working Teams ➤ Conflict-Solving Process 	<ul style="list-style-type: none"> ➤ Communication and Alignment Practices ➤ Defined Rules ➤ Working Teams ➤ Conflict-Solving Process

Firms' Heterogeneity and Owner profile asymmetry pressed network C to be more inclusive. In contrast, goal incongruence fosters conflicts regarding value capture that delay network decisions and increase a sense of competitiveness among network members. Since Network C has heterogeneous members, there is a concern about making the participation of different groups possible. Therefore, the context in which Network C operates has some characteristics that influence inclusiveness-efficiency and cooperation-competition paradoxes. I could identify different contextual factors that make the interorganizational network more inclusive in decision-making processes and contextual factor that fosters competition among

network members. Three contextual factors emerged from the data: **(a) Firms Heterogeneity, (b) Owner Profile Asymmetry, and (c) Goal Incongruence.** I organized the first-order categories into second-order categories: actors and network characteristics.

(a) Firms Heterogeneity: Although the network members are from the same sector and the region (south of Brazil), cultural and economic differences add challenges to Network C. Inclusion is achieved by making members included in the decision-making process and treating them equally. From the data, I could identify difficulties in the decision-making process on inclusiveness due to the firm's heterogeneity.

Interviewee 2 highlights the challenge of providing inclusiveness in network decisions due to the firm's heterogeneity *"we have little conflicts because we have a very large action field, the mix of products from one state to the other changes. Stores from some cities demand product quality. On the other hand, some cities have a low-income population level, which requires another product mix"*.

Recently, the interorganizational network started a discussion about implementing an indoor radio. Regarding the initial proposition, Interviewee 3 reported, *"how could I play the network radio? My region comprises people who organize meetings in the city center to drink and listen to country music. How could I play international music from the 70s and the Rio Grande do Sul culture? There's no way you can implement it"*. Therefore, the firm's heterogeneity presses the network management to be more inclusive in decision-making. Collective decisions must attend to demands from different cultures.

Additionally, Interviewee 4 reported that *"the opinion of the Rio Grande do Sul members commanded the purchasing group. Hence, they hardly accepted suppliers indicated by members from Parana. It was common to see in the tabloid announcing wood stoves and kitchens with baseboards. However, in the North of Paraná, nobody knows what a wood stove is"*.

(b) Owner Profile Asymmetry: Network C has mostly composed of family business companies. Network members present a conservative profile. According to Interviewee 2, *"most of the network members are over fifty, some are sixty, others are seventy. Some of the network members no longer have family succession. Their sons' study abroad to be medical doctors, architects, dentists, and they do not want the stores"*. Likewise, there is a group of network members with a different profile. Additionally, Interviewee 4 reported his objective in the Network C *"look at my hair, I'm getting ready to stop in four years. I'm very organized and*

methodical, so I no longer have the patience. Today, I need punctual things for my consumption,”. Contrary to this profile. There is a group of network members who declares a growth ambition. Interviewee 3 reported, *“Network C is very good for those who want to be comfortable. Network C provides a comfort zone. On the other hand, for those who want to grow, they will have to leave”*.

Different member profiles increase the need for decision-making inclusiveness. Interviewee 3 reports that his voice is not heard in Network C *“There is a member who's been in the network for fifty years. He has more voice than you because of that. Network C has no interest in giving voice to those who are growing, to those who are developing, but hearing the voice of experience, a stagnant firm”*.

I did not identify the influence that each profile had in Network C but the influence of having contradictory profiles in the network. Like firms' heterogeneity, member profile asymmetry requires representativeness in decision-making, which relates to inclusiveness. Member profile asymmetry presses the network management for inclusiveness because the profiles seem contradictory.

(c) Goal Incongruency: Initially, the interviewees reported that Network C has a common goal. However, there is a small group of network members with conflicting goals compared to the network's goals. The owner profile asymmetry and firm heterogeneity may lead to different goals in the network. The previous contextual factors press the interorganizational network for decision-making inclusiveness due to the multiplicity of views. However, when the asymmetries convert to different goals, they may evolve into conflicts. The conflicts provided by goal incongruency increase the time and effort in decision-making processes. The goal incongruence made network members compete to capture value in the network. According to Interviewee 6, *“some decisions take a long time because network members have too much critical thinking. Some network members are critical and invasive, especially those who do not accept a contrary opinion. Hence, they want to manage the network in their way because they have had their business for thirty, forty years.”* Interviewee 3 reported, *“the network mediates the conflicts, but it is a waste of time. The network has not everyone rowing in the same direction”*.

Goal incongruency presses the network for decision-making efficiency and increases competition. Therefore, equal to the asymmetries, goal incongruency increases the time and effort to make the right decisions.

Table 16 presents a summary of contextual factors and their influence on paradoxes.

Table 16. Contextual Factors and their influence on decision-making inclusiveness-efficiency and cooperation-competition paradoxes.

Category	Contextual Factor	Description	Effects on Paradoxes
Actors Characteristics	Firm's Heterogeneity (2,3,4)*	Refer to differences among network members regarding their total revenue and their regional culture.	Impose a need for inclusiveness because every member is a network owner, and their peculiarities should be included in the decision-making process. Additionally, the diversity of interests increases the conflicts and, consequently, the efforts to make decisions.
	Owner Profile Asymmetry (1,4,5,6)*	Refer to the difference among network members regarding their owner's desire to establish or grow their business.	Impose a need for inclusiveness because every member is a network owner. Their peculiarities should be included in the decision-making process. Additionally, the diversity of interests increases the conflicts and, consequently, the efforts to make decisions.
Network Characteristics	Goal Incongruence (2,3,6)*	Refer to a divergence of objectives among network members.	The goal incongruence increases the conflicts and, consequently, the efforts to make decisions. Additionally, goal incongruence fosters competition because network members may not perceive relationship value. Consequently, leaving the network and competing in the market seems a possibility.

*The numbers refer to the interviewees' IDs.

Contextual factors press the network management to prevent tensions in the decision-making inclusiveness-efficiency paradox. Network C uses practices and structures that positively influence the balance between paradoxical elements. The practices seem to increase members' inclusiveness and prevent competition among network members. From the collected data, I could identify different management practices and structures that influence the decision-making inclusiveness, efficiency, and competition among network members. Four different practices with consistent references emerge from the data: **(a) Communication and Alignment Practices; (b) Defined Rules; (c) Working Teams; and (d) Conflict-Solving Process.**

(a) Communication and Alignment Practices: Network C has been taking actions to influence decision-making inclusiveness. Most interorganizational events are equivocal, and experiences can be interpreted in multiple ways (Kramer, 2016). Therefore, these practices give meaning and explanation to collective experiences. Communication and alignment practices are present in this relationship through regular meetings, online surveys, and using an online platform to share information among members. Regular virtual meetings occur periodically. Network members have meetings on Mondays (marketing), Tuesdays (director board),

Wednesdays (electronics negotiation) negotiation, Thursdays (strategic), and Fridays (furniture negotiation). Additionally, Network C organizes cluster meetings that they call “Regionais” (members from the same region inside each State). Network members can discuss important topics for the network. In addition, Network C calls meetings to discuss strategic topics. Interviewee 1 reported, *“a fortnight ago, there was a general meeting to talk about the credit platform. The meeting lasted three hours because the network members had doubts about the platform”*. This quote demonstrated the importance of communicating and clarifying doubts in the network. The effort to align a unique interpretation and understand regarding the credit platform operation.

Interviewees 1 and 5 reported using online surveys as an instrument to hear the network member. Network D uses an enterprise resource planning system named “Área Central,” which works on the network level and facilitates data collection and knowledge management. The meetings combined with surveys enable Network C to acknowledge different demands from network members.

(b) Defined Rules: I identified four rules that influence the decision-making inclusiveness-efficiency and cooperation-competition paradox from interviews and document analyses. Firstly, although the existence of regular meetings, Network C is aware of the low participation. Therefore, they formalized rules to obligate the network member to participate in the meetings. They have defined fees for members who do not participate. Additionally, Network C has financial incentives to cover the meeting costs. Second, since Network C operates in different states, Network C created a rule of representativeness to cope with cultural asymmetry. Each Network Structure preferably must be composed of members from each State. According to Interviewee 2, *“We are formatted with an almost equal division of representatives by state, so everyone seeks for consensus.”* In addition, Interviewee 5 reported, *“the work teams have representants from the three States. Decisions are taken when there are participants from the three states. If there are only two states, it moves to the next meeting”*. The representative rule increases the network member inclusion, minimizing the effects of the firm’s heterogeneity in the Network C context. The third rule is regarding the distribution of competencies for decision-making. Network C distributed the decision-making power along with his structure. The distribution between their structure increases decision-making efficiency because the discussion occurs parallel in the network. Finally, the last rule that influences the studied paradoxes aims to avoid competition in the Network. Interviewees reported a minimum distance

of 30km between network members. The minimum distance protects network members from internal competition.

(c) Working Teams: Network C structure includes working teams. These teams are composed of network members from different states (representativeness). These structures increased the decision-making inclusiveness and efficiency because they increased network members' participation while decentralizing decision-making processes. According to Interviewee 2, *“almost half of the members are in some network activity.”* Therefore, the working teams provide space for dialogue and participation in the network. In addition, Interviewee 4 reported that *“the network has matured in recent years. In the last six years, the network has been extremely inclusive. The whole management is by teams.”* According to the bylaws, working teams may discuss and have the autonomy to make decisions in their respective areas.

(d) Conflict-Solving Process: Network C has a structure for problem-solving. The ethical committee acts to solve problems between network members. Interviewees reported previous experiences that evolved conflicts between network members. Ethical Committee dialogue and mediated network C conflicts. According to Interviewee 4, *“last week, a network member was distributing flyers in my city. The prices were outside the established by the network. However, there is the ethics committee to solve the conflict”*. The ethical committee works through dialogue to solve internal conflicts. Therefore, whenever there is a disagreement between network members, the ethical committee calls network members to solve the conflict. Network C has ethical committee procedures regulated by internal norms. In addition, the committee has the power to apply sanctions to network members. Hence, through the committee, Network C has an effective conflict-solving process that reduces tensions between network members, mainly competitive tensions that emerge in the network. The mediation process reframed network members act as a sense-giving process, in which network members reframe their interpretation regarding the collective experience. Table 17 lists every paradox management practice and how its influences the inclusiveness-efficiency and cooperation-competition paradoxes in Network C.

Table 17. Paradox Management Practices and their influence on decision-making inclusiveness-efficiency and cooperation-competition paradoxes.

Paradox Management Practices	Description	Effects on Paradoxes
Communication and Alignment Practices (1,2,5)*	Refer to the set of practices to improve the communication and the alignment of objectives in the Network.	Foster inclusiveness and cooperation because the communication helps the network to accommodate different interpretations and preferences regarding paradox poles.
Defined Rules (1,2,3,4,5,6)*	Refer to the formalization of rules that foster decision-making inclusiveness and efficiency and minimize the competition among network members.	Foster inclusiveness efficiency and minimize the effects of the competition in the network. Rules represent an incentive to participate and cooperate.
Working Teams (1,2,4,5,6)*	Refers to committees that increase network members' participation in decision-making processes.	Foster inclusiveness and cooperation through increasing network members' participation in decision-making processes.
Conflict-Solving Processes (1,4)	Refers to the established practices to solve conflicts that may emerge in the network.	Aid network conflicts regarding the paradoxical relation between inclusiveness-efficiency and cooperation-competition that could harm the relationship.

*The numbers refer to the interviewees' IDs.

4.3.3 Paradoxical Tensions and Relationship Value

The findings indicate an imbalance between the decision-making inclusiveness-efficiency paradox' poles and the cooperation-competition paradox' poles. The contextual factors influence the sensemaking process toward decision-making inclusiveness and cooperation among network members. Network C members acknowledge the importance of inclusiveness, and they accept low levels of decision-making efficiency. Despite isolated episodes of competition, network members recognize the advantages of cooperation. Figure 15 illustrates the relation between paradox poles.

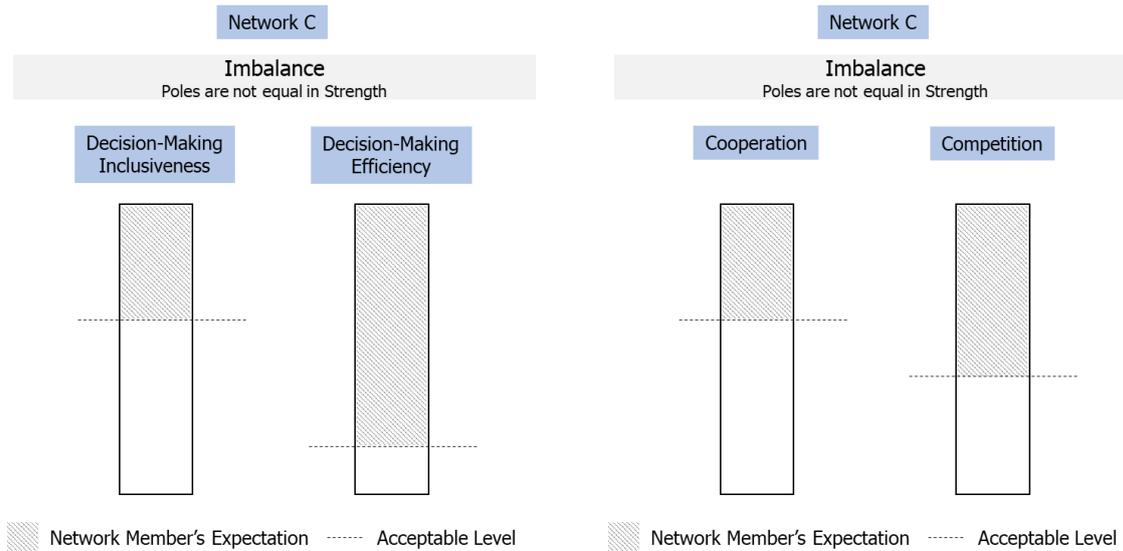


Figure 15. Paradoxes pole's expectation in Network C.

Network C reported previous negative experiences regarding competition among network members. Although Network C defined a minimum distance between network members to prevent competition, conflicts still happened. However, there is a sense of responsibility regarding the competition. According to Interviewee 3, *“I know network members in the region, so I am not opening stores there. I do not want to cause discomfort to them”*. Additionally, the ethical committee works through dialogue and sanctions to solve network members' conflicts. The combination of defined rules with ethical committees seems to avoid and minimize competition in the network.

Network C members perceive plenty of inclusiveness in their decision-making process. According to interviewee 2, it happens because the members always are involved in network decisions. In addition, network members accept a slower decision-making process than individual firms (Interviewee 2). According to Interviewee 4, *“the network is similar to a large organizational structure. It is slow”*. Therefore, the inclusiveness and efficiency levels seem adequate to Network C members.

Tensions emerged from a disagreement regarding Network C decisions. According to Interviewee 3, a group of network members organized a collective purchase due to disagreement with the network objectives: *“We made a parallel group with seven network members because we had the same objective, the network is aware of this. It does not work when the members goals conflicts with network's goals”*. However, this tension emerged in a different paradox related to value capture and appropriation (Dyer et al., 2018). Regarding the decision-making inclusiveness-efficiency paradox, there is no tension emerging from any

element. Network C members can be heard, although some decisions may be contrary to small groups' interests. Therefore, there is no signal of tension emerging from the decision-making inclusiveness-efficiency paradox in Network C.

Interviewees (1,2,4,6) reported gains that could not be achieved isolated by firms. Network members perceive financial and strategic gains. The interorganizational network provides a strategic gain through marketing strategies and merchandising campaigns (Interviewees 2 and 6). Additionally, the joint negotiation provides volume to purchase with cost reduction (Interviewees 1 and 2). The financial gain increases the firms' competitiveness in the market. Despite the generation of relationship value for most networks, there is a group perceiving the potential to reach a better performance on their own. According to Interviewee 3, *“I have enough volume to most purchases. I have X stores, and sometimes I get better prices than in the network.”*. Additionally, according to interviewee 3, *“The network works for them, it's great, but not for me. I need a network that matches with my goals”*. Network members compete internally to capture value. Value capture manifests competition in interorganizational relationships (Dyer et al., 2018). Therefore, since the network is not aligned with some network members' objectives, they cannot capture value from the cooperation. Although Network C still generates relationship value for most participants, the competition to capture value harmed the relationship value of some network members.

According to the reports, I could identify tensions that emerged from network members' perceptions regarding their collective experience. A group of seven network members captured less value than expected in the network. The experience below expectations triggered a sensemaking process. The most plausible explanation selected by these members relates to the difference in objectives among network members. According to Interviewee 3, the owner's profile asymmetries led to a split of efforts toward different goals and concluded with a lack of value generation for him. This represents the group of seven network members' interpretation regarding their experience in network C. Figure 16 illustrates the relation between paradox poles levels perceived by network members.

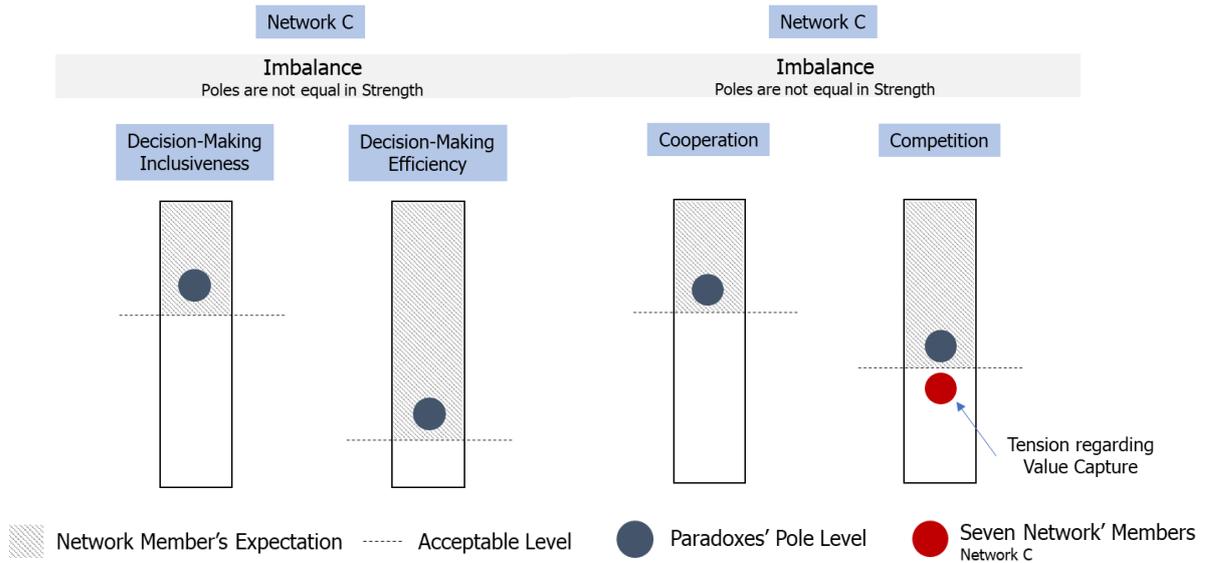


Figure 16. Network C member's perception regarding paradox poles.

Contextual factors could lead to tensions regarding paradoxical elements, especially decision-making inclusiveness. However, Network C management could effectively control the inclusiveness-efficiency paradox through management practices that increased the inclusiveness level in the network. Additionally, the well-established conflict-solving processes worked as a sense-giving mechanism to provide meaning to network members' experiences. Mediation through conflict-solving processes develops network members' awareness regarding the importance of cooperation and provides meaning to members' collective experience. However, this practice was not enough to prevent tensions. A tension emerged regarding the competition to capture value in the network and harmed the perception of relationship value of a small group of members (7 members) compared with the whole network (125 members), the episode represents evidence of tension harming the network's capacity to provide relationship value to its members. Figure 17 synthesizes the relation among contextual factors, the inclusiveness-efficiency paradox, and the paradox management practices in Network C.

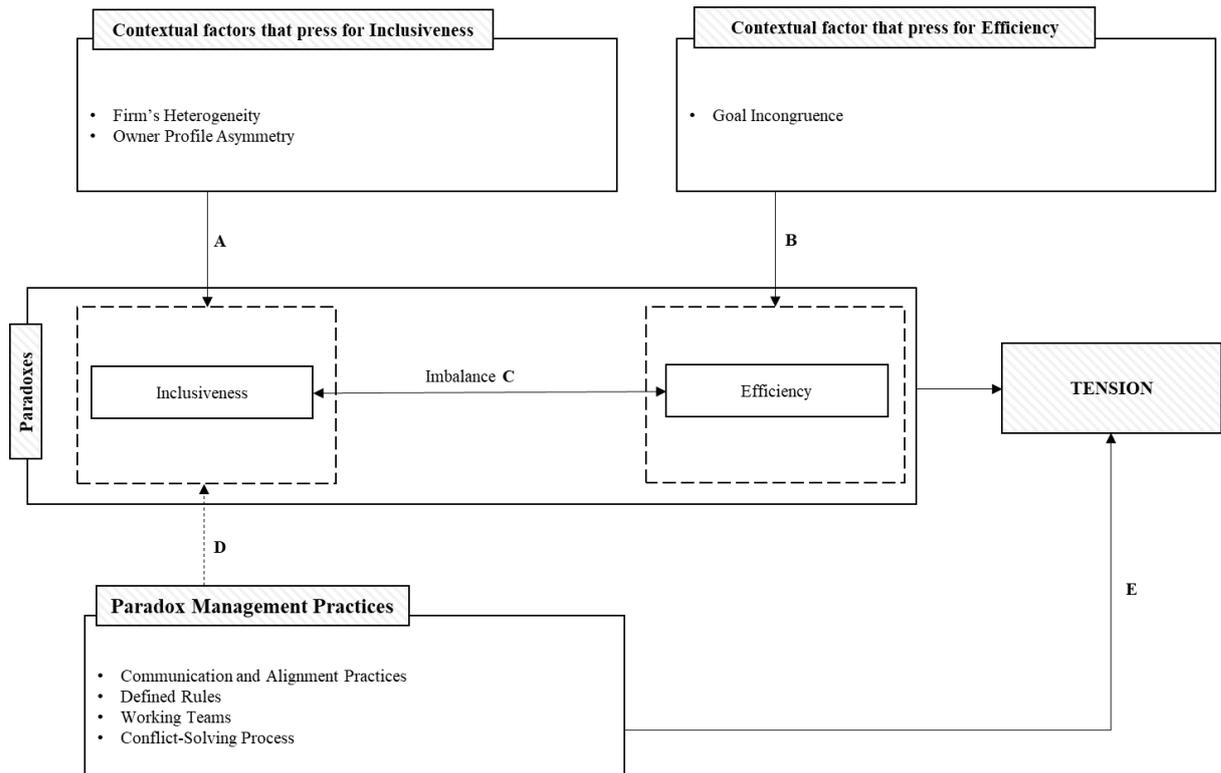


Figure 17. Paradox Management in Network C.

Network C context presses for decision-making inclusiveness (**A**) and factors that harm efficiency (**B**). Although the influence in both paradox poles, network members accept a lower level of efficiency to increase decision-making inclusiveness. There is an imbalance between the paradox poles (**C**) because inclusiveness became stronger than efficiency. Network C copes with the paradox through practices that prevent tensions (**D**) by increasing the inclusiveness level in the network and practices that cope with emerging tensions (**E**). In this case, the paradox management contributed to preventing tensions from harming the relationship value.

On the other hand, Network C could not prevent tensions from emerging from the cooperation-competition paradox. Figure 18 synthesizes the relation among contextual factors, cooperation-competition paradox, and paradox management practices in Network C.

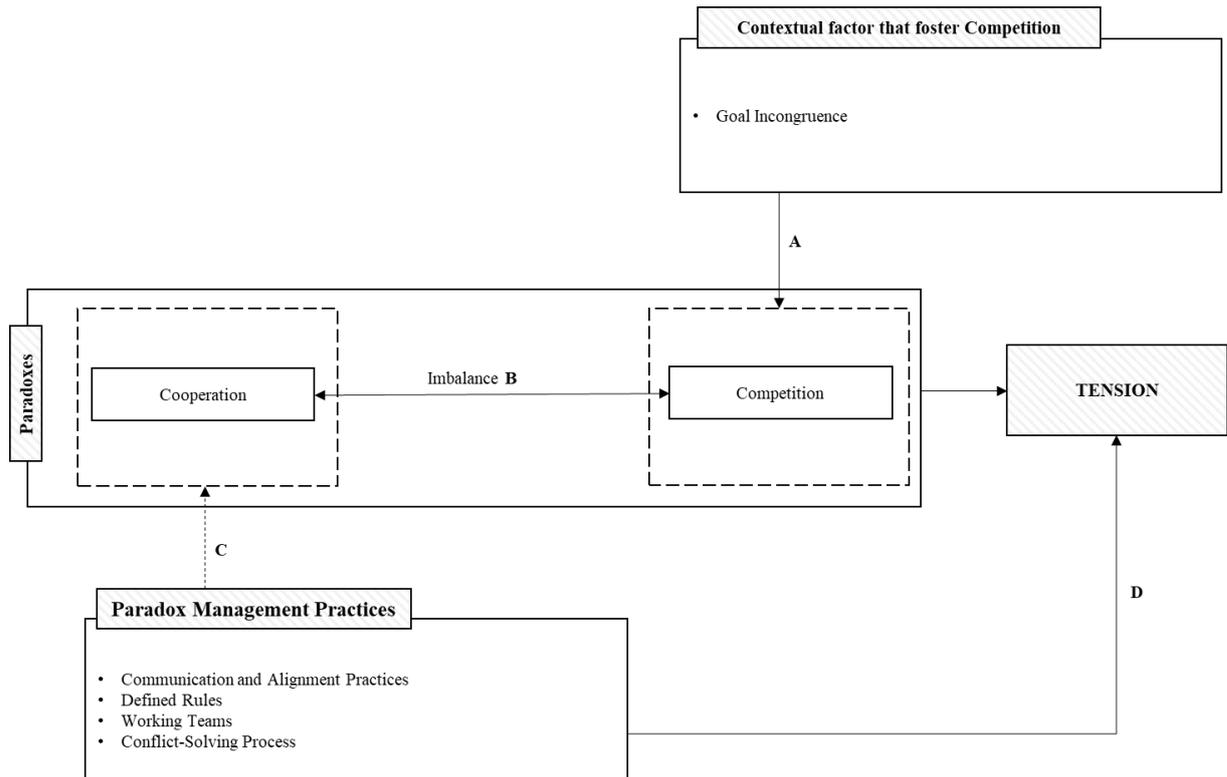


Figure 18. Paradox Management in Network C.

Network C context includes goal incongruence among network members (**A**). The goals of incongruence foster competition. However, Network C increased the network member's cooperation and prevented tensions through paradox management practices (**C**). Therefore, cooperation became stronger than the competition in network members framing (**B**). Additionally, Network C copes with eventual tensions through conflict-solving processes, which happens through reframing network members' interpretation of tension episodes (**D**). Despite the efforts to increase the cooperation levels in the network, the paradox management was not enough to prevent all tension episodes. The competition pole arose from a dispute to capture value from the interorganizational network and harmed the relationship capacity to provide financial value (efficiency) to network members. Although the network still provides relationship value to its members in other categories, there is a small group of seven network members that does not perceive efficiency gains as they used to do.

4.4 RETAIL NETWORK D: COOPERATION IN THE RETAIL SECTOR

Network D aims to be the largest and most efficient retail building materials network in the south of Brazil and be among the most extensive networks nationwide. Network D started its activities in 2001 with 18 retail stores of building materials in the southwest region of the State of Parana through an initiative of two entrepreneurs. In 2022, Network D reached 56 members in the State Parana and Santa Catarina. Network D is primarily present in the Parana State (94%), with an estimated population of 11.597.484. The per capita income of employed people is € 457,59, according to the Brazilian Institute of Geography and Statistics – IBGE (2022).

The building materials retail reached 16% growth in 2021, according to a survey carried out by Anamaco (National Association of Building Material Traders), in partnership with FGV IBRE (Brazilian Institute of Economics of Getulio Vargas Foundation). The growth trend follows the results in 2020, when the retail of construction materials grew 11% compared to 2019, with revenue of € 24,5 billion⁶.

The sector faces a challenge due to the entrance of e-commerce in the sector. According to the Brazilian Federation of Building Materials Associative Networks, indicators from the Mastercard Spending Pulse survey, conducted in 2020, reported that e-commerce represented 11% of retail sales and the Home and Construction department. Although most purchases were made in person, the digital consumption medium in the sector increased by 74% compared to 2020, according to data from Visa Consulting and Analytics.

E-commerce has been in debate in the network. Network D acknowledges the advance in building materials retail and has already started internal discussions about adopting e-commerce platforms. However, Network D decided to keep the traditional organization. Network D benefits its associates through partnerships with more than 50 supplier industries, joint purchases with better conditions, differentiated negotiations for tabloids, and negotiations for marketing. In addition to the listed benefits, Network D has a Distribution Center with a 2,000 m² structure and more than 3,000 active items, and that uses a warehouse management system, which enables agility in processes and fast delivery to associates.

Recently, Network D changed its decision-making processes radically. In 2017, Network D changed from a traditional unpaid presidential system to a stipendiary board governance system. Through interviews, we identified two leading causes that drive this

⁶ <https://febramat.com.br/2022/01/17/varejo-de-materiais-de-construcao-resultados-de-2021-e-perspectivas-para-2022/>

change: firstly, associates had little interest in assuming the role of president, which led to difficulties in the transition from one management to another; second, there was a feeling that the network took decisions slowly in a mismatch with the required by the market.

New challenges arrived in the network because of implementing a different system. Additionally, the network changed its constitution (the main document that defines the relationship between companies in the relationship). The new constitution's contents include the member selection process, sanctions, associate rights and duties, and the new structure.

Network D governance system is composed of four formal structures (a) General Assembly, (b) Governance Council, and (d) Fiscal Council. Figure 19 illustrates the relationship between these structures.

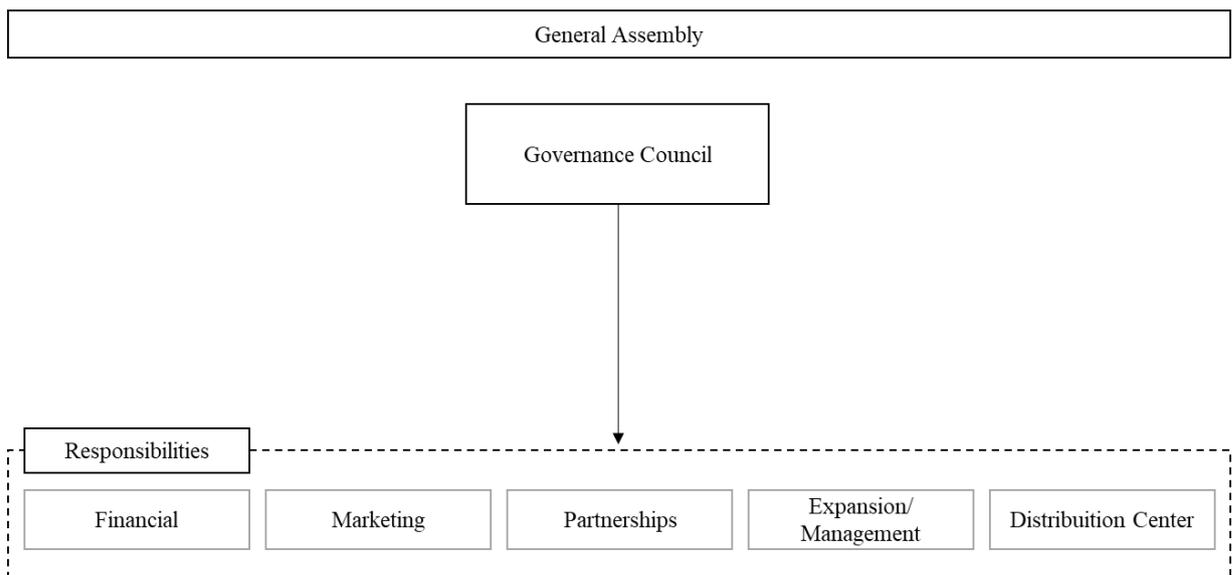


Figure 19. Network D Organizational Representation. Source: elaborated by the author from network documents.

Source: author.

Network D is composed of competitors. Network D did not establish a formal rule to limit members per city or define a minimum distance between network members to prevent competition. The dual logic of interaction could result in conflicts of interest in the network. However, the sense of collaboration has been present in Network D since the beginning. The network was designed through interpersonal relationships when two entrepreneurs started inviting firms to compose Network D personally. Initially, the entrepreneurs met once per week to design the network. This process lasted about two years until they formalized the network.

Since the beginning, Network D has fostered cooperation and a sense of belonging among network members. This sense of belonging is still present in Network D. Interviewee 8 highlighted: *“When we are evaluating a new firm, I say that he is entering the network ‘family.’ Hence, the new entrants must understand that they are entering a family. The word ‘family’ is used a lot.”*

Network D has 49 members spread over the Parana States. Although network members work in the same state, there are economic and cultural differences that require inclusiveness in the decision-making process. The heterogeneity represents different inputs in the sensemaking process, which lead Network D to face challenges in accommodating different interpretation regarding the captured relationship value in the network. Network D's new governance system added agility to network decisions but reduced network members' participation. The network manager is aware of the members' demand for more inclusiveness in the network decision-making processes. He works through management practices to reduce a possible loss in members' participation. The dialogue with network members represents a reframing process that influences the member's interpretation regarding their possibilities of decision-making participation.

Network D constantly evaluates network members' demands. The concern about decision-making inclusiveness led Network D to increase the use of surveys. Additionally, Network D is discussing a strategy to hire a supervisor to hear network members and take their demands to the governance council. Since Network D has members from different areas, some asymmetries arise in their relationships. Consequently, Network D faces some conflicts regarding inclusiveness that can harm the relationship value. According to Interviewee 7, *“I have heard from a network member that he's being excluded from network processes.”*

Network D prioritized decision-making efficiency instead inclusiveness in the recent past. The new governance structure reduced concerns about network efficiency but increased discomfort related to inclusiveness. Network D adopts practices to increase network efficiency and inclusiveness. Paradoxical management practices made it possible for Network D to emphasize efficiency and inclusiveness in different moments of its history and consequently manage tensions that could arise.

In general, Network D members receive different inputs in their sensemaking process. The recognition of their reality suffers the influence of contextual factors and management practices that influence the alignment of expectations and experiences. In the following section,

I present these contextual factors and the management practices that contributed to network members' sensemaking processes and prevented emerging tensions regarding cooperation-competition and knowledge sharing-protection paradoxes.

4.4.2 Paradoxes: Inclusiveness-Efficiency and Cooperation-Competition

In Network D, I aimed to understand the paradoxical relation between decision-making inclusiveness-efficiency and cooperation-competition. Therefore, I gathered data regarding contextual factors and paradox management practices that could influence each pole of these paradoxes. The retail network adopted effective paradox management practices to prevent paradoxical tensions that could harm the relationship.

Contextual factors imposed difficulties on network management regarding efficiency and inclusiveness but fostered cooperation. Network D adopted paradox management practices to deal with the paradoxes and effectively control emerging tensions. Table 18 illustrates the contextual factors and management practices and which paradox it influenced.

Table 18. Contextual Factors and Paradox Management Practices that influence decision-making inclusiveness-efficiency and cooperation-competition paradox

	Inclusiveness-Efficiency	Cooperation-Competition
Contextual Factors	<ul style="list-style-type: none"> ➤ Firms Heterogeneity ➤ Restrictions due to a pandemic ➤ Market Pressure 	<ul style="list-style-type: none"> ➤ Interpersonal Relationships ➤ Member Selection Criteria
Paradox Management Practices	<ul style="list-style-type: none"> ➤ Communication and Alignment Practices ➤ Defined Rules ➤ Governance Council ➤ Thematic Committees ➤ Expert Consultancy ➤ Conflict-Solving Process 	<ul style="list-style-type: none"> ➤ Communication and Alignment Practices ➤ Defined Rules ➤ Thematic Committees ➤ Conflict-Solving Process

Firms Heterogeneity pressed Network D to be more inclusive. In contrast, pressure from the market to make faster decisions pressed the network to be more efficient in decision-making processes. Therefore, the context in which Network D operates has some characteristics that influence decision-making inclusiveness-efficiency and cooperation-competition paradoxes. Five contextual factors emerged from the data: **(a) Firm's Heterogeneity; (b) Restrictions due to a pandemic; (c) Market Pressure; (d) Interpersonal Relationships; and (e) Member Selection Criteria.**

(a) Firms Heterogeneity: Although the network is primarily present in just one State, the distance between network members contributes negatively to the feeling of belonging and participation in the decision-making process. Additionally, some economic differences between the companies that compose the network contribute negatively to the decision-making inclusiveness and efficiency. Inclusiveness is reached by making inclusion in the decision-making process possible and treating them equally. On the other hand, efficiency is reached with a minimum of spending resources to make network decisions. From the data, I could identify difficulties in the decision-making process on inclusiveness and efficiency, mainly because of geographic and economic asymmetry between network members.

Interviewee 1 reported, *“our geographic area is very different, and with different customs and habits, this has always been one of the great conflicts. For example, one region is able to ride BMW, while the other is able to drive a GOL. This causes some conflicts”*. The interviewee reported that the differences create a challenge for enabling participation in the decision-making process. These asymmetries contribute to conflicts because you have different thoughts on the process. The network must equalize the differences and enable the participation of different groups in the decision-making process. The interviewees perceived the difficulties in a strategic decision due to economic differences. As reported by Interviewee 7, *“it's very confusing, especially between our small stores and the bigger stores. The bigger stores are ahead, and we have a dilemma where some want e-commerce while others do not. So we are in a horrible dilemma”*. Entering e-commerce is a strategic and ongoing decision on Network D which faces the effects of differences between network members.

On the other hand, the economic and geographic asymmetry seems not to be a problem for all decisions. In a decision related to the purchasing scope Network, D could deal with differences, as reported by Interviewee 7 *“There are some conflicts that are part of it because they are different realities, different regions. Some products sell in one region and not in others, but this is all already adapted and working”*.

(b) Restrictions due to the pandemic: The Coronavirus pandemic (SARS-CoV-2) affected companies worldwide. Network D suffers difficulties due to the pandemic. The pandemic restriction of meetings contributed to a feeling of not being included in the decision-making process. Network members feel that decisions are being taken without their participation. The dissatisfaction was identified and reported by Interviewee 8, which believes *“they are not there every Wednesday voting, they feel that part of the process was taken from them. Two years of a pandemic and two years that we didn't see each other anymore, so I see that in their minds.*

They are confused. In addition to the pandemic, there's a change (governance system). It was not totally because of the change, but we are in a pandemic". The pandemic restriction affected the Network D routine. The regular and presential meeting was a critical practice to increase the sense of belonging and the sense of inclusiveness. Therefore, although out of the Network boundaries, the event directly affects the paradox pole named inclusiveness, contributing to an emerging tension, which will be appropriately discussed later in this chapter.

(c) Market Pressure: Finally, the pressure from the market for faster decisions was the last contextual factor that influenced the paradox between decision-making inclusiveness and efficiency. Earlier in 2017, Network D realized a need to be more efficient in decision-making processes. Network D members identified that the market requires faster decisions than before. According to Interviewee 1, *"Today, the decisions have to be immediate in the retail market"* additionally, Interviewee 2 *"I think our challenge will be this agility that the world demands now."* The decision may harm the network income *"you in a market in a constant evolution, and with things happening very fast. The lengthy processes end up generating losses"* (Interviewee 1). The demand for faster decisions was also reported by Interviewees 3 and 6, which understand that nowadays, networks must make decisions faster not to lose competitiveness.

(d) Interpersonal Relationships: Network D has fostered cooperation through interpersonal relationships since the beginning. According to Interviewee 5, *"when the network had few members, we used to go to fairs in Sao Paulo. Once we went to Porto Alegre, then we tour to the Serra Gaucha. It creates a sense of family"*. The interpersonal relationship among network members is still present today. According to Interviewee 1, *"Some network members want to meet, play the guitar together, and drink a beer or a wine. This integration is very strong in the network. I do not see competitors in the network. Contrary, I see network members uniting values, sharing information among them"*. Additionally, Interviewee 2 reported, *"Network members are like friends that you haven't seen in ten years. When we meet, we feel closeness. I think it is particular to the people in the network."* Network members maintain interpersonal relationships that increase their willingness to cooperate because it creates trust among members (Interviewee 8). Therefore, the good interpersonal relationship among network members fostered cooperation in Network D.

Table 19 presents a summary of contextual factors and their influence on paradoxes.

Table 19. Contextual Factors and their influence on decision-making inclusiveness-efficiency and cooperation-competition paradoxes.

Category	Contextual Factor	Description	Effects on Paradoxes
Actors Characteristics	Firms Heterogeneity (1,4,5,7,8)*	Refer to differences among network members regarding their total revenue and their regional culture.	Impose a need for inclusiveness because every member is a network owner, and their peculiarities should be included in the decision-making process. Additionally, the diversity of interests increases the conflicts and, consequently, the efforts to make decisions.
	Interpersonal Relationships (1,2,3,4,5,6,7,8)*	Refer to the interpersonal relationship beyond the network activities among the firm's owners.	Foster cooperation because the interpersonal relationship beyond network activities generates trust among them.
External Environment Characteristics	Restriction due to a pandemic (3,6,7,8)*	Refer to the restrictions imposed by the SARS-CoV-2 pandemic.	Impose a need for inclusiveness because the pandemic restrictions reduce members' interaction and participation in network decision-making processes. The absence of presential meetings reduced the sense of inclusiveness in the network.
	Market Pressure (1,2,3,6)*	Refer to the market competitiveness that requires faster decisions in the network.	Impose a need for efficiency in the decision-making process to be competitive in the market.

*The numbers refer to the interviewees' IDs.

The contextual factors listed contributed to emerging tensions in the decision-making inclusiveness-efficiency paradox. Network D uses a set of practices and structures that positively influence the balance between elements to prevent and solve emerging tensions. I could identify different management practices and structures that influence the inclusiveness-efficiency and cooperation-competition paradox from the collected data. Seven different management practices with consistent references from the data: **(a) Communication and Alignment Practices; (b) Defined Rules; (c) Governance Council; (d) Thematic Committees; (e) Conflict-Solving Process; (f) Expert Consultancy and (g) Member Selection Criteria.**

(a) Communication and Alignment Practices: Although not recognized as a paradox, Network D has influenced each side of the inclusiveness-efficiency paradox. Communication and alignment practices give meaning and explanation to collective experiences in network D. These practices are present in this relationship through regular meetings, online surveys, and an online platform to share information between members. Regular virtual meetings occur periodically, at least two times per month, on Wednesdays. Network members can explain their points of view and discuss important topics. Interviewee 6 reported the opportunity to be heard

in these periodical meetings *“these meetings are on Wednesday, then the network discusses a topic, for example, marketing.”*

Additionally, Interviewee 8 *“We collected a series of information from all the stores through a survey. The idea this year debate and discuss relevant topics with network members”*. The network management keeps these regular meetings combined with online surveys. The online survey is an important instrument that enables network member participation in the decision-making process. Interviewee 1 reported this sense of inclusiveness *“we carry out surveys every six months, which are very interesting. The surveys may be an inclusive process where the network member expresses himself. In the last survey, they indicated to us that we would need to expand, we would need to go further”*. Moreover, Interviewee 6 reported the existence of these surveys *“a survey was previously carried out to see what the associate want and needs before we were defining the marketing plan.”* These examples were facilitated by online technologies, which were improved after the pandemic. Interviewees reported this improvement and an increasing use after the pandemic. Furthermore, Network D uses an enterprise resource planning named *“Área Central,”* which works on the network level and facilitates data collection and knowledge management.

(b) Defined Rules: Although the existence of regular meetings, Network D is aware of possible low participation. Therefore, they formalized rules to obligate the network member to participate in the meetings. They have a Constitution that defines fees for members who do not participate. Additionally, Network D rules define decision-making structures that have the autonomy to decide without consulting every member. The network manager has the autonomy to make micro-decisions. Interviewee 2 highlights the autonomy importance *“She has the autonomy to make administrative decisions, and when she has something, “Oh, I need to make this decision, but I have some doubts,” she calls the responsible Council member. She decides right away and move on, that's fast.”* The concern of defining rules to incentivize member participation and increase efficiency in the decision-making process directly impacts the inclusiveness-efficiency paradox. The awareness of formalization was reported by Interviewee 4 *“There is a very strong concern in the network, things are formalized. The network is very formalized. Everything is well-regulated. So, I think that the network member agrees with the decision-making process to be accepted by the member. The rules are always very clear and written on paper”*.

Having defined rules works similarly to formalization, as it provides inputs to network members' expectations in the relationship. Since network members experiences behaviors

previously defined, there is an alignment with their expectations that contribute to preventing tensions.

(c) Governance Council: Network D's new Constitution radically changed the decision-making structures changing the network from a presidential form to a governance council, including the creation of thematic committees. This new structure increased the efficiency of the decision-making process. On the other hand, the new structure negatively impacted inclusiveness. Interviewee 1 is aware of this relationship “... *not in the member's participation, but I see a great evolution in decision-making speed. Hence, we have a conflict: things happen faster, but the associate ends up being excluded ... the new system is increasingly undermining inclusion*”. Additionally, Interviewee 6 related the influence on inclusiveness and efficiency “*I see our network going through a very difficult transition, because before everything that was decided went through the associates. Today the network needs to be faster in decisions and more assertive, and when it depends on the decision-making of all the associates, it is slow. Today, many things are decided without members' participation with this governance system.*”. The contradictory relation between the decision-making inclusiveness-efficiency led to a positive effect on efficiency and a negative outcome for the network inclusiveness.

(d) Thematic Committees: Each Governance Council member has a defined responsibility, accordingly: financial, partnerships, marketing, distribution center, expansion, and management. Members of the governing council may request the creation of thematic committees to discuss complex issues. According to Interviewee 2, “*The council member may request the creation of a committee to discuss topics under his responsibility. Hence, the marketing committee is the one that evaluates the campaigns. Therefore, I have more network members participating in decision-making in the marketing committee.*”. Recently, Network D created a committee to discuss partnerships. The thematic committees are regulated by their constitution and provide decision-making inclusiveness in the network. Members who participate in committees perceive to be included in decision-making processes (Interviewee 7). Therefore, thematic committees represent a practice that increases inclusiveness in Network D.

(e) Conflict-Solving Process: Tensions may arise on any paradox pole. Network D has a structure for the problem-solving process. The Network Manager acts to solve problems between network members. The decrease in member participation increases the number of decision-making dissatisfactions, which leads to minor tensions. When dissatisfaction emerges

in the network, the Network Manager conducts a process of mediation. Interviewee 2 highlights this process after tension emerges: “Every time this happens, Network Manager contacts the associate to understand what happened, what was his pain, and *find out what is the problem. Then the network manager looks for the best possible solution*”. Also, Interviewees 6, 7, and 8 reported this process. Therefore, it may increase the sense of inclusiveness through the dialogue between the network member and the network management. In addition, the conflict-solving process contributes to reframing network members' perceptions regarding their network experiences, aligned expectations, and experiences, which reduces emerging tensions.

(f) Expert Consultancy. Finally, some decisions require specific knowledge, which would be time-consuming. Network D is aware of this situation and contracts Expert Consultancy when the decision requires knowledge that could not be found in the network. This practice contributes to accelerating the process and consequently increasing decision-making efficiency. Interviewee 2 highlights the experience with the e-commerce decision “*associates asked for the e-commerce. However, the council does not have anyone qualified enough to make this kind of decision. Hence, we looked for an outside person. He provided all the information the council needed*”. Network D has previous good experiences with expert consultancy, firstly related to the network structuration (Interviewee 6) and later for the governance council implementation (Interviewee 5).

(g) Member Selection Criteria. Network D has formal criteria to accept new members into the network. The member selection process evaluates information regarding the business management and the owner's characteristics (Interviewee 8). Network D evaluates if the firm has a culture of cooperation. Interviewee 7 reported his experience when entering the network “*Network D sent a consultant to our store. He was from network management. Hence he helped us to develop the network culture in our firm*”. Interviewee 7 integration processes last five months till they could use the network name. Therefore, the member selection combined with a period of integration in the networks' culture fosters cooperation and facilitates interaction among network members through cultural alignment. Members with similar cultures tend to face fewer conflicts than members from different cultures. Additionally, Interviewee 5 reported that the member selection helps the network achieve its objectives “*network handpicked members. So, new members know that we must collaborate to cooperate. It is one for all and all for one. That's the foundation, a solid beginning. Everyone is running in the same direction*”.

Table 20 lists every paradox management practice and how it influences the decision-making inclusiveness-efficiency and cooperation-competition paradoxes in Network C.

Table 20. Paradox Management Practices and their influence on knowledge sharing-protection and cooperation-competition paradoxes.

Paradox Management Practices	Description	Effects on Paradoxes
Communication and Alignment Practices (1,2,3,4,5,6,7,8)*	Refer to the set of practices to improve the communication and the alignment of objectives in the Network.	Foster inclusiveness and cooperation because the communication helps the network to accommodate different interpretations and preferences regarding paradox poles.
Defined Rules (1,2,3,4,5,6,7,8)*	Refer to the formalization of rules that foster decision-making inclusiveness and efficiency and minimize the effects of competition in the network.	Foster inclusiveness and efficiency and minimize the effects of competition in the network. Rules represent an incentive to participate and cooperate.
Governance Council (1,2,3,4,5,6,7,8)*	Refers to the network governance structure.	Foster efficiency at the cost of reducing network members' participation in decision-making processes.
Thematic Committees (1,2,3,4,6,7)*	Refers to committees that increase network members' participation in decision-making processes.	Foster inclusiveness through increasing network members' participation in decision-making processes.
Expert Consultancy (2,4,5,6,7)*	Refers to the act of hiring an external consultancy to support the network's decision-making processes.	Foster efficiency and accelerate network decision-making processes.
Conflict-Solving Process (1,2,4,5,6,7,8)*	Refers to the established practices to solve conflicts that may emerge in the network.	Conflict-solving processes aid network conflicts regarding the paradoxical relation between inclusiveness-efficiency and cooperation-competition that could harm the relationship.
Member Selection Criteria (2,3,4,5,6,7,8)*	Refer to the member selection process, which includes selecting candidates according to their culture and characteristics.	Foster cooperation because cultural similarity may reduce conflicts among network members.

*The numbers refer to the interviewees' IDs.

4.4.3 Paradoxical Tensions and Relationship Value

The findings indicate a balance between the decision-making inclusiveness-efficiency paradox' poles and an imbalance between the cooperation-competition paradox' poles. The contextual factors influence the sensemaking process toward decision-making inclusiveness and cooperation among network members. Network C members acknowledge the importance of having members' decision-making efficiency but do not accept lower levels of decision-making inclusiveness. Regarding competition, network members recognize the advantages of

cooperation and accept the restriction imposed to control competitive tensions. Figure 20 illustrates the relation between paradox poles.

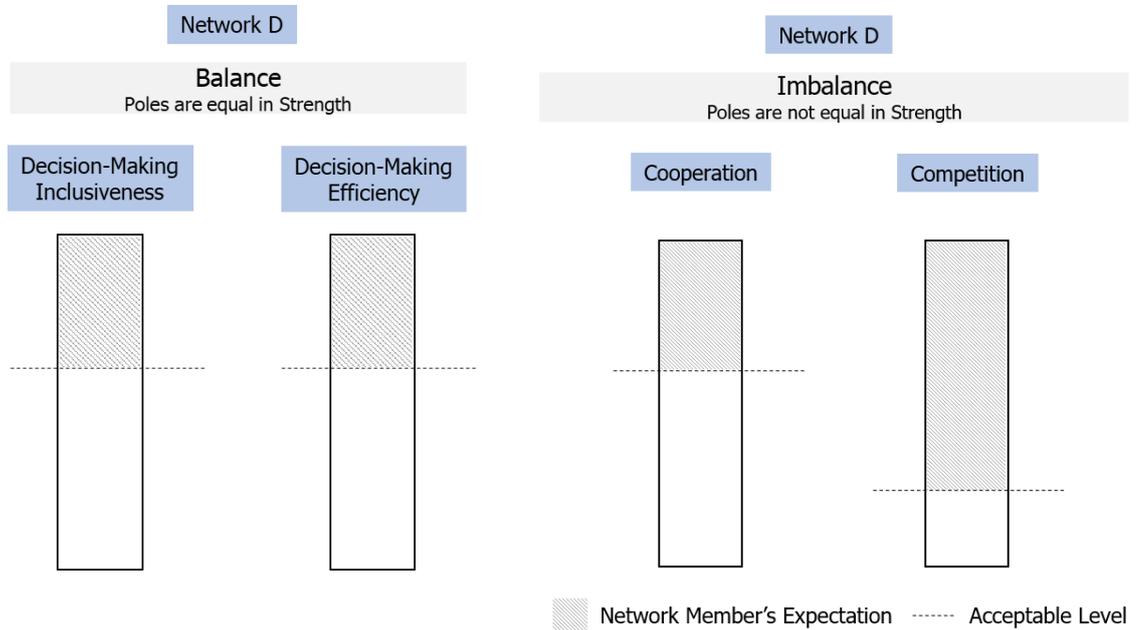


Figure 20. Paradoxes pole's expectation in Network D.

Regarding tensions, the findings reveal the dynamic interplay between the decision-making inclusiveness-efficiency paradox and the contextual factors that permeate the network and management practices. Initially, Network D identified an emerging tension related to decision-making efficiency due to the pressure from the market for faster decisions. These contextual factors increase the need for faster decisions, which was an essential factor that led to a change in the Network D governance structure. The implementation of a new system gave some efficiency to the process. Network members are aware of this gain. However, the new system gave the needed efficiency at a high cost, inclusiveness. Network members started to feel excluded from the process due to the concentration on the council for decision-making.

A key question from the interviews was identifying if the tension could emerge from the relationship between the elements or from paradox poles. The answer to this question was clearly identified in the field. Undoubtedly the tension arises from the paradox poles. Although some interviewees realize the paradoxical relation between inclusiveness-efficiency (e.g., Interviewee 6), the tension emerges from discomfort in a paradoxical pole. Examples of a tension emergence regarding inclusiveness are illustrated within interviewees “*sometimes he doesn't have the opportunity to express. Sometimes the simple fact that he cannot express his will makes him feel excluded. This is a problem that I realize we have and that is increasingly difficult to manage*” (Interviewee 1), and “*maybe I can understand different because I'm*

participating in the committees, so I'm always included in the process. However, I heard from a former president that he is being excluded. This is a conflict" (Interviewee 7). Therefore, there is no signal of tension from the difficulty of managing the paradox but from the element itself.

Network D is now facing an emerging tension in the inclusiveness pole, but only after changing its structure from a presidential form to council governance. The movement from one pole (efficiency tension) to the other (inclusiveness tension) leads to an important conclusion: tension emerges through a dynamic process between paradoxical elements, where practices that would increase one pole's effectiveness (efficiency) can harm the opposite pole (inclusiveness). In this scenario, Network D may work towards breaking the tradeoff between paradoxical elements. Practices that could positively influence both sides of the paradox were found in the case. Although not capable of solving the whole problem, the adoption of virtual meetings seems to positively influence decision-making efficiency since it enables meetings regarding the long distances between members.

Decision-making inclusiveness and efficiency are valuable from the network point of view. On the other hand, competition arises from firms' concern about their competitiveness. It can harm the relationship between network members. Consequently, the ideal paradoxes setting can be defined as a high level of inclusiveness, efficiency, cooperation, and lower competition levels.

Interviewees (1,2,4, and 7) reported gains that could not be achieved isolated by firms. Network members perceive financial and strategic gains (1,2,4, and 7). The network provides a strategic gain through marketing activities (Interviewees 4 and 7). Additionally, the joint negotiation provides volume to purchase with cost reduction (Interviewees 1,2,4, and 7). The financial gain increases firms' competitiveness in the market. The network manager and governance council are aware of the inclusiveness tensions that can harm the relationship. Since the practices do not match network members' expectations, Network D is studying best practices to deal with the demand for inclusiveness. Figure 21 illustrates the relation between paradox pole levels perceived by network members.

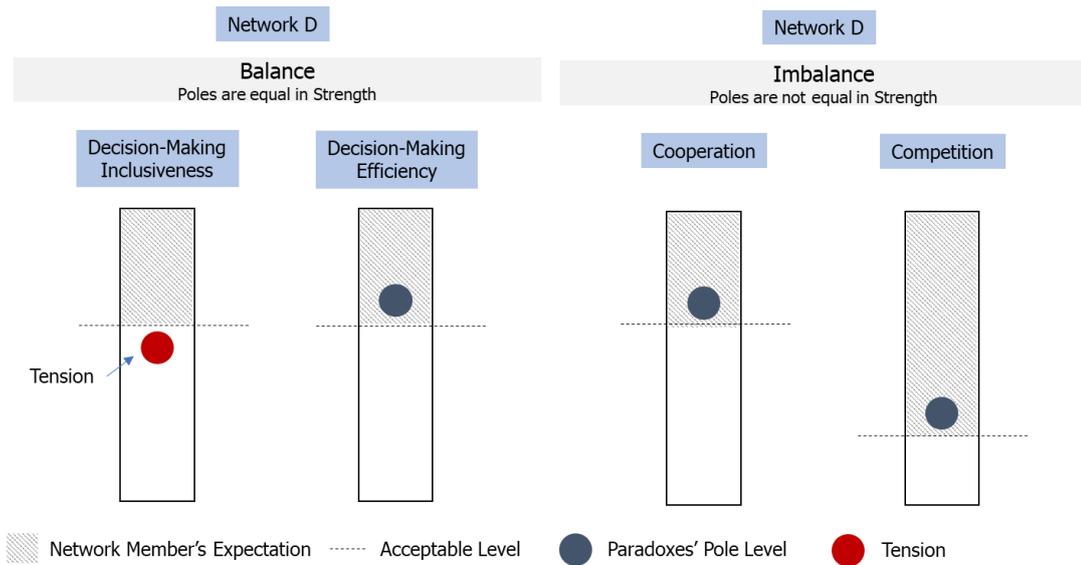


Figure 21. Network C member's perception regarding paradox poles.

Contextual factors could lead to tensions regarding paradoxical elements, including efficiency and inclusiveness issues. However, Network D management could partially control the inclusiveness-efficiency paradox through paradox management practices that increase the network's efficiency level and communication and alignment practices that foster inclusiveness in the network. Although the network faces an emerging tension regarding inclusiveness, the paradox management practices prevented tensions from harming relationship value. Figure 22 synthesizes the relation among contextual factors, inclusiveness-efficiency paradox, and paradox management practices in Network D.

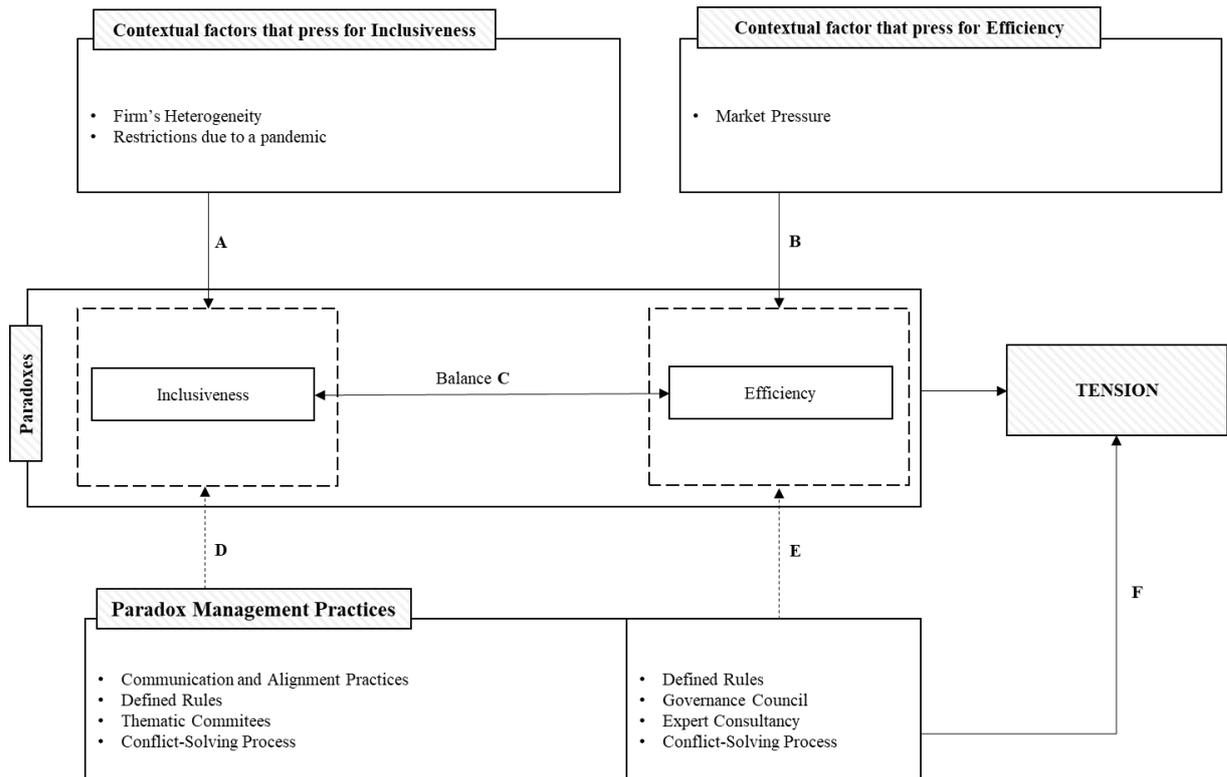


Figure 22. Paradox Management in Network D.

Network D context presses for inclusiveness (**A**) and efficiency (**B**). Although the adoption of practices that cope with both paradox poles (**D, E**). Network members could not accept the inclusiveness loss after their governance system changed. Network D faced tensions even when both paradox poles were equal in strength (**B**). Network D coped with tensions through conflict-solving processes (**F**) that could effectively prevent tensions from harming the relationship value in the network.

On the other hand, Network D effectively prevented tensions from the cooperation-competition paradox. Figure 23 synthesizes the relation among contextual factors, cooperation-competition paradox, and paradox management practices in Network D.

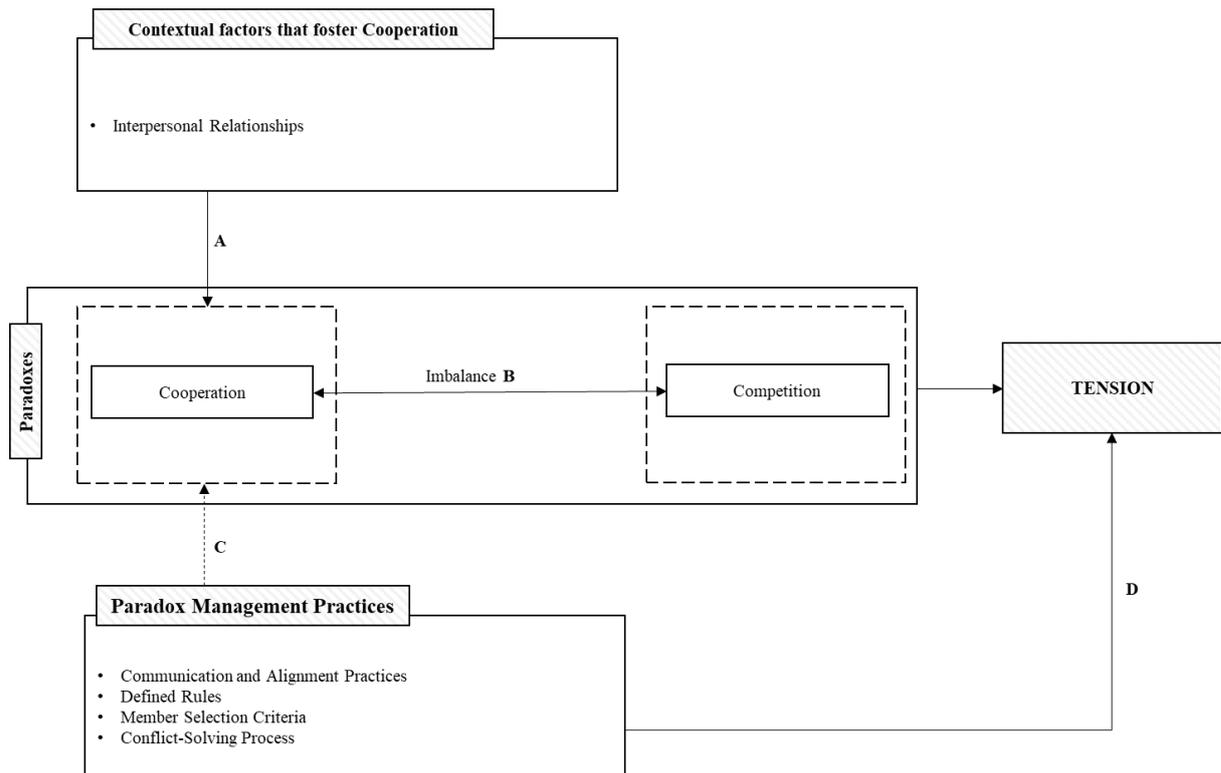


Figure 23. Paradox Management in Network D.

Network D context includes the interpersonal relationship among firms' owners (**A**). Network management could emphasize practices that increase the level of cooperation in the network (**C**). Therefore, cooperation became stronger than competition (**B**). Additionally, Network D copes with eventual tensions through conflict-solving processes (**D**). In this case, the paradox management contributed by (i) preventing tensions from emerging from the cooperation-competition paradox and (ii) preventing tensions emerging from the decision-making inclusiveness-efficiency paradox from harming the relationship value.

In the next chapter, I present the cross-case analyses between the four networks, then present theoretical purposes.

5. CROSS-CASE ANALYSIS AND DISCUSSION

This chapter presents the similarities and differences between the R&D networks and between the retail networks. I highlight the main elements that influence the knowledge sharing-protection, inclusiveness-efficiency, and cooperation-competition paradoxes, as well as the management practices used to prevent and manage tensions. Initially, I analyze the pairs of cases, then compare the similarities and differences among the four cases.

5.1 CROSS-CASE ANALYSIS: R&D NETWORKS

Network A and Network B have been proposed to foster joint R&D. Network A researches technologies that could efficiently join aluminum and steel, while Network B researches common topics for the gear industry, which may evolve into R&D projects with private, public, or mixed funding. Knowledge sharing and cooperation are necessary for Network A and Network B to reach their objectives. Therefore, I analyzed the knowledge sharing-protection and cooperation-competition paradoxes. I tried to understand how the context influences the balance between paradoxical elements and how paradox management practices could help interorganizational networks deal with paradoxes and foster relationship value.

Networks A and B had a paradoxical imbalance toward knowledge sharing and cooperation. The context favors both paradoxical elements, essentially reducing the firm's concern regarding knowledge protection and competition. Network A and B had similarities with regard to contextual factors, namely: **previous interpersonal relationships, partners' reputations, previous interorganizational relationships, and the organizational culture of cooperation.** These contextual factors seem to reduce concerns regarding knowledge protection and competition, as they generate trust among network members. These factors were present in both cases.

The knowledge and information required by interorganizational networks are different. Since Network A requires sensitive knowledge to execute the research, this seemed to increase network members' concern regarding knowledge protection and consequently required management practices to stimulate knowledge sharing. On the other hand, Network B mostly requires common knowledge to reach its objective, and consequently, network members had fewer concerns about knowledge protection than Network A members. Table 21 presents a comparison of contextual factors and their presence in Networks A and B.

Table 21. Contextual Factors in Network A and B.

Dimension	Category	Description	Network A	Network B
Contextual Factors	Actors Characteristics	* Previous interpersonal relationships	Present	Present
		* Partners' reputation	Present	Present
		* Previous interorganizational relationships	Present	Present
		* Organizational culture of cooperation	Present	Present
		* Characteristics of shared knowledge/information	Present	Present
	External Environment	* Legal security	Present	-
		* Government financial incentive	Present	-

Contextual factors mainly contributed to reducing knowledge protection and competition concern in Networks A and B. Additionally, both networks used paradox management practices that could effectively maintain knowledge sharing and knowledge protection at acceptable levels. Therefore, network members accepted the imbalance between paradoxical elements, and significant tensions did not emerge.

Networks A and B addressed both paradox poles through paradox management practice. However, the networks emphasized knowledge sharing and, consequently, cooperation among network members. Since the contextual factors reduced concerns regarding knowledge protection, the paradox management practices of Network A and B focused on sharing without triggering tension relating to knowledge protection. The contextual difference between Networks A and B occurred because Network A required more sensitive knowledge sharing in order to be effective. Therefore, Network A had to adopt specific practices to deal with this issue. Despite these practices, Networks A and B shared similarities regarding paradox management. Table 22 presents a comparison of paradox management practices between Network A and B.

Table 22. Paradox Management Practices in Networks A and B.

Dimension	Category	Description	Network A	Network B
Paradox Management Practices	Network Design	Formal contract	Present	Present
		Member selection criteria	Present	Present
	Network Execution	Management and technical committees' segregation	Present	-
		Neutral actor as a mediator	Present	-
		Protocol for sensitive knowledge-sharing	Present	-
		Communication and alignment practices	Present	Present
		Project management and brokerage competencies	-	Present
		Expert Advice Board	-	Present

The findings support the fact that the paradox management practices listed in Table 22 contributed to setting the level of knowledge sharing and knowledge protection in Networks A and B. Significant tensions did not emerge because both networks could effectively manage the knowledge sharing-protection paradox. Evidence also shows that Networks A and B produced relationship value for their members, while paradox management practices dealt with possible tensions that could harm the relationship value.

5.2 CROSS-CASE ANALYSIS: RETAIL NETWORKS

Network C and Network D have similar purposes. Network C organizes collective actions in the furniture retail sector, while Network D organizes collective actions in the building material retail sector. Decision-making inclusiveness, efficiency, and cooperation are necessary for the networks to ensure collaboration between network members. Therefore, I analyzed the inclusiveness-efficiency and cooperation-competition paradoxes in these cases. I tried to understand how the context influences the balance between paradoxical elements and how the paradox management dealt with balancing the paradoxical elements and the relationship value.

Networks C and D had a context that heightened the network management's concerns regarding decision-making inclusiveness and efficiency. At the same time, there was an imbalance in cooperation, that is, a high level of cooperation and a low level of competition. The context challenged network inclusiveness due to asymmetries among network members. The firm's heterogeneity seemed to increase the pressure on inclusiveness since different opinions must be heard in the networks. The firms' heterogeneity was present in both cases. Table 23 presents a comparison of contextual factors between Networks A and B.

Table 23. Contextual Factors in Networks A and B.

Dimension	Category	Description	Network C	Network D
	Actors Characteristics	* Interpersonal relationships	-	Present
		* Firm's heterogeneity	Present	Present
		* Owner profile asymmetry	Present	-
Contextual Factors	Network Characteristics	* Goal incongruence	Present	-
	External Environment	* Press from Market	-	Present
		* Restrictions due to a pandemic	-	Present

Contextual factors mainly contributed to increasing the need for decision-making inclusiveness in both networks. Additionally, Network C used paradox management practices

to maintain inclusiveness and efficiency due to network members' expectations. Therefore, Network C members were comfortable with the decision-making efficiency and inclusiveness levels, and consequently, no significant tensions did emerge.

On the other hand, Network D members perceived that their efficiency levels should be increased to ensure network competitiveness. Therefore, Network D adopted a strategy that emphasized efficiency through a restructuring of its governance system. The new governance system added efficiency to the network decision-making process. However, due to the contradiction between efficiency and inclusiveness, the new system reduced the members' participation. Network D members felt that their participation in decision-making was significantly reduced, and they required more inclusiveness. Network D management was aware of the need for more inclusiveness and increased the dialogue among network members before making decisions. Network D addressed the emerging tension through surveys and meetings prior to making decisions. The network behavior characterized an alternation strategy (Carlson et al., 2016), and Networks A and B shared similarities regarding paradox management despite the contextual differences. Table 24 presents a comparison of the paradox management practices of Networks C and D.

Table 24. Paradox Management Practices in Networks C and D.

Dimension	Description	Network C	Network D
Management Practices	Communication and alignment practices	Present	Present
	Defined rules	Present	Present
	Governance Council	-	Present
	Thematic committees/work teams	Present	Present
	Member selection criteria	-	Present
	Conflict-solving process	Present	Present
	Expert consultancy	-	Present

Coopetition is an endogenous paradox that was present in both retail networks. However, only Network C faced tension regarding competition among network members. The differences in network context may explain the tension emerging in Network C. Network D members maintain interpersonal relationships that facilitate interaction in the network domain. On the other hand, Network C had different network members who disagreed with the objectives. The various groups led to a dispute over value appropriation, and the network could not reach a consensus or provide value for both groups. The set of paradox management practices diverges in the networks. Network D deals with coopetition through a careful member

selection process. Network C depends on formal rules that delimit the geographical area for each network member. Network C practices did not address the competition among network members with regard to value appropriation.

The punctual tensions in both networks were effectively controlled by the ethical committees and the network managers, and mediation prevented the tension from harming relationship value. However, Network C's tension regarding competition was different. Network C could generate relationship value for most members, except for at least seven network members. For this group, Network C seemed unable to provide gains that the firms could reach in isolation. Although tension arose in this small group, it harmed the relationship. The network's incapacity to generate relationship value led this small group to discuss the possibility of leaving the network.

Data from Networks C and D demonstrate that the networks can deal with tensions after their emergence through conflict-solving processes. The post-tension practice may reduce conflict. Exceptionally, Network C could not efficiently manage the competition between network members. The incapacity to deal with competition among network members led to tensions that the established conflict-solving process could not resolve. Although the issue was with a small group (seven members of Network C), Networks C and D created relationship value for their members. Network D dealt with possible tensions that could harm the relationship through paradox management practices. Meanwhile, Network C faced a competition issue regarding value capture, which partially harmed the network's capacity to provide relationship value for a group of members.

5.3 PARADOX MANAGEMENT AND RELATIONSHIP VALUE IN NETWORKS WITH A DIFFERENT PURPOSE

The literature proposes different strategies to deal with paradoxical tensions, namely: selection, alternation, segmentation, and transcendence (e.g., Carlson et al., 2016). According to the paradox balance and press, Carlson et al. (2016) proposed that firms could select the best response to the paradox. At the same time, the “press” concept relates to a sense of urgency (Carlson et al., 2017). Evidence from this study indicates that contextual factors press paradox poles. Hence, I argue that contextual factors analysis plays an essential role in defining the best response to the paradox (e.g., Schrage & Rasche, 2021). Consequently, paradox management may be conducted by a broader contextual analysis, as analyzing the context helps the network manager to identify the press on paradox poles.

A critical and unanswered question centers on the issue of choosing specific responses to the paradoxes (Carlson et al., 2016). According to Carlson et al. (2016), the concept of the press can be used to evaluate the relative strength between paradox poles (balance or imbalance). In addition, the Dynamic Equilibrium Model (Smith & Lewis, 2011) advocated that a plurality of views, scarcity of resources, and environmental changes could trigger paradoxical tensions. In this thesis, all networks exhibited contextual factors influencing the relative strength between paradox poles.

Contextual factors pressed the paradoxes poles and indicated from which pole tension was more likely to emerge. In the R&D network cases, the network management could effectively prevent tensions by adopting practices that increase knowledge sharing at the interorganizational network level in a trade-off with the firm's knowledge protection. The context in which R&D networks operate facilitated this strategy (selection: knowledge sharing). The selection strategy (Schmidt, 2019) effectively responded to the paradox, as the network was surrounded by contextual factors that reduced the concern surrounding knowledge protection.

Contrary to previous literature (Carlson et al., 2016), data from these cases indicate this was not an exclusive matter of urgency (press) but related to the level of knowledge protection the network members were disposed to accept to increase knowledge sharing. The results indicated that contextual factors, such as previous interorganizational relationships and partners' reputations influenced the network members' acceptance of knowledge protection since network members accepted lower levels of knowledge protection. Previous literature has identified that these factors contributed to the presence of trust among network members, which is a critical element in interorganizational networks (Onyango, 2019). According to Austen (2018), the trust may provide support to balance contrasting demands in interorganizational networks. Since network members trust each other, they could minimize the risks regarding knowledge leakage and, consequently, reduce concerns regarding knowledge protection.

The relationship between contextual factors and the strength of the paradox poles also appears in the retail networks' cases. For example, in Network D, the network members' awareness of the need for faster decisions to keep up with the market triggered tensions in the efficiency pole. Network D did not anticipate the change in the context, but it could identify and define the best response to the paradox by reading the context (selection: efficiency). Consequently, the contextual factor, labeled as pressure from the market, indicated from which pole a tension (efficiency) was more likely to emerge. This evidence is in line with the Dynamic

Equilibrium Model (Smith & Lewis, 2011) because environmental change contributed to the emergence of the tension. On the other hand, Network C could trade decision-making efficiency for inclusiveness without triggering tensions.

The results indicate that the context in which each network operates indicates the strength of each paradox pole. A contextual analysis indicates the factors that impose pressure (e.g., the market) or relieves pressure (e.g., previous interorganizational relationship) on each paradox pole. Consequently, the network manager may choose the best response to cope with the paradoxes to prevent tensions. Accordingly, I propose the following:

P1: Contextual factors influence the strength of each paradoxical pole and indicate the best response to prevent paradoxical tensions in interorganizational networks.

Although the context indicated where tensions were more likely to emerge, Network D could not prevent tensions from emerging. Network D was concerned about market pressure for faster decisions and decided to change its governance system. The trade-off between decision-making efficiency and inclusiveness led to tensions, as Network D reduced member participation below acceptable levels. Smith and Lewis (2011) proposed that the plurality of views, the scarcity of resources, and the environmental changes could trigger paradoxical tensions. Data from the cases indicate that these factors (scarcity, plurality, and change) are not determinants of the emergence of paradoxical tensions but environmental characteristics that intensify the pressure on paradox poles. For example, in R&D networks, the multiplicity of views (plurality) was used as a complementary resource that facilitated the research. In the retail networks, despite the heterogeneity of Network C, they could deal with the multiplicity of views through management practices that increased inclusiveness. Hence, data from the cases in this study indicate that plurality, scarcity, and change (Smith & Lewis, 2011) do not trigger tensions directly. Data from Network D indicate that the network members' perception regarding the decision-making efficiency is given new meaning when they realize that the network had to speed up decisions to keep up with the market. This change in the context triggered a sensemaking process among Network D members regarding their actual decision-making efficiency level. This reframing concluded that the former efficiency level was no longer acceptable anymore, the point being that tension only emerged when the network members reframed the decision-making efficiency in the network.

This evidence indicates that the emergence of tensions relates to maintaining the paradox pole within network members' expectations, which suffer oscillations according to

contextual factors and management practices that reframe network members' perceptions regarding paradox poles. For example, the R&D networks could effectively reduce knowledge protection to favor knowledge sharing without triggering tensions. Contextual factors, such as previous interpersonal and interorganizational relationships, fostered trust among network members, which relieved the pressure for knowledge protection. Hence, network members were more prepared to accept lower levels of knowledge protection than in a traditional arm's length relationship. This finding indicates that, contrary to previous literature (e.g., Niesten & Stefan, 2019), the perspective of balance in terms of equality of forces (e.g., Carlson et al., 2016) may not avoid or solve paradoxical tensions. Interorganizational networks may have an unbalanced relationship between paradox poles without facing significant tensions, as reported in the cases studied (Networks A, B, and C). Consequently, from a different perspective, although environmental factors such as plurality, scarcity, and change (Smith & Lewis, 2011) increase the pressure on paradox poles, network management may reframe the paradox through the effective implementation of management practices. Tensions may occur when the network member perceives a dissonance regarding the expected and the experienced paradox, triggering a sensemaking process (Weick, 1995; Kramer, 2016). For example, when the group of seven Network C members realized that their expectations were not being addressed by the interorganizational network, the sensemaking process led to an emerging tension. On the other hand, paradox management practices may prevent tensions when reframing the meaning of the paradox pole within network members' expectations as a sense-giving process. For example: (a) when Network A implemented the protocol to enable sensitive knowledge sharing and reduced the concern regarding knowledge spillover, and; (b) when Network C established that its decisions would be made with representativeness, which increased the inclusiveness in line with network members' expectations.

Hence, I propose that the paradox equilibrium constitutes the state in which the strength of two paradoxical poles is aligned with network members' expectations and does not cause conflict or discomfort. Consequently, I propose the following:

P2a: Paradox management practices may prevent tensions by maintaining network members' experiences within their expectations regarding each paradox pole.

P2b: Tensions may emerge from paradoxes when network members' experiences are not within their expectations.

Wang and Ran (2021) advocate that there is no comprehensive framework that systematically examines the tensional or paradoxical factors of network governance. Additionally, Henry et al. (2020) argue that little is known about the way in which the decision-making inclusiveness-efficiency paradox unfolds over time in cross-sector interorganizational relationships. According to the paradox equilibrium proposition, tensions may occur if the strength of two paradoxical poles is not aligned with network members' expectations, resulting in conflict or discomfort. In the cases analyzed, tensions have occurred regarding decision-making inclusiveness and efficiency throughout the retail networks' history. Network D data showed that tensions might arise in one pole (decision-making efficiency) or another (inclusiveness). When Network D changed its governance system to increase the decision-making efficiency, it reduced its inclusiveness below network members' expectations. This process helps to explain how tensions unfold over time (Henry et al., 2020). From this perspective, preventing tensions may be a challenging process in interorganizational networks, as each network member is an autonomous organization (Provan & Kenis, 2008) and may develop their own meaning regarding the paradox's poles.

Despite the networks' efforts to prevent tensions, the conflict did emerge in Networks A, C, and D. The retail networks addressed minor tensions through established conflict-solving processes. The ethical committee (Network C) and the network manager (Network D) could deal with minor network tensions effectively. In the R&D networks, IPT and ITA played the role of mediators to solve the eventual conflicts between network members. This finding corroborates previous literature, which advocated the importance of problem-solving agreements to deal with paradoxes (Uzzi, 1997; Saz-Carranza & Ospina, 2011; Best et al., 2021). Hence, post-tension mediation reduced conflicts in the interorganizational network. Mediation was a critical process in which the network could cope with tensions that could harm the relationship's value. For example, in Network A, the IPT mediated a conflict regarding a network member's resistance to sharing a technical drawing by reframing the importance of this resource for the interorganizational network. Therefore, I propose the following:

P3: Paradox management practices may reduce tensions by reframing paradox poles within network members' expectations.

According to Biggemann and Buttle's (2012) taxonomy, it was possible to identify and classify different relationship values according to each network member's perception. For example, in R&D networks, it was possible to identify: (a) personal value from the expectation to maintain the buyer/supplier relationship for the long-term and from a willingness to share

positive experiences with other parties; (b) financial value resulting from efficiency and market share; (c) knowledge value from idea-generation, which is the outcome of participating and discussing ideas, as well as innovation and (d) strategic value as a result of a long-term relationship in the retail networks and the networking provided in the four cases.

Despite the relationship value from different sources, Network C showed that tensions cause the relationship value perceived by network members to deteriorate. The conflicts surrounding value capture in Network C demonstrate that tensions arising from paradoxes may harm the relationship value. The network capacity to provide value for a small group of members was compromised. Dyer et al. (2018) propose that competitive forces (coopetition) represent a challenge, as partners seek to appropriate the benefits from cooperation. Since a small group could not capture the intended value from the network, they did not perceive financial value in the way that they used to. The conflict that appeared in Network C reframed the relationship value from the network member's view.

On the other hand, Networks A, B, and D could effectively cope with the paradoxes through paradox management practices. Eventually, networks A, B, and D faced minor tensions, but effective post-tension management prevented tensions from harming the network's relationship value.

This finding corroborates with previous studies which claimed that ineffective tension management could influence relationship value negatively (Bills et al., 2021; Runge et al., 2021; Úbeda-García, 2021; Raza-Ullah, 2020) and, as a final consequence, interorganizational relationships could fail (Casey & Lawless, 2011; Niesten & Stefan, 2019). Data from the cases studied demonstrated that tensions might influence the network members' perception regarding relationship value in interorganizational networks. On the other hand, when network managers equilibrated the paradoxes within network members' expectations, network members perceived relationship value from different dimensions (personal, financial, knowledge, strategic). Hence, paradox management contributed to the relationship value by preventing tensions that could harm the network members' perception regarding the value generated from their participation in the interorganizational network. Therefore, I propose the following:

P4: Effective paradox management may prevent tensions from harming the relationship value in interorganizational networks.

6. CONCLUSION

6.1 THEORETICAL AND MANAGERIAL CONTRIBUTIONS

This research investigated how paradox management contributes to the relationship value in interorganizational networks. The findings support the fact that paradox management contribution occurs twice: prior to the emergence of tensions, by implementing practices that cope with the paradoxes and post-tension emergence through mediation and conflict-solving processes that minimize the effects of tensions in the generation of relational value. **This thesis makes two contributions to the literature and suggests four recommendations for practitioners:**

(a) Contribution to Paradox and Relationship value Streams

The thesis contributes to two literature fields: (a) paradoxes and (b) the relationship value in interorganizational contexts. This thesis contributes to a literature call to better understand the dynamics behind the emergence of tensions from paradoxes (Shad et al., 2016). Contrary to previous studies that indicate the balance of paradox poles' strength as a solution to manage paradoxes (e.g., Smith & Lewis, 2011; Carlson et al., 2016, Niesten & Stefan, 2019), the findings indicate that tensions may emerge from a difference between network members' expectations and what their observation in the network. The results indicate that a violation of expectations triggers the sensemaking process (Kramer, 2016), which may lead to tension. Therefore, paradox management could obtain positive outcomes from paradoxes even when one pole is stronger than the opposite pole (imbalance). This thesis proposes an alternative perspective that enables paradox management to prevent tensions from harming the generation of relationship value. The proposed perspective takes into account network members' framing and the reframing process regarding the paradox's poles. Consequently, this research contributes to the relationship value literature (Biggemann and Buttle, 2012), demonstrating in which conditions tensions can harm the relationship value and how effective paradox management may prevent these from harming the value in interorganizational networks.

This thesis enables a better understanding of the emergence of tensions and the potential effects on the generation of relationship value. This set of propositions helps elucidate the process regarding the emergence of tensions and the role of paradox management in coping with tensions that could jeopardize the generation of relationship value (Carlson et al., 2016; Szentes, 2018; Dyer & Singh, 1998; Dyer et al., 2018).

As reported previously, contextual factors may influence each paradoxical pole's strength and indicate the best response to prevent paradoxical tensions in interorganizational networks (P1). This proposition answers a literature call from Carlson et al. (2016), who questioned which processes underlie the choice of certain responses to the paradoxes. Additionally, the role of paradox management practices in maintaining paradox poles within network members' expectations so as to prevent tensions (P2a and P2b) is aligned with Van Fenema and Loebbecke's (2014) theory regarding the way in which to manage tensions and helps explain in which conditions tensions may occur (Niesten & Stefan, 2019). Moreover, the literature considers the paradox and tension dynamics (Schad et al., 2016) and the way in which actors answer to paradoxes over time (Henry et al., 2020). This is addressed by the P3, which suggests paradox management practices as a mechanism to reframe paradox poles in order to prevent tensions. Finally, Dyer et al. (2018) proposed that paradoxical tensions may harm relational performance, which is aligned with the findings of this thesis. Therefore, effective paradox management may prevent tensions from harming the relationship value and may help networks achieve their strategic objectives.

(b) Contribution to Paradox Management in R&D and Retail Networks

This thesis enriches the paradox in interorganizational relationships literature as the findings indicate that previous interpersonal relationships, interorganizational relationships, partners' reputations, and the organizational culture of cooperation may favor knowledge sharing reducing concerns regarding knowledge protection in R&D networks. Moreover, the findings identify the knowledge type needed in the network as a critical factor that may influence concerns regarding knowledge protection. In addition, the findings indicate that formalization, network member selection criteria, and communication and alignment practices play a critical role in paradox management. These practices help the network emphasize one or another paradox pole. Finally, the findings highlight the importance of having a lead organization with previous experience in leading R&D projects, which contributes to Provan and Kennis's (2008) governance mode theory.

Regarding retail networks, the findings indicate that a firm's heterogeneity may pressure the inclusiveness-efficiency paradox, as it requires more decision-making inclusiveness. The findings also indicate that the formalization of rules regarding inclusiveness and competition, communication and alignment practices, and the adoption of working teams (or thematic committees) play an essential role in paradox management. These practices help management

increase the level of decision-making inclusiveness and efficiency in the network. Finally, the findings highlight the importance of having conflict-solving processes to cope with the tensions that may emerge from the paradox.

(c) Managerial Recommendations

The research also contributes to managerial practice. Networks may adopt a systematic and contextual analysis to evaluate the paradox pole's strength. The previous analysis may indicate which paradox poles require attention or how much the paradox management can trade off before triggering tensions. Networks may take advantage of this perspective to prevent tensions and explore the potential of each paradox. Accordingly, this thesis suggests a series of recommendations which are listed and explained below:

- (a) Designing the interorganizational network and selecting partners:** when designing the interorganizational network, the network scope may influence concerns regarding a paradox pole (e.g., knowledge protection) as the governance mode. Care must be taken in order to prevent tensions from the disadvantaged paradox' pole. In addition, partner selection may be used to relieve the pressure from the external environment. For example, prioritizing members with previous interorganizational relationships may foster trust among network members, which contributes to reducing concerns regarding knowledge protection and inclusiveness.
- (b) Designing communication in interorganizational networks:** it is important to define the way in which network members communicate with one other. Clear communication may reduce efficiency problems regarding misinformation. Additionally, a sound communication process contributes to expectation alignment, and effective communication and alignment practices may increase the sense of continuity and may build trust among network members.
- (c) Defining rules for the network members' interaction:** as the number of network members increases, rules are necessary to govern the interorganizational relationship. Establishing rules previously may reduce the problem occurrence and cope with conflicts that may happen during the interorganizational network life cycle. Defining rules is important in interorganizational networks where there is no hierarchy that can solve problems in a vertical way.

- (d) **Managing paradoxes through assigning meaning:** the findings indicated that balancing paradox poles might not be efficient in preventing tensions. Network managers may analyze the context in which the interorganizational network operates to identify the factors that impose or relieve the pressure on each paradox's pole. According to the contextual analysis, network managers may select the best response to the paradox and implement their strategy through management practices. This process is important to reframe the network members' understanding of paradox poles and to prevent tensions that could harm the relationship's value.

6.2 RESEARCH LIMITATIONS AND FUTURE RESEARCH

The findings enabled a better understanding of how tensions emerge from paradoxes, the role of paradox management practices, and the way in which paradox management practices may prevent tensions from harming the relationship value in interorganizational networks. However, the findings relate to interorganizational networks in a limited context variation. The networks had different purposes: research and development and promoting collective action in the retail sectors. The number and variety of cases limit the generalization of the research findings.

The investigation regarding the dynamic behind the emergence of tensions requested delimitation in terms of the type of networks and paradoxes. The variety of cases and paradoxes was sufficient with regard to finding evidence relating to the research question. However, this rendered a deeper and longitudinal analysis regarding the emergence of tensions unfeasible. Future research can explore tensions emerging from a dynamic perspective, and longitudinal studies can address the way in which tensions arise from one or another paradox pole and how the network management copes with tensions.

Another limitation occurred because the networks represent successful cases regarding paradox management and the generation of relationship value. Networks A and B had IPT and ITA as network orchestrators, respectively, which have previous experience in leading networks and projects. The expertise of these organizations may have had a significant impact on preventing tensions. On the other hand, Networks C and D could prevent tensions from escalating through paradox management practices. The successful cases contributed to evidence of good paradox management practices in coping with paradoxical tensions. However, future

research may take advantage of cases of failure. Unsuccessful cases may provide a different perspective, enabling a deeper and comparative analysis of how tensions harm the relationship value of networks over time.

Furthermore, the pandemic restrictions due to the SARS-COV-2 influenced the data collection strategy. Although virtual meetings facilitated interaction with interviewees from a distance, the restrictions imposed limitations, especially regarding the observation of and participation in certain activities. There has been a considerable emotional impact on the interviewees and on firms' routines. The pandemic restrictions significantly changed the interaction between people, which impacted firms' perception of their interorganizational relationships. This impact occurred mainly in the retail networks, as these were primarily composed of small firms with personal proximity in network activities. Future research may explore the paradoxes without the influence of pandemic restrictions.

Finally, this is not an attempt to exhaust future research possibilities but to guide future investigations. Managing competitive and paradoxical demands is a fertile area that challenges the literature and the empirical field. Future investigation in this field may contribute to a better understanding of paradox management regarding specific paradoxes. This thesis broadens the views of researchers and practitioners regarding the process in which tensions emerge from paradoxes and elucidates a method that indicates the best response with which to cope with paradoxical situations. Since this thesis provides an alternative perspective in which framing and reframing play an important role in managing paradoxes, future research may explore this phenomenon from a sensemaking approach.

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