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The governance of interorganizational relations: case study investigation in triads and tetrads

Addendum:
The response of governance structure to project-critical incidents: case study investigation in triads and tetrads

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ABSTRACT

The management of supplier relationships is asserted to be a key contributor to the performance of firms and organizations, notably as the globalization of the economy and the pace of change have significantly increased the competitive pressure. The interdependence of organizations, reflected in supplier portfolios, demands a finer understanding of the interplay of relationships across multiple tiers. After a thorough literature review on the governance of triads, an empirical investigation was conducted in the energy sector in Switzerland. Four cases studies were executed to investigate how does the governance of buyer-supplier relationships influence the other relationships within a buyer-supplier-supplier triad. Data was collected during semi-structured interviews and complemented with documentary evidence, on four concomitant projects involving the same organizations. The findings revealed the interplay of external and internal factors in the choice of governance arrangements and were summarized in a causal network. As well, the evolution of governance in response to threats to the attainment of goals exposed the primacy of functional-level logics in the prioritization of problem resolution. This also allowed to highlight how the governance of one link can affect another link, by changing the structure of the project-level triad, and/or the instruments enacted in the links. Managerial implications were materialized in a practical model displaying the interactions of internal and external influences to be accounted for in the continuous adaptation of supplier relationship and portfolio management practice. A limitation is that full reciprocal recounting of events was not achieved due to access restrictions even when data was collected from all parties in the triads. The value of this research lies in the demonstration of governance evolution across multiple tiers, how it affected both the structure of the triads and the choice of instruments, and the importance of intrinsic values in decision making. The contribution to managerial practice provides insights to improve readiness and flexibility in the management of intra and inter organizational relationships.

Keywords: Adaptation; Buyer; Buyer-Supplier Relations; Inter-organizational relations; Purchasing; Supplier; Supplier portfolio management

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LIST OF ABBREVIATIONS

Acronym	Stands for:
DSO	Distribution System Operator
ENTSOE	European Network of Transmission System Operators
EPC	Engineering, Procurement, Construction
GTC	General Terms and Conditions
IEA	International Energy Agency
IOE	Inter-Organizational Entity (or Entities, according to context)
IOR	Inter-Organizational Relations
IORs	Inter-Organizational Relationships
IT	Information Technology
MSC	Multi-tier Supply Chain
NAFTA	North American Free Trade Agreement
OFEN	Office Fédéral de l'Energie
PM	Project Manager
PSM	Procurement and Supply chain Management
RBV	Resource Based View
RDT	Resource Dependency Theory
RV	Relational View
SCT	Social Capital Theory
SIMAP	Système d'Information sur les MArchés Publics en Suisse
SLR	Systematic Literature Review
ST	Stakeholder Theory
TCE	Transaction Costs Economics
TSO	Transmission System Operator
VRIN	Valuable, Rare, Inimitable, Non-substitutable

INTRODUCTION

This work aims at informing the practice of the procurement function, notably in the management of supplier relations and portfolio optimization. The attention this subject received has mostly been either limited to dyadic or virtually boundary-less considerations (the ‘supply network’). In the study presented here, the influence of relationship governance across tiers is investigated in triads, in four case studies. Learnings are then presented.

The document is structured in five chapters, and a conclusion.

The first chapter is an extended introduction and contextualization of the practical issue faced by the purchasing managers. It leads to the identification of a systematic literature review question, and the grounding of research in triads.

In chapter 2, the execution of the systematic literature review is detailed in five sections. Planning, searching, screening, extraction and analysis, and synthesis enable the emergence of an empirical research question, with two sub-questions.

Chapter 3 presents the methodology used for the empirical project. It includes the philosophical approach, research design, the data collection methods, sources, and data analysis principles enacted. The last two sections present the steps taken to ensure methodological rigour, and the adherence to the ethics of research.

In chapter 4 are found the within case and cross case analysis work, as well as a causal network.

The discussion of findings is conducted in chapter 5, including the answers to the research question. They are followed by the managerial implications derived from the practical model proposed. Research limitations are outlined, as well as avenues for further investigations.

Finally, the conclusion summarizes the work accomplished and highlights theoretical and practical findings.

1 PROBLEM DEFINITION

This first chapter intends to introduce the issue faced by the procurement function in managing suppliers' relations of growing complexity. After several definitions of concepts specific to the management of supplier relationships are given. Then, in a third section, an assessment of current knowledge on the topic enables the identification of a review question that will lead to a detailed systematic review (SLR). The planning, execution, and findings of this SLR are subsequently detailed in chapter 2.

1.1 Scoping study

The introduction of the concept of Value Chain by Porter (1985) coincided with the evolution from integration to outsourcing of a growing number of activities in most industries. This phenomenon has been amplified by the globalization of trade, deregulation and lowering of barriers through the actions of international bodies such as the World Trade Organization, or the forming of trade regions (e.g. European Economic Community, NAFTA), and the emergence of countries as manufacturing and consuming hubs (e.g. China, India, Brazil). A new era of inter-organizational collaboration developed, where the suppliers played an increasing role in the ability of firms to meet the requirements of their customers. The competition had shifted from an organization level to a network level (Gomes-Casseres, 1996). This change affected manufacturing activities, as well as knowledge-based exchanges as illustrated in the automotive industry (e.g. Dyer and Nobeoka, 2000), or the then nascent biotechnology sector. As underlined by (Powell, Koput and Smith-Doerr, 1996, p.116) "When the knowledge base of an industry is both complex and expanding and the sources of expertise are widely dispersed, the locus of innovation will be found in networks of learning, rather than in individual firms."

Although this represents a transformation in how the companies operate, what hasn't changed is that the need to achieve cost competitiveness and innovation is still there, and that each company remains accountable for the end result of its activities.

In the past, with most activities being carried out in-house, the procurement department could support the requirements of the organization through simple processes based on competitive bidding and short-term relations, and formal contractual relationships (e.g. Monczka et al., 2011; van Weele, 2005). These days, that is far more difficult to do. Whereas the procurement department dealt in the past with a production-focused supply chain, it has now evolved into managing a complex and dynamic global network that delivers not only resources, but also services, knowledge and talent -all contributing to a series of processes related to product development, manufacturing, delivery, marketing and communication activities, most with uncertain outcomes.

On top of this complicated framework, the number of interactions between these processes makes it extremely complex. In other words, the procurement department's operating environment has transformed from being stable and predictable to complex, dynamic and uncertain.

Under these new conditions, the contracts-and-rules-based practices of the past can only go so far – if they were to go too far, they might hinder the initiatives and risk-taking necessary for accelerated innovation to take place, as already underlined by Williamson (1979). This means, the activities and decisions made by the procurement department now have far-reaching operational and strategic consequences, not only on the daily operations of the company but also on its ability to access supplier-led innovation.

Therefore, based on the foundational proposition from the transaction costs economics theory that from alignment between governance structure and transactions stems greater potential for relational rents (Dyer and Singh, 1998), there is a legitimate need for the procurement function to reconsider the governance of relationships with the suppliers in order to address the following four challenges (Monczka et al., 2011; van Weele, 2005):

First, there is a shift of focus of the purchasing function from being preoccupied mostly on procuring production intent materials and goods in a highly vertically integrated supply chain, to the management of a network of vendors whose services (research services, product development, contract manufacturing, logistics, all aspects of marketing and communication, and all the various services required for the daily operations of the company) are spread across the value chain of the company. The activity has become largely project-based, generating a large number of discrete transactions with possibly long-standing supplier that will likely deliver over the life-time of the product. In production-intent materials and equipment, once an ingredient or machinery is approved, changing the source can be extremely time consuming and costly (e.g. use worthiness and safety certification in highly regulated industries such as automotive, aircraft, pharmaceutical and biotechnologies), or risky (e.g. ensuring acceptance of new product by the consumer). Services such as research, marketing, consultancy, information technology, clinical trials revolve around projects. Construction, investments and infrastructure development and renewal (e.g. energy and utilities production and transportation, rail networks, roads) are project-based activities. One can contend that only a fraction of recurring daily operations expenses of an organization are not considered as project-based spend (e.g. office supplies, fleet management, real estate rental).

Second, the evolution towards a multi-tiered relations[1] approach to encompass the value chain scale, combined with the fact that some suppliers are intervening at several contiguous or separate steps and levels in the value chain and the supply network.

Third challenge is the need to support the efforts of the company to stay on the edge of competition, and recognizing that advantages can come from every direction, means that the approach to suppliers has moved from a mostly

[1] In a procurement (and supply chain management) context, “Multi-tier” is used to describe relations that span several levels in the supply network. Suppliers selling directly to the Buyer (focal firm) are Tier1 suppliers; the suppliers of the tier1 suppliers are tier2 suppliers; and so on. Using “tier” avoids confusion with “level” which has a different meaning in research. Mena, Humphries and Choi (2013) stipulate in their abstract that a “three-tier supply chains […] consists of a buyer, supplier, and supplier’s supplier”. See 1.2.2 for detailed illustration.

exploitation mind set to an explore plus exploit mind set. The outcomes expected have evolved from pure price competitive advantage to service and knowledge-based value creation.

And fourth, relationships that were commonly dealt with under an arm's length approach, are now in most cases considered under a cooperative lens. In a number of cases, there is even coopetition when specific assets or resources are not available otherwise. Governance instruments that were good enough in power-based relations are probably not the most appropriate to collaborative undertakings.

As outlined by Powell, Koput and Smith-Doerr (1996, p. 119) "the development of cooperative routines goes beyond simply learning how to maintain a large number of ties", it is the management of such networks of relationships that enables the firm to maximize the value it captures from them (Powell, Koput and Smith-Doerr, 1996, confirmation of Hyp. 2. p. 137). Identifying the various possible governance models and associated instruments for this new set-up shall allow the adaptation of the procurement practice in the organization -an effort that can lead to a significant modification of the operating model and operational execution principles of the purchasing function.

The evolution of competition from an organizational-level to a network level has led to the emergence of several new concepts linked to inter-organizational collaboration, notably relating to the identification of relative position and status of suppliers (e.g. supply network, supplier portfolio, supply base, tiers), or the management of contractual risk in a multi-tiered environment (e.g. back-to-back contracting). They are routinely used in procurement literature and by practitioners, and sometimes with different understanding. That is why definitions are given here. After these, a literature review on the current knowledge on inter-organizational relations will be presented. It will support the positioning of the problem in current theory.

1.2 Concepts definitions

1.2.1 Supply network, supplier portfolio, supply base

We have here three different considerations.

The first one, the supply network, is the broadest reaching.

According to Choi and Krause (2006, p.638): a supply network includes all inter-connected companies that exist upstream to any one company in the value system.

The supplier portfolio includes active, inactive, and potential suppliers.

An active supplier is receiving purchase orders on a regular basis (at least once every two years is the admitted practice); an inactive supplier has had some extent of business and is not active at the moment. A potential supplier is clearly identified, its capabilities are known, and can be invited to submit proposals; although it has not yet been awarded a contract.

Wagner and Johnson (2004, p.719) state that: “A strategic supplier portfolio consists of the set of supplier relationships assembled by the firm with the intent of managing risks and optimizing returns where management activities involve not just individual supplier relationships but the entire supplier portfolio as a group. The portfolio is structured deliberately according to factors identified by the firm as important to sustainable competitive advantage, superior economic performance, or both. Explicit consideration is given to the strategic role of the various relationships, where dependencies and interdependencies are created, the alternative governance mechanisms, and where the firm will invest in and leverage relational capital.”

The authors consider that purchasing should include “first-tier, second-tier and even third-tier suppliers in the process" of portfolio management (Wagner and Johnson, 2004, p.729).

In the view of Choi and Krause (2006, p. 638), “the supply base is the portion of the supply network that is actively managed by the focal company”.

It is more restrictive than the supplier portfolio, as a portion of inactive suppliers are not actively managed, to the point that some of these are known only through the electronic records of transactions kept for regulatory reasons.

1.2.2 Tiers

A key point in conducting this research was the definition of the boundaries of the nodes in the triads under scrutiny, thereby defining the tiers.

The definition of tier used here corresponds to the one recently used in a study of the defence industry supply chain: “Tiers are measured as the number of contractual relationships between the supplier and the facility that produces the final product (i.e., the systems integrator).” (Gholz, James and Speller, 2018, p.1479). In note 2 (p. 1479) of the same paper, the authors indicated that a facility was construed as “a profit-and-loss centre for the company”, providing confirmation that several tiers can be found within a firm.

Gholz’s work was conducted using the lens of modularization theory, where consideration of the products and services being traded between the organizations, and of the actors intervening at each technological and production step, is paramount (Brusoni, Prencipe and Pavitt, 2001). In the cases here, we have a replication of the tier layering described in Figure 1 of the widely cited paper by Murmann and Frenken (2006, p.938), as reproduced in Figure 1-1.

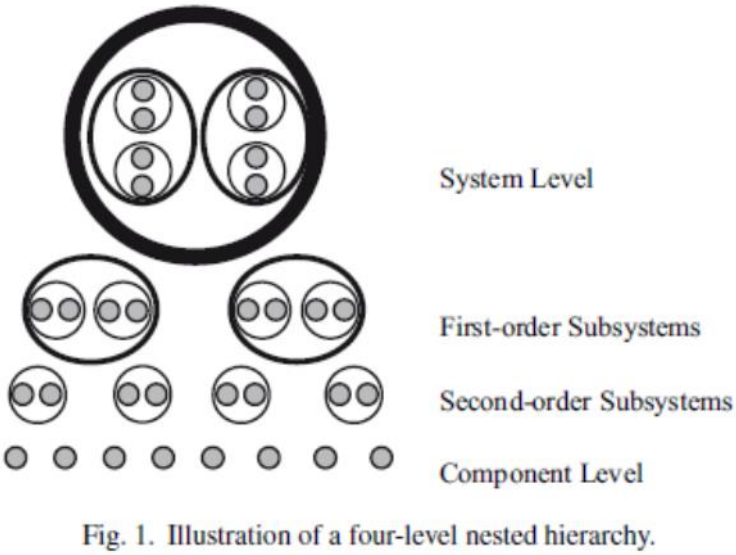

Fig. 1. Illustration of a four-level nested hierarchy.

Figure 1-1 Layering of tiers

Recently, Buxbaum-Conradi et al. (2015) used the exact same approach in their work on the transformation of the supply chain in the aviation industry through modularization.

1.2.3 Up and down the layers of tiers

Grounded in the world of procurement and supply chain management, this research refers to “upstream” and “downstream” concepts as used in supply chain management (Ateş, Wynstra and van Raaij, 2015).

Upstream, means in tiers prior to the reference organization. That is, for a focal organization, the chain of suppliers.

Downstream, means in tiers subsequent to the reference organization. That is, for a focal organization, its customers and the chain of their customers.
It is illustrated in Figure 1-2 below.

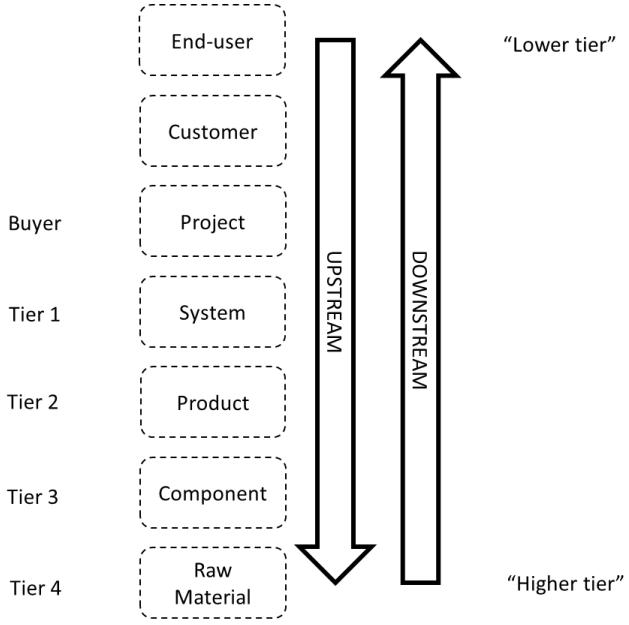

Figure 1-2 Upstream and Downstream in tiers

1.2.4 Back-to-back contracting

Back-to-back contracting is a technique by which an organization aims at reducing its risk by mirroring terms and conditions agreed with one of its trading partners towards the other parties to a transaction (or a series of transactions governed by the same contractual terms).

This back-to-back contracting is generally done upstream in the supply chain, as when the seller of products or services acting as a buyer is mirroring the terms and conditions agreed with a customer towards its own suppliers. Common back-to-back contracting clauses refer to technical and delivery performance, penalties or reward systems, payment terms, raw materials and currencies fluctuation adjustments.

An example of the use of such contracts in large project in the oil and gas industry is given in the Case B of Olsen et al. (2005)

1.3 Review of literature on subject

The management of supply networks draws extensively on the theories used in interorganizational relations (IOR). Therefore, as a first step, the literature on interorganizational relations is reviewed, to build an image of the field, the concepts and conversations. After this, it is the shift from dyadic to multi-tiered relations that will be discussed.

In the context of this research, the organizations referred to are deemed to be for-profit organizations (firms) whose partners are participating in efforts and inter-organizational relations in order to develop, manufacture, market, for-profit products. This implies that collaborative efforts including public bodies having pure not-for-profit goals (e.g. management of healthcare systems or practices, troubled youth support, etc.) will not be specifically covered (i.e. no special section on public-private or not-for-profit collaborations), even though they are regularly subject of research in the domain. However, findings relating to such collaborations will be included when they are pertinent to the topic in scope.

1.3.1 Inter-organizational relations

In order to follow a path of increasing focus, the literature is going to be critically reviewed following the steps described by Sydow, Schüssler and Müller-Seitz (2016) in the engagement into and set-up of IOR: why, what for (the common goal), with whom (partner selection), under which form, following which structure and rules (governance), and how these are enforced (the governance instruments).

The distinction between “why” and “what for” emphasized by Parmigiani and Rivera-Santos (2011), is novel compared to many articles in the literature in which the words “aim”, “goal”, “interest”, “objective”, “purpose”, are used indistinctively. Here, this distinction is followed, as it highlights two different aspects of inter-organizational relations, each possibly affecting different steps and actions undertaken in the formation and over the life-time of inter-organizational relations.

1.3.2 Why do firms engage in inter-organizational relations?

Firms look for collaboration in order to respond to internal or external pressures; it is therefore not a self-started endeavour.

Firms entering collaboration do so to secure competitive advantages that can be achieved through a focus on costs (as per Transaction Costs Theory), a focus on benefits (e.g. access to specific resources as per the Resource Based View, the Resource Dependency Theory; or developing a relational advantage as per the Relational View, the Social Capital Theory), or focus on risks (reducing risk and dealing with uncertainty, as per Agency Theory). As underlined by Huxham and Vangen (2004, p.191) “to gain real *advantage* from collaboration, something has to be achieved that could not be achieved by any one of the organizations acting alone” (emphasis from the original article).

Achieving the best cost to quality ratio is a long-standing objective of procurement, and most organizations are now using the Total Cost of Ownership approach (Monczka et al., 2011) when making make or buy decisions or comparing between suppliers in order to assess the most favourable way to serve a customer. Then formal contracts are drawn to secure the deal, and secure a powerful position if anything should go awry. This approach is grounded in the Transaction cost economics theory (TCE). It is a key theory in the understanding of interorganizational networks as a form of governance. This theory favours hierarchical forms of governance. Networks are seen as a hybrid between market and hierarchies and contended to offer the minimal transaction costs when asset specificity is medium (Williamson, 1979, 1991). The network is also the most efficient form of governance in bounded rationality, when specific investments and high incentives are required to avoid opportunistic behaviours (Parmigiani and Rivera-Santos, 2011).

But costs are not everything, access to specific resources (materials, equipment, skills, competences, knowledge, finances…) and assurance of supply have become two major themes as well. They are based on a theory identified as

Resource based view (RBV), which focuses on the resources available to the firm. The RBV stipulates four qualities required for a resource to provide a sustainable advantage, and therefore be of strategic importance (Barney, 1991). These qualities are known as the VRIN criteria: Valuable, Rare, Inimitable and Non-substitutable. The resource-based view considers networks as one of the means to access such resources to complement the ones already integrated by the focus firm. Without the possibility to acquire the desired resources from external partners, the organization would have to invest in internal development, or full acquisition of the company holding the coveted resource (Rivera-Santos and Inkpen, 2009). Controlling a VRIN resource is a source of power.

An important aspect of managing the supply base, is to keep relationships satisfactory for both parties. When the buyer or the supplier feel being on the losing end of a relation, it will react either to rebalance, or to end the transaction. This is part of the risk management aspect of purchasing and is reflected in agency theory. This theory stipulates that IOR are used in order to minimize the risk (especially opportunistic behaviour) that agents take advantage of a given situation over their principals. IOR are a way to align incentives (control the division of value created) when ownership and control are separated. Agency theory is focused on arrangements to achieve this alignment.

The theories described above are part of the organizational economics body of literature. Their basic assumption is that firms use IOR for an efficiency purpose, by accessing complementary resources and aligning incentives among the participants. These theories are looking at the micro level (the transactions between individuals or firms, the organization itself).

Another body of literature -the organization theory- contends that it is effectiveness and the development of relationships that entices firms to enter IOR.

The relational view (RV) and social capital theory (SCT) change perspective from the transaction-based approach outlined in TCE and RBV to a relationship approach with vendors. The benefits of entering a network are seen in information and knowledge exchange, higher social credentials and influence, and a

reinforcement of identity (sense of belonging). The relationships in scope of RV and SCT are also supporting the development of organizational learning, and foster innovation. Social capital is seen as one of the foundations of trust through the repetition of social contacts and market relations.

Repeated interactions and the development of social relations are important in the course of buyer-supplier relationships, even when they have to be bounded by professional practice and ethics. The ties so created are found between individuals, organizations and networks. According to the Social Network Theory (SNT), the quantity, density, multiplicity, mix and diversity of ties (the embeddedness) will enable access to privileged information and stimulate knowledge flows and learning. In the long run, trust will be enhanced, promoting deeper relationships, as well as creation and exchange of social capital. Powell, Koput and Smith-Doerr (1996) established that relationships created by networks are pivotal to innovative organizations as they enable the formal and informal sharing of knowledge and increase the attractiveness of the firm for others to link with it. This relationship approach also encompasses the individual ties that employees can form. These will bring additional benefits to the relationship such as trust, lowering the risk of opportunistic behaviours which are to be addressed through tight contractual and regulatory stipulations (see the section 1.3.6 on Governance Instruments).

There are several other grounds for effectiveness gains through IOR, such as building on relationships with actors controlling resources vital to the organization to increase power vis-à-vis competitors, legislators, or other entities, and reduce uncertainty (Pfeffer and Salancik, 1978).In this view, actors can be individuals, organizations, or other networks, the theory spanning thereby from micro to macro levels of analysis. Another approach with the same span across units of analysis is for managers to make their organizations partner with stakeholders that are powerful, legitimate, and reputable, to gain support in their endeavours and increase their own status.

As outlined by the different theories presented above, firms can engage in a collaborative endeavour for different reasons.

Mostly the “why” of entering into IOR is dominated by the pursuit of efficiency gains (organizational economics) or effectiveness gains (organization theory). Both approaches will address access to certain resources (assets, capacities, knowledge, information, markets, etc.), control or reduce costs and the need to reduce uncertainty. Their differences lie in their unit of analysis (micro level vs micro to macro level, respectively), and their focus: where the organizational economics look at the transactions (e.g. TCE theory Williamson, 1991, RBV theory, Barney, 1991), the organization theory is interested in the relationships (e.g. Relational View, Dyer and Singh, 1998).

It is worth noting that whilst the topic of Inter-Organizational Relations is by essence including many-to-many interactions, these theories focus on dyadic transactions or relationships. Discussions on interactions involving more than two firms are extremely limited: some work has been published on triadic relations, so far mostly focusing on interactions between one firm and two of its suppliers of same tier, mimicking the structural hole bridging situation described by Burt, (1992). Research on multi-tiered interactions is in its infancy, even if triads were already identified as a subject for research by Simmel in 1950! (Simmel, 1950). The context of Multi-tier Supply Chains (MSC) has seen some contributions (e.g. Choi and Wu, 2009a; Mena, Humphries and Choi, 2013), however “what happens within MSCs is still largely underexplored” (Mena, Humphries and Choi, 2013, p.58).

The reason to engage in a collaboration is not to be confounded with the goal of the collaboration (Parmigiani and Rivera-Santos, 2011). A good example is the development of new technology and equipment to manufacture computer chips done through the consortium SEMATECH (case by C. Schubert and U. Meyer, in Sydow, Schüssler and Müller-Seitz, 2016, p.264). In this example, firms usually competing one against another horizontally and vertically in the value chain of the specific industry are going to combine their complementary resources in order to develop new lithography equipment for computer chip production. The “why” is

accessing complementary resources (especially specific knowledge and capabilities, in this example), and the “what for” is the pursuit of technological advantage in the competition for the development and production of lithography equipment to manufacture computer chips (and the benefits of spill overs from the progress made in their specific domains that can be applied to other products and markets).

1.3.3 Common Aims

The words “aim”, “goal”, “interest”, “objective”, “purpose”, are used here indistinctively, as seen in the works reviewed.

In his discussion of non-hierarchical organizations, the concept of networked inter-organizational relations is an alternative to hierarchical relations, Herbst, (1976, p.68) already outlined that the “achievement of a joint aim” was an essential element to the formation and survival of such endeavours. More recently, Walters and Rainbird (2007) introduced the idea of ‘co-destiny’ to illustrate the sharing of objectives, strategies and values. As illustrated by Rossetti and Choi (2008) in the aerospace industry, goal incongruence can lead to severe disruptions in buyer-supplier relations and network cohesiveness.

Building on the framework described by March (1991) on exploration (activities involving “search, variation, risk-taking, experimentation, play, flexibility, discovery, and innovation”) and exploitation (“refinement, choice, production, efficiency, selection, implementation and execution”), Lavie, Stettner and Tushman (2010) proposed that firms, and inter-organizational endeavours, pursued a portfolio of such activities, and that the balance between both directions was a strategic choice based on contextual elements and the application of various modes of balancing. Parmigiani & Rivera-Santos (2011) formally extended the exploration-exploitation framework to inter-organizational relations in defining the concepts of co-exploration: “strategically important, cooperative relationship to create new knowledge, tasks, functions, or activities” (Parmigiani and Rivera-Santos, 2011, p. 1122), and co-exploitation: “strategically

important, cooperative relationship to execute existing knowledge, tasks, functions or activities" (ibid, p. 1123).

According to the framework for understanding aims in collaboration developed by Huxham and Vangen (2004), goals can be explicit, assumed, or even hidden. Objectives can be identified at each of the inter-organization, organization, and individual levels. In principle, there must be at least one inter-organizational level explicit goal declared as shared and agreed to by the organizations participating to the collaborative effort for them to join in.

A major issue in practice is that other interests that are kept purposefully hidden or simply unspoken (at least initially), can be (and routinely are) more powerful drivers to establishing IOR than the publicly agreed-upon goal.

In addition, there can be sub-aims at each and every level of the inter-organizational entity (IOE), i.e. at IOE, organization, individual level. These sub-aims can be open or hidden, shared between participants or specific (Huxham and Vangen, 2005). Hidden interests and sub-aims can drive opportunistic behaviours (Lavie, 2006).

Whilst literature underlines the importance of common goals, and their definition, in IOR – Huxham and Vangen devote 19% of the pages of their 2005 book on the topic; Sydow, Schüssler and Müller-Seitz (2016) touch it about fifty times in various sections- the dedicated research on how goals affect governance in IOR is very limited (notable exceptions are Rossetti and Choi, 2008 and Huxham Vangen, 2004, cited above). There is a need for investigation here.

1.3.4 Partner selection and network boundaries

The selection of partners to engage in IOR is one of the most researched topics in the field. It encompasses, attracting, selecting, retaining and letting go of relationship partners.

Partner selection is mostly based on aspects captured under the concepts of complementarity, and similarity.

From the Resource point of view, Teece (1986) has illustrated the concept of complementarity, showing that an innovative company will bring the core technological know-how and may -depending on contingencies on the appropriability regime- rely on external assets to bring the innovative product to the market. Here the unit of analysis is the firm, and the relations are considered as dyadic from the innovative firm at the centre to each one of the complementary assets holders in the system.

Complementarity is most often used in a vertical integration and, as mentioned by Rothaermel and Boeker (2008, p.51), “involves the creation of immediate value for the combined entity”. Complementarity can also be found at relationship level, as defended by Dyer and Singh (1998): in their view the distinctive advantage of organizations is the nurturing of balanced relationships with complementors rather than in the control of given resources.

One of the distinctive downfalls of relationships based on complementarity, is the dependency created between the owner of the asset and the organization that needs it. The said owner has thereby a dominant position to influence the governance and structure of the relationship (Dyer and Singh, 1998).

The concept of similarities is used to describe situations where organizations look for partners having similar traits such as goals, values, markets, skills, innovative output, experience and competence in collaborations, and reputation (Gulati, 1995, 1998; Miles et al., 2009).

From the elements cited above, and in contrasts to the complementary assets, the resources in scope of similarity are relating to social and human capabilities rather than investments-based capital. To further substantiate this, Rothaermel and Boeker (2008) used the cross-patenting and common patenting propensity of biotechnologies and pharmaceuticals firms as a proxy for similarity of technologies and concluded that similarity measured this way is a good indicator of the probability of alliance formation between firms of this industry. Here it is the potential sharing of ideas that trigger the connection to similar organizations. Powell, Koput and Smith-Doerr (1996) also underlined the importance of finding the right partners to create networks of learning, and that this was better done

when looking at organizations having similar knowledge or issues, and a track record of successful collaborations.

This focus on social and human relations is an important feature of successful and lasting IOR, through -as outlined by Gulati (1998)- easier communication, agility, human proclivity to collaborate better with trusted parties; this is also effective in situations of high uncertainty (such as innovative efforts).

In a IOR context, similarities are also associated with the attractiveness an organization exerts on other firms to join and their willingness to contribute actively (Gulati, 1998): depending on the position occupied by an organization in the web of relations, and this position being linked with the status of the said party, the partners attracted will greatly vary as, individuals and organizations likewise, one prefers to be associated with others of similar –or higher- reputation and with a real potential of mutually profitable exchange (Birkinshaw, Bessant and Delbridge, 2007; Powell, Koput and Smith-Doerr, 1996).

Partner selection can also be influenced by criteria specific to the context of the collaborative undertaking. In a regional cluster, partners will be selected also according to geographic proximity criteria (Lazerson and Lorenzoni, 2008). In public-private collaborations, some stakeholders may be invited based on their vested interests (e.g. consumers associations, NGOs, lobbies).

In addition, the specific background of the searcher and of the potential members can heavily influence the selection criteria and acceptance decision. One will find here elements such as cultural, ideological, institutional, technological differences and similarities (Birkinshaw, Bessant and Delbridge, 2007; Dacin, Reid and Smith Ring, 2008). As well, the history of existing relationships at individual, organizational and macro level is an important factor in partner selection. Firms will tend to maintain relationships with the same partners (Dyer and Singh, 1998), and the overall past collaborative experience of organizations is seen favorably in partner selection (Gulati, 1995; Gulati and Singh, 1998; Powell, Koput and Smith-Doerr, 1996). Social embeddedness is therefore an important element for partner selection.

Gulati, Puranam and Tushman (2012) outline that in more recent forms of IOR, boundaries have become blurred through the use of 'open' forms of collaborations. However, the examples given (e.g. Wikipedia, open source communities), relate to contexts where firms (and for-profit organizations in general) are a minority. In contexts such as OEM-supplier networks, boundaries are more strictly defined, at least for the relations between the OEM and its direct partners (Dyer, 1996; Gulati, Puranam and Tushman, 2012).

1.3.5 Inter-organizational relations forms

There are many forms used to organize inter-organizational relations -e.g. business groups, clusters, consortia, cooperatives, constellations, federations, inter-firms' networks, joint-ventures, network organizations, etc- each with its specific characteristics and context of use. Some are endemic to certain cultures, such as the Korean *Chaebol*, or the Japanese *Keiretsu*. Most of the other ones are used across the world, depending on the needs and goals of the firms setting-up and participating in them.

The choice of the form depends on the approach taken by the lead firm(s), the goals (at least the openly declared common purpose), and the partners attracted. It will also tend to optimize either effectiveness, or efficiency, pulling on either the Resource Dependence Theory or the Transaction Cost Economics approaches.

In most inter-organizational networks, a quasi-hierarchical leadership model (one lead organization) is in action (Provan and Kenis, 2008). Non hierarchic networks can have one or more leaders acting based on legitimization rather than formal designation; such leaders may change over time (Gulati, Puranam and Tushman, 2012; Sydow, Schüssler and Müller-Seitz, 2016).

The role of leadership is to foster the development and activities of the IOE to achieve the common goal, using governance instruments. In order to accomplish this, leadership must be institutionalized (Sydow, Schüssler and Müller-Seitz, 2016). This is reflected by Gulati, Puranam and Tushman (2012), who show that

even in open ecosystems, leadership exists and is recognized and accepted by the participants.

The form of IOE adopted has a structural dimension, and a relational dimension. The structural dimension highlights ‘who knows whom’ and is focused on the position of the actors in the web of relations. It encompasses the density of ties, the issue and benefits of centrality, and the identification exploitation of structural holes. The relational dimension is concerned by ‘how well do members know each other’, and is focused on the intensity of the relations, their multiplexity, and trust.

The form is evolving over the life of the IOR, in order to adapt to changes in the context, to the evolution of the participants in their intrinsic qualities and the entries and exits, to the shifts in leadership. As outlined above, interorganizational relations are initiated in order to respond to internal and external pressures, therefore the form adopted will evolve accordingly -even if not in real time, or in ways anticipated by some or all of the actors. Termination of relations is part of the lifecycle of IOR.

1.3.6 Governance instruments

Coming back to Herbst (1976, p. 69), the governance mechanisms are contributing to the achievement of the common goals, underlining their importance to the success of the IOR undertakings.

Governance instruments are meant to regulate the interactions between participating firms (and possibly with organizations beyond the boundaries of the IOE) and can be formal or informal in nature.

In an extensive review of literature on the governance of supply networks, Pilbeam, Alvarez and Wilson (2012), identified two sets of instruments. Formal instruments: standards (for output and for participation); processes (control systems, coordination); structures and organizations / roles functions at macro or micro level; and contracts. They are favoured in organizational economics

theories such as RBV, TCE, agency theory, where they contribute to avoid opportunistic behaviours and change in the balance of power by using material (usually financial) incentives. As to informal instruments: social norms; value systems, schema and culture; structure – relationships / embeddedness; information sharing. These are favoured in the organization theories such as relational theory, social networks theory, where they contribute to develop relationships and avoid opportunistic behaviours by using incentives based on soft factors such as trust, reputation, reciprocity and equity, justice.

Formal and informal instruments are mediated by two relational constructs, power and trust. Power is defined as “the ability to influence, control, or resist the activities of others” (Huxham and Beech, 2008, p.555). It is often visible in formal contracts (Pilbeam, Alvarez and Wilson, 2012). One characteristic of power is that it is always intended as being an asymmetric instrument: ‘having more power than’ is the basis for its dominance effect (Choi and Wu, 2009a; Huxham and Beech, 2008; Pilbeam, Alvarez and Wilson, 2012). Another characteristic is that it can be used either for the benefit of the wielder, or for the benefit of the common goal. Power itself can be a pursuit of a participant. As it is the ultimate recourse to foster, or resist, change, power plays are frequent in IOR (Lotia and Hardy, 2008). There are three types of power (Huxham and Beech, 2008): the power over, the power to, and the power of. Power over, is the power to control, the bargaining power. It is referred to in the theories focusing on oppositional relationships: exchange theory, TCE, RDT. Within organizations, it is expected that managers will use it to diagnose the organization and support the implementation of their strategies. Power to, is the power to function properly, to achieve, to support the outcomes. It focuses on the IOE, not the participants. It is used in the determination of processes, steps, and tools of the organization. Power of, is the power to empower, also focused on collaborative outcomes. Managers will use it for capability building. Power does not appear randomly. It comes from defined sources. Knoke and Chen (2008) identified three sources of power. The first source of power is resources: the control of resources gives power over the ones who need them. In supply relations, a classic example of power-based relations is based on complementary assets (Rothaermel and

Boeker, 2008, Teece 1986). Their potential specificity and/or scarcity thereby induce particular relationships between the owner of the asset and the organization that needs it: a dependency mostly governed by bargaining power is created between the parties, having thereby influence on the governance and structure of the relationship (Dyer and Singh, 1998). This situation of power-based relations is mentioned routinely, notably when relating to the relationships between car manufacturers and their scores of suppliers, as the illustration of the unresolved dilemma to shift from a purely transaction-costs based relationship to a network based alliance. The classic opposing examples given are General Motors – an organization heavily relying on arm's lengths relations [at the time of the research referred to], and struggling in the international competition- and Toyota – having created a network of cooperating firms around its own needs, and enjoying a leading position in the industry: both need complementary resources and yet manage them differently, yielding different outcomes. Second source of power is rules: laws, regulations, technical standards, and the ability to influence their definition and application. The history of the video standards VHS and BETACAM -each supported by different consortia- is an illustration of the use of the technical standards to obtain / retain power in a market where the winner takes it all -it has shifted when the use of videotapes has been taken over by DVDs, who are in turn now replaced by electronic storage, cloud solutions, and streaming services. The third source of power is the position of the participant in the network (applicable from individual level to macro level). Several positions have been identified as conveying power to the holder, each position having its specifics. Three positions are most commented: Centrality, bridging a structural hole, and spanning boundaries. Centrality is linked to the density of significant ties of the participant considered (Wasserman and Faust, 1994). Centrality confers power and status, as well as easier and faster access to network resources (Brass et al., 2004; Gnyawali and Madhavan, 2001; Zaheer, Gözübüyük and Milanov, 2010). When ties are directional, a central organization will have many out-ties (it 'sends' lot of resources), and a prestigious organization will have a many in-ties (it 'receives' lot of resources). According to the 'size hypothesis' (Afuah, 2013), the value of a network increases proportionally to the

number of its members, therefore a central firm own network has a high value, whatever the direction of ties. In a bridge position, the focal member is the unique link between two areas of a network (Granovetter, 1973, 1983). This position is granting extraordinary power to the said participant, through control of information and resources flow between the two sides of the bridge (Brass et al., 2004; Burt, 1992; Suarez-Villa, 1998; Zaheer and Bell, 2005). In addition, where the focal member is bridging a structural hole (a structural hole exists between B and C when A has a link to B, and A has a link to C, and there is no link between B and C - Granovetter, 1973), it benefits from an information brokerage position based on the speed of access to information, the diversity of this information, and power and control over the disconnected others (Gnyawali and Madhavan, 2001). A member in this position is providing more value to the network than one that does not (Afuah, 2013). Building on this unique access to novel and diverse information, Zaheer and Bell (2005) showed that “an innovative firm that bridges structural holes performs better than other firms”, and that a “firm that bridges structural holes with innovative firms does not perform better than other firms”, thereby concluding that a firm innovativeness performance is based on a combination of its own position in the network and its own characteristics: neither of these two elements in isolation is sufficient to explain the performance. The boundary spanner is linking the network to organizations outside of it. It is the channel for resources exchange to and from the environment. In this simple acceptation, it is a common role, as many organizations are part of several networks; still membership exclusivity is a possible entry or exit criteria (Gulati, Puranam and Tushman, 2012). Contractor, Wasserman and Faust (2006) proposed that boundary spanners are also likely to have a high centrality, using their status and many ties as attraction factors. In the sense of being a member in charge of reaching out for specific resources, or attracting new members, this role plays a critical function, and will influence the structure and configuration of a network (Brass et al., 2004).

Depending on the theoretical approach used (the most frequent being governance networks, power structure networks, social capital theory, resource dependence theory, policy domain networks), each will use different forms of

power, provide different advantages, possible outcomes, and uncertainties. Powell et al. (2005) illustrate several benefits in power stemming from the various positions of participants in the evolving biotechnology industry. One is the attraction of new entrants, which increases the diversity of connections; and a snowball effect is that ties diversity is positively impacting cohesion and multi-connectivity. Huxham and Beech (2008) also refer to the power gained through discourse, by the management of meaning and the ability to influence the identities, conceptual frameworks, or even through the control gained on the collaborative agenda.

The second relational construct is trust.

Trust is often described as the willingness to take a risk, especially the risk of being subject to opportunistic behaviour. It can be considered as a leap of faith. This is why some theories, such as TCE, in their preference to use formal controls and safeguards to avoid opportunism, will not adhere to the use of trust in business relationships (Wilding and Humphries, 2006).

The Rational Choice Theory offers three variables for trust (Bachmann and Zaheer, 2008): the chance that the trustee will behave trustworthily, the potential gain for the trustor in this case, the potential loss for the trustor otherwise -the potential gain for the trustee in both situations is not considered. This theory contends that the choice made by the trustee is entirely based on this free will (rational choice), exposing its trustworthiness, or lack of. In contrast to power, trust is based on balance, not asymmetry. It is the reciprocal level of trust that will entice the most benefits for the parties. However, trust is not evident and given from the onset of a relationship. Calculativeness is described as being a first step, and it can also coexist along with trust. Relational trust needs to be nurtured, and as much as it can take time to build, it needs a minute to evaporate. Gulati, Sytch and Mehrotra (2008), highlight that even when trust is primarily seen as an interpersonal concept, it also arises to become interorganizational. Furthermore, the building of relational trust beyond calculative trust is non-linear, thereby not linked to the specific duration of the relationship. It is the repeated interactions of boundary spanners that will enable the relationship to go beyond calculative trust,

time alone is not sufficient. Thus, trust is directly linked to the lifecycle of interorganizational relationships. This is consistent with social embeddedness and the Social Network Theory. The same approach includes a 'societal level' trust, based on the belief shared by individuals and organizations that the institutions will enforce regulations consistently, and providing a reliable environment for business development (Bachmann and Zaheer, 2008). In addition, Lewicki, Tomlinson and Gillespie (2006) also identified Competence trust (based on skills and capabilities to fulfil what is expected), Contractual trust (based on the assumption that individuals stick to their word), and Good-will trust (based on commitment to the other).

It is important to take into account that, similarly to most of the elements present in the literature on IOR, trust has so far been researched only as a dyadic concept.

1.3.7 Summary

As a summary, IOR are initiated in order to respond to internal or external pressures (or both). A broad range of theories offer various explanations as to "why" do organizations enter interorganizational relations, with two major visions: the quest for efficiency, and the quest for effectiveness.

The next topic covered is the determination of a common goal towards which the organizations collaborating are going to work. A common, macro level, goal does not preclude the existence of organizational or individual levels aims. As well, these can even be hidden and sometimes deemed more important than the stated macro level objective.

As to the selection of partners, there are several factors that are considered, based on the need of the focal firm (complementarity), or its own characteristics (similarity). Other factors such as geographic proximity, past experience in collaboration, reputation, individual ties, can influence the choice of partnering with a given organization.

The next element reviewed is the form used to organize the collaboration. Many set-ups exist, with a highly varying degree of formalization (e.g. joint-ventures, cooperatives, federations have a strong formal basis, whilst most business groups, clusters, or inter-firm networks do not). Depending on the form adopted, leadership will be positioned and held differently. Both form and leadership can evolve over time, adapting to circumstances.

Governance mechanisms are contributing to the achievement of the common goals, underlining their importance to the success of the IOR undertakings. Such instruments are meant to regulate the interactions between participating firms (and possibly with organizations beyond the boundaries of the IOE), and can be formal (standards (for output and for participation); processes (control systems, coordination); structures and organizations and roles functions at macro or micro level; and contracts) or informal (social norms; value systems, schema and culture; structure – relationships and embeddedness; information sharing) in nature. In addition, the constructs of power and trust contribute to the regulation of behaviours.

As illustrated by Pilbeam, Alvarez and (2012), the governance form and instruments used in supply networks are highly dependent on the context and the goals. Furthermore, the mix of instruments indicates that there is not one single theoretical reference at play, as organizations tend to adapt their practice to the circumstances -and are little aware of the theoretical distinctions used by academics.

1.3.8 From dyadic to multi-tiered relations

As stipulated by Provan, Fish and Sydow (2007), interorganizational networks need at least three participants to exist (otherwise it is a simple firm to firm relation). However, in the literature reviews conducted recently on supply networks and supply chains (Chicksand et al., 2012; Giunipero et al., 2008; Halldórsson, Hsuan and Kotzab, 2015; Pilbeam, Alvarez and Wilson, 2012), RBV and TCE came forward as the theoretical frameworks most used in the field, even

though they are focusing on dyadic relations. This recurrent reference to TCE and RBV can be based on the fact that “what the buyers really care about is competition between suppliers and minimizing their risk against uncertain future” (Wu and Choi, 2005, p.45). The focus on dyadic relations is emphasized as being a shortcoming of the research in the field (Chicksand et al, 2012, Giunipero *et al*, 2008, Mena, Humphries and Choi, 2013). In the same review, Chicksand *et al* identified a trend to the absence of theoretical reference, highlighting the issue faced by authors by lack of a specific academic foundation to the field.

Still a debate has started on triadic relations, albeit with so far a limited number of contributors. Interestingly it started with empirical research, focusing on the relations between one Buyer and two tier1 Suppliers (Dubois and Fredriksson, 2008; Wu and Choi, 2005). In 2005 Wu and Choi studied the relationships between the two suppliers when responding to the strategic intent of the buyer, through eight cases from various industries and geographies. They proposed five relational archetypes (conflicting, contracting, dog-fighting, networking, transacting, ibid, p. 45) exhibiting relational and/or transactional dimensions. These archetypes reflect that the response of the suppliers to the strategic intent of the buyer is based on a combination of factors including the actions of the buyer, the suppliers’ own interests, and elements external to the triad (other customers, other possible competitors). It also showed the influence of intellectual property ownership and flows of tacit and explicit knowledge in the determination of the archetype in action. Dubois’s case study in the automotive industry highlighted the interdependence of two suppliers willing to cooperate (“transacting” archetype from Wu 2005), and the power position enjoyed by the buyer in managing the triad dynamically through regular competitions for business, commitment to the relationship and intense exchange of tacit and explicit knowledge between the suppliers. In both studies, contextual elements were numerous, and sometimes preeminent in the behaviour of both buyers and suppliers, drastically reducing the generalizability of the findings. Nevertheless, these are building blocks for further research.

In an effort to address the gap in formal knowledge, Choi and Wu (2009a) theorized nine triadic situations of Buyer-Supplier-Supplier relations, based on balance theory (a behavioural psychology framework) and the concept of structural hole, presenting a novel approach to the comprehension of multi-tiered relations. These nine possible configurations describe five balanced and four unbalanced states. A balanced state is when “all members of the triad consider the overall relationship arrangement as being equitable” (Choi and Wu, 2009a, p. 12); this does not imply that relationships between the parties are good. From these configurations, they build fifteen propositions describing how to shift from an unbalanced state to a balanced state, or how the balanced state could have been created.

More recently, Vedel, Holma and Havila (2016) proposed an important distinction to be made in the study of triads. It is the difference between triadic context and triadic structure. The triadic context is when three parties are involved, and the focus is only on one or two of them. The triadic structure is when the three actors are in focus, thereby matching Provan, Fish and Sydow (2007) criteria for the existence of a network.

In the same article, Vedel, Holma and Havila (2016) distinguishes between the concepts of open triad “in which the three actors are indirectly linked to each other through one of the actors” -i.e. a middle man linking two other, acting as a broker in the structural hole concept- and closed triad “in which all actors are directly linked to each other” (Vedel, Holma and Havila, 2016, p 140). This looks very similar to the distinction made by Burt (1992) and Obstfeld (2005) to describe the concepts of *tertius gaudens* (‘rejoicing third’) and *tertius iungens* (‘linking third’), respectively, in structural holes situations. In a situation of two dyads AB and AC, with A the node common to both dyads, the *tertius gaudens* A is acting as a broker between B and C, and benefits from the situation. In contrast, starting from a similar situation of two dyads AB and AC linked by the common node A, the *tertius iungens* A is going to create the link between B and C, forming a triad, thereby facilitating collaboration between B and C.

In the closed triad situation, Vedel, Holma and Havila (2016) identifies “group-like” triads that display cohesiveness through coordinated idiosyncratic activities towards a common goal, and interdependence: the properties of the relations between the members of the triad make the difference. It is on building further on connectedness, cohesiveness and the ability to act as one entity (described as having one boundary spanner representing the triad towards the environment, such as in a coalition or a hub-driven strategic network) that a framework of four different types of triads is proposed.

Another concept of triad has been proposed by Mena, Humphries and Choi (2013): the transitional triad. Seen in multi-tiered Buyer-Supplier1-Supplier2 supply chains, this situation indicates that the highest-tier supplier (Supplier2) and the Buyer are in the process of creating a direct tie. The situation can evolve towards several outcomes: the creation of a closed triad (e.g. increased interdependence, with positive relation between all parties), the disintermediation of Supplier1, or the exit of Supplier2 from the triad (possibly as a retaliation from Supplier1 who currently has the direct link with Buyer, or Buyer profiting from information gained from Supplier2 to modify its supply chain). These outcomes are directly in the scope of the purchasing function through the management of its supply network. Given the vast differences between these possible outcomes, and how to operationalize them, a governance model going beyond dyadic, short-term, transactions is necessary. This is supported by the evolution towards the development of strategic long-term relational collaborations, moving away from contractual-based tactical interactions noted by (Giunipero et al., 2008).

In the case of service triads (when the buyer choses a business process outsourcing solution to provide a service to a customer), disintermediation can also occur, especially when incentives are not strong enough for the supplier to keep its relationship with the buyer (Rossetti and Choi, 2008). However, this is not the majority of cases in real life. Still, service triads offer a context of interest for the study of triads due to the multi-tiered situation. Looking at the impact of several governance instruments (“relationship connectors”, per Cannon and Perreault, 1999) issued from Social Exchange Theory, Industrial Marketing and

Purchasing Interaction Model, TCE and RDT, Karatzas, Johnson and Bastl (2016) showed that in the specific context under scrutiny, several combinations of instruments could lead to a high performance of the service supplier. Each of these high-performance combinations included adaptation to the local dynamics between customer and supplier –those involved in the daily operational aspects, even when the relationship between buyer and customer was not good: the service supplier was preserving its own interests at local level.

Also found by Mena, Humphries and Choi (2013), is that different triadic structure offer different perceptions of stability (closed is stronger, open is weaker), an important factor in supplier relationship management. However, as each structure requires different levels of resources for its management (closed is more demanding, open is less), there should probably not be a single approach taken to be applied across the portfolio of suppliers. Even when some portfolio management tools and framework have been developed (e.g. Kraljic, 1983), they are looking at dyadic relations, and do not propose actionable processes.

In sum, the transition of research on inter-organizational relations from dyadic to multi-tiered structures is nascent and done through triadic situations. The few conceptual works focus on the definition of the basic concepts (e.g. “what defines a triad”), and empirical cases are so far scarce and not aimed at verifying these theoretical inputs. A recent literature review focused on purchasing and supply management (Spina et al., 2013), lists three levels of analysis (organization, dyad, and supply network), and does not even mention the concept of triad as a topic for research; it may be hidden within the “network configuration (sourcing strategy)” or “relationship management” themes, though. Even when some governance instruments (power, information sharing, in Mena, Humphries and Choi (2013) have been seen at work with outcomes consistent with those described for dyadic relations, opening the possibility of transferability between the two levels, this remains to be demonstrated on a larger scale, and for more governance instruments (informal such as social norms and trust, and formal such as contracts, rules and regulations). As an example, trust was described as

having a limited transferability -even declining while the density of ties increased- in Provan, Fish and Sydow (2007).

Another limitation of dyadic-level theories is that they focus on the impact at organizational level (between two organizations), not at the network level (where three or more organizations are involved) (Provan, Fish and Sydow, 2007).

Furthermore, such theories focused on dyadic relations can't address questions found in research on triads, such as 'how can a node affect a link it is not directly linked to?' (Choi and Wu, 2009c), or 'how dyads influence or are influenced by other dyads in a triad' (Dubois, 2009).

1.3.9 Conclusion of the literature review

Interorganizational relations have been studied extensively through the Transaction cost economics and the Resource Based View, theories focused at dyadic transactions. With the advent of networks, relational theories have come to show a different light on these relations, highlighting the importance of relationships and social interactions at micro and macro levels. Nowadays, in the practice of procurement confronted to a shift of focus towards the strategic management of a network of vendors whose services are spread across the value chain of the company, taking into account the multi-tiered nature of buyer-supplier relations is imperative. The use of the concept of triads, and its associated theoretical elements, can be of great help to identify the various possible governance models and associated instruments for this new set-up.

1.4 Problem positioning in relation to existing theory

The existing theories used in IOR research are based on dyadic interactions, whilst the issue at hand is addressing multi-tiered relations. The scarce work done on such multi-tiered relations is, fortunately, looking at supply networks and buyer-seller relationships. Still it has not yet proposed sound theoretical basis nor much empirical confirmation.

As spelled out by Choi and Wu (2009c, p. 269), “the triad is the smallest network unit where one can observe how a link affects a link or a node affects a link directly or indirectly connected”. The shift from a dyadic focus to a multi-tiered focus is an important change, because it opens a vast amount of new questions, especially regarding the interplay of governance mechanisms between the various dyads that form the triad. The research is positioned at the intersection of interorganizational triads and buyer-supplier relations (Figure 1-3).

Already little is known about the interplay of governance mechanisms in dyadic relations. In their study of a complex project in the Norwegian oil industry, Caniëls, Gelderman and Vermeulen (2012), referred to only three other studies investigating the simultaneous use of several governance instruments. And only a handful of studies have dealt with multi-tiered situations (e.g. Karatzas, Johnson and Bastl, 2016; Mena, Humphries and Choi, 2013). However no systematic identification and review of such conversations has been conducted so far.

There are obviously many open avenues for research on inter-organizational triadic relations, especially when the few publications available are already offering new concepts. In order to be able to properly target such empirical effort, it is necessary to investigate the existing knowledge on the review question:

> ***“How are relationships between organizations governed in triads?”***
> With two sub questions:
> - “What are the governance structures used in triadic relations?”
> - “What are the governance instruments used in triadic relations?”

through a systematic literature review (SLR).

The proposition here is to identify the relevant existing literature on the governance of triadic inter-organizational relations, to uncover the known key elements that could be used in an empirical study to evidence if and how they are enacted in buyer-supplier-supplier relationships.

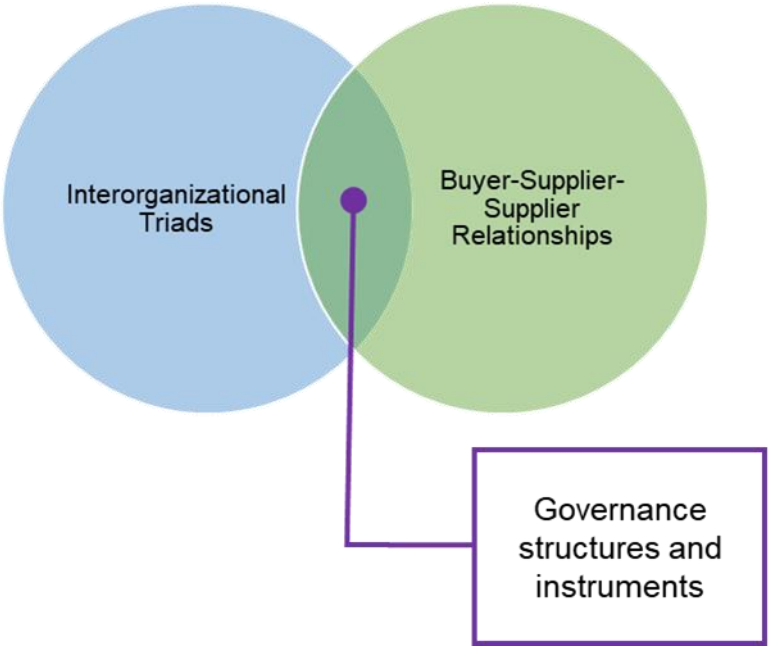

Figure 1-3 Positioning of research

Even though the review question does not specifically include wording pertaining to the field of procurement, as it is the context of this research endeavour this dimension will be taken into account at every step.

The next chapter introduces the literature review, executed in five steps (planning, searching, screening, extraction and analysis, and synthesis) presented in that many sections, and concludes on a proposal for empirical research.

The subsequent chapters describe the methodology used for the empirical investigation, followed by the case analysis work and findings. Then the discussion that encompasses managerial implications. Finally the conclusion summarizes the work accomplished, the findings and proposes avenues for research.

2 SYSTEMATIC LITERATURE REVIEW

The evolution of inter-organizational relations, notably through the expansion of global trade and the increased reliance on external resources and capabilities, led to the realization of the importance of managing the portfolio of suppliers differently in terms of depth -that is not limiting oneself to the tier 1 suppliers- and in terms of governance -that is including collaboration-inducing approaches in complement to the secular arm-twisting power-based transactions. The procurement function has responded first to the increase in quantity of external interactions, and to the expansion of outsourcing to new activities that were essential (e.g. research and development) or deemed not worthy of mobilizing company permanent resources (e.g. payroll, fleet management). Shifting from addressing the quantitative issue to the qualitative dimension of relations was started with the consideration of the relative importance of suppliers in providing resources and capabilities, notably thanks to the work of Kraljic (1983). The development of complex networks of interactions between firms has prompted researchers to investigate inter-organizational relations beyond the dyadic level. These efforts focused on the network level and produced a wealth of concepts. Albeit this grand scale does not allow to easily identify the influence of the actions of a given node on the links and nodes directly or indirectly connected to it. This is possible in triads, as underlined by Choi and Wu (2009a, 2009c).

Thus, the aim of this systematic literature review was to uncover what was already known in order to respond to the question

> ***"How are relationships between organizations governed in triads?"***
> With two sub questions:
> - "What are the governance structures used in triadic relations?"
> - "What are the governance instruments used in triadic relations?"

Tranfield, Denyer and Smart (2003) and Denyer and Tranfield (2009) described how to plan, organize, execute and report findings of a Systematic Literature

Review with a stepped approach: Planning, Searching, Screening, Extraction and Synthesis, and Reporting. These were the steps followed for this work, and the document is therefore organized in sections corresponding to this order.

The choice of a systematic approach is based on three characteristics of systematic literature reviews. The first one, is to contribute to the overall credibility, dependability and confirmability of the research undertaking. The second one is to approach a potentially huge amount of literature in an methodical way, in order to identify the relevant documents and analyse them consistently. The third one is to thereby produce a reliable basis for further investigation that shall reveal new and meaningful knowledge; as well, the synthesis realized is usable by practitioners to define a 'state of the art' for their practice (Tranfield, Denyer and Smart, 2003).

2.1 Planning

This systematic literature review is focused on academic literature, including articles, books, book chapters, and recent conference papers (2012 and after, as earlier conference material should have been published) to ensure sound science-based research. These articles can be found in databases, or through recommendations from other scholars/researchers. Forward and backward search (screening papers that cite an article identified as relevant, or screening papers that were cited as references in an article identified as relevant) can also be used. This approach explicitly excluded, white papers, work-in-progress papers, and theses.

This approach focused on ABI/Proquest, Ebscohost, and Scopus databases, as they grant access to most of peer-reviewed publications in the field of business and management studies as well as conference proceedings.

ABI/Proquest, in addition to granting access to thousands of journals from the most important scholarly publishers, also holds papers and reports from cutting edge organizations (e.g. INSEAD, The Organisation for Economic Co-operation and Development (OECD)). It grants access to full-text of papers.

Within the choice offered by Ebscohost, three subsets of data are included: Business source complete, E-journals, and eBook collection. Business source complete offers access to over 1,300 full-text peers-reviewed journals covering all aspects of business issues. Among these, more than 800 have no embargo period, enabling access to a wide selection of the most recent publications. E-journals extends access to all journals referenced by Cranfield's Library under a single interface. And eBook collection holds more than 140,000 books in digital form, granting access to materials otherwise difficult to obtain rapidly and within a tight budget.

As to Scopus, it is the largest abstract and citation database of peer-reviewed literature: scientific journals, books and conference proceedings. Scopus also features functions to delineate with great precision the query search scope. It is therefore very helpful to identify potentially relevant documents.

Grey literature was also included in the systematic literature review. The expected benefits were to capture findings that are not subject to the time lag of academic publication, and possibly reflecting the actual practice which may not yet be reflected in the scientific literature (Adams et al., 2016).

Databases were searched using queries. The preparation of the search strings used in these queries is presented in subsection 2.1.1. Regarding grey literature, the process to identify relevant documents followed is described in subsection 2.1.2.

2.1.1 Building search strings for database queries

Search strings are built from keywords, and the said keywords are connected by logical commands of the databases. Commonly used logical commands are: AND, AND NOT, NOT, OR.

The command AND adds and includes the keywords. The command NOT excludes the keywords, while the command OR allows the inclusion of several

sub-keywords for one keyword (e.g. alliance, consortium and cluster are sub-keywords to Network).

In addition, the joker characters “?” and “*” can be used to specify that one or more characters can be missing or different. The joker “?” is used when one character can be missing or different, e.g. typing “organi?ation” will instruct the database engine to report both organisation and organization (there are no other words than these matching the expected spelling). The joker “*” is used when one or several characters can be added to the word to which it is attached. The joker “*” is most often found at the end of a word, e.g. typing triad* will instruct the database engine to report all of triad, triads, triadic. This is also why governance was not expanded by using govern*, as this would include governess, government, governor, etc which are not related to the research here and may generate a high number of false positive results to be eliminated afterwards.

In databases, it is also possible to use proximity operators to look for words/phrases within a certain distance of each other. The proximity of relevant keywords is an indicator of a probable higher relevance of the articles and helps reduce the number of documents captured. After testing with proximity factors of 10, 8 and 5, the distance between relevant words was set to 5 in the final search strings. This is based on the observed dispersion of topics of captured articles when using larger distances (e.g. articles relating to defence strategies based on the triad of ground, air and naval forces, or articles relating to financial policies balancing three financial instruments), and discussion with Cranfield’s Library data specialists.

Given the specific search engines and command structure of each of the databases used, specific search strings are needed for each database. Bespoke search strings also enable to use functions limiting the search to relevant scientific domains, thereby gaining a better focus of the search, e.g. the “limit to area” function of Scopus.

For greater precision and targeting of the search, specific commands were used to focus the queries on titles and abstracts of articles.

The research question comprised two key elements: the context (triadic situations), and the topic in focus (governance).

Keywords were identified for each of the key elements, based on previous systematic literature reviews on a similar topic (e.g. governance), words identified in the literature already known, and synonyms or related words identified through the online dictionary Lexilogos (http://www.lexilogos.com) and the French to English dictionary Le Robert & Collins (2006).

The list of terms retained to build the search strings relevant to triadic and governance is shown in Table 2-1

The following keywords have been considered and not retained:

- Threesome: not used in context
- Triang*: not used in context
- Trinal: not used in context
- Trine: not used in context
- Trinity: not used in context
- Trio: not used in context
- Triplet: not used in context (mathematics, physics, genetics)
- Trisector* or tri-sector: not used in context

Triadic		**Governance**		**Exclusions**
	Within 5 words of		AND NOT	
Crosssector*		Contract*		Biolog*
Cross-sector*		Control		Chemi*
Interfirm*		Coordinat*		Crim*
Inter-firm*		Decision		“Dark triad”
Interorganisation*		Governance		Depression
Inter-organisation*		Manage*		Fuzzy
Interorganization		Norm*		Gang*
Inter-organization				Mathematic*
Multifirm*				Narcism
Multi-firm*				Physics
Multitier*				Psychology*
Multi-tier*				Trinity
Three-tier*				
Triad*				
Trilateral				
Tri-lateral				
Tripartite				
Tri-partite				

Table 2-1 List of terms used for triadic & governance

In addition, the problem identified has roots in the field of procurement. In order to capture literature focused on triadic situations where language specific to procurement is used, and for which keywords specific to governance are not used, a second set of search strings was necessary. To this list the keyword “network” was added as triads are the smallest possible network (Choi and Wu,

2009b; Provan, Fish and Sydow, 2007) and the addition of this keyword extended the coverage of the review.

Here below (Table 2-2) is the list of terms retained to build the search strings relevant to triadic and procurement:

Triadic		**Procurement**		**Exclusions**
	Within 5 words of		AND NOT	
Crosssector*		Buyer?		Biolog*
Cross-sector*		Procurement		Chemi*
Interfirm*		Purchasing		Crim*
Inter-firm*		Seller?		“Dark triad”
Interorganisation*		Supplier?		Depression
Inter-organisation*		Supply		Fuzzy
Interorganization		Vendor?		Gang*
Inter-organization		Network*		Mathematic*
Multifirm*				Narcism
Multi-firm*				Physics
Multitier*				Psychology*
Multi-tier*				Trinity
Three-tier*				
Triad*				
Trilateral				
Tri-lateral				
Tripartite				
Tri-partite				

Table 2-2 List of terms used for triadic & procurement

For the search strings to collect material relevant to the discussion on the governance of interorganisational triads, they were therefore built using the following logic:

If one of a series of terms relating to the a) triadic context and b) topic are to be found within 5 words of each other (the proximity factor), and if one of a series of terms relating to undesired topics is not found in the observed text (exclusions), then the document is captured by the query and reported as of potential interest.

Two different searches were conducted, one around the topic “governance”, and one around the topic “procurement”.

2.1.2 Identifying grey literature

Searching for grey literature was by essence less systematic. It focused on publications found on websites of major consultancy groups active in the field of procurement, prominent practitioners’ blogs and practitioners’ organisations in the domain of procurement. The focus on procurement comes from the nature of the business problem from which this research emerged. The list of sites searched is in Table 2-3.

Major Consultancies	Practitioners organizations	Contributors
Accenture	CAPS Research	Thomas Choi
AT Kearney	Chartered Institute of Procurement and Supply (UK)	Martin Christopher
BCG	Conseil National des Achats-CDAF (France)	Larry Giunipero
CASME	Institute for Supply Management (USA)	Peter Kraljic
Deloitte	Procurement Leaders	Carlos Mena Madrazo
EY		Robert Monczka
Genpact		Arjan Van Weele
IBM Consultancy Services		Zhaohui Wu
IBM Outsourcing Services		
KPMG LCP Consulting		
McKinsey Old Street labs		
PA Consulting Group Procurement Intelligence Unit/ Sigaria		
The Hackett Group		

Table 2-3 List of sites searched for grey literature

2.2 Searching

Searching for articles was done differently for academic elements and grey literature. Academic publications were searched for in databases, and this process is detailed in subsection 2.2.1 below. Searching for grey literature followed a slightly different process, as these documents are found in different types of repositories. This process is described in subsection 2.2.2.

2.2.1 Searching for academic papers in databases

Searching in databases was executed using search strings. A specific search string is constructed and tested for each database in scope, based on the keywords identified in subsection 2.1.1. Once the syntax of each query is finalized, it is run on the corresponding database.

To enhance consistency of findings, all queries in databases were run on the same day, on September 4th, 2017. The parameters set for each database search are shown below (Table 2-4).

	ABI/Proquest	**Ebscohost**	**Scopus**
Databases included	ABI/INFORM Global and ProQuest Business Collection	Business source complete, E-Journals, eBook Collection	All of Scopus
Documents included	Scholarly journals, trade journals, conference proceedings, books, reports	Academic article, book, case study, conference paper, conference proceeding, report	Articles, conference papers, reports, books, book chapters, article in press, conference review, erratum
Limits	Language English and French	English and French	Limited to subject area "Business, Management and Accounting", and "Decision sciences". Limited to Languages English and French
Search mode		Find all my search terms	

Table 2-4 Parameters specific to each database

In total 2,436 hits were captured through database search.

	PROCUREMENT + “network*”	GOVERNANCE
ABI	226	150
EBSCO	350	213
SCOPUS	730	767
TOTAL	1306	1130

Table 2-5 Summary of academic databases search results

The dominance of the number of hits for the combination triadic + procurement grounds the inclusion of this combination in the searching effort.

2.2.2 Searching for grey literature

Grey literature was searched via internet access to the websites of organisations identified in subsection 2.1.2 Identifying Grey literature, above.

Here is the list of sites searched, and the results:

- **Major consultancy Groups**

These groups are known for their intense activity in the world of procurement, purchasing and supply chain, and regularly publish reports, white papers and guides of best practices. They are advising and supporting many organizations in transforming and improving their businesses on the premise of staying at the forefront of knowledge. However, there were no relevant documents available from these organizations.

Organization	Website	Date Accessed	Elements identified
Accenture	www.accenture.com	9/16/2017	None
AT Kearney	www.atkearney.com	9/16/2017	None
BCG	www.bcg.com	9/16/2017	None
CASME	www.casme.com	9/16/2017	None
Deloitte	www.deloitte.com	9/16/2017	None
EY	www.ey.com	9/16/2017	None
Genpact	www.genpact.com	9/16/2017	None
IBM Consultancy Services	www.ibm.com	9/16/2017	None
IBM BPO Services	www.ibm.com	9/16/2017	None
KPMG	www.kpmg.com	9/16/2017	None
LCP Consulting	www.lcpconsulting.home	9/16/2017	None
McKinsey	www.mckinsey.com	9/16/2017	None
Old St Labs	www.oldstlabs.com	9/16/2017	None
PA Consulting Group	www.paconsulting.com	9/16/2017	None
Procurement Intelligence Unit/ Sigaria	www.sigaria.com www.procurementleaders.com	9/16/2017	None
The Hackett Group	www.thehackettgroup.com	9/16/2017	None

Table 2-6 List of websites of major consultancy groups searched, and results

- **Purchasing practitioners' organisations**

Organization	Description	Website	Date Accessed	Elements Identified	Comments
CAPS Research	Research organisation on procurement	www.capsresearch.org	8/4/2017	None	Access restricted to member firms
Chartered Institute of Procurement and Supply CIPS	Practitioners organisation in UK, with branches world wide	www.cips.org	8/4/2017	None	
Conseil National des Achats CDAF	Practitioners organisation in France	www.cdaf.fr	8/4/2017	None	No publications available. Reference to an academic-intent journal "excellence HA" not available in databases. Access requested to CDAF, no obtained.
Institute for Supply Management ISM	Practitioners organisation in USA.	www.instituteforsupplymanagement.org/	9/16/2017	None	
Procurement Leaders	Practitioners network, and research and consulting provider	www.procurementleaders.com	8/4/2017	None	

Table 2-7 Purchasing practitioners' organizations websites searched

Similarly, to major consultancy firms, there were no relevant documents available from these organizations.

- **Major contributors in the field of procurement**

No grey literature was found.

2.3 Screening

Screening of studies collected was done in two main phases. A first phase was conducted right after the data was captured; it aimed at identifying the studies and documents relevant to the research. Then as a second phase a Quality Assessment was performed to evaluate the studies' adherence to scientific approach and therefore the strength of the arguments proposed.

The process used to screen the academic literature and its results are described in the first subsection. The process and results of activities pursued to enlarge the reach of this Systematic Literature Review from the studies identified through the screening of literature are described in subsection 3. Afterwards, the Quality Assessment process and results are defined.

2.3.1 Academic literature

From the three databases explored by the search strings, article details were imported into a RefWorks database to be individually identified with a sequence number.

The RefWorks database *ab initio* contained 2,436 records. These records contained all bibliographic details of each document, including the abstract, and excluding the full text.

A screening process in four steps was then used to identify the documents relevant to the research.

The first step was to eliminate duplicates in the RefWorks database. This was done through the built-in function of RefWorks, set on "close matches". The function runs a comparison of article titles, authors' names, and year of publication, and proposes a list of potential duplicate records. The researcher then must check all proposed duplicates manually and decide which records are to be eliminated. This step allowed the identification and elimination of 641 duplicates, leaving 1,795 records.

The second step was to check the titles of all records for topic, focus and overall relevance to the research. 1,470 irrelevant records were then eliminated. As examples, Aarstad, Ness and Haugland (2015) paper “Destination evolution and network dynamics: New research agendas” was rejected as its topic (tourism destination management) does not correspond to the focus of the research undertaken; similarly, Win et al. (2015), “Multi-tier network secrecy in the ether” addresses telecommunication secrecy and is irrelevant here. Thereby, 325 records were kept for the following step.

The third step was to read the abstracts of the 325 remaining records, assessing for focus, unit of measure and overall relevance. According to the research question, the focus had to be governance structures or instruments in non-dyadic situations, the unit of measure had to be a triad (e.g. articles solely on dyads are not retained; however, articles on dyads in a triad are retained; articles on networks are retained based on Choi and Wu (2009b, 2009c), and Provan, Fish and Sydow (2007). Articles such as (Bablak, 2007) that focuses on partners selection, or Cäker (2008) in which interorganizational relations are studied at dyadic level were rejected at this stage.

After this third step, 70 records were then retained for the following step.

The fourth step is to read the full text of each record to ascertain that they meet the inclusion or exclusion criteria outlined below (Table 2-8). Finding an exclusion criterion triggered the end of reading and elimination of the record, else the record was kept for detailed analysis. At this stage, contributions such as Cao and Lumineau (2015) or Melin (2014) were not retained as their unit of analysis was not the triad as a network or the network. This issue of unit of analysis was a key distinction factor, and some authors (e.g. Vedel, Holma and Havila, 2016) even distinguished between triadic context, triadic structures within which the actors may act independently, and the triads that display group-like characteristics and notably acting in coordination. Here, in a field that is closely linked to the network field, the intent was to focus on papers basing their discussion on triads or triadic context examples. After step four, 29 studies did meet the criteria to be included in the research.

Inclusion criteria	Exclusion criteria
Focus on triadic situations, or networks	Do not meet the inclusion criteria (e.g. on dyadic situations; on individuals, lack on details enabling the CIMO analysis)
Focus on governance (network structures, instruments, mechanisms)	Book reviews
Unit of analysis: the triad as a network, the network	
Actors are organisations (i.e. not individuals)	
Can be conceptual papers, empirical studies, review papers, case studies	
Empirical papers inform on the link between the governance instrument used, the mechanism associated, and the outcome obtained, in a clearly established context	
Can be qualitative or quantitative papers	
No industry or geography restrictions	
Languages: English, French	

Table 2-8 Inclusion and exclusion criteria

The details of each of these articles were transferred from RefWorks into a Unified Spreadsheet, to automatically record bibliographic characteristics. The template was designed to allow incorporation of the quality rating.

These records were then ready to undergo the Quality Assessment.

2.3.2 Extending reach from identified studies

The principle is to use the references cited in the works short listed by screening the academic and grey literature and check for potentially relevant studies. When the information is available, the articles citing the short-listed studies were also checked. In addition, two recent literature reviews on triads included in papers (Vedel, Holma and Havila, 2016; Wynstra, Spring and Schoenherr, 2015a) were used for cross-referencing.

The screening process specific to these documents followed the same principles as for academic literature and grey literature, depending on the nature of the paper examined. As these elements were accessed one-by-one, if they passed the title check, all subsequent screening steps were executed immediately. Only the documents retained for inclusion in the literature review are identified here. From the texts identified through cross-referencing, 7 successfully passed the screening steps and were therefore included in this SLR. Their details are included in the Unified Spreadsheet created previously.

The final list of elements constituting the basis for this SLR now includes 36 studies. 35 are journal articles, and one a conference paper. This list is in Appendix A.1.

All records contained in the Unified Spreadsheet are then appraised and scored according to the Quality Assessment process.

The complete process of searching and screening, is illustrated in Figure 2-1.

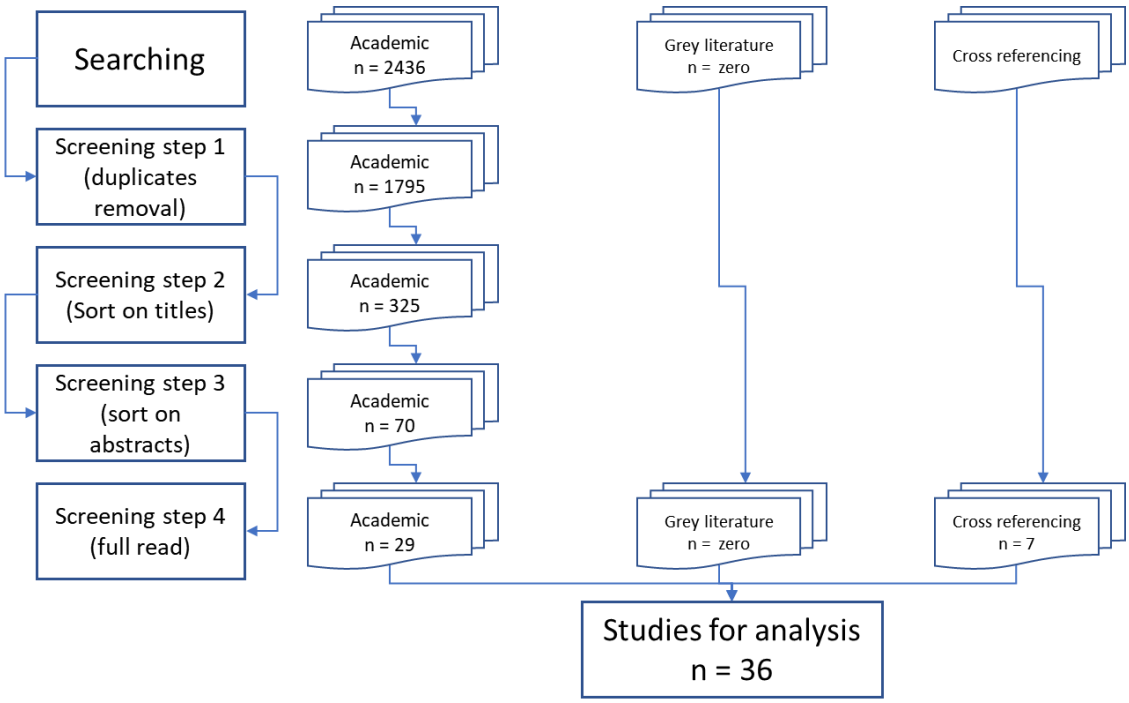

Figure 2-1 Process flow diagram of searching and screening studies

2.3.3 Quality Assessment

The literature to be analysed included documents from various sources (articles from peer-reviewed journals, conference papers) that used different criteria for acceptance before publication. It was therefore necessary to have a Quality Assessment process that accounted for the diversity of the said criteria for publication, the background and writing skills of authors, and the target audiences whose expectations in terms of article structure, arguments construction and evidencing are different.

With these constraints in mind, and following the methods of Reay, Berta and Kohn (2009) and Adams et al. (2016), the quality assessment will be based on the strength of the evidence proposed in the documents gathered.

A ranking of evidence strength was then made using the following table (Table 2-9), adapted from Reay, Berta and Kohn (2009, p.8–9). This table was constructed to take into account the presence, transparency and replicability of elements supporting a scientific approach:

- Problem definition and scoping:
    - The problem definition is clear,
    - A literature review was executed and provides a synthesis,
- Data gathering, or conceptual development:
    - The inquiry method is clear and respected,
    - When present, the sample for evidence gathering is clear and in line with the unit of analysis,
    - Conceptual development logic and argument development are clear and easy to follow,
- Data analysis, Synthesis and Conclusions
    - The arguments are facts-based,
    - Biases are identified,
    - Conclusions are actionable.

The level of evidence is ranked from 1 to 4, the higher being the better. From the three scores obtained for each paper, it is the lowest that was retained as final evaluation, e.g. a document with a score of 4 for Problem definition and scoping, 3 for Data gathering and 4 for Data analysis, synthesis and Conclusions will have a final rating of 3.

This rating does not reflect a “right or wrong” assessment of the arguments presented by the authors. It is based on the elements evidenced by the authors on the extent, transparency and replicability of their research, thereby supporting evidence-based knowledge development (Denyer and Tranfield, 2009; Reay, Berta and Kohn, 2009; Tranfield, Denyer and Smart, 2003).

Level of evidence (the higher the better)	Problem definition and scoping	Data gathering / Conceptual formulation	Data analysis, synthesis and Conclusions
Level 4	Clear problem definition. High-quality systematic literature review, that is comprehensive, transparent, replicable, with synthesis.	Inquiry method clear and respected. Data gathered through multiple sites case studies or large-sample quantitative studies. Conceptual papers show logic and development of argument.	Unit of analysis consistent with problem description and data gathering. Arguments are facts-based and theoretically motivated. Bias are identified. Conclusions are actionable.
Level 3	Clear Problem definition. Literature review transparency and replicability are questionable.	Inquiry method is transparent. Sample size is limited (e.g. single site qualitative or quantitative studies). Conceptual logic and development has limited gaps.	Unit of analysis consistency respected. Theoretical motivation and fact-backing of arguments infrequent. Bias are identified. Conclusions are actionable.
Level 2	Problem definition not clear. Literature review of limited scope and transparency.	Very small sample size and/ or self-reported stories. Expert opinion-based information. Conceptual logic is fragmented.	Arguments are poorly supported by theory or evidence. Researchers’ opinion prevails. Bias omitted. Conclusions are weak or of limited reach.
Level 1	Problem definition is not clear. Scoping based on limited literature or based on anecdotal information.	Data consists of anecdotal evidence. Concepts are offered without grounding.	Arguments are opinion statements, “ voice of wisdom” proposals. References to theory are missing.

Table 2-9 Assessing quality & strength of research in retained articles.

Overall, the quality of the papers as assessed by this method was significantly above average, with 88% of the papers scored 3 or 4 (Table 2-10).

Quality assessment and strength of evidence	Number of papers n =36	Percentage
4	7	19%
3	25	69%
2	3	8%
1	1	3%

Table 2-10 Results of Quality Assessment

Additional information on the overall quality of the studies retained was obtained by referring to the Chartered Association of Business Schools' Academic Journal Guide 2015, available online at https://charteredabs.org/academic-journal-guide-2015/.

As per the website "The Guide is based upon peer review, editorial and expert judgements following the evaluation of many hundreds of publications and is informed by statistical information relating to citation. It is a guide to the range, subject matter and relative quality of journals in which business and management academics publish their research."

In the 2015 version of the Guide, there were 1,390 journals ranked. The ranking goes from 1 to 4*, with 4* being the highest. Only thirty-three journals (2% of total) achieve the highest (4*) ranking.

Here below, in Table 2-11, is the statistics obtained for the list of 35 studies retained in this SLR that are Journal articles (one conference paper is not included).

With 54% of papers coming from journals having a ranking of 4 or 4*, and 80% coming from journals having a ranking of 3 or higher, the selection certainly stemmed from journals with a major influence and readership.

Quality assessment and strength of evidence	Number of papers n =35	Percentage
4*	14	40%
4	1	3%
3	10	29%
2	5	14%
1	3	9%
n/a	2	6%

Table 2-11 CABS Academic Journal Guide 2015 ranking of sources

2.4 Extraction and analysis

In the flow of searching-screening-extraction-analysis-reporting (Figure 2-2), this section describes how information was captured from the selected papers, and in the sub-sections “analysis” and “reporting” proposes a picture of current knowledge on the research question. These three steps are highlighted in Figure 2-2.

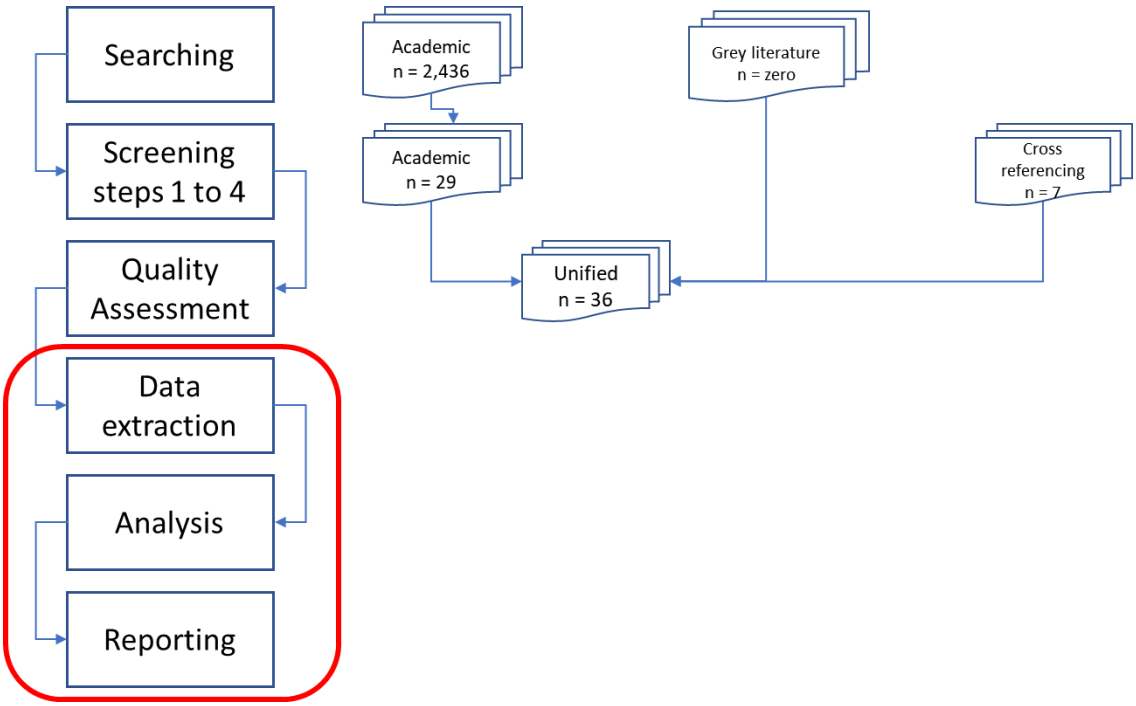

Figure 2-2 Flow chart of research

2.4.1 Extraction

2.4.1.1 Extraction process

Each article was analysed individually, and the information contained captured using a large data matrix in an Excel spreadsheet. This tool allows high flexibility in organizing data, coding it, and enables multiple ways to analyse it.

Data from papers was classified as per the list of variables shown in Table 2-12. Initially a larger number of variables were captured, as well as more sub-categories. It is through the analysis of the content that the themes and sub-themes were reduced to the ones shown here. Notably, 'Coalition formation' was incorporated in the 'Evolution' of 'Structures', and 'Imitation' was included in 'Choice of Instruments and Mechanisms' of the 'Relationship Management' theme.

Category	Variable	Encompasses
Bibliographic data	Authors	Author names
	Title	Full title of the document
	Source	Journal title, book section, conference name, publishing organization for Grey literature
	Year	Year of publication
	Type of document	Journal article, Conference paper, Book section
Methodology	Paper type	Conceptual, empirical, literature review
	Methods	Case study, Experiment, Statistical analysis, Survey
	Sample	Sample size
	Theoretical lens	What is the theoretical foundation used for data analysis
	Field focus	Generic, Supply Chain
Themes	Structure	Description, Evolution
	Relationship Management	Choice of instruments & mechanisms, Relationship balance

Table 2-12 Variables

2.4.2 Analysis

The analysis is structured as follows: in the first sub-section (2.4.2.1), an overview of the bibliographic data is provided, showing the diversity of contributions and explaining the split between theoretical papers and empirical case studies. The findings are then presented in a large table (Table 2-15), sorted by themes (Table 2-16) and discussed thematically in sub-sections 2.4.2.2 and 2.4.2.3.

2.4.2.1 Bibliographical data

There were 35 journal articles, and one conference paper (conference papers were considered only if published after 2012) finally retained.

Bibliographical data revealed a steady acceleration of the pace of publication relating to the topic in focus of this systematic literature review since the turn of the twentieth first century (Figure 2-3).

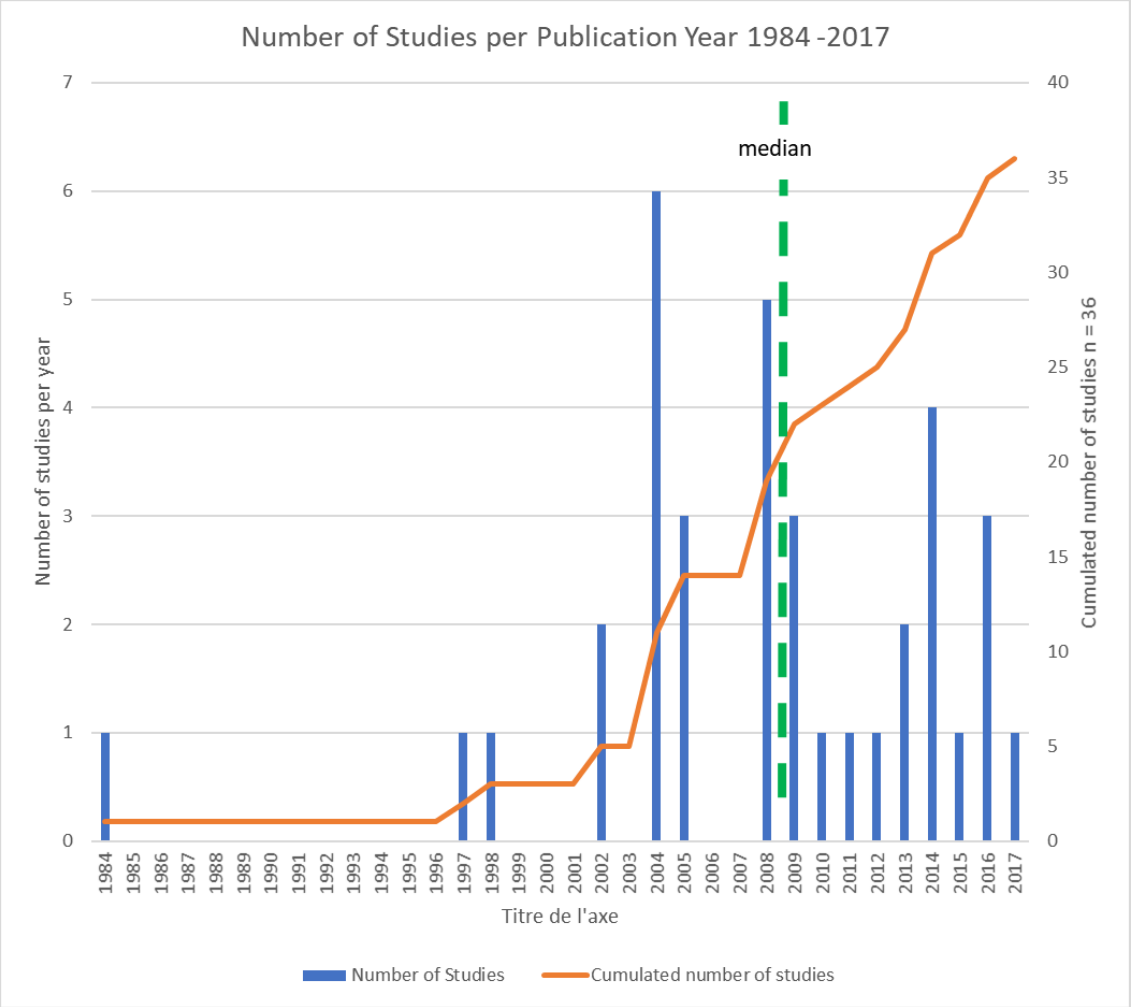

Figure 2-3 Number of studies per publication year

Whilst the oldest paper dated back to 1984, half of the works in this systematic review were published after 2008 (underlined by median shown on Figure 2-3). The 35 papers were published in 23 different journals (Figure 2-4), reflecting the dynamism and increased interest from academia. Most journals published only one article on the topic over a thirty years span, with the two most notable exceptions of the Journal of Operations Management (5 papers), and Journal of Supply Chain Management (4 papers).

Also reflecting the wide interest, is the diversity of fields covered by journals that published the papers in scope: from industry specific (e.g. food, facilities management) to accounting and administration & public policy. The coverage has expanded well beyond sociology, where triads were first discussed (Caplow, 1959, 1968; Simmel, 1950), into, amongst others, the fields of purchasing & supply chain management and operations where this SLR is grounded (Figure 2-5).

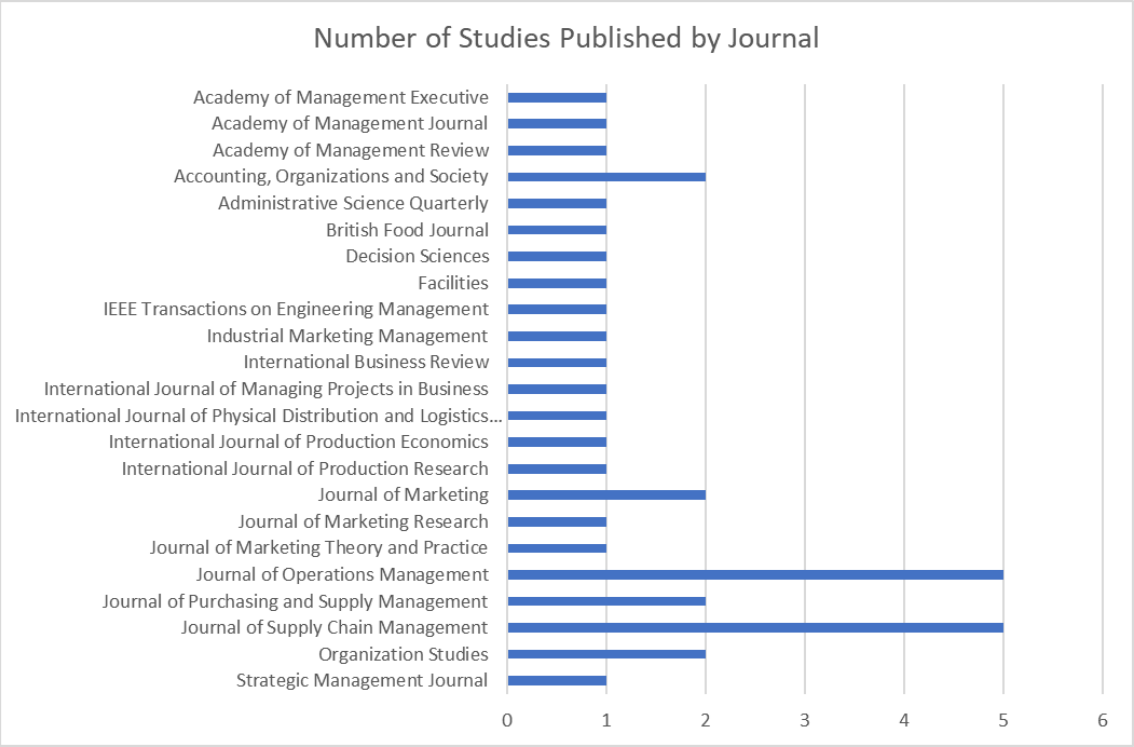

Figure 2-4 Number of studies published by journal

This diversity of authors and journals benefits from, and probably also contributes to, a high visibility in academia, as measured by the CABS ranking of publications, with more than 70% of considered journals being ranked 3 or higher (Table 2-11). The topic of triads is gaining momentum and attracts both conceptual and empirical papers.

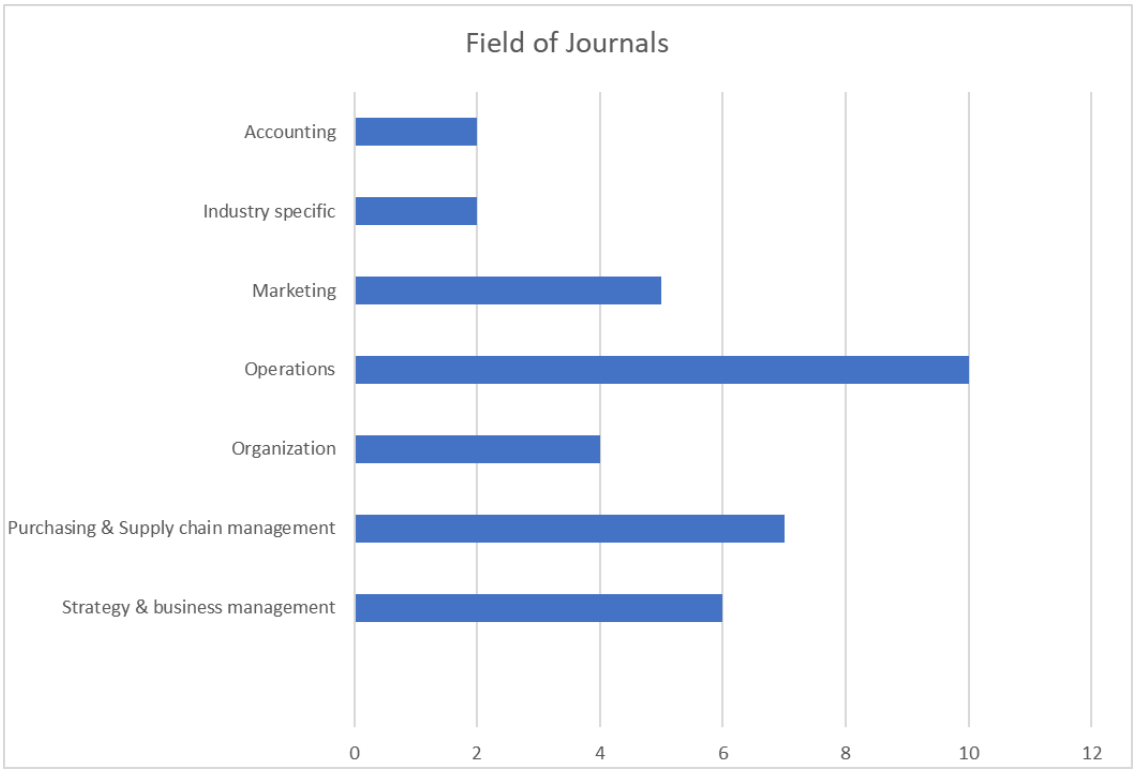

Figure 2-5 Field of journals

This diversity was also found in the theoretical foundations of the contributions. Nineteen different theories have been identified in the short-listed papers. They are reflected in Table 2-13; the table is sorted by alphabetical order of papers (left-hand side), and the count of papers for each theory is shown in the bottom line. In addition, a proportion of papers citing each theory is given (e.g. 19% for the transaction cost economics theory). The editorial by Wynstra, Spring and Schoenherr (2015) offers a rather comprehensive literature review of the contributions on triads, as well as insights on service triads; the only theory mentioned (Unified Service Theory) is the one used by the authors in their contribution on service triads, whilst many others are cited in their literature review. A vast majority of papers referred to only one theory (30), whilst 6 refer to two; for two papers (Salonen, 2004; Trimarchi and Tamaschke, 2004) no specific theory could be identified.

One interesting point, that was also called upon in Wynstra, Spring and Schoenherr (2015), is the mix of personal level, organizational level and interorganizational level theories. The recourse to several levels of analysis

stems from the personal-level theorization of triads (Simmel, 1950) and shows the complexity of the field and the interplay of these different levels in inter-organizational relationships.

The most frequently referred to theoretical foundation is transaction cost economics (7 occurrences), followed by social network theory (5 occurrences) that originates from personal-level studies (e.g. Granovetter, 1973). Game theory was used four times, notably to explain the influence of the buyer on supplier-supplier relations (Wu, Choi and Rungtusanatham, 2010; Wu and Choi, 2005). In two cases (Trimarchi and Tamaschke, 2004) the reference theory could not be identified. These choices of theories, even when mirroring the theories commonly used in IORs and supply chain research, raise questions as to the appropriate lens to be used for research on triadic context. Transaction cost economics (TCE) focuses on selecting the governance that will minimize transaction cost for the focal firm, with the transaction as the unit of analysis. TCE is not meant to explain IORs dynamics. Relations-based theories (social network, social capital, social exchange) are largely focused on dyadic relations, as are resource-based view, and game theory. Only agency theory (3 occurrences), balance theory (2 references), coalition theory (1), network theory (2) and supply chain specific theories such as industrial marketing and purchasing (1), or industrial networks theory (1), have a multi-party relationships approach.

With such a broad selection of theoretical foundations, the lack of consistency between unit of observation and unit of analysis was underlined by Wynstra, Spring and Schoenherr (2015). However, the use of non-field specific theories, such as individual-level theories and concepts -e.g. Simmel's balance theory in (Choi and Wu, 2009a), or Granovetter's ties in Vedel, Holma and Havila (2016)- is common in other fields, and especially the study of inter-organizational networks.

	Agency theory	Balance theory	Coalition theory	Complex adaptative systems	Critical success factor theory	Exchange theory	Game theory	Industrial marketing and purchasing	Industrial network theory	Institutional theory	Network theory	Not informed	Resource based view	Social capital theory	Social network theory	Transaction cost economics	Unified Service Theory	n =
Arrito, Ebrrana, Kujata, 2008																X		1
Bastl, Johnson, Choi, 2013			X															1
Choi, Kim, 2008											X				X			2
Choi, Wu, 2009a		X																1
Choi, Wu, 2009b [taking the leap]													X					1
Choi, Wu, Ellram, Koka, 2002																X		1
Dekker, 2004																X		1
Dubois, Fredriksson, 2008									X									1
Grandori, 1997											X							1
Grimm, Hofstetter, Sarkis, 2014					X													1
Harrison, Holmen, Perdersen, 2012								X										1
Hartmann, Herb, 2014														X				1
Li, Choi, 2009															X			1
Madhavan, Gnyawali, He, 2004										X	X							2
Mc-Farland, Bloodgood, Payan, 2008										X								1
Mena, Humphries, Choi, 2013				X														1
Obstfeld, 2005														X	X			2
Odongo, Dora, Mahnaj, Ongeng, Gellynck, 2016															X			1
Pathak, Wu, Johnston, 2014							X											1
Phillips, Lin, Costello, 1998		X																1
Poppo, Zenger, 2002														X		X		2
Provan, 1984						X							X					2
Reusen, Stouthuysen, 2017																X		1
Rossetti, Choi, 2005																X		1
Rossetti, Choi, 2008	X																	1
Salonen, 2004												X						1
Shi, Zhou, Wang, Xu, Xiong, 2014							X											1
Trimarch, Tamaschke, 2004												X						1
van der Valk & van Iwaarden, 2011	X																	1
Vedel, Holma, Hävila, 2016											X							1
Walrine, Heide, 2004																X		1
Wilhelm, Blome, Bhakoo, Paulraj, 2016	X									X								2
Wu, Choi, 2005							X											1
Wu, Choi, Rungtusanatham, 2010							X											1
Wuyts, van den Bulte, Franses, 2004															X			1
Wynstra, Spring, Schoenherr, 2015																	X	1
n =	3	2	1	1	1	1	4	1	1	3	4	2	2	3	5	7	1	
Proportion =	8%	6%	3%	3%	3%	3%	11%	3%	3%	8%	11%	6%	6%	8%	14%	19%	3%	

Table 2-13 Theoretical foundations of papers

In the analysis of methods (Table 2-14), distinction is made between conceptual/ theory generation papers and a those that are empirical in nature, with the intent to test or generalize a theory. A majority (61%, that is 22 out of 36) of the papers analysed have conceptual (theory generation) endeavours, showing the dynamism of research on the topic. The intention of researchers in using case studies can be to build theory, develop theory or test theory (Ridder, 2017), that is why some papers appear as conceptual/theory generation and have case study as a method. In these articles (e.g. Dekker, 2004), a case study was used to support the argument of the researcher. Fourteen papers (39%) have empirical endeavours, to test or generalize theories. Distinction was made on the context of the research presented in these papers, between “supply chain” and others. This reflects the focus context of this undertaking (procurement and supply chain management), and shows that the conversation is not confined to it. Still there is a strong emphasis on procurement and supply-chain management, with 78% (28) of the contributions directly set with buyer-supplier relations in scope -sometimes considering buyer’s customer as well, notably the service triads. The eight (22%) remaining ones refer to other contexts (e.g. Dekker's, 2004 discussion on governance instruments; Obstfled, 2005 on innovation). The diversity of investigations undertaken (case study, experiment, analysis of secondary data, surveys) reflects the openness of the field to diverse endeavours. Only two papers explicitly used mixed methods, combining case study and survey (Obstfeld, 2005), or survey and experiment (Wuyts et al., 2004)(Wuyts et al., 2004). Otherwise, case study was most frequently used. Sample size refers to the number of cases (when available the number of participants is also indicated), or contributors to surveys or experiments. Most case studies have a sample size comprised between 1 and 3 cases, to the notable exception of Trimarchi and Tamaschke (2004) with 23 cases, and Wu and Choi (2005) who compared 8. However, case studies, in spite of the recommendation given by Eisenhardt (1989) of having between 4 and 10 cases, do not necessarily depend on quantity of information to provide rich insights. This large utilisation of primary data-based research (case studies, experiments, surveys) contributes to the specificity of the findings in relation to topic-focused research questions.

			Methods					Context	
	Conceptual / Theory generation	Empirical / Theory testing or generalization	Case study	Experiment	Secondary data only	Survey	*Sample size*	Supply chain focus	Other focus (e.g. IOR, innovation)
Artto, Elorana, Kujata, 2008		X	X				*2*	X	
Bastl, Johnson, Choi, 2013	X						--	X	
Choi, Kim, 2008	X						--	X	
Choi, Wu, 2009a	X						--	X	
Choi, Wu, Ellram, Koka, 2002	X						--	X	
Choi, Wu, 2009b [taking the leap]	X						--	X	
Dekker, 2004	X		X				--		X
Dubois, Fredriksson, 2008		X	X				*1*	X	
Grandori, 1997	X						--		X
Grimm, Hosfetter, Sarkis, 2014		X	X				*2*	X	
Harrison, Holmen, Perdersen, 2012	X						--		X
Hartmann, Herb, 2014		X					--	X	
Li, Choi, 2009	X						--	X	
Madhavan, Gnyawali, He, 2004	X				X		*45 firms in 72 strategic alliances*		X
McFarland, Bloodgood, Payan, 2008	X					X	*151*	X	
Mena, Humphries, Choi, 2013	X		X				*3*	X	
Obstfeld, 2005		X	X			X	*1 case 152 participants*		X
Odongo, Dora, Molnajr, Ongeng, Gellynck, 2016		X				X	*150*	X	
Pathak, Wu, Johnston, 2014	X						--	X	
Phillips, Lin, Costello, 1998	X			X			*66*	X	
Poppo, Zenger, 2002	X					X	*285*		X
Provan, 1984	X				X		--		X
Reusen, Stouthuysen, 2017	X					X	*119*	X	
Rossetti, Choi, 2005	X		X				*not informed: "industry wide trend analysis"*	X	
Rossetti, Choi, 2008		X				X	*107*	X	
Salonen, 2004		X	X				*1*	X	
Shi, Zhou, Wang, Xu, Xiong, 2014	X						--	X	
Trimarchi, Tamaschke, 2004		X	X				*23*	X	
van der Valk & van Iwaarden, 2011		X	X				*2*	X	
Vedel, Holma, Havila, 2016	X						--		X
Wathne, Heide, 2004		X				X	*421 buyers and 81 customers*	X	
Wilhelm, Blome, Bhakoo, Paulraj, 2016		X	X				*3*	X	
Wu, Choi, 2005	X		X				*8*	X	
Wu, Choi, Rungtusanatham, 2010		X				X	*43*	X	
Wuyts, van den Bulte, Franses, 2004		X		X		X	*167*	X	
Wynstra, Spring, Schoenherr, 2015	X						--	X	
n =	22	14	12	2	2	9		28	8
Proportion =	61%	39%						78%	22%

Total is higher than 36 (100%) as some conceptual papers collected data, e.g. Madhavan, Gnyawali and He, 2004; or some papers use mixed methods (e.g. Wuyts, van den Bulte, Franses, 2004, use experiment and survey)

Table 2-14 Methods of papers

The findings presented in the papers review (Table 2-15, in four parts to accommodate legibility on A4-sized paper) have been regrouped according to the two themes used at variable extraction stage: triad structures and relationship management (Category “Themes”, Column “Variable” of Table 2-12). The topic of the first sub-question (“What are the governance structures used in triadic relations?”) was encompassed in the conversations relating to the structure of the triads. As this theme attracted broader contributions, it has been retained for the analysis. Each theme was divided in sub-themes, as per the variables used at extraction stage (Category “Themes”, lines in “Column “Encompasses” of Table 2-12) for a finer-grained reflection of the contributions. Table 2-16 shows which papers contributed to which of the theme(s) and sub-theme(s) detailed in sections 2.4.2.2 and 2.4.2.3.

Artto, Elorana, Kujata, 2008	Temporary project networks are formed and dissolved within long-term business networks, reflecting a duality of time-related levels in inter-firm relations. Within a triad, dyads can form coalitions. There is a possibility of risk contagion through a network.
Bastl, Johnson, Choi, 2013	Paper focused on within-triad coalitions: formation conditions, logic for structuration and power distribution. Coalitions can form across tiers and result in greater or equal power of the allies relative to the third player. Shows the importance of the relative position of a player in a triad.
Choi, Kim, 2008	Advocates long term approach for buyer-supplier relations. Importance of context (embeddedness in both direct and indirect relationships) to manage inter-firm relations and ensure a dyad's performance. A buying company should work with a supplier that consorts with its worst enemies.
Choi, Wu, 2009a	Based on balance theory, uses transitivity to show the impact of one link on another link. Proposes 9 buyer-supplier-supplier archetypes, to depict balanced/unbalanced relations within a triad. Uses structural hole concept for the 3 archetypes that are open triads. Always considers the buyer as the tertius. Recommends relationship balancing actions by the buyer to avoid coalition behaviour by frustrated suppliers.
Choi, Wu, Ellram, Koka, 2002	Focuses on impact of supplier-supplier relations on buyer-supplier relationship. Proposes 3 archetypes of supplier-supplier relationships: competitive, cooperative, coopetitive. Coopetition is cooperation between firms that are competitors, as a temporary behaviour. Contends that coopetition provides competitive advantage to suppliers through consideration of common strategic interests. On buyer's side, 3 factors are useful to assess a buyer's supplier relationship management strategy and its influence on supplier-supplier relations: relationship types, bargaining power and outcomes, and risk. The analysis is within 2 tiers only. Context and nature of products also impact buyer's choices.
Choi, Wu, 2009b [taking the leap]	Underlines the importance of triads as smallest unit of analysis to uncover how a link affects another link. Also considers the influence of embeddedness of nodes, beyond the triad. Triads also help consider influence of a third on a dyad, notably on the balance of relationships. Claims that triad study is open door to networks for purchasing and supply management relationships field.
Dekker, 2004	Higher interdependence increases the need for control and monitoring. Formal control looks at what and how. Informal control uses social control mechanisms. Balance and appropriate use of formal and informal governance instruments supports coordination of interdependent tasks. Partner selection important, due to embeddedness. The use of multiple theoretic lenses helps understanding context and phenomena.
Dubois, Fredriksson, 2008	Procurement tactic of "triadic sourcing." to foster competition and cooperation between 2 suppliers with overlapping capabilities. The authors articulated how one observes "a shift in the focal unit of analysis from two dyads handled separately to one triad consisting of three connected relationships" (p.171). Coopetition requires constant monitoring of technical, economic, and relationships status and capabilities. Suppliers need to manage cooperation and competition carefully to avoid opportunistic behaviours by other supplier and buyer in the triad.
Grandori, 1997	Presents 4 types of interdependence based on pooling of similar resources and joint use of complementary resources: pooled, intensive, sequential, reciprocal. Show how each influences the choice of effective coordination mechanisms. Context (network and governance structure: bureaucratic, proprietary, social) is major influencer.

Table 2-15 Findings of papers in literature review

Grimm, Hosfetter, Sarkis, 2014	Proposes 14 dimensions important for supplier relationship management. They relate to the focal firm, relationships, the other parties in the supply chain, and the context. In a specific study on the implementation of sustainability-related practices in a supply chain, shows that proper incentives are needed at both tier 2 and tier 3 levels for actions to materialize. The cases are 3 tier open triads.
Harrison, Holmen, Perdersen, 2012	Roles (competitor, buyer, supplier) of actors in triad can change along the change of structure of the triad. Multiplicity of parallel activities means a node can simultaneously be in multiple triads of different configurations with the same partners. This means that the focal actor can change with each analysis. 3 configurations proposed diamond, aligned unitary and timer.
Hartmann, Herb, 2014	In the context of closed service triads, focuses on the reduction of opportunism risk through social capital. Proposes three dimensions. Structural capital increases information flow and reduces ambiguity. Relational capital reduces ambiguity and buyer dependence on supplier. Cognitive capital enhances mitigating effect of relational norms. Highlights antecedents to opportunism: uncertainty, dependence, formalization, relation norms, and contends that increased social capital between the buyer and the customer reduces opportunism by the supplier.
Li, Choi, 2009	Introduces the concepts of bridge decay and bridge transfer in service triads In an open triad, the link between the customer and the buyer can decay, and be transferred to the supplier who is in operational execution of the service, leading to the disintermediation of the buyer. To prevent this, the buyer should continue to actively interact with its customer and closely monitor the supplier in order to prevent the supplier from solidifying its bridge position. Reminds of the importance of social capital in inter-firm relations.
Madhavan, Gnyawali, He, 2004	Looks at coalition forming in closed triads. Firms engage in triadic ties for both competitive (countering) and cooperative (clustering) reasons. Countering is the formation of triads with the goal of reducing the value appropriated by a competitor, captures the competitive motive. Clustering is formation of triads with the goal of combining resources from multiple partners, captures the cooperative motive.
McFarland, Bloodgood, Payan, 2008	Supply chain contagion is the propagation of inter-firm behaviours from one dyadic relationship to an adjacent dyadic relationship within the supply chain. In a open customer-intermediary-supplier triad, from the supplier point of view. How intermediaries treat end customers is explained, to a large degree, as the intermediaries simply imitating how their suppliers treated them (downwards imitation). Proposes reflexive imitation, compliant imitation, normative imitation motives. Imitation behaviour is enhanced by uncertainty, and the development of social capital; and it reduced by dependence asymmetry.
Mena, Humphries, Choi, 2013	In multiple tiers supply chain triads, observes the evolution of links. Proposes vocabulary of open, closed, transitional triads (shift from open to close, or vice versa). Firms look for balance (fairness in value distribution) within relations, leading to evolution of triad structure. Power shifts with structure changes, underlining the importance of a node's position. Closing a triad increase sense of interdependence. Closed triads offer stronger perception of stability and require more resources to manage (and vice-versa), which shows the connection between structure and Ipecific investments. Interdependence leads firms to favour tertius iungens vs gaudens.
Obstfeld, 2005	Investigates the growth of large and cohesive networks through the concept of tertius iungens, the third party who links. Insists on the role of boundary spanner of the tertius. He considers triads as the core structure of higher-order networks and uses them as building blocks. The role of iungens, and network density, are fundamental for innovation. A tertius iungens -as individual- orientation, social knowledge, and social network density are independent predictors of innovation involvement within the firm.
Odongo, Dora, Molnajr, Ongeng, Gellynck, 2016	Through a large sample of customer-buyer-supplier triads, identifies the governance instruments favoured by customer, buyer and supplier roles, to enact their governance and the ones they prefer the buyer to use. Constructs used are trust, commitment, information sharing, coercive and non-coercive power, dependency and conflict, and were used to measure "relationship quality". Relationship quality positively influences the performance of the supply chain.

Table 2-15 Findings of papers in literature review continued

Pathak, Wu, Johnston, 2014	Investigates how coopetition influences evolution of triad structures. Uses 4 interrelated elements in supply networks: firm level tasks, ties between firms, network level objectives, and governance, and four supply network archetypes: Community, Federation, Consortium and Hierarchy. Role evolution (iungers) of a node changes structure of triads, hence coopetitive behaviours. Tensions are necessary for a triad structure to change. Choice of governance model (NAO, consortium, federation, etc) influences outcomes. First, local brokerage choices can trigger broad structural changes in the supply network. Second, coopetition of a supply network is not a simple aggregation of dyadic coopetitive relationships between firms. Lastly, coopetition of the network by nature exists in a dynamic balance between two opposing forces.
Phillips, Lin, Costello, 1998	In a simulated customer-intermediary-manufacturer open triad, measures upwards loyalty between tiers. Evidences contagion (imitation) effect between the two links through a common node (the intermediary). As per Heider's balance theory, there is transitivity: customer loyalty to the manufacturer is dependent upon the interaction between customer loyalty to the dealer and dealer loyalty to the manufacturer. Limitation is that the experiement was executed with students, and no real-life comparative data was available.
Poppo, Zenger, 2002	Relational governance and contract complexity stem from different motivations and are based on different mechanisms. They are complementary rather than substitutive, and both contribute to exchange performance. Relational governance emerges from long-standing relationships. Contractual governance is preferred to tackle uncertainty, and when assets are highly specific. There is a loopback effect between contract complexity and relational governance: high contract complexity increases the need and impact of relational governance, which increase exchange performance.
Provan, 1984	Evidences the role of the focal actor in a consortium, and the factors that influence the dependence of a node on the dominant node for strategic decision making in a consortium. These are: Influence on own and relative structural position, dependence, power, competitive and geographic context to other members on decision making autonomy. Also shows the influence of the other nodes in the decision making of a given node.
Reusen, Stouthuysen, 2017	Demonstrates that upstream governance imitation from one tier to another can lead to misalignment of governance with the goals of the node. Buyers control their suppliers partially by imitating how their customers are controlling them. Origin of behaviour can be "mindless matching" without consideration of context and can also be triggered by risk acceptance and investment limitation strategy based on financial trade-offs.
Rossetti, Choi, 2005	In a customer-buyer-supplier triad, goals and incentives alignment between the links are essential to avoid disintermediation of the buyer by the supplier. A supplier facing increased risks could even use illegal means to mitigate loss of profits (specific to context of case study). Therefore, procurement role in keeping the balance in buyer-supplier relations and adapting the governance to the context and industry evolution is crucial.
Rossetti, Choi, 2008	Contractual inflexibility, financial and operational misalignment, and alternative attractiveness are factors that caused goal incongruence, and led to disintermediation of buyer by supplier who had an alternative. Procurement role in managing relationships, ensuring adequate governance is in place, and partner selection criteria affect relationship balance. Abusing trust leads to opportunism.
Salonen, 2004	In a service triad, that the buyer structures as two-tiers closed in the contracting phase and then changes into a three-tiers closed triad (one supplier is managed by the other one), the buyer tries to avoid coalition forming by the suppliers through contractual complexity focused on outcomes rather than behaviours. In addition, high specific investments were made, supporting trust building in this complex arrangement. This case highlights the importance of position and power in shaping the structure of a triad, and in arranging the balance of governance instruments according to context (facilities management services in multiple dispersed sites) and desired value distribution.
Shi, Zhou, Wang, Xu, Xiong, 2014	Coalition behaviour of suppliers is dependent on the behaviour of the buyer. As well, dependency of buyer on suppliers will lead to suppliers forming a coalition, leading to disadvantage for the buyer. Knowing suppliers' capabilities and dependency situation is essential for the buyer to govern the supply chain and relationships within.

Table 2-15 Findings of papers in literature review continued

Trimarchi, Tamaschke, 2004	In multicultural triads, relationship governance is influenced by cultural boundaries. From the three coordination mechanisms, price, authority, social relations, the latter is less efficient across cultural barriers.
van der Valk & van Iwaarden, 2011	In a 3 tiers service triad, contractual alignment (outcome vs behaviours) across tiers supports higher service delivery performance. Relational management can mitigate for slightly misaligned contracts between tiers. End customers prefer outcome-based contracts. Buyers prefer behaviour monitoring (how) than transfer of obligations from customer (outcomes). In this study the presence of a social contract seems to lead subcontractors to behave according to that social norm instead of a profit maximization behaviour.
Vedel, Holma, Havila, 2016	Distinguish triadic context from triads. Triads demonstrate cohesiveness and ability to act as one entity. Cohesiveness is based on absent, strong & weak ties concepts by Granovetter. Embeddedness is essential to form a coalition, and therefore to a triad.
Wathne, Heide, 2004	The ability to show flexibility toward a (downstream) customer under uncertain market conditions depends on the governance mechanisms that have been deployed in an (upstream) supplier relationship. Supplier selection by the buyer must incorporate flexibility to enable this. Downstream link governance on link governance influence. In 3 tier customer-buyer-supplier triads, buyer can be dependent on supplier, underlining the need for adequate and aligned incentives in both links.
Wilhelm, Blome, Bhakoo, Paulraj, 2016	In sustainable supply chain implementation, in a three-tier open triad, the buyer as requester of new goals, must incentivize and decouple the goals from previous operational management. Three factors influence the enactment of the new goals by the tier 1 supplier upstream: resource availability, enforcement of goal-aligned governance by the buyer, and internal functional alignment at buyer level between procurement and requesting function. Adaptation of governance instruments to context is essential to avoid loss of link tier 1 – tier 2 (the tier 2 supplier leaves the triad).
Wu, Choi, 2005	Identification of five archetypes of supplier– supplier relationships: conflicting, contracting, dog-fighting, networking, and transacting, depending on how much competition, cooperation and coopetition is stimulated by the Buyer. Using the archetypes, buyer can plan procurement strategy, and portfolio management and governance accordingly. Triadic structure, links, power positions evolution depends on the archetype enacted. Risks of supplier-supplier coalition were not discussed.
Wu, Choi, Rungtusanatham, 2010	Examines impact of supplier-supplier coopetitive relationships in buyer- supplier-supplier triads on buyer's performance. Buyers are able to influence supplier-supplier behaviour between competing suppliers. In case of poor supplier performance, buyer intervenes to stimulate cooperation between suppliers. Contributes to reinstate the role and power of dominant buyer in a triad on triadic-level governance.
Wuyts, van den Bulte, Franses, 2004	Investigates importance of embeddedness and characteristics of ties in an open triad. Buyers value sequences of strong ties in open triads, and multiplicity of weak ties in each link, and boundary spanning ties. These grant access to knowledge and innovation, reinforcing importance of embeddedness beyond the triad. Closing the triad is not always of value for the buyer if the supplier-supplier tie is strong, as it would change the balance of the triad. Buyer closing the triad is mainly an anti-supplier-supplier coalition behaviour. Buyer needs to keep number of tier1 low to enable adequate management.
Wynstra, Spring, Schoenherr, 2015	In this editorial, the use of interorganizational relations focused theories is seen as necessary for investigation of triads as the use of interpersonal level theories (e.g. balance theory, social network theory). Combining theories is helpful to investigate complex contexts. In the focus part on service triads, one difference between service and manufacturing triad is postulated to be that service triads are always closed triads whilst manufacturing ones can be open or closed. Triad formation can be initiated by any node based on make or buy at different tier level.

Table 2-15 Findings of papers in literature review continued

	Structures		Relationship Management	
	Description	Evolution	Choice of instruments & mechanisms	Relationship balance
Artto, Elorana, Kujata, 2008	X	X		X
Bastl, Johnson, Choi, 2013	X	X		X
Choi, Kim, 2008				X
Choi, Wu, 2009a		X		X
Choi, Wu, 2009b	X			
Choi, Wu, Ellram, Koka, 2002				X
Dekker, 2004			X	X
Dubois, Fredriksson, 2008		X	X	
Grandori, 1997			X	X
Grimm, Hosfetter, Sarkis, 2014			X	
Harrison, Holmen, Perdersen, 2012	X	X		
Hartmann, Herb, 2014	X		X	X
Li, Choi, 2009	X	X		X
Madhavan, Gnyawali, He, 2004	X	X		X
McFarland			X	
Mena, Humphries, Choi, 2013	X	X		X
Obstfeld, 2005	X	X		
Odongo, Dora, Molnajr, Ongeng, Gellynck, 2016			X	X
Pathak, Wu, Johnston, 2014	X	X		
Phillips, Lin, Costello, 1998			X	X
Poppo, Zenger, 2002			X	
Provan, 1984			X	
Reusen, Stouthuysen, 2017			X	
Rossetti, Choi, 2005		X	X	
Rossetti, Choi, 2008	X	X	X	
Salonen, 2004		X	X	X
Shi, Zhou, Wang, Xu, Xiong, 2014				X
Trimarchi, Tamaschke, 2004			X	
van der Valk & van Iwaarden, 2011			X	
Vedel, Holma, Havila, 2016	X	X		X
Wathne, Heide, 2004			X	
Wilhelm, Blome, Bhakoo, Paulraj, 2016			X	
Wu, Choi, 2005		X	X	
Wu, Choi, Rungtusanatham, 2010		X	X	
Wuyts, van den Bulte, Franses, 2004	X	X		X
Wynstra, Spring, Schoenherr, 2015	X		X	
Contributions:	14	17	21	17
Proportion discussing the topic:	39%	47%	58%	47%

Table 2-16 Thematic contributions of papers

2.4.2.2 Contributions on the structure of triads

This theme has two sub-themes: Description and Evolution. ‘Description’ relates to identification and description of triads as structures, including their creation. ‘Evolution’ includes contribution regarding changes affecting the triadic structure (e.g. creation or loss of a link). Structures Description and Evolution were very often discussed together and have been addressed in 14 and 17 papers, respectively. They are presented in turn here.

The description of triadic structures is a long standing conversation, with a major contribution from Wasserman and Faust (1994) in their census of triads (Figure 14.4, p. 566). Albeit these authors considered that nodes in a triad did not necessarily have links between them (e.g. the 003 triad, ibid), and they considered the directionality of links. In contrast, in the literature reviewed here that focuses on relations between organizations, the nodes considered shared a link with a least one common node, and links were the representation of exchanges which are, by definition, bi-directional. In some configurations, reference was made to the concept of structural hole (Burt, 1992), and the subsequent conversations on the roles of *tertius iungens* and *tertius gaudens* (Burt, 1992; Obstfled, 2005). The presence of links between the nodes was an essential distinction between a triadic context, and an actual triad (Vedel, Holma and Havila, 2016). Embeddedness was therefore an essential condition. Furthermore, the concept of tiers, as explained in section 1.2.2 is typical of the greater field of Operations within which Procurement and Supply Chain Management is nested, and therefore not taken into consideration elsewhere. This concept of tier is essential to the research undertaken here, as it supports the identification of relations and possible dependencies between nodes.

In terms of triadic structures, eight were identified, that span either two or three tiers (Figure 2-6). They accounted for the triads that span two-tiers and those which span three-tiers, and the various role definitions (buyer, supplier, customer, intermediary), used. “Two-tier triads involve two actors who essentially perform the same role vis-à-vis the third actor, i.e. they involve two suppliers or two customers. Three-tier triads involve actors that perform different roles in the overall supply ‘chain’. Typically, these latter types of triads involve an actor that is performing two different roles; a supplier role in relation to one actor, and a customer role in relation to the other actor.” (Wynstra, Spring and Schoenherr, 2015a).

Clarification of notation is needed here: B stands for Buyer, S stands for Supplier, C stands for Customer. The x digit identifies the node (i.e. B1 and B2, or S1 and S2 for buyer 1, and buyer or supplier 1 and supplier 2, respectively). In three-tier

triads, S1 refers to the supplier in the first tier, and S2 refers to the supplier in the second tier. The digit to the left indicates the number of tiers in the triad: 2*abc* is a two-tier triad, 3*abc* is a three-tier triad. For clarity the notation exposed here (e.g. 2BSS, 3BSS, B, S1, S2, C) is adopted in the subsequent sections and chapters.

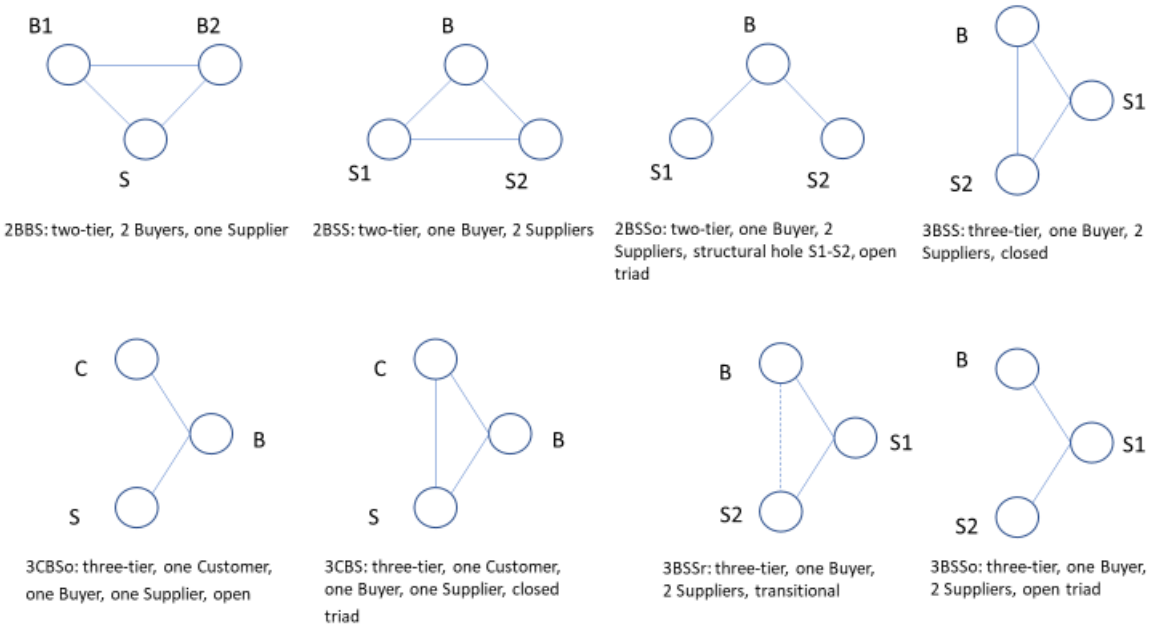

Figure 2-6 Possible triadic structures

By default, B shows the focal actor in the triad i.e. the Buyer. Given the importance of position in triads, and more generally in networks, clarifying this notation convention is essential.

Two types of triads emerged: a triad can be closed when all three nodes are linked or open when two dyads are linked through one common node (Bastl, Johnson and Choi, 2013; Hartmann and Herb, 2014; Madhavan, Gnyawali and He, 2004; Mena, Humphries and Choi, 2013; Wuyts et al., 2004). In Figure 2-6, the open triads are highlighted by the addition of the letter ‘o’ to their acronyms (e.g. 2BSSo, 3CBSo). In this research, distinction is made between closed-transitive and open-intransitive structure of triads. This is based on the specificity of the concept of transitivity (link on link influence) stemming from balance theory

as used by Choi and Wu (2009a) to indicate the balancing of relationships in triads to shift from adversarial to collaborative states. Hence the vocabulary adopted -open and closed triads- mirrors the one used by Mena, Humphries and Choi (2013). In contrast, and without referring to balance theory, Madhavan, Gnyawali and He (2004) referred to closed triads as transitive, meaning that all three actors had direct ties with each other. This highlights the lack of vocabulary clarity, and thereby the need for further conceptual work on the field.

As illustrated by Mena, Humphries and Choi (2013), in three-tier triads, the common node is not necessarily the focal actor that would benefit from a *tertius gaudens* (Burt, 1992) or *tertius iungens* (Obstfled, 2005) position in a structural hole configuration. Thanks to the specific notation adopted, this is easily identifiable, e.g. in a 3BSSo triad the focal actor B is only linked to S1 and the common node is S1, although in a 3CBSo B is linked to both C and S and is the focal actor.

In some papers, a three-tier triad 3BSS was presented as a Buyer - Intermediary – Supplier, “3BIS”, (Pathak, Wu and Johnston, 2014). The intermediary role was used to identify a purely transactional role that links the supplier and the customer. As a convention, and unless otherwise specified by the authors of the papers, the focus was always on the buyer (B), not the intermediary. This clearly reflected the grounding in the PSM field. A similar study with the intermediary as focal actor would be a 3CBS, as in Trimarchi and Tamaschke (2004).

The structure of triads therefore depends on the interactions existing between the nodes. This led to the distinction between service triads and manufacturing triads (Li and Choi, 2009; Wynstra, Spring and Schoenherr, 2015). Both are three-tier types of triads. The service triad is typically a 3CBS structure, in which the buyer is having services provided by the supplier to the buyer’s customer. There is a contractual link between the customer and the buyer, then between the buyer and the supplier, and an operational link (the provision of services) between the supplier and the customer. Service triads were the subject of several papers (e.g. Hartmann and Herb, 2014; Li and Choi, 2009; Wynstra, Spring and Schoenherr, 2015) that focused on the evolution of the triadic structure and how the Buyer can

remain in control of the relation between the customer and the supplier. However, the service in a 3CBS structure can also be related to the supply of goods as part of a service (Rossetti and Choi, 2008). In contrast, a manufacturing triad is an open triad, noted 3BSSo, typical of supply chain arrangement where a buyer acquires products from a tier 1 supplier, who uses materials from a tier 2 supplier. This vertical chain does not prevent the existence of contacts between the buyer and the tier 2 supplier (Wynstra, Spring and Schoenherr, 2015a). These discretionary exchanges are focused on information exchange, and do not entail the existence of formal links (ibid).

As indicated above, the evolution of triadic structures was very often discussed in parallel to their description. Evolution of the structure entails the creation and or the loss of links between the nodes. Or the extension of the links to nodes beyond the triad, changing the nature of the triad into a tetrad, or, *a contrario*, the loss of a link to a node, reducing the triad to a dyad. Several expressions were used to describe the creation and loss of links in triads, trying to capture the steps in which this occurs. These steps have been proposed by different authors, and can be sequenced as follows: First, a gradual loss of information and social exchange through a link, even if contractual obligations still exist. This is the bridge decay (Li and Choi, 2009). It happens in parallel to the creation of a new link. Then, there is the switch from the decaying link to a newly formed link. This is the bridge transfer (Li and Choi, 2009). Now the exchanges occur mainly through the newly formed link, whilst the decaying bridge is not formally cut. The state during which the decaying link and the newly formed link co-exist and therefore leads was identified as a transitional triad (Mena, Humphries and Choi, 2013). The whole of this process was referred to as disintermediation and was described in both service and manufacturing triads (e.g. Artto, Eloranta and Kujala, 2008; Li and Choi, 2009; Mena, Humphries and Choi, 2013; Rossetti and Choi, 2005, 2008). At the end of this process, the structure of the triad changes, and the balance of power is modified. The disintermediated node might even possibly be removed from the triad. This is considered to be a rare occurrence though, and suppliers would undertake such disintermediation only as a last recourse when confronted by an abusive buyer (Rossetti and Choi, 2005).

This evolution can also be towards closure of the triad, that is changing from an open triad to a closed triad (e.g. Bastl, Johnson and Choi, 2013; Dubois and Fredriksson, 2008; Madhavan, Gnyawali and He, 2004; Mena, Humphries and Choi, 2013).

The evolution of triads can be triggered by several phenomena. In service triads, it is frequently an opportunistic move initiated by the customer and/or the supplier, who aim at increasing their benefits by removing an intermediary. In manufacturing triads, it is relationship (mis)management by the buyer that is more frequently referred to. The formation of coalitions is a third trigger to the evolution of triads. These points will be discussed in more details in the section relating to the management of relationships within triads (section 2.4.2.3).

An interesting case was described by Salonen (2004), in which, in a service triad, the customer (in a buyer role) initiated a two-tier triad for the sourcing and contracting phase of the project, and then forcibly changed the triad into a three-tier closed structure, with services provided by both suppliers and the tier 1 in charge of the operational management of the tier 2. As much as it is typical of service outsourcing practice, this has been scantly reported in research as the focus was on undesired disintermediation as described above.

This project dimension in the case described above is an important aspect of interorganizational relations that has been scantly touched in the conversations on triads. Only one paper (Artto, Eloranta and Kujala, 2008) addressed it. The essence of the point is that triads exist at organizational level, with their own structure, roles, and relationship balance. Simultaneously, on a project basis, a project level triad can exist with its own structure, roles and relationship balance. Apart from Artto, Eloranta and Kujala (2008) that distinguished both organizational and project levels, the other papers considered organizational level triads only; the distinction was not highlighted in Salonen's. This lack of distinction implies that organizations would govern their external relations identically across all projects or activities with a given node. Taking the buyer's point of view in a triad, as it is the case in many of the papers reviewed, this is in contradiction with the portfolio management prescriptions usually followed by the

profession (e.g. Kraljic, 1983; Moeller, Fassnacht and Klose, 2006; Monczka et al., 2011) that include a product-level categorization and prioritization, that is a more granular level analysis than an organizational-level approach.

Even if the structures proposed focus on the three parties of the triad with a defined role for each (buyer, supplier, customer, intermediary), these organizations are still part of a larger ensemble and may have distinct roles in the triad in focus and the ensemble, depending on the particular relation observed (Harrison, Holmen and Pedersen, 2012). In the same paper, the introduction of a fourth node was referred to as a valid empirical endeavour, as long as it provided additional explanation to the dynamics of the triad observed.

2.4.2.3 Contributions on the management of relationships within triads

Relationship management conversations are focused on the achievement of balance in relationships, and the choice of instruments to govern the interactions.

The choice of appropriate governance instruments and practice is deemed essential to the performance of triads. These terms are broad and interpreted differently across the literature reviewed. As well, some papers focused on the benefits of one node (in general, the buyer, e.g. Dubois and Fredriksson, 2008; Salonen, 2004), of a specific dyad (Bastl, Johnson and Choi, 2013; Shi et al., 2014), or of the triad itself (e.g. Grimm, Hofstetter and Sarkis, 2014; Hartmann and Herb, 2014; Wilhelm et al., 2016).

What made consensus was the necessary alignment of goals and incentives, across the tiers of the triad. This is not new in the literature, though. What was specific is that the unit of analysis has evolved and can now show the influence of a third node on the ‘classic’ dyad, the interactions of these three nodes together, and the influence of a link on another link (Choi and Wu, 2009a, 2009c).

Balance theory (Heider, 1958) stipulates that in a triad, actions taken at a dyadic level can affect other dyads across the triad, with the objective of reaching a balanced state between the dyads in the triad, as an unbalanced state causes

tension and, if unresolved by reaching a balanced state, tension will lead to the dissolution of the triad. Choi and Wu (2009a) proposed nine types of 2BSS triads, focused on the balance of relations between the nodes: three closed triads in a balanced stated, three closed triads in an unbalanced state, and three 2BSSo triads (i.e. with a structural hole). The recommendation of the authors was for the Buyer (focal actor) to foster a balanced state of positive relations between the members of the triad. The risk to the Buyer is that in case of imbalance or negative relations, either the suppliers are going to avoid collaborating with each other, they would possibly leave the triadic arrangement, or they may form a coalition to take control of the relationship with the Buyer. With the buyer being the focal actor, coalition formation between suppliers is leading to a potentially unfavourable power imbalance against the buyer. Therefore, it is in the Buyer's best interest to govern the relationships within the triad to avoid such outcome.

As just indicated, coalitions are formed by frustrated parties, who seek to tip the balance of power (Artto, Eloranta and Kujala, 2008; Bastl, Johnson and Choi, 2013; Choi et al., 2002; Shi et al., 2014; Wuyts et al., 2004) in their dyadic favour. This can be either construed as a competitive or a defensive reaction (Madhavan, Gnyawali and He, 2004). In the quest to avoid being overpowered, reaching equilibrium can be enough to satisfy the coalition (Bastl, Johnson and Choi, 2013). Within triad coalition mean that two nodes ally against the third, even across tiers (Bastl, Johnson and Choi, 2013), or geographic distance (Rossetti and Choi, 2008). The nodes need not have the same role, that is a buyer can ally with a supplier to counter another supplier, or a customer. Even though this was not expressed in the papers reviewed, disintermediation can be construed as a form of coalition building that can lead to the dissolution of the triad.

With this in mind, the role of the procurement function in managing the relationships of the buyer node with the nodes in a supplier role is therefore essential, as is the alignment of the said function with its internal stakeholders (Wilhelm et al., 2016). The approach taken by the authors differed based on the background of their research. Those looking at interorganizational relationships in general had a tendency to discuss what is the balance between formal and

informal instruments that should be preferred (Dekker, 2004; Poppo and Zenger, 2002; Provan, 1984; Vedel, Holma and Havila, 2016), staying at conceptual level. The adoption of the adequate mix of governance instruments in the context is an essential element to manage uncertainty and allow flexibility in triadic contexts (Wathne and Heide, 2004). However, the “right” mix is the object of a lasting debate. Stemming from different fields, in dyadic contexts, Poppo and Zenger (2002) and Cao and Lumineau -in an extensive literature review- (Cao and Lumineau, 2015) concluded that formal and informal instruments as well as the mediating relational constructs (e.g. power and trust) are complementary rather than exclusive. In contrast, some authors (e.g. ,Gulati, 1995; Sitkin and Roth, 1993) asserted that formal and informal governance instruments are substitutable. The debate is far from closed. However, there is a growing trend to consider that the choice of governance to achieve a given outcome preferably calls on combination of several instruments, rather than relying on one set (Alvarez, Pilbeam and Wilding, 2010; Wathne and Heide, 2004). Furthermore, in a recent study in a dyadic context, the co-existence and independent evolution of formal and informal governance was shown to influence the outcomes of complex projects mixing product and service delivery (Howard et al., 2019). Whatever the combination enacted, continuous adaptation to flexible circumstances is the rule (Wathne and Heide, 2004). That is why keeping autonomy in decision-making is an important factor (Provan, 1984).

In contrast, the researchers having a strong link to the field of operations (e.g. Dubois and Fredriksson, 2008; Grimm, Hofstetter and Sarkis, 2014; Mena, Humphries and Choi, 2013; Odongo et al., 2016; Reusen and Stouthuysen, 2017; Rossetti and Choi, 2005) were more focused on the precise instruments (e.g. contracts, processes, etc), and in which combination, to select in order to protect the focal actor’s (in general, the buyer) best interests. These authors fed on the work on interorganizational relationships in general, albeit (from the references used in the papers reviewed) there is no strong evidence that the reverse flow of knowledge use is true.

As shown in Table 2-14 Methods of papers 78% of the papers related to the supply chain field. The first recommendation of these authors was to pay attention to the context of the nodes in the triad, and the interdependence of the various nodes (e.g. Choi and Kim, 2008; Grandori, 1997; Grimm, Hofstetter and Sarkis, 2014). This shall not be limited to the triad, fully reflecting the importance of embeddedness (Grandori, 1997; Wuyts et al., 2004) and linking to the recommendation made to researchers of looking beyond the triad when this brings additional explanation to the dynamics of the triad observed (Harrison, Holmen and Pedersen, 2012).

The second one, was -when the buyer is the dominant actor- to make sure that no party in the triad finds an interest in changing it. That is to ensure fair distribution of value (Choi and Kim, 2008; Dubois and Fredriksson, 2008; Hartmann and Herb, 2014; Mena, Humphries and Choi, 2013; Odongo et al, 2016; Rossetti and Choi, 2005; Rossetti and Choi, 2008; Wu and Choi, 2005). Other circumstances would only be the result of coalition formation by frustrated suppliers, or disintermediation. This is a direct consequence of using the Buyer as the focal actor: it is always this node whose interests are taken into account in analysis. Even when a research design considered the view of the other nodes, it was in relation to the buyer (Odongo et al, 2016; Wilhelm et al., 2016).

Nearly half (15) of the contributions discussed the management of supplier-supplier relations (Choi et al., 2002; Choi and Kim, 2008; Choi and Wu, 2009a; Dubois and Fredriksson, 2008; Grimm, Hofstetter and Sarkis, 2014; McFarland, Bloodgood and Payan, 2008; Pathak, Wu and Johnston, 2014; Rossetti and Choi, 2008; Salonen, 2004; Shi et al., 2014; Van der Valk and Van Iwaarden, 2011; Wathne and Heide, 2004; Wilhelm et al., 2016; Wu, Choi and Rungtusanatham, 2010; Wu and Choi, 2005; Wuyts et al., 2004), and only two (Choi et al., 2002; Wu and Choi, 2005) offered archetypes to analyse and strategize. The first one qualified supplier-supplier relations as competitive, cooperative, and coopetitive. Coopetition is cooperation between two firms that are competitors, as a temporary behaviour that “facilitates the overall efficiency and competitiveness of both parties” (Choi et al., 2002, p.122). The second one described five archetypes

of suppliers relations (conflicting, contracting, dog-fighting, networking, transacting) (Wu and Choi, 2005) that detail the possible impact of actions by the buying firm on the relations between the suppliers, thereby supporting -or not- the action(s) meant to foster competition, cooperation or co-opetition suggested in Choi et al. (2002). At the same time Wu and Choi made eight propositions that emphasized that common understanding of each organization's context and goals, and the fostering of positive interorganizational relationships -this did not mean to refrain from competing- will support same-tier and across-tier collaboration. In this paper, the only mention of coalition behaviour by suppliers was to positively address buyer's expectations (case "Hands-off", p 34).

As much as influence is exerted, it is also received. Three papers (McFarland, Bloodgood and Payan, 2008; Phillips, Liu and Costello, 2001; Reusen and Stouthuysen, 2017) investigated the influence of the choice made by a node to govern a link on the choice by the subsequent node to govern the subsequent link through imitation behaviour. These three studies were made in the context of three-tier triad, with two of them relating to the field of marketing (McFarland, Bloodgood, Payan, 2008; Phillips, Lin, Costello, 1998), and one stemming from accounting (Reusen and Stouthuysen, 2017). Why did that not catch the attention of operations-related researchers? The phenomenon of imitation -also called 'contagion' by McFarland et al- was shown in these three papers to be detrimental to the organizations applying it, and to the overall performance of the triad. Essentially, at an organizational level, it is a source of misalignment between the node goals and the way it is monitoring them and the performance of its related nodes. Like trying to drive using someone else's glasses. This behaviour is reinforced by uncertainty (Reusen and Stouthuysen, 2017) and social capital (McFarland, Bloodgood, Payan, 2008). Imitation was evidenced to occur both upstream, when buyers imitated their customer in the governance of their own suppliers (Phillips, Lin, Costello, 1998; Reusen and Stouthuysen, 2017) and downstream (McFarland, Bloodgood, Payan, 2008), whereby buyers would behave towards their customers as their own suppliers behaved. There has been no research made to uncover the possible reciprocal influence of this link-on-link effect.

2.5 Synthesis

2.5.1 Findings

The purpose of this review was to answer the question:

> "How are relationships between organizations governed in triads?"

and the two sub-questions:

- What are the governance structures used in triadic relations?
- What are the governance instruments used in triadic relations?

From the 2,436 contributions identified by searching databases and grey literature sources, 36 papers were retained for review. From the thorough analysis of their inputs, two main themes emerged: triadic structures, and relationship management.

The review identified eight triadic structures (Figure 2-6), distinguished by three factors. Firstly, they can be open or closed, that is there are two or three links within the triad. An open triad implies the presence of a linking node, the one connecting the other two. Secondly, the triads can span two or three tiers. Thirdly, the role of the nodes (buyer, supplier, customer, intermediary), whose importance and span varies depending on the other two factors. This structure can evolve, notably under the influence of the governance actions undertaken by the nodes in a quest to balance the relationships within the triad. Links can be created or lost, reinforced or weakened. Coalition building, a change in the structure of the triad, is the most common reaction to a perceived unbalance. Disintermediation was presented as either an opportunistic move, or a natural evolution in a relationship, and only context would tell. In all circumstances, evolution of the structure is linked to balance of relationships within the triad, not discounting the possible influences of the wider environment. This implies that governance is of the essence.

The purpose of governance is to align goals and incentives. It is enacted through formal and informal instruments. In a nutshell, the literature review did not uncover governance instruments specific to triads or triadic contexts. In fact, “these formal and informal control mechanisms protect organizations in their relationships to each other (as dyads) and not the network’s activities as a whole.” (Provan, Fish, Sydow, 2007, p. 503). This also emphasises that it is the enactment of these instruments that is specific to the triad as a structure.

Stemming from the procurement and supply chain management field, most of the papers considered the point of view of the buyer, and the governance efforts to be made to protect the benefits of the buyer. Several frameworks for context analysis (a specific dyad, the triad, interdependence of nodes, looking beyond the triad, influencing factors) were proposed. Any change of focal actor entails a new analysis. Specific supplier management tactics were offered to entice behaviours that would benefit to the buyer (e.g. competition, cooperation, coopetition, delegation of supplier management tasks), and applicable to both two-tier and three-tier triads (Choi et al., 2002; Dubois and Fredriksson, 2008; Wilhelm et al., 2016; Wu and Choi, 2005). Their applicability to both manufacturing and service triads was not straightforward, as the role of the customer in a service triad did not seem taken into account.

The interdependence of the nodes in a triad is a critical factor to take into consideration, as it means that whatever action undertaken by a node will affect the two other nodes in the triad. This is also why the triad is an attractive unit of analysis for researchers: the link-on-link effect can be observed. Combined to the perpetual evolution of balance within dyads, triads, and the broader environment, uninterrupted adaptation of governance as a mix is necessary, be it by the adjustment or the replacement of the instruments used.

In sum, as much as the triadic context is specific, the governance instruments used are not specific to triads. It is the adaptation of the governance mix that is, as it has to consider the interdependence of the nodes and their possible individual and collective reactions.

From a research design point of view, the units of analysis used are not consistent across papers claiming to investigate similar phenomena (e.g. node, dyad, triad, dyad within a triad). As well, the lack of accepted theoretical foundations hinders the definition of commonly accepted vocabulary (e.g. agree on open-closed or transitive-intransitive). In addition, cross-field exchanges seem scarce, in spite of the large array of journals in which the reviewed papers were found.

2.5.2 What was not discussed in the papers

Remarkably, the governance instruments themselves were not discussed in these papers. They are referred to, albeit not theorized about. The roots of governance instruments remain in dyadic and broader network-level conversations, as shown in section 1.3, and notably section 1.3.6. These elements are summarized here.

Two sets of instruments used in interorganizational relations were confirmed by an extensive review of literature on the governance of supply networks (Pilbeam, Alvarez and Wilson, 2012), and briefly described by Dekker (2004, p.32). Firstly, formal instruments: standards (for output and for participation); processes (control systems, coordination); structures and organizations / roles functions at macro or micro level; and contracts. These formal instruments contribute to avoid opportunistic behaviours by using material (usually financial) incentives to control outcomes (what is achieved) and behaviours (how it is achieved) (Dekker, 2004). They are often mediated by power. Also part of formal instruments, specific investments (Williamson, 1979) are two-sided: they display the willingness of a party to commit to a relation, be it by providing a hostage (e.g. when a supplier buys a specific equipment to serve a customer), or by facilitating the relationship (e.g. a buyer implements an electronic exchange platform to enable seamless communication to and from suppliers). Secondly, informal instruments: social norms; value systems, schema and culture; relationships / embeddedness; information sharing. These informal instruments promote self-regulation through social control (Dekker, 2004). They are often mediated by trust.

Social power is defined as the ability to bring “change in the belief, attitude, or behaviour of a person” (Raven, 2008). One characteristic of power is that it is always intended as being an asymmetric instrument: ‘having more power than’ is the basis for its dominance effect (Choi and Wu, 2009a; Huxham and Beech, 2008). In a triadic context, Bastl, Johnson and Choi (2013) referred to the five initial bases of power of French, J. R. and Raven (1959) and then adopted the mediated and non-mediated power types described by (Johnson et al., 1993) in Bastl, Johnson and Choi (2013) that incorporate informational power -the sixth base of power proposed by (Raven, 1965).

This gives the following classification:

- mediated power (deliberate action to influence): (ability to) reward, coercion, legal legitimate (authority based on legal principles);
- non-mediated power (“not specifically exercised or threatened to manipulate a target”): expertise, referent (model), information, traditional legitimacy.

In contrast to power, trust is based on balance, not asymmetry. It is the reciprocal level of trust that will entice the most benefits for the parties. However, trust is not evident and given from the onset of a relationship. Calculativeness is often a first step, and it can also coexist along with trust. Relational trust is an essential “explanatory factor for the structural manifestation of governance” (Zaheer and Venkatraman, 1995, p.388). In addition, (Lewicki, Tomlinson and Gillespie, 2006) identified Competence trust (based on skills and capabilities to fulfil what is expected), Contractual trust (based on the assumption that individuals stick to their word), and Goodwill trust (based on commitment to the other).

Voilà, the stage is (briefly) set for the governance instruments used in the papers reviewed. Although, whilst these papers do commonly refer to a specific instrument (e.g. ‘a contract’, ‘a process’, ‘contacts’), the references to the conduit used to mediate them are usually more generic (e.g. ‘power’ or ‘trust’) -with the notable exception of Bastl, Johnson and Choi (2013) as detailed in section 1.3.6.

The second point that stands out here is that all papers reviewed kept their analyses and contributions at organizational level, in spite of the fact that the

theoretical foundations on triads stemmed from individual-level research in psychology and sociology (e.g. Simmel, 1950; Heider, 1958), and that the most frequently referred-to theory has a transaction-level lens (e.g. TCE). In TCE human-driven behavioural factors such as bounded rationality and opportunism are part of the drivers of transaction costs (Williamson, 1979). Moreover, theories potentially addressing individual behaviours were also used (e.g. Agency theory, Social network theory -second most used after TCE) in the papers reviewed, indicating that this level can also provide insights on organizational-level relations. Furthermore, relational governance has been increasingly researched and highlighted as an important factor in IORs (e.g. Cao and Lumineau, 2015; Dekker, 2004; Gulati and Singh, 1998; Poppo and Zenger, 2002). The apparent absence of consideration of a micro level (be it individual, function, or project level) in the research on the governance of and within triads is a clear gap in literature; if only to ensure that the existing knowledge on this level could be applicable there as well.

2.5.3 Conclusion and further research

There is a clear surge in interest in the topic of governance of triads by researchers from several different fields (e.g. accounting, networks, supply chain management).

Compared to the generally accepted models of network governance, i.e. shared governance, lead organization, network administration organization (Provan and Kenis, 2008), the only one presented in the reviewed papers was the lead governance model, that is governance enacted by the buyer as dominant actor. In the sense that triads are the smallest possible network (Choi and Wu, 2009b; Provan, Fish and Sydow, 2007), a reflexion on the applicability of the other two could bring additional clarity on the roles of nodes and their possible governance behaviours.

In addition, regarding the choice of governance mix, no information was given on the adequacy of instruments depending on the goals of the enacting organization.

‘Aligning goals and incentives’ is a broad statement. Some input was given on the recourse to relationship-based interactions in situations of tensions (Hartmann and Herb, 2014), even though it is recognized as less efficient than authority across cultural barriers (Trimarchi and Tamaschke, 2004).

The interplay of relationships within a triad is a topic that was addressed only in the frame of managing supplier-supplier relations for the benefit of the buyer (Dubois and Fredriksson, 2008; Wilhelm et al., 2016; Wu, Choi and Rungtusanatham, 2010), or in the very broad sense of balancing relations through coalitions (Bastl, Johnson and Choi, 2013; Choi and Wu, 2009a). Understanding how a link can influence another link is still an incomplete endeavour.

Moreover, the research presented, theoretical and empirical, was conducted at organizational level. Only one paper (Wilhelm et al., 2016) offered findings from an investigation conducted at operational level, on the implementation of a sustainable supply chain management program. In spite of the existing input of the existence of temporary, project level networks in parallel to the more enduring organizational networks (Artto, Elanora and Kujata, 2008), current efforts seem to overlook the daily-reality-bound operational level and the differences that can stem from a project-specific context in contrast to an organizational level context. Given that the importance of the context was heavily underlined, this is surprising. As well, this would enable functional-level investigations, and resonate with the recommendation of Wilhelm et al. (2016) on the parallel consideration of triad-organization and functional/individual levels.

From the above elements, the following research question is proposed:

> ***How does the governance of buyer-supplier relationships influence the other relationships within a buyer-supplier-supplier triad?***

The intent is to explore two possible interactions:

- How do the goals of a node affect the governance of a link?
- How does the governance of a link affect the governance of another link?

The following chapter describes the methodology used for the empirical investigation that seeks to provide answers to the above question. This chapter first introduces the philosophical approach to empirical research. Then it details the research design, and the data collection methods and sources, and the data analysis principles enacted. The last two sections present the steps taken to ensure methodological rigour, and the adherence to the ethics of research.

The subsequent chapters present the case analysis work and findings, followed by the discussion that encompasses managerial implications. Finally, the conclusion summarizes the work accomplished, the findings and proposes avenues for research.

3 RESEARCH METHODOLOGY

This chapter is focused on describing the empirical research project. The underlying ontological and epistemological foundations are discussed first, followed by the research design, data collection methods, and data analysis principles. This chapter ends with a summary of the steps taken to ensure methodological rigour, and those regarding research ethics.

3.1 Philosophical approach

The analysis of the possible connection between nodes and links beyond their direct relations is based on a critical realist approach.

What is central in critical realism is that structure and relationships have causal powers: it is the interaction between them that produce the conditions that may enable or constrain the actual (Peters et al., 2013). “The objective of understanding why things are as they are” (Easton, 2010, p.118) is at the core of critical realism, and of this research. This is illustrated by Figure 3-1 below.

The purpose of the analysis is to conceptualize what drives the achievement of the meso-level goals expressed by the organizations participating, taking into account the context and the impact of the governance choices made by the individuals in the nodes when confronted with threats to their goals. It is through the analysis of the mechanisms driving the changes in the structure of relationships and of the governance instruments used in order to resolve the threats that the questions are expected to be answered.

The logic of discovery is abduction: to find the best explanation, looking for details and the unexpected (Easton, 2010; Ryan et al., 2012). An abductive research design enables a retroductive analysis, particularly well supporting the critical realist research mindset: “reflect on not only what happened, but what could happen or what hasn’t happened; taking into account the situational and contingent nature of causal powers.” (Ryan et al., 2012, in table 1, p. 302). This

is particularly well suited to theory generation and elaboration endeavours (Ketokivi and Choi, 2014).

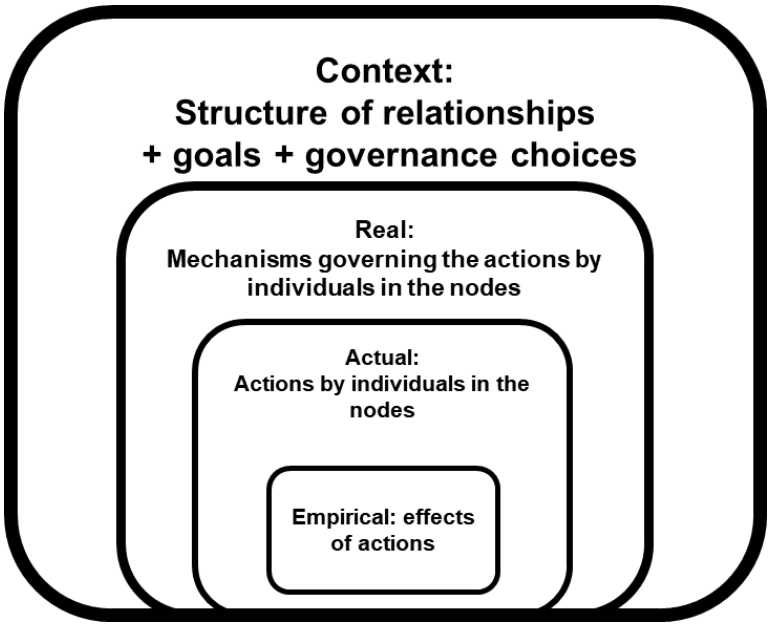

Figure 3-1 Critical realist approach

3.2 Case study research design

Given the exploratory nature of the research, and the importance of context in interorganizational relations, a qualitative approach was preferred. Case study research can be used to generate theory, test theory, or elaborate on an existing theory (Ketokivi and Choi, 2014), depending on the richness of existing theoretical knowledge and the importance of the context. In this research, on the one hand, governance instruments are well known and documented, as are triadic structures; on the other hand, the interplay of relations within triads is not, and the specifics of the context are expected to play a role in influencing their interactions. Therefore, the exploration corresponds to a theory elaboration endeavour that builds from existing knowledge (Ketokivi and Choi, 2014).

Undertaking a theory elaboration work influences the type of case study that can be used. Considering the four methods of theorising analysed by Welch et al.

(2011), ‘contextualised explanation’ is the one that fits best to the inquiry. The first one, ‘inductive theory building’, is based on testing hypotheses and aims at generalization of findings. This positivist approach implies the a-priori identification of constructs and variables, which are not known here. The second one, ‘natural experiment’ is also a positivist approach, aimed at developing theory through the demonstration of proposed causal links in the real world. The third one, 'interpretive sensemaking', in which the researcher is an active observer, aims at uncovering the social meaning of individual-level actions. The fourth one, ‘contextualized explanation’, intends to offer causal mechanisms that are related to the context. This is also consistent with a critical realist ontology, and the use of an abductive process to recontextualize a phenomenon.

Hence, the empirical research method selected is the case study, for its appropriateness to address “what”, “how” and “why” questions, and its proven effectiveness in taking into account the importance of the context (Sayer, 1994; Welch et al., 2011; Yin, 2018).

The intent was to collect information through interviews, from individuals that decide on the actions (what is done), the intended outcome (why is the action undertaken), and the process followed (how is it done) – and it is recognised that they may be the same individuals in some organisations. To the extent permitted by confidentiality of business relations and ethics, a combination of interviews and documentary evidence was used.

3.2.1 Case selection

As indicated by Yin (2018), the multiplicity of cases contributes to the robustness of findings. Here, in an exploratory endeavour, the intent was to limit changes in conditions to a minimum to support literal replication and reduce the influence of contextual differences across cases. It was therefore necessary to find organizations willing to disclose information on several cases simultaneously. As indicated in section 3.1, the context is of high importance in this research.

This objective was achieved, with the Buyer and tier 1 supplier being the same actors in all four cases. This introduced favourable and unfavourable factors. The first favourable factor was the reduction in variation of goals and governance instruments used by these nodes on this specific link, which is deemed to ease identification of the effects of a link (this link) on another link (the tier 1 – tier 2 link). The second favourable factor was that the organizational-level contextual elements (triad structure, governance instruments routinely used between the organizations) were expected to be highly similar; therefore, variations at individual level (the actual) were expected to be more visible, hereby making the identification of the mechanisms driving these actions (the real) easier. The unfavourable side was the limitation of expected differences in goals and governance, possibly reducing the richness of comparative data.

As a counter point to the unfavourable factor, in two of the four cases, the influence of a node external to the focal triad (a tier 3 supplier linked to the tier 2 supplier) was included. These opportunistic observations were meant to incorporate richer data, and they provided insightful information regarding the main research question as well as the two sub-questions.

The industry sector selected, electricity production and transportation, was chosen for the challenges it has been facing for several years, such as wild swings in fossil energy prices (e.g. since mid-2015, the Brent oil barrel prices varied from over 115 USD to less than 30 USD in January 2016, and now navigating between 50 and 86 USD since mid-2018, according to sticker XC0009677409 BRN), political decisions regarding the choices of production sources and means (e.g. decisions to abandon nuclear power in Germany and Switzerland), climate accords (e.g. Conférence de Paris sur le Climat, COP21, in 2015, about the United Nations Framework Convention on Climate Change), technology developments and political decisions that support the development of production based on renewable sources (e.g. solar, wind), and the ever greater interconnectedness that also amplifies the interdependence of national networks. As an example, at the onset of year 2018, a dispute between Kosovo and Serbia led to an unbalance between production and consumption in these countries,

affecting the whole of Europe through a reduced frequency throughout the network. The visible impact to consumers was that the clocks of appliances that run on the assumption of a 50Hz frequency were “losing” time (ref. to press release by ENTSOE at https://www.entsoe.eu/news/2018/03/06/press-release-continuing-frequency-deviation-in-the-continental-european-power-system-originating-in-serbia-kosovo-political-solution-urgently-needed-in-addition-to-technical/).

The country selected, Switzerland, was an opportunistic choice by the researcher, for the recent changes undergone by the sector in this country (see Section 4.1.1), as well as geographic proximity that facilitated access to firms and interviewees.

The lead firm (the Buyer) was selected for its long-standing position in the industry as a major player in all aspects of energy production, transportation and distribution in Switzerland. This specific position and history made the existence of long-standing ties to at least one tier 1 supplier that would accept to participate in the research more likely. In addition, the implication of the Buyer firm in the expansion and renewal program of the Swiss energy footprint meant that a number of concurrent cases would be accessible and provide a combination of context-actors-time coherence supportive of higher consistency in observations and, possibly, findings.

There are four cases. Each case is a specific project involving the buyer and the tier 1, and possibly different tier 2 and tier 3 (Table 3-1). One project is a continuous service delivery; the other three are discrete orders for engineering products that include standard and bespoke components.

Case ID	Type of delivery	Buyer	Tier 1 Supplier	Tier 2 Supplier	Tier 3 Supplier
Case 1	Service	EPCCO	TECHCO	SERVCO	
Case 2	Product	EPCCO	TECHCO	PRODCO	
Case 3	Product	EPCCO	TECHCO	PRODCO	HIGHCO
Case 4	Product	EPCCO	TECHCO	PRODCO	DCABCO

Table 3-1 Cases and actors

A more detailed description of the overall context (market, organizations in scope) is provided in section 4.1.

3.2.2 Unit of analysis

According to Wasserman and Faust (1994, p. 19), a triad is defined as “a subset of three actors and the (possible) ties among them”. This implies that connections between all three actors are not required, leading to the concepts of open (closed) and closed (closed) triads.

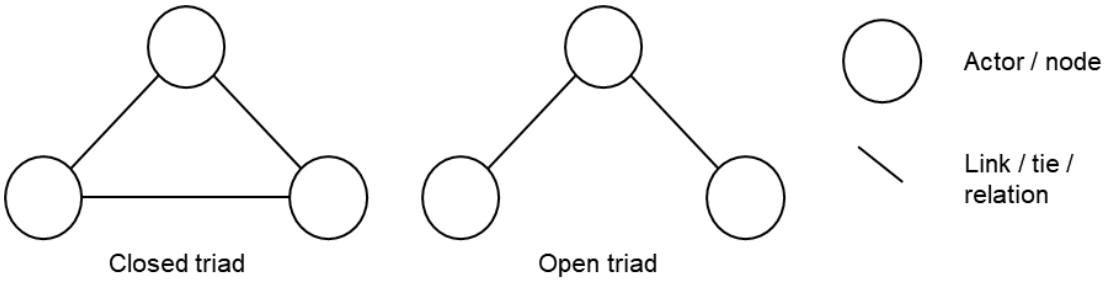

Figure 3-2 A closed and an open triad

The unit of analysis is each dyadic relation in the triads observed.

As in Rossetti and Choi (2005), the triads in this research span across three tiers (Buyer - tier 1 supplier - tier 2 supplier). The focal actor is the Buyer.

In this document, triads are illustrated as in Figure 3-3: the Buyer is on the top, the tier 1 supplier at the bottom-left, the tier 2 supplier at the bottom-right.

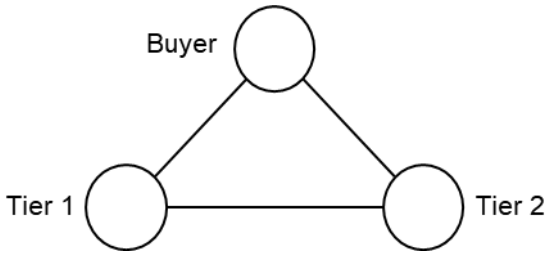

Figure 3-3 Conventional arrangement of tiers in a triad

Two of the cases are tetrads. For these, the drawing convention remains the same, with the Buyer as the higher node, and then tiers displayed upstream from left to right. The fourth node, tier 3, is then the rightmost node on the horizontal line.

3.3 Data collection

3.3.1 Approach and procedures

A research protocol was defined, outlining the research questions, interview guide and data collection guidelines were designed and followed during the data collection process (Yin, 2018). Following the recommendations from the same author, a research database was created that contained information regarding the interviewees, interviews follow-up (interview date, audio file transcription and anonymization, review by interviewee, acceptance of citation), and documents was created. These took the form of several MS-Excel files. As detailed in the Ethics section (3.6), particular attention was paid to confidentiality and anonymization of the participants (organizations and individuals) and of the data collected.

Data collection was executed in two main phases.

The first phase intended to capture data relating to the four cases. The second phase intended to contribute to construct validity, transferability, and data verification, of the findings of the first phase through comparative data from different contexts.

In the first phase, data was collected through semi-structured interviews, and documents from each of the Buyer, tier 1 and tier 2 nodes. In addition, contextual information was gathered from a customer of Buyer through email exchange, as well as institutional documentation on the industry.

In this phase 13 in-depth interviews were realized with participants of Buyer, tier 1 and tier 2 actors. The average duration was of 62 minutes (minimum 44, maximum 85), for a total of 809 minutes transcribed. A short description of the interviewees, their background, and the transcribed duration of each interview is given in Table 3-2. Some audio files were edited before transcription to remove interruptions (three interviews were interrupted by outside interventions) and social chatter with interviewees. Transcripts totalled 286 pages of text.

Participants represented procurement, sales and project management functions, to obtain a picture as complete as possible of each of the four cases. This approach is consistent with the work of Brito and Miguel (2017), who interviewed participants from both buyer and supplier firms to understand both perspectives. They all were from mid-level management, thereby making the decisions on which actions were to be undertaken in the face of the tensions that threatened the fulfilment of the goals of the projects. This also contributed to allow access to detailed information of the context and history of events, with a complete view for each individual case. Interviewing individuals having routine access to information on all cases -such as sales and procurement managers- led to conversations where cross-functional practices were readily discussed, in comparison to the more case-focused exchanges experienced with project managers. As an example, the discussion on the inconsistent contracting practice by the buyer organization was evidenced through exchanges with procurement managers, whilst the project managers were considering this not to be in their realm. Similarly, a sales manager of the tier 1 gave indications on how information flows were regulated with the tier 2, across all activities, enabling to form a consistent picture.

One constraint was the lack of access to the project managers of the tier 1 and tier 2 firms, as these organizations considered the competition with the Buyer to be predominant in the relation. As indicated by email by a project manager of the tier 1 firm, that did not want his team to be interviewed:

"[Buyer] *is our strongest competitor. We are not interested in an exchange in this case*."

The main limitation this created on the research is that it did not enable to assess how the governance efforts of the Buyer were perceived and reacted to by these project managers. However, the participation of a sales manager of the tier 1 enabled to gather valuable insight on how the management of suppliers and projects by the buyer was perceived by the tier 1 supplier as an organization. Moreover, the contributions of the procurement managers of tier 1 and tier 2 companies allowed to capture the chain of buyer-supplier governance, satisfying the main objective of the research effort. Nevertheless, even though the distribution of participants over-represents the buyer node, it is also representative of the efforts deployed in governing the projects and the suppliers. The buyer node was the one with the biggest stake, for several reasons. First one, it is ultimately responsible and liable in front of the end customer, and therefore of the market. Failing to deliver will tarnish its reputation, possibly reducing its attractiveness to potential customers. This links to the second reason: the buyer is a new comer on the competitive EPC market; it has a recognized competence based on its past history of serving its own needs, albeit it has to prove it can apply this expertise in delivering to third parties. Third reason, it does not make the products part of the delivery, meaning that it is always in a 'buy' position. By establishing itself as a business-competent customer, possibly adopting a 'tough but fair' stance, it is more likely to earn respect from its suppliers beyond the already recognized technical expertise.

One element stood out in this group of interviewees: only two persons of female gender. This is generally representative of the industry, notably in the engineering functions. The Buyer's Board of Directors is composed of nine members, among them only one woman. Gender equality is not cited in the documents available on their website. Similarly, the tier 1 has 11 members of its Board of Directors, including two females. It's Swiss operations are fully managed by men. However, gender equality is put forward on their website, notably in the 'careers' section; still a picture underlining the engineering and technical heritage of the firm displays 5 females out of 17 participants. Nevertheless, the answers of the female project manager person were not different in choice of words and content than

her counterparts. One could content that this reflects the primacy of function logics over other considerations, such as gender.

Organization	Function	Role	Interview duration in minutes (audio file sent for transcription)	History in company	Native Language
EPCCO	Procurement	Procurement Director	74	Joined in 2012, to establish procurement and supply quality	German
EPCCO	Procurement	Procurement manager	75	Worked for competitors of EPCCO in the same industry, and suppliers.	German
EPCCO	Procurement	Senior Procurement Manager	76	Joined EPCCO in 2017. Extensive experience in other industrial procurement focused on products rather than projects.	German
EPCCO	Project Management	Project manager	48	Group leader for high voltage engineering, over 25 years in the industry	German
EPCCO	Project Management	Project manager	85	Recently joined EPCCO. Case was his first project as project manager.	German
EPCCO	Project Management	Project manager	64	15 years with EPCCO. In charge of SCADA systems. Had same role in previous firm.	German
EPCCO	Project Management	Project manager	45	Has previous experience with several competitors/suppliers of EPCCO and TECHCO	German
EPCCO	Sales	Sales Manager	63	With EPCCO since 2011. Does business development for grid-related services	German
PRODCO	Procurement	Supply chain manager	72	With PRODCO since 2010. Previous experience with several competitors/suppliers of PROCDCO.	Czech
SERVCO	Project Management	Project manager	53	20 years in SERVCO, in network management and automations projects.	German
SERVCO	Sales	Sales Manager	44	Joined SERVCO early 2018. In charge of network management customers.	German
TECHCO	Procurement	Procurement director	60	Long standing experience in industrial machinery. Joined TECHCO in 2018.	Spanish
TECHCO	Sales	Sales Manager	60	Market manager since 2016.	Italian

Table 3-2 Interviews: firms, participants, duration

Contextual information was mostly based on documents obtained from institutions not part of the research, on their websites. Those are reports on the industry and the country, and they provided a large portion of the general information presented in Section 4.1.

Documents specific to the actors were either volunteered by the participants or obtained through the websites of the firms. Documents volunteered were scrubbed of sensitive data (e.g. budgets) before sharing. These documents are mainly related to relationship management with suppliers e.g. general legal and commercial terms and conditions applied by the firms in their relations with

suppliers, codes of conduct to be adhered to by suppliers, expected employees' behaviour in conducting business with external parties.

In the second phase, three semi-structured interviews were conducted with participants from the procurement functions of firms in the Buyer position. The intention was to contribute to construct validity, transferability of the findings of the first phase through comparative data from different contexts. The semi-structured interview guide used was the same one as for the first phase for procurement function (Appendix B.1), to keep the *deliberate naiveté* necessary to "openness to new and unexpected phenomena" (Brinkmann and Kvale, 2015, p.33-34). One firm was in the electricity production sector, one in the chemical industry, and one in the industrial goods sector. All three organizations had a strong business-to-business focus -only one has part of its products range that is intended for the consumers market. The interviews with these participants totalled 207 minutes (minimum 60, maximum 83) of transcribed interviews, and 64 pages of text. Details on the participants and interviews of phase two are found in Table 3-3.

Industry	Function	Role	Interview duration in minutes (audio file sent for transcription)	History in company	Native Language
Energy	Procurement	Procurement Director	64	Procures turnkey energy production and management projects, including all systems, products and services discussed in Case 1 to 4	French
Chemicals	Procurement	Procurement Director Region EMEA	60	29 years in firm. In charge of direct and indirect procurement for the region. Over 100 persons team.	English
Industrial products	Procurement	Procurement Manager France	83	20 years in company, always procurement. Manages team of 6. Coordination tasks with factories and procurement teams around the globe.	French

Table 3-3 Interviewees of second phase

Additional documents were also collected, for data verification and to obtain up-to-date contextual information (e.g. financial reports).

3.3.2 Data sources

3.3.2.1 Interviews, transcripts, and quotes

The interviews were semi-structured, and conducted around the following topics: context of the firm in the triad; actors (who is doing what); actions (what is done); the intended outcome (why is the action undertaken); the process (how the action is executed); and realized outcomes (what is the observed effect of the action, and how does it compare to the intended outcome). Specific interview guides were used for the three different functions interviewed (Procurement, Project Management, Sales). They are short and intended to steer the conversation on the topics of interest; they are available in Appendix B.1. The use of open-ended questions enabled the participants to talk about their projects, perceptions, feelings and experiences in their own words (Patton, 2015). As much as the topics did not evolve from one interview to another, the development of the conversation was specific to each participant, allowing for the individual to recount his story and experience in his own words. The researcher adapted his vocabulary to be as close to the participant's references as possible, and re-used the knowledge gathered from one interview for the following ones.

As examples:

- Gather technical vocabulary and specifics of project management in the energy industry;
- Avoid procurement jargon with non-procurement participants;
- Understand market mechanics and specifics of the industry (e.g. atomisation of product and services offering across many companies, high level of customer-supplier-competitor relations between the firms, the duality of public and private tendering rules and status depending on who the customer is).

Also contributing to construct validity, inputs from interviewees were used to dynamically create and subsequently update the list of categories and variables

used for coding, and improve the interview guide (Brinkmann and Kvale, 2015; Sayer, 1994,).

Two pilot interviews were conducted, with highly experienced procurement practitioners. Both had over fifteen years of experience of procuring goods and services, in several industries, and in several countries, in medium and large size companies (see Appendix B.2). As well, both these practitioners had not worked in the target industry of the case study, contributing to mitigate industry bias in the formulation of the interview guide. Nevertheless, it created a bias on procurement expertise: these pilot participants expertise in procurement was much higher than those of the interviewees at EPCCO[2], TECHCO and PRODCO. In addition, the questions were too narrow, prompting the participants to take the initiative to elaborate on what they thought was the research interest. In the empirical research, the bias was reduced by using semi-structured interview guides specific to each function (Procurement, Project Management, Sales), associated with open-ended questions. This enabled conversation-like exchanges between the researcher and the participants, providing for a more relaxed atmosphere in the interviews.

All interviews were conducted in English, and recorded, with a large majority of interviewees being non-native speakers from German-speaking education (77%). The researcher himself is a non-native English speaker, and with a generally better command of English than the interviewees. In addition, the researcher had an understanding of the native languages spoken by the interviewees -except Czech.

It is recognized that the use of a foreign language is a less efficient way to share knowledge and information(Ahmad, 2018; Welch and Welch, 2008). That is why it was also important to distinguish between lack of language knowledge, and lack of specific topical knowledge in the interactions with the interviewees. Context and situation dependence of the use of language (Renzl, 2007) were

[2] Codes for firms participating in the research are explained in Section 4.1 on Context

taken into account, as the lack of topical knowledge was not deemed to be a factor influencing the communication ability of the participants.

The extensive experience of researcher of working in multi-cultural environments (22 years in American, German and Swiss, Fortune 250 companies, in four countries and two continents, none from his original cultural background), meant he was aware of this issue, and somewhat prepared for it.

When confronted with a language barrier, participants often adjust the knowledge content to their command of the language -or the supposed command of the language of their interlocutor (Ahmad 2018, Renzl, 2007). In order to overcome the first obstacle, the pace of the conversation was adapted to the ability of each participant (speaking pace adjustment, as reported by Ahmad, 2018, p. 255). In addition, when necessary during the conversation, an online translation tool was used to confirm words or expressions (https://www.leo.org, https:www.lexilogos.com or https://translate.google.com/).

Sometimes, language adjustment (Ahmad, 2018), that is the recourse to the main language of the participant, was used. This was most systematically at the initiative of the interviewee, who used native-language words in the course of the conversation. In these cases, the researcher -within his ability- provided facilitation.

Example of language facilitation from Case 1 (*verbatim* transcription, thus “sic” is not added here):

Participant: *My knowhow is enough to change this Bestand (German word)* –

Researcher: *Equipment?*

Participant: *This equipments that they are always installed.*

In German, ‘Bestand’ means ‘inventory’, ‘stock’, and ‘asset’. Given the context of the interview (a project manager describing his tasks in the maintenance and upgrade of specific equipment), the researcher offered ‘equipment’, and this word was confirmed by the participant. ‘Asset’ would have also been correct, however

it is often used with a financial undertone, and the practitioner habit is to use ‘equipment’ rather than ‘asset’.

Other example, in Case 4:

Original text from transcription:

“Very handsome with its suppliers”

Quotation in Case 4:

“Very generous with its suppliers”

Based on the context of the discussion on the favourable treatment given to suppliers in the General Terms and Conditions of the Buyer, as well as the proximity of the idea of grandeur / nobility and the adjective ‘goodly’ with the German adjective ‘stattlich’ that conveys all of these meanings.

When the researcher could not offer an immediate English word, recourse was made to an online translation tool used by the participant who could then pick the exact word in his original language.

To lessen the impact of the second adaptation tactics by participants confronted to a foreign language, that is the adaptation of language to the supposed command of the language by the recipient, i.e. the researcher, two measures were adopted. Firstly, extensive information was collected on the sector and industry, through reports and brochures (see Documents section 3.3.2.2), enabling the researcher to show his awareness of the specific market organization and of the web of relations existing between the firms in scope. Secondly, the researcher volunteered his understanding of technical vocabulary and issues. This was mostly necessary with Project Managers, as in comparison Sales and Procurement interviewees were not as challenging on these aspects.

In fact, it is the researcher that adapted the vocabulary used in questions and loopbacks to the ability of the interviewees.

Clarification feedback and cross-check questions ('confirmatory questions', Ahmad, 2018) were extensively used by the researcher, through read-back and loopback for immediate confirmation by the participant.

Example of loopback from Case 3 (*verbatim* transcription, thus "sic" is not added here):

Researcher: *And this project, is it for a new substation, or is it a replacement?*

Participant: *A replacement. It's the replacement. This was the refurbishment. It's very tricky. This substation was working, and we change all.*

Researcher: *You change while it is operating?*

Participant: *Yeah.*

Researcher: *So, you had to continue the operation of the existing substation and, at the same time, you had to replace one element.*

Participant: *Yeah.*

These steps taken before and during the interviews made this data collection between non-native speakers easier than anticipated. Two elements support this perception by the researcher. Firstly, the depth of information captured, especially through information volunteered by interviewees without recourse to probing questions; this demonstrate that participants felt safe to share even in a non-native language. Second, the limited amount of edition done in the transcription review step: even when the text showed a limited command of English language, participants did not request a more sophisticated expression. This was done by the researcher for the longer quotes included in the document.

Before transcription, each file was checked by the researcher for audio quality, and removal of social chatter and interruptions (three interviews were interrupted by external interventions). Then the file was made available to the transcription service provider through a link to a private secure server. Access to the file on the server was revoked after the transfer. The transcriptions were made *verbatim*,

and verified against the audio file by the researcher. In order to ensure consistency all interviews (except one) were entrusted to the same service provider. The researcher provided the service providers with a short explanation on the context, specific names (firms, cities), and a list of specific vocabulary relating to the industry, or even the German words used by the participants in the heat of the moment.

The transcribed text was then sent to the participant for review, as a word file. Interviewees were given three weeks to review; after this time, the text was deemed accepted. On the one hand, only half of the participants actively confirmed their review before expiration of review period. On the other hand, only few minor corrections were requested, by two interviewees. This participant-executed review was also a way to ensure that the participant's input (words, intended message) was properly captured, and give him the opportunity to clarify and adjust any of the expressed fact or opinion.

As much as the *verbatim* transcription captures the exact words, it also creates some difficulties to directly quote participants as spoken and written language are different. This was sometimes amplified by the use of a foreign language for the interview. In order to ensure legibility of the document, some sentences were rephrased, as shown in the following example in Case 2:

Original text from transcription:

"*In our company, our purchasing manager or purchasing colleague, he have buy* [sic] *pencils, he have buy* [sic] *my high-voltage systems, and he have buy* [sic] *the computers for the secretaries team. He have* [sic] *no chance to understood* [sic] *what all has happened and how it is connect* [sic]."

Quotation in Case 2:

"*In our company, our purchasing manager or purchasing colleague, he buys pencils, he buys my high-voltage systems, and he buys the computers for the secretaries team. He has no chance to understand all that has happened and how it connects*."

Such editorial work was done only for longer quotes (like above).

In addition, the researcher took notes during each interview, to underline, concatenate or summarize statements, ideas, links to other interviews, documents, theories or practical examples.

Moreover, the *verbatim* transcription does not convey the pauses and hesitations of either interviewer or interviewee in the course of the interview. During the analysis of interview transcripts, the audio files were frequently used to ascertain of non-verbal elements (i.e. elements on transcribed) such as the rhythm of the conversation revealing that the interviewee was looking for words -in some circumstances an online dictionary was used, and the tone of the voice at the given moment in the interview. This proved useful notably when onomatopoeia were used, such as “mm mm”, or single words such as “yeah”, moments when the tone conveys the message, and was not available in the written transcript.

In spite of these obstacles, conducting the whole research project in one language (English) contributed to the consistency of meaning because one person (the researcher) could see the same words and concepts in only one language rather than having to reconcile across several languages. As an additional error-reduction method, systematic recourse to dictionaries in English (mostly on www.lexilogos.com) rather than English-French (the native language of the researcher) reduced double-translation issues.

3.3.2.2 Documents

Documentation was the main source of data concerning the institutional environment present at the macro and meso-levels.

Documents were collected to build the researcher’s knowledge of the industry, on the specifics of the Swiss market, and understand the business of the main firms included in the research (Buyer, EPCCO, TECHCO, PRODCO and SERVCO), as well as the way they conduct business with their suppliers. A total of 49 documents representing 2,297 pages were used; they are listed in Appendix

B.3. These documents were classified as brochure (e.g. presentation of organizations, products and services), commercial (e.g. general terms and conditions of procurement), instructions (e.g. Supplier code of conduct, Process control plan), presentations (e.g. internal documents shared during interviews); one press release, reports (e.g. information on the industry or the country, such as International Energy Agency's report on Swiss energy policy, Swissgrid's strategic grid 2025 technical report; Swiss Office Fédéral de l'ENergie report on transmission grid strategy), two webpages, and two work documents from EPCCO (a Request for Quote example, and the template for offer analysis). The bulk of the documents was found in the reports (18 documents, totalling 2,029 pages) and brochures (11 documents, totalling 101 pages), necessary to understand the specifics on the industry, the organizations, and their products. The summary of number of documents by type, and associated total of pages is shown in Table 3-4.

Document type	Pages total	Number of documents
Brochure	101	11
Commercial	35	8
Instructions	93	5
Presentation	27	2
Press release	2	1
Report	2029	18
Webpage	3	2
Work document	7	2

Table 3-4 Type and size of documents used

From the researcher's experience, the small size of the commercial documents (2 to 11 pages, with only one above 5 pages) is a sign of the lack of maturity of the procurement function in the firms. In fact, TECHCO, that is the organization that has been on a competitive market for the longest time, had the most comprehensive commercial documents. One might contend that the institutional

background provides enough safeguards in contracting, however, as experienced in the cases, this was not the case.

3.4 Data analysis

3.4.1 Coding logic

As per the prescription of grounded theory (open coding, e.g. Corbin and Strauss, 1990), the data collected during the interviews was coded in several categories: contextual information, participant information, actions taken, influencer, results obtained (Trimarchi and Tamaschke, 2004; Wilhelm et al., 2016). These codes were descriptive codes (Miles and Huberman, 1994).

Contextual information related to the case (which case), the node, the position of the node in the triad, the links of the node, and the governance choices of the node for each goal in each of its links.

Participant information focused on the case, the node in which the participant worked, and their function.

The actions taken related to what was done by each node and participant after threats to goals were discovered. These elements related to who was contacted by the participant, to address which goal.

The influencer dimension captures the motivations expressed by the participants in explaining why they undertook the actions.

The results obtained were identified in relation to the goals, with fail/ success/ partial assessments based on input by the participants. For the same case, participants may have different views as to the success of their undertaking and the achievement of goals (Roehrich and Lewis, 2014).

The coding pattern was changed several times, in consideration of the data collected, and of the accumulation of the material collected (‘data driven coding’, Brinkmann and Kvale, 2015). Notably, the use of institutional logics was introduced in the course of the interviewing effort, after consideration of which

theoretical basis would best suit this dimension in the context of the research question and of the cases.

Coding enabled the researcher to populate the tables used in data analysis and identify patterns of actions-mechanisms-outcomes.

Pattern coding (Corbin and Strauss, 1990; Miles and Huberman, 1994) was used to create the causal networks presented in the Cross-case analysis section (4.3).

3.4.2 Analysis framework

The analysis was always conducted from the perspective of the procurement function of the focal firm (Buyer). This created a recognized bias and corresponded to the journey undertaken in the research: to guide managers to the best choice of governance for their organizations to achieve their goals in environments that go beyond the traditional dyadic view. This is also part of the critical realist ontology that recognizes that “social reality may not be dependent on the mind of the observer for the critical realists” (Peters et al., 2013, p.329).

3.4.3 Theoretical foundations

Governance instruments as construed in this research stem from TCE (Cannon and Perreault, 1999). This theory also contributed to the definition of the concept of tier (in Section 1.2.2), essential in understanding the interactions between nodes.

Very early in the course of the interviews, the micro-level dimension (that is the function they represent in their organization) was referred to by participants as a key element in the operationalization of governance instruments. As this dimension is only considered in TCE for bounded rationality and opportunism as drivers to transactions, it became necessary to identify a theoretical foundation to analyse this dimension.

In the requirements, the theory needed to take into consideration the interaction between institutional-level goals and individual actions. Three bodies of literature came to mind. In procurement and supply chain literature, the theory most commonly referred to to highlight goal convergence or divergence between agents and principals is agency theory (e.g. Fayezi, O'Loughlin and Zutshi, 2012). However, critical realism explanatory approach is to take into account individual intentionality and the actor's position in its context and social structure (Welch et al., 2011): agency theory does not include this aspect; it is rather linear in its conception of principal-agent consideration, and presupposes that the agent must be controlled to avoid opportunistic behaviour to the prejudice of the principal. Stewardship theory (e.g. Donaldson and Davis, 1991), is also interested in the relation between a manager and its corporate organization, in the long term. According to stewardship theory, the project manager acts in the best interest of the project sponsors (Davis, Schoormann and Donaldson, 1997). Here again, the inquiry is based on the assumption of alignment of goals between an individual and an organization for their mutual benefits, with a relationship based on trust whilst agency theory is a proponent of power-based control and monitoring. However, the specific context of the individual is not taken into account. In contrast, institutional logics theory does consider the context in which the individual is situated, as well as the intrinsic and extrinsic influences that drive his behaviour. This more recent theory encompasses macro, meso and individual levels (e.g. Thornton and Ocasio, 2012) and is therefore particularly appropriate to the situation analysed.

Institutional logics represent the values and references which individuals and organizations draw upon to guide their decisions and actions (Thornton and Ocasio, 2008). Six institutional orders (the family, religion, state, market, professions, and corporation) have been recognized to "shape how reasoning takes place and how rationality is perceived and experienced" (Thornton, Lounsbury and Ocasio, 2012, p.2).

Three types of logic were described by Martin et al. (2017): professional logic is characterized by the dominance of professionals over decision-making and

deference to knowledge and skills; corporate logic refers to managerial techniques to monitor and control professionals' and organisational performance; market logic encompasses all signals given by market about its requirements, and the measures taken by organisations to address them (e.g. costs containment, performance of products and services).

They are observed at individual (micro), organizational (meso), and industry (macro) levels, respectively. It is the embeddedness of agency across these three levels (Thornton, Lounsbury and Ocasio, 2012) that renders this theory well-suited to the understanding of the phenomena in the cases retained in this research. Furthermore, recent literature on intraorganizational conflicts based on institutional logics (Besharov and Smith, 2014) brings useful insights on the evolution of the balance of institutional logics within the focal organization.

In contrast, the agency theory that is frequently used to uncover individual's motivations to act in business context, is less appropriate to the specific context. As outlined in numerous papers (Eisenhardt, 1989; Tate et al., 2010), agency theory focuses on the contract between a principal and an agent, and how can the principal ensure that the agent resolves the potential conflict of interest in favour of the organization. In agency theory, the assumption is that the agent is seeking self-interest (Eisenhardt, 1989). To the contrary, in the interviews conducted in this research, the participants referred to protecting the interests of the organisation -meeting the goals- and to professional values as guides for their actions, thereby eliminating the main driver of agency theory: goal conflict between the principal and the agent and fostering institutional logics as the relevant frame of understanding.

During the coding, three levels of reference were identified: the industry (macro-level), the company (meso-level), and the individual (micro-level) resembling the ones used by Martin et al. (2017) and Gonçalves, da Silva and Teixeira (2019): profession logic, corporation logic, and market logic.

- profession logic is characterized by centeredness on one's functional responsibilities, and deference to knowledge and skills;

- corporation logic refers to the impact of corporate priorities (e.g. brand image, products quality, and associated means to monitor them) on individual's behaviour;

- market logic encompasses all signals given by market about its requirements, and the measures taken by organisations to address them (e.g. costs containment, standards and norms). In their article (Gonçalves, da Silva and Teixeira, 2019), used both market and state logics to refer to technical standards; here only market is used as these technical standards apply across all Cases and introducing an additional logic specific to this point would not provide additional clarification.

3.4.4 Analysis models

The model for data analysis developed for this research project (Figure 3-4) was not meant to represent the duality of structure (organizational governance) and agency (individual execution). It was meant to identify necessary relations and contingent relations, and where they were manifested in the cases observed.

The model reads from left to right and starts by the description of the context. Apart from information on industry and organizations, including their goals, the context includes the choice of governance instruments by the node according to their goals. These choices can be specific to business conditions, such as the competitive/ cooperative/ coopetitive relations organizations can experience, or a project. The questions to be answered at this time relate to the influence of the choice of governance instrument by a node according to its goals on the links this node has with upstream nodes. Also, do these links affect other links. The next step is to identify if and when, and which, tensions emerged to threaten the fulfilment of organizations' goals. Then, the reactions of the organizations are observed, with the intention to uncover the mechanisms driving these reactions. The next step is to understand the effects of the actions taken at the 'reactions' step, notably the consequences on the structure of the triad, the governance of the links, and again how links affect other links. And the last step is to assess the

new situation, especially verify the extent to which the remedies to the threats have produced their intended effects.

This model was also meant to maximize the opportunity offered to compare an initial situation (the structure of links in the triad, and the governance of each case as intended designed by each of the participating companies), and the changes that followed the emergence of tensions (threats to goals of the organizations). That is why the analysis follows the flow of events (initial context, tension, reactions, effects, new situation).

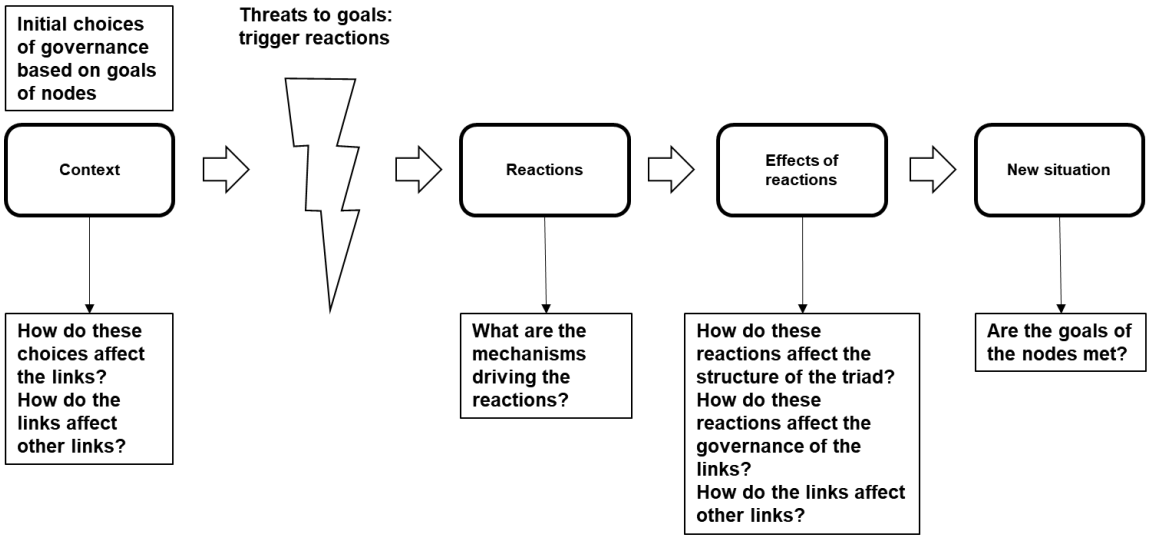

Figure 3-4 Model for data analysis

Referring back to Figure 3-1 on the Critical Realist approach, the context determines the starting situation. Then, threat to goals trigger reactions by the individuals (the actual), that have effects (the empirical), leading to a new situation. The real are the mechanisms governing the actions of the individuals.

This model was used to create specific tables to capture the interactions stemming from the research question:

- How do the goals of a node affect the governance of a link?
- How does the governance of a link affect the governance of another link?

3.4.5 Depiction of relations in cases

The structure of the relations in the Cases is an important element of the context, and it is also affected by the reactions of the individuals after threats to goals appear. It is represented using the symbols and arrangements introduced in Figure 3-2 and Figure 3-3. As done by (Holma, 2012, figure 1 p.103) the intensity of the relation (link) was captured. It is illustrated by the thickness to the line showing the link between two nodes. Intensity was assessed on the number of instruments used by the lower node on that link (e.g. the number of instruments used by the buyer in its relations with the tier 1 and tier 2 suppliers), and -notably for the informal relations- the input by the participants (e.g. “We are frequently in contact”, or “I don’t talk to them”).

Except for case one, a depiction of the structure of relations as “initial situation” and “after issues emerged” is given.

The governance instruments were identified in the first review of literature conducted during the problem definition (see section 1.3.6), from Pilbeam, Alvarez and Wilson (2012) and Dekker (2004), and are summarized in Table 3-5. Governance instruments are meant to regulate the interactions between participating firms (and possibly with organizations beyond the boundaries of the triad) and can be formal or informal in nature.

Firstly, formal instruments prevent opportunistic behaviours by using material (usually financial) incentives to control outcomes (what is achieved) and behaviours (how it is achieved) (Dekker, 2004). They are standards (for output and for participation); processes (control systems, coordination); structures and organizations / roles functions at macro or micro level; and contracts.

Secondly, informal instruments promote self-regulation through social control (Dekker, 2004). They are social norms; value systems, schema and culture; relationships / embeddedness; information sharing.

	Identifier	Includes	Focuses on
Formal Instruments	Contract	Legal safeguards	What / Outcome
	Goal Alignment	Incentives and reward structure	What / outcome & How / Behaviour
	Organization & Structure	roles functions at macro or micro level	How / Behaviour
	Process	control systems, coordination	How / Behaviour
	Standard	for outputs and for participation	What / Outcome
Informal Instruments	Embeddedness & Relationships	Individual-level connections	How / Behaviour
	Information	Sharing of information	How / Behaviour
	Social norms	Expected behaviours of extrinsic source	How / Behaviour
	Values	Behaviours based on intrinsic references	What / outcome & How / Behaviour

Table 3-5 Governance instruments

There is another formal instrument that is not represented in Table 3-5: specific investments. Specific investments (Williamson, 1979) are two-sided: they display the willingness of a party to commit to a relation, be it by providing a hostage (e.g. when a supplier buys a specific equipment to serve a customer), or by facilitating the relationship (e.g. a buyer implements an electronic exchange platform to enable seamless communication to and from suppliers).

In the context, the occurrence of specific investments is dependent on the presence of a specific supplier relationship management structure. In the cases, it is specifically designated when present.

3.4.6 Influence of a node on a link

For each link in each case, going up the supply chain (from Buyer to tier-n, refer to Figure 1-2 for illustration), the governance instruments deployed by the lower node to ensure its goals were met, are captured in a table like the one below (Table 3-6).

LINK	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Goal 1									
Goal 2									
Goal 3									
Goal n									

Key: ◆ instrument present ❒ added for issue resolution

Table 3-6 Capturing influence of a node on a link

The table is meant to show, for each goal, which are the formal and informal instruments used by the lower node towards the upper node of the link observed (e.g. the Buyer towards the tier 1; the tier 1 towards the tier 2, and so on). Two different symbols are used to distinguish the instruments used *ab initio* and the ones added after the threats to goals appeared and different instruments were used for issue resolution.

There is one table for every link in the case in scope.

3.4.7 Influence of a link on a link

For each link in each case, going upwards the supply chain (from Buyer to tier-n, refer to Figure 1-2 for illustration), the governance instruments deployed in the lower link are compared to the governance instruments deployed in the next link upwards, using a table like the one below (Table 3-7).

		Formal Instruments					Informal Instruments			
Between	And	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Buyer	Tier 1									
Tier 1	Tier 2									
Buyer	Tier 2									

Key: ◆ instrument present ❒ added for issue resolution

Table 3-7 Capturing influence of a link on a link

This table enables the identification and the comparison of the instruments used in the links of the structure being observed. Two different symbols are again used to distinguish the instruments used *ab initio* and the ones added after the threats to goals appeared and different instruments were used for issue resolution.

There is one table for each case.

The cases were selected for their display of tensions -threats to goals of Buyer- and evidence the change in the governance operationalized in reaction to these tensions. In these circumstances, what was not said, and not done, was as important as what was enacted (Easton, 2010).

3.5 Methodological rigour considerations

The principle applied was that “Case research must be made transparent by demonstration of what one has done, not by declaration that a formalized process was followed” (Ketokivi and Choi, 2014, p.233).

Thus, following the recommendations of several authors (Burke Johnson, 1997; Gibbert and Ruigrok, 2010; Guba, 1981; Ridder, 2017; Yin, 2018),a number of steps were taken to ensure rigor and quality in this case study:

- **Construct validity** was supported by the integration of several sources of evidence, dependent and independent from the participating individuals and organizations. The choice of context and participating organizations allowed to highlight commonalities and differences.

- **Credibility:** a major contribution to credibility was to ensure ‘factual accuracy of the accounts’ obtained in English from non-native speakers as per the measures described in 3.3.2.1. This information was triangulated across several sources. Credibility was also achieved thanks to the comparison of patterns between cases in the cross-case analysis. A causal framework was drawn (Figure 4-5) to ascertain the existence of a consistent cross-case pattern. It was confirmed through the possibility to subsequently create a conceptual causal framework (Figure 4-6). Theoretical triangulation was included when the duality of analysis levels was identified. Several fields of literature were included, to ensure that specific knowledge was available when needed, instead of subjective assumptions. This also enabled better-informed abduction.

- **Transferability**: in addition to the literal replication logic inherent to a multi-case study, the findings of the four cases were tested through three interviews with participants in significantly different contexts (industry, company size, cultural background).

- **Dependability**: the case study protocol was detailed. A chain of evidence was maintained, through extensive description of data collection methods, data sources, extent of data collected, and referencing to the exact sources (interviews, documents). Extreme attention was given to mitigate collection and interpretation risks linked to the use of a non-native language by the researcher

and the participants. In addition, interpretive validity was enhanced by verbatim transcription of interviews, and by executing coding using the transcript, researcher's notes, and the audio file in combination to get the "feel" of the moment (hesitations, stumbles, looking for words, etc). The data analysis procedure was carefully documented.

- **Confirmability**: in a qualitative undertaking, it is based on the credibility and dependability of the data collected, and of the findings produced.

3.6 Ethics

Ethics are an important aspect of research involving individuals, *a minima* to ensure that they are held safe from negative consequences of their participation in the research.

Particular attention was paid to obtaining informed consent of the interviewees in writing before each interview, for their participation, and the use and publication of research material and findings. A specific form (Appendix B.4) was created by the researcher -from examples provided by the supervisors- to this aim and exchanged either physically or by email with the interviewees, with a signed copy for each of participant and researcher.

Interviewees were informed when the recording of the interview started.

After each interview the transcription was made available for review by each participant, with a three-week period granted for input.

The confidentiality of the data was ensured through anonymisation and by restricting access to the original (non-anonymised) data: apart from the participant, only the researcher would know the names of these interviewees along with their contribution. In three cases the participants introduced themselves with their full names during the recorded part of the interviews, enabling the transcriber to hear them. The names were removed from the transcription.

In addition, tracking of identifiers (individual names, organizations, cities) was kept using a two-step coding. That is two different tables were used to link the participant number as indicated on the Informed Consent Form and the anonymization code visible in the transcribed interviews.

Audio files and transcriptions were encrypted using a specialized software (AxCrypt) specially purchased by the researcher, using a 256 bits key. As per the Informed Consent Form, the audio files shall be destroyed within five years of the end of the research. End of the research is deemed to be the graduation of the researcher.

Other files containing identifiable information (e.g. documents, researcher's work files to track and anonymize data and progress) were also encrypted.

One firm (the Buyer) required the researcher to sign a non-disclosure agreement regarding commercial data that may be shared.

The next chapter presents the case analysis work and findings. It is organized in three sections, to introduce the context of the four cases, the within case analysis, then the cross-case analysis. This last section includes the insights and findings identified.

The subsequent chapters are the discussion, where findings are debated, and managerial implications developed. Finally, the conclusion summarizes the work accomplished, the findings and proposes avenues for research.

4 CASE ANALYSIS

4.1 Context description

The context description intends to provide a rapid introduction to the Swiss market of electricity transportation, and introduce the organisations participating to the research project then follows.

This array of information is intended to ease understanding of the situation faced by the organisations and individual actors in this research, and from time to time, parallel between published reference procurement practices and the actions of the participants.

4.1.1 The Swiss market of electricity transportation

4.1.1.1 High level explanation of power infrastructure systems[3]

Power plants and international power lines provide extra-high-voltage electricity (380,000 Volts, and 220,000 Volts) to the transmission grid. Across the grid, stations and substations enable the balancing of the supply and demand, the routing of available electricity, and reduce the voltage down to end-user friendly values (typically 400 Volts or 220 Volts).

4.1.1.2 Recent development of the Swiss market of electricity transportation

Switzerland's geographic position makes the country a privileged path for electricity transit between countries in continental Europe. It contributes significantly to the production of electricity from renewable sources, with 64.5% of its electricity generation issued from hydro, biofuels and waste, solar and wind

[3] The purpose of this context description is not to provide deep knowledge of the technical side of electricity production, transmission and grid management. Therefore such explanations are kept to the information necessary for understanding of the links between actors.

(OECD/IEA, 2018). Furthermore, the country developed extensive hydro pumped-storage and reservoir capacities that are of strategic importance in the balancing of the overall supply in Europe.

However, Switzerland has still not finalized the negotiations for a deeper integration with the EU market, especially for day-ahead and intraday markets, lowering the coupling and balancing of networks capacity, thereby generating losses of electrical energy. Still, the Swiss Confederation needs to import electricity, especially during winter times, and this will probably be amplified by the retirement of nuclear power in the mid-term. The transportation of electricity is done through power lines. Within Switzerland, there is over 250,000 km of power lines to transport and distribute electricity to all customers.

Swissgrid is the transmission system operator (TSO) that owns the Swiss extra-high-voltage transmission network (220 kV and over). As such it is in charge of the safe operation, maintenance, and non-discriminatory access to the network. This extra-high voltage transmission grid is about 6,700 kilometres long, and is rather old (two-third built before 1980) (Swissgrid, 2015a).

Electricity is locally provided by distribution system operator (DSO), many of them also being producers. There are about 650 DSOs in the Swiss market, largely owned by the public sector (cantons and municipalities) (OECD/IEA, 2018). DSOs are suppliers and customers of Swissgrid.

4.1.1.3 The monopoly customer: Swissgrid

Founded in 2006, Swissgrid is a publicly-owned organisation. Its shareholders are mostly Swiss DSOs and energy producers (over 95%, according to the Swiss register of Shareholders as of January 3rd, 2019). These organisations are for the majority themselves owned by public authorities (cantons, cities). A number are buying from and/or supplying products and services to Swissgrid.

Since 2009, Swissgrid is responsible for “the operation, safety and expansion” of the extra-high voltage transmission grid. This grid includes 380 kV and 220kV

lines and associated transforming and switching stations and substations. Essentially, the 380kV network transports electricity from the main production points (500 MW and above), across long distances, eventually across national borders. The 220 kV network insures local and regional distribution of electricity and connects the production points of lower output (below 500 MW). Local distribution is done by the DSOs.

Since January 3rd, 2013, Swissgrid has acquired ownership of this extra-high voltage transmission grid (art 8 of law Loi sur l'Approvisionnement en Electricité, March 2007) (Swissgrid, 2015b).

Given the age of the grid, and the recurrent congestion events, Swissgrid is confronted with an urgent task to expand the transmission capacity of the network, through optimisation of the existing system and, when unavoidable, the construction of physical new power lines and network management installations (Swissgrid, 2015b). Preference is always given to optimisation over installation of new equipment (the NOVA principle: Grid optimisation before enhancement before expansion) (Swissgrid, 2015). The "Strategic Plan 2025" calls for about CHF 2.5 Bn of investments, including about CHF 1 Bn for regular maintenance (Swissgrid, 2015b).

Swissgrid's motto "Security of supply is our task. At all times. For the whole of Switzerland" (Swissgrid, 2015a) has a strong impact on the way it operates. It is reflected in their mission statement «We run the transmission grid constantly, reliably, efficiently and without discrimination on behalf of the Swiss economy and electricity industry. We are designing and building the transmission grid of the future. »

The organisations considered in this research project are one of the DSOs (EPCCO), and tier 1 and tier 2 suppliers of this DSO (TECHCO as tier one, and PRODCO and SERVCO as tier 2). The focus is on network (grid) maintenance, updates and upgrades of the existing substations, and the construction of new ones. This business is known as Engineering, Procurement, Construction (EPC), and includes a mix of services and products.

4.1.2 Organisations in scope of the research project

4.1.2.1 The focal firm: EPCCO (the Buyer)

EPCCO is a public company, owned by cantons and utilities providers (themselves mostly controlled by cantons and cities). EPCCO is an important shareholder of Swissgrid, controlling directly or indirectly more than 20% of Swissgrid's capital.

Early 2013 EPCCO was required by law to sell its transmission lines, transformers and substations of 220kV and above to Swissgrid. It is now operating as a distribution system operator (DSO) in the transmission market. EPCCO also remains a key player in electricity production [disclosure of detailed information would breach the confidentiality commitment of the research].

The company is organised in several divisions, representing its diverse activities in electricity production, distribution and trading. The research was conducted within the division in charge of grid-associated services: construction and maintenance of EPCCO's own network, and provision of similar tasks as services to third parties.

With this change in its economic balance, EPCCO entered the Engineering, Procurement, Construction (EPC) competitive business, building on its extensive knowledge and experience in the corresponding tasks as they also use the said resources and capabilities for their own needs. The transfer of assets to the TSO means that about half of the engineering workload was lost, and EPCCO is actively pursuing sales activities with Swissgrid and other actors on the Swiss market. Capturing business outside of Switzerland is "*by chance*" according to a sales director at EPCCO, as few efforts have so far been made to expand beyond national borders. De facto, EPCCO is one of the biggest players on the Swiss market and enjoys an history-based competitive advantage in the detailed knowledge of a large portion of the grid. Still, as underlined by a procurement director and a sales director, the need to compete for projects and generate margins is new to EPCCO. The provision of such EPC services is considered '3rd party business', to distinguish from the fulfilment of EPCCO's own needs.

This new situation creates tensions with incumbents such as TECHCO, that do not welcome competition on an already extremely difficult market. A procurement director at EPCCO gave the example of one of their German suppliers:

"[they] have also their own third-market business, and we fight against. […] for [them], this is a problem. A problem because there is a new player on the market and they [EPCCO] *take the projects."*

In addition, a sales director described the Swiss market as

"V*ery closed and one where prices are the lowest*",

increasing competitive pressure between EPC providers for products and services that are considered as commodity markets due to globalisation. This sales director summarized:

"Competition is quite tough in Switzerland because there are many good skilled companies for not so many business opportunities. And they are all almost on a…it's a similar level equality. So, it's quite price sensitive, Switzerland."

These changes have triggered the creation of a procurement function within EPCCO, in 2012. Prior to this date, procurement was executed by the technical function in charge of the project or service. The procurement function plays an important role in managing the duality of processes associated to the "double hat" created by the provision of EPC services. As indicated above, EPCCO is a public company, and has to follow public procurement rules to address its own needs; however, when conducting 3rd party business, it is entitled to follow private procurement rules, even when participating in a public tender initiated by an organisation such as Swissgrid. All tenders that follow public procurement rules are published on the internet-based platform for public procurement in Switzerland (SIMAP, www.simap.ch), and abide by the rules of the World Trade Organization on public tendering.

Procurement at EPCCO is mostly project-based, with a few (less than 30, according to a procurement director) contracts covering standard services (e.g.

software upgrades for network management) or simple components (sensors, switches). The procurement director and senior manager interviewed underlined the strong focus on risk management, with a recent entry in cost containment. Cost control is different from cost optimisation and highlights the lack of maturity of the function. A senior manager illustrated that by the fact that

"*Procurement as an activity is considered as less important than cost control"*,

and the function is fighting a tough battle for recognition in the organisation. This is visible from the outside, and one of TECHCO project managers even mentioned that, at EPCCO:

"*The procurement department is taking part of responsibilities of EPCCO project managers*".

EPCCO procurement function has implemented a number of processes and documents to ensure transparency and compliance to regulatory requirements, and ethics principles.

These documents are:

General terms and conditions

Code of conduct

Business principles

Procurement principles

Code for business partners purchasing

They all are available on the website of the firm.

4.1.2.2 The tier one supplier: TECHCO

TECHCO is a large international industrial firm, operating in four different sectors: energy, industrial automation, robotics, transportation. According to the 2018

annual report, it posted a revenue in excess of CHF 25Bn for 2018. Its shares are traded on several stock markets in Europe and the USA, with a fragmented ownership (collectively, the top three shareholders own less than 20% of the capital and voting rights, with the biggest being below 12%).

The energy division, within which this research project was conducted represents more than 20% of the posted revenue, with over 50,000 employees at the end of 2018. The range of products and services aims at extra-high, high, and medium voltage applications, i.e. at business-to-business customers, and is sold through multiple channels.

The energy division comprises several business units. As explained by a sales executive:

"*Each unit is competing, have to survive and make business, and that's the way is TECHCO.*"

A quick introduction to the three units is given below. In the scope of this research the first two (PRODCO and SERVCO) are acting as tier 2 suppliers, and they will be described more extensively in the corresponding section.

The first one, PRODCO, is in charge of engineering and manufacturing products such as modular substation packages, transformers, switchgears, circuit breakers, wiring accessories, enclosures and cabling systems, measuring and sensing devices. PRODCO is headquartered in Switzerland, not far away from EPCCO.

The second business unit, SERVCO, focuses on service-products such as network management software, and data communication networks. SERVCO is headquartered in Germany and has technical centres in various countries to execute software development and integration with PRODCO's products.

The third business unit, ENGCO, acts as an EPC provider, building on internal competencies from PRODCO and SERVCO to propose system-level solutions (e.g. complete substations or transformer stations). ENGCO is a direct competitor

of EPCCO on the EPC market and is actively pursuing business with Swissgrid. ENGCO is not considered further in the research.

Some persons at TECHCO, SERVCO and PRODCO refused to participate, or even let their team members participate, in this research, as, citing an email from one of them:

"*EPCCO is our strongest competitor. We are not interested in an exchange in this case*."

Sales activities are executed at divisional level (TECHCO). Projects won are contracted to the business units to ensure delivery of adequate products and services. TECHCO does offer system level solutions that combine products and services from the three business units; still there is competition for revenue allocation between the business units as underlined before by a sales executive (refer to citation above).

Procurement strategic activities are executed at divisional level (energy division), to achieve volume bundling across product lines (e.g. for raw materials such as copper, aluminium and silver), and support standardisation of components, which enables leveraging for these categories as well. Tactical and operational implementation are devolved at business unit level. For PRODCO, it means that one individual supports competing manufacturing locations, including the one where he is based. As an example, a Buyer based in Switzerland will implement the strategy decided at divisional level for four factories located in Switzerland (her home base), Germany, Poland and Czech Republic; and these plants are competing against each other for the business captured by the sales function.

Similarly to other large firms, TECHCO has a set of processes and documents to ensure transparency and compliance to regulatory requirements, and ethics principles.

The documents available on their website are:

General terms and conditions

Code of conduct

Self-enrolment and certification process of suppliers in a third-party administered database of supplier to the energy industry

With the exception of the Code of Conduct, these documents may be tailored to fit specific business unit and regulatory requirements.

Competitors to TECHCO exist, with similar supply range, or focused on some products of PRODCO or services of ENGCO. Competitors to SERVCO are competing at TECHCO level.

4.1.2.3 Tier 2 supplier for products: PRODCO

PRODCO, is in charge of engineering and producing products such as modular substation packages, transformers, switchgears, circuit breakers, wiring accessories, enclosures and cabling systems, measuring and sensing devices. These products are either standard solutions or engineered-to-order. PRODCO is structured as a network of technical centres and factories. There is active competition between the plants to be awarded business captured by the sales function. However, as pricing from plants is centrally controlled at divisional level, there is stronger emphasis on technical performance of production systems, final product quality and time to delivery.

Even though few firms offer such an extended range of products, external competition on each family of products is intense and global. One way to alleviate the product cost advantage enjoyed by some competitors due to easier access to materials, labour, or lower institutional constraints, is to offer superior services (engineering, delivery, quality), and innovative products.

PRODCO invests on manufacturing automation and has kept a high level of vertical integration. As an example, large stampings parts are made in house from metal coils, a range of components typically outsourced in other manufacturing industries (e.g. appliances).

Part of the strategy of PRODCO is to stimulate competition between its network of technical centres and manufacturing locations. This supports the push for

technical innovation, manufacturing excellence, continuous improvement of processes and products, and cost control.

From a procurement side, PRODCO benefits from the high level of sophistication in procurement strategizing and execution brought by TECHCO at divisional level. In addition to powerful IT systems and detailed databases, a procurement executive cited structural advantages such as centralization of category management, integration in sub-regional clusters, and process advantages such as systematic leveraging and bundling, buy-on-behalf, hedging on materials and currencies, as major contributors to PRODCO's procurement function performance. As procured components and materials represent more than 60% of PRODCO's product value, this highly centralized approach brings most factories to very similar materials costs, emphasizing the competition on workmanship in the factory. In addition, as about half of these components are supplied from other PRODCO (and sometimes TECHCO) plants, the individual competitiveness of each plant benefits to the whole organization.

Dealing with its suppliers, PRODCO is using a highly standardized approach, based on contracts and processes. There are no supplier specific adaptations made by PRODCO: it is the supplier who has to adapt, fit in the process, and deliver accordingly. A procurement manager explained that all interactions are regulated through processes, often supported by digital platforms, and that informal communication and exchange is creating risk, especially the risk of repeating same issues/ mistakes. PRODCO made significant specific investments (development of comprehensive processes, digital platforms) in this domain to ensure suppliers' performance is up to expectations.

Supplier performance is constantly monitored, with quality and on time delivery being considered more important than price, as they impact the daily performance of the receiving plants, and can potentially impact the end customer, generate waste, rework, warranty issues and loss of brand image.

In the relation with upstream suppliers, PRODCO is "shielding" them from terms imposed by customers. PRODCO absorbs any risks that are not handled in the

contract between TECHCO and EPCCO or other customers. This stems from the fact that, as explained by a procurement executive at PRODCO:

"*PRODCO consider their business as a product business, not a project business*",

that is based on standard products rather than bespoke solutions. This was confirmed by a sales manager, who went further:

"We are afraid of risk because of the product, because we sell products that sometimes require a real deeper knowledge for special solutions, and sometimes it is difficult because of lack of resources. We prefer to stay in a well-defined range of products."

A senior purchasing manager at PRODCO explained that in spite of the constraints imposed by PRODCO, suppliers seek business from PRODCO to benefit from structured and process-based relationships, as well as PRODCO's reputation for fair business behaviour. The same individual (who refused to be quoted) specified that, apart from pricing, buying from PRODCO or TECHCO plants is handled following exactly the same rules and processes as any other supplier.

4.1.2.4 Tier 2 supplier for Services: SERVCO

SERVCO, headquartered in Germany, focuses on service-products such as network management software, and data communication networks. These service-products are software-based, including a kernel of basic functions to which many other modules can be added in order to create a bespoke system. Sales and project management are managed, and executed for EPCCO, from Germany. Software is developed in-house, in different countries, and the implementation and upgrades are executed by SERVCO employees. Occasionally, SERVCO provides hardware such as computers, however it represents only a tiny fraction of its activity. Competition on these service-

products is limited to about 5 companies worldwide. All of these companies are part of industrial firms that compete with TECHCO's energy division in general.

4.1.3 The relationship between EPCCO and TECHCO

The relationship between EPCCO and TECHCO is a long standing one, and that is made more intimate by the regular movement of employees from one company to another. Several executives and C-level individuals in both companies have worked at both firms.

A major evolution was triggered by the changes made to the Swiss electricity market in 2013, when EPCCO entered the EPC business following the law-forced transfer of its extra-high voltage assets to Swissgrid. EPCCO evolved from being purely a customer into becoming also a competitor to TECHCO. In parallel, TECHCO lost some engineering knowledge and capacity, and sometimes relies on EPCCO's resources to provide the necessary services.

In sum, EPCCO and TECHCO are in a complex relationship of being competitors, clients and suppliers of each other.

Early 2019, the relationship was rather tense, explained a sales executive at TECHCO.

"There is a lot of competition at the moment, there is an overcapacity in the world and more and more competitors on the market.",

referring to the EPC market on which TECHCO and EPCCO compete. Emphasizing that, between TECHCO and EPCCO,

"There is competition, and collaboration is very wide range. Sometimes competition, sometimes collaboration. So, it's not only good relationship for working together. Sometimes they [EPCCO] *take work that we would like to have also and, therefore, this is also against further investment in the relationship."*

In addition, the performance of TECHCO on some recent projects was below EPCCO's expectations, creating tensions between the organizations.

Nevertheless, procurement and sales managers of both firms referred to the need to keep good working relations.

TECHCO is considered a strategic supplier by EPCCO, based on spend and products specificity. As a procurement manager of EPCCO explained:

"We don't have it too much on the screen that [TECHCO] *is a competitor, from procurement side"*;

"*It is a top 5 supplier, they are totally cross-divisional* [delivering to all divisions of EPCCO], *and there are a lot of discussions at high-level management."*

A framework agreement was signed between the companies to simplify transactions below CHF 250,000, considered as "*small orders*" by EPCCO. It is also the threshold beyond which EPCCO has to follow public procurement rules when buying goods or services for its own use. EPCCO intends to develop automation of transactions between the firms, also gaining additional monitoring and cost control.

From TECHCO's perspective, EPCCO is a valued customer, thanks to EPCCO's position on the market as DSO and as EPC provider. In both circumstances, EPCCO is in a position to specify or buy TECHCO's products and services. In addition, EPCCO is a provider of services to TECHCO, as explained by a sales manager of TECHCO:

"Sometimes we ask them for services, equipment and manpower." And "*we involve EPCCO* [on some tenders] *because they have engineering capacity which are not more available in TECHCO or not so easy to find and sometimes a little costly, and, therefore, we ask EPCCO to cover this small part for us."*

TECHCO sees this position as customer of EPCCO as an opportunity to leverage business with EPCCO, as well as generating a strong need for internal coordination in the management of the relationship with EPCCO, as, for the same project there can be collaboration and competition depending on the mix of products and services required by the end customer.

In the management of relations, both parties would like to simplify communication, and are confronted by institutional and internal limitations. Interviewees from both organizations underlined the restrictions imposed by compliance rules, and expressed concern over the informal discussions held between executives:

"*You cannot do too much and speak too much with someone that is also your competitor*".

A sales executive at TECHCO summarized:

"*Open communication with EPCCO is difficult because of compliance issue and possible different strategic orientations on the market."*

In the interview with a procurement director at EPCCO, the on-going development of a supplier relationship management framework to foster information exchange and facilitate issue resolution between EPCCO and TECHCO was mentioned. To the extent it was developed at that time, it seemed to be confined to an issue-resolution and escalation process. The co-opetition situation seemed to affect this initiative as well.

The empirical research was conducted in the context of the development of a supplier relationship management framework by EPCCO. EPCCO procurement function designated TECHCO to be the focal supplier of this project. EPCCO requested that employees of Swissgrid were not interviewed, focusing on reaching the business unit level of TECHCO, that is PRODCO and SERVCO.

4.1.4 The goals of participating organizations

From the interviews and documents, in the scope of this research project, four goals are driving the actions of the organizations. These organizational-level goals are shared by all organizations in the research.

In order of importance: uninterrupted supply of energy (delivery risk), compliance (respect rules and regulations linked to procurement and sales), technical performance (adhere to standards, quality of products and workmanship), cost control (stay within budget).

4.1.4.1 Minimize supply disruption risks

The overarching goal is to ensure the uninterrupted supply of electricity to customers (institutions, businesses and consumers) through the transmission grid, within the specified power ranges (in Volts and Amperes). In Europe, the ENTSO-E (www.entsoe.eu) is the oversight body in Europe, with 43 members in 36 countries. “ENTSO-E members share the objective of setting up the internal energy market and ensuring its optimal functioning, and of supporting the ambitious European energy and climate agenda.” (https://www.entsoe.eu/about/inside-entsoe/objectives/).

This is also part of the mission statement of Swissgrid, the end-customer.

As put by a procurement manager at EPCCO:

“The first risk is to have the production still running”.

And reinforced by a project manager:

“*Our goal from production side is to have a stable production, so to produce power without any interruption or any stop, and this is how we will also manage our project somehow.”*

For EPCCO, TECHCO and PRODCO it translates into on-time delivery of projects, and continuous operation of the systems they are in charge of. For SERVCO, it relates to the resilience of the system provided and its ability to manage power balance and incidents on the grid instantly. An example of failure

for SERVCO could be compared to British Airways catastrophic IT system crash on May 27th, 2017 that stranded thousands of passengers for several days[4].

4.1.4.2 Compliance

In this field, the main emphasis is on transparency of bidding process and business award. After interruption of electricity supply, this is the second biggest risk underlined by a procurement manager at EPCCO:

"*The CEO don't* [sic] *want to see his company on a page one saying it's incompliant somewhere due to public procurement or whatever*".

Attention to business ethics is on the rise, and Corporate Social Responsibility is also mentioned in official documentation.

In a short (4 questions, 10 lines of response) email exchange with a representative of Swissgrid procurement, compliance to rules and regulations on public procurement was mentioned twice.

Non-compliance to bidding process and award rules, especially in public procurement, would potentially lead to the following consequences:

- Cancellation of the award and a re-run of the whole tender, generating delays and costs;
- Aggrieved parties could claim for damages and demand compensation;
- Negatively impact the image of the organization that broke the rules.

This goal is impacting all parties as they work with customers following public procurement regulation -here it is a legal obligation. Nonetheless, even outside of public affairs, procurement and sales mis-practices are a possible source of litigation and reputation damage.

[4] A quick summary of events on BBC News website: https://www.bbc.com/news/live/world-40069977

4.1.4.3 Technical performance

Achieving the technical standards used in the industry is a basic requirement to be in business. Proposing higher -if not highest- performance is a key differentiator in the products and services offered. This goal includes both the pure performance (e.g. a lower energy loss during transmission or conversion of electricity; compactness of product), and the quality measured through absence of breakdowns and duration of life in service. These parameters affect the total cost of ownership[5] of the system and are therefore part of the competitiveness in the bidding process.

4.1.4.4 Cost control

The primary idea here is to stay within budget. Competitive margin generation is a new concept at EPCCO, and only seen in the EPC business. Other divisions still operate on the basis that 'costs are recoverable through time' as the variations of the wholesale price naturally come under the retail price, and that customers, and especially consumers, are captive (summarized from a lunch conversation with managers from sales and procurement functions on December 7th, 2018).

TECHCO is a for-profit private company traded on several stock markets and has a keener sense of economic performance and profit generation. This goal percolates throughout PRODCO and SERVCO as well.

Nevertheless, as competition is rising, and customers are becoming more cost conscious, notions such as total cost of ownership are appearing in conversations within EPCCO.

Exemplified by a project manager at EPCCO:

[5] The total cost of ownership is defined as "the present value of all costs associated with a product, service, or capital equipment that are incurred over its expected life" (Monczka et al., 2011, p.427)

"When we do something, we do that to maintain or to…we do it because we have budget, and the budget is coming from the management and saying that this is approved, we want to do that to maintain the electricity situation, to improve something."

In another off-record conversation (lunch on November 21st, 2018), the participant insisted on the fact that the customer was looking for cheap solutions. In support of this assertion, two elements were offered. Firstly, that the persons working at this client company had little technical expertise (this was also raised by the Sales manager of EPCCO in a different conversation). Secondly, that this customer was not enforcing standardization of solutions across its substations: the winner of the tender proceeds as per the specification offered and accepted for the tender.

Relating these goals to the three performance areas on which procurement has an impact in EPC projects described by Micheli and Cagno (2016, table 5 p.5) for EPC projects, Risk Management would be related to Time, Technical Performance to Quality, and Cost Control to Costs. In the specific context, compliance is added.

These organizational-level goals are reflected across the participating organizations to guide internal decision making, and the governance of inter-organizational relationships. Furthermore, in project-based business, corporate goals and project objectives are often confounded, asserting an influence of corporate-level governance on project-level governance choices (Biesenthal and Wilden, 2014).

Within this context, four cases were selected to explore the research question:

How does the governance of buyer-supplier relationships influence the other relationships within a buyer-supplier-supplier triad?

The intent was to explore two possible interactions:

- How do the goals of a node affect the governance of a link?
- How does the governance of a link affect the governance of another link?

All cases involve EPCCO as Buyer, TECHCO as tier one supplier and either SERVCO (Case1) or PRODCO (Case 2, 3, 4) as tier two supplier. In cases 3 and 4, an external supplier to PRODCO is identified in Tier 3. Each case corresponds to a specific project.

The projects described in the cases occurred simultaneously: case 1 is a service delivery over multiple years, case was completed in the first half of 2018, case 3 and 4 were commissioned in the first half of 2019.

4.2 Within case analysis

The cases are presented in increasing complexity: from a triad where the relations between the nodes are stable, even with their own challenges (Case 1), to a triad where relations shift in order to resolve issues (Case 2), to an open triad that becomes a tetrad (Case 3), to a closed triad that becomes a tetrad (Case 4) after issues emerged. This “progression” is intended to enable to provide additional insights with every case, always building from an initial triadic situation.

This section is focused on story-telling and observations, describing what happened: the context, the actual and the empirical dimensions of critical realism. Identifying the mechanisms, is part of the Cross-case analysis section (4.3).

The influence of a node on a link was construed through the choice of governance instruments by the lower-tier node in order to fulfil its goals. That is, in a EPCCO-TECHCO link, the lower-tier node is EPCCO, and the governance depicted Is the one implemented by EPCCO to ensure EPCCO’s goals are fulfilled. Then, if the next tier is TECHCO-PRODCO, the lower-tier node is TECHCO, and the governance depicted Is the one implemented by TECHCO to ensure TECHCO’s goals are fulfilled.

4.2.1 Case 1: Services from SERVCO

4.2.1.1 Context

In this Case 1, EPCCO is buying services from TECHCO, and TECHCO has its division SERVCO deliver (Figure 4-1). The services include the creation and delivery of software solutions to monitor and report the condition and performance of the electricity transmission grid, transformers and substations, and to send instructions to these systems to adjust the operation of the distribution grid to keep the balance between demand and offer. These are used by EPCCO for its own benefit as a distribution operator, and they are also part of maintenance and upgrade service contracts between Swissgrid and EPCCO for a portion of the ultra-high-voltage network owned and operated by Swissgrid. This business represents a large share of SERVCO's activity on the Swiss market as EPCCO is an overall large player here through the fulfilment of its own needs, and the contracts it gets from other customers. SERVCO also sees the opportunity offered to gain new customers through EPCCO when TECHCO is not the awarded bidder for EPC work or systems.

EPCCO is dependent on SERVO for this service, as SERVCO is the only one that can intervene on these systems.

The triad in focus in this Case 1 includes EPCCO as buyer and end customer, TECHCO as service provider, and SERVCO as business unit of TECHCO that delivers the service. It is an open triad, where there is no contractual link between EPCCO and SERVCO. However, EPCCO and SERVCO project managers are in regular contact for the execution of the contract between EPCCO and TECHCO.

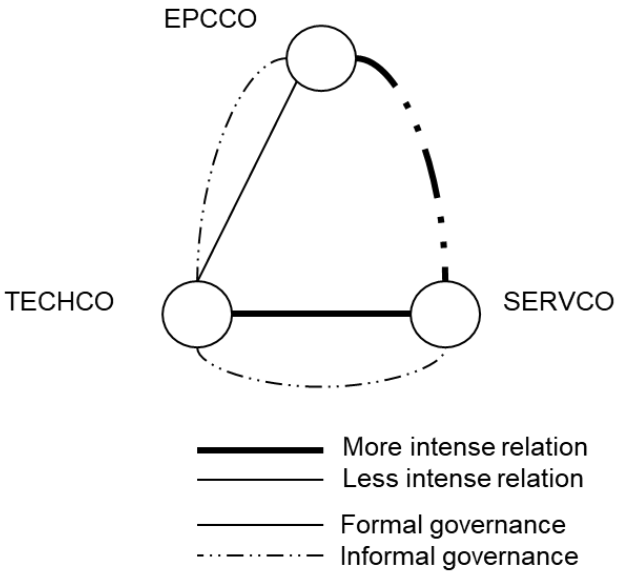

Figure 4-1 Case 1 Triad depiction

4.2.1.2 Influence of a node on a link

There are three links in this Case 1: EPCCO-TECHCO, TECHCO-SERVCO, EPCCO-SERVCO. The governance used in each one in regard of the four goals of each organization is captured in specific tables below.

The EPCCO-TECHCO link has three governance instruments deployed by EPCCO: a contract, technical standards, and professional values (Table 4-1).

EPCCO - TECHCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance	◆								
Risk Management	◆								
Technical Performance	◆				◆				
Cost Control					◆				◆

Key: ◆ instrument present

Table 4-1 Case 1 EPCCO-TECHCO node on link

The contract is the framework agreement signed between both firms to manage orders below CHF 250,000 (the "*small orders*" referred to earlier). However, this framework contract does not include cost-related elements. As explained by a procurement executive at EPCCO:

> "*It is just the process, how it works, and also the legal parts."*

The role of the contract is therefore to address the compliance goal of EPCCO and support the risk management and technical performance goals by referring to standards and instructions given in individual purchase orders.

Each request by EPCCO is, in principle, answered with a commercial offer from SERVCO through TECHCO. Interestingly, as explained by a project manager at EPCCO, when a complete substation is valued around CHF 20,000,000, the value of such a software system for the substation rarely exceeds CHF 100,000, meaning EPCCO's procurement department would likely be little involved in this business if it were not a part of a larger tender. The project manager of EPCCO thereby has a potentially significant contribution to the 'cost control' goal of EPCCO as an organization.

The technical standards are those defined by regulatory agencies (e.g. IEC[6]) and the specification documents issued by EPCCO's project management function. They relate to the technical performance of the system to be delivered by TECHCO, that is the results to be achieved by the supplier through the delivery of products and services to the buyer, as well as the commissioning documents -the report through which the Buyer and the Supplier acknowledge the delivery of the products and services by the Supplier, and notify any deviation to the statement of work as witnessed to that day through testing and use- are issued. These documents are legally binding.

Values refer to the professional values shared between practitioners in the same field. It is by referring to this common understanding of craftsmanship and good practice that EPCCO's project manager expects to avoid issues related to costs.

Between TECHCO and SERVCO, a much wider array of governance instruments is used (Table 4-2).

[6] International Electrotechnical Commission -website: https://www.iec.ch/

TECHCO - SERVCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance	◆			◆					
Risk Management	◆	◆	◆	◆			◆		
Technical Performance	◆	◆	◆	◆	◆		◆		
Cost Control	◆		◆	◆					

Key: ◆ instrument present

Table 4-2 Case 1 TECHCO-SERVCO node on link

The relations between these parties are highly codified, through contracts and processes, enforced by the sales, technical and procurement organizations at TECHCO. They support strong goal alignment between the organizations. Obviously, standards complement the spectrum, as the delivery expected by TECHCO's customer (EPCCO) is strictly defined.

TECHCO's sales organisation is based in Switzerland and calls upon SERVCO's resources that are primarily based in Germany. TECHCO's sales function is in contact with SERVCO's sales function, and SERVCO's project manager acts according to the instructions of SERVCO's sales.

"*After the sales of the project is concluded, it is handed over to me from the sales department, to start my activity as project manager for this project."*

Furthermore, TECHCO has established processes on the provision of services to TECHCO's customers, that SERVCO's project management function is expected to abide by in its interactions with EPCCO. Monitoring is exerted by TECHCO regarding the respect of the processes, and the achievement of the contract deliverables.

From an informal perspective, information flows between these organizations are used mostly by sales departments to discuss business development opportunities. The sales managers of TECHCO and SERVCO that were interviewed, as well as a project manager of SERVCO, confirmed the strong segregation of commercial vs technical duties between them.

"*My responsibility is to support our customers with sales functions* […]*, because the project leaders are not interested on sales."*

Still, project managers at SERVCO have a profitability (cost control) goal in their performance monitoring system.

Between EPCCO and SERVCO, contacts are limited to informal communication between project managers (Table 4-3). These contacts are deemed essential to the fulfilment of services by SERVCO.

EPCCO - SERVCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance									
Risk Management						◆	◆		
Technical Performance						◆	◆		◆
Cost Control									◆

Key: ◆ instrument present

Table 4-3 Case 1 EPCCO-SERVCO node on link

The relation between the project managers is focused on technical matters. The project managers interviewed are happy to focus on the technical side of the service bought by EPCCO, highlighting the importance of values in their interaction:

"*We are both technical men. We are interested in the technical part first, not the price in the first time*".

Regarding cost control, a project manager at EPCCO uses multiple orders of very small value (below CHF 5,000) -that is a threshold below which the four eyes principle[7] is not applied within EPCCO- and confirms that:

"I have some limit, and I say [to my contact at SERVCO] *that it's not possible to go over this limit."*

The same individual underlines that these informal relations are really based on a person-to-person connection:

[7] The 'four eyes principle' (also known as 'two-man rule') is a technique that requires two persons to verify an activity has been conducted according to compliance and controlling guidelines. In practice, it is often realized by adding a second approval step to a purchase order above a certain value.

"It is nice to have a good relation… but it is not necessary"; "I can just reduce this on the technical side of the communication."

4.2.1.3 Influence of a link on a link

In Table 4-4 below, the use of contracts and standards is found in the two links that go upstream of the tiers. This reflects the chain of transfer of legal obligations from the Buyer (EPCCO) to the supplier that will effectively execute and deliver (SERVCO). This shows the influence of the link EPCCO-TECHCO on the link TECHCO-SERVCO, for the formal part.

		Formal Instruments					Informal Instruments			
Between	And	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
EPCCO	TECHCO	◆				◆				◆
TECHCO	SERVCO	◆	◆	◆	◆	◆		◆		
EPCCO	SERVCO						◆	◆		◆

Key: ◆ instrument present

Table 4-4 Case 1 Link on link

However, TECHCO adds several formal instruments to the governance of the relation with SERVCO, to monitor how SERVCO is to execute the tasks entrusted to them. This is part of TECHCO supplier management philosophy, as explained by a procurement director of TECHCO:

"We have contracts with our suppliers, for sure. We have standards for terms and conditions, we frame our relationships."

Nevertheless, these terms are specific to TECHCO, as confirmed by the same participant:

"This is not necessarily back to back terms and conditions from the customer."

Regarding informal governance, the main interest of this case lies in the influence of the behaviour of the project managers of EPCCO and SERVCO on the governance of the triad, and on the achievement of EPCCO's compliance and cost control goals.

This direct informal relation is intense (Figure 4-1) and used to manage and solve most matters. As illustrated by a project manager at EPCCO (*verbatim* quote):

"If you know him, you take the telephone and I'll call him and say hello, how we are? And please send me like this, an offer, or please do this today or tomorrow, and, if you stay not so near with him, you have to take some rules. Please send me this offer with…until next week or…it's complicated way."

These non-written interactions were also appreciated by a project manager at SERVCO:

"*Solving issues outside of processes saves a lot of energy.*"

The conjunction of this modus operandi with the lack of cost control in the contract between EPCCO and TECHCO, and the deliberate use of small amounts orders creates a threat to the non-technical goals of EPCCO.

The EPCCO-SERVCO informal link weakens the formal governance of the EPCCO-TECHCO-SERVCO chain. From the statements of both parties regarding the avoidance of formalism, the influence of the governance used in EPCCO-TECHCO and TECHCO-SERVCO links induces non-compliant behaviour in the EPCCO-SERVCO link.

4.2.1.4 Conclusion

The decision to deploy governance instruments is made at node level. The use of a wider array by TECHCO as the one used by EPCCO to obtain the same technical performance (the one specified by contracts and specifications), shows that a node has a clear influence on a link it is part of to meet its goals.

The weakness of the governance implemented by EPCCO in its relations with TECHCO over this particular range of services has an impact on the governance of the EPCCO-SERVCO relation. The informal governance adopted by both parties, bypassing the EPCCO-TECHCO and TECHCO-SERVCO links, leads to the non-achievement of compliance and cost control goals of EPCCO. Even though this attitude by the project managers is deliberate, the focus on their

duties, and the fulfilment of risk management and technical performance goals, leads to think that they acted based on functional logics rather than with opportunistic and malicious intent. There is evidence of the impact of individual-level behaviour on the fulfilment of organizational goals.

However, this situation may come to an end, as questions are being raised. Citing a procurement director at EPCCO:

"We are looking for transparency, that we know how many service contracts we have, why we spend money with [TECHCO]. *If you analyse finance transactions, you see, I don't know, thirty thousand Swiss francs for a service contract. Why? Why do we pay that?"*

"We need transparency on spend. And also get in touch with [TECHCO] *and the responsible guys."*

4.2.2 Case 2: Special equipment from PRODCO

4.2.2.1 Context

EPCCO, who at this time still owned the high-voltage substations, started engineering work to install high-voltage transformers and the corresponding switchgear into a power station with little available space. Several years of engineering led to a technical solution to be identified. Through a public tender by EPCCO that TECHCO won, a small-scale prototype was built by PRODCO. The prototype gave satisfactory results. In the mean-time, ownership of the high-voltage transmission grid passed on to Swissgrid. Therefore, it is Swissgrid that launched a public tender for the delivery and installation of the production-intent system. EPCCO won the contract. On the basis of the previous work, EPCCO selected TECHCO, to obtain the equipment from PRODCO (Figure 4-2). The full-scale system failed on technical performance at commissioning stage (installed *in situ*), delaying the production start of the power generation station. This meant failure of the technical performance goal, and partial failure of the supply disruption risk goal (there was no supply interruption, as the overall grid did not

depend on this new installation to run, albeit this specific installation did not deliver).

The case focuses on the execution phase, that is the delivery by TECHCO to EPCCO of the full scale product made PRODCO.

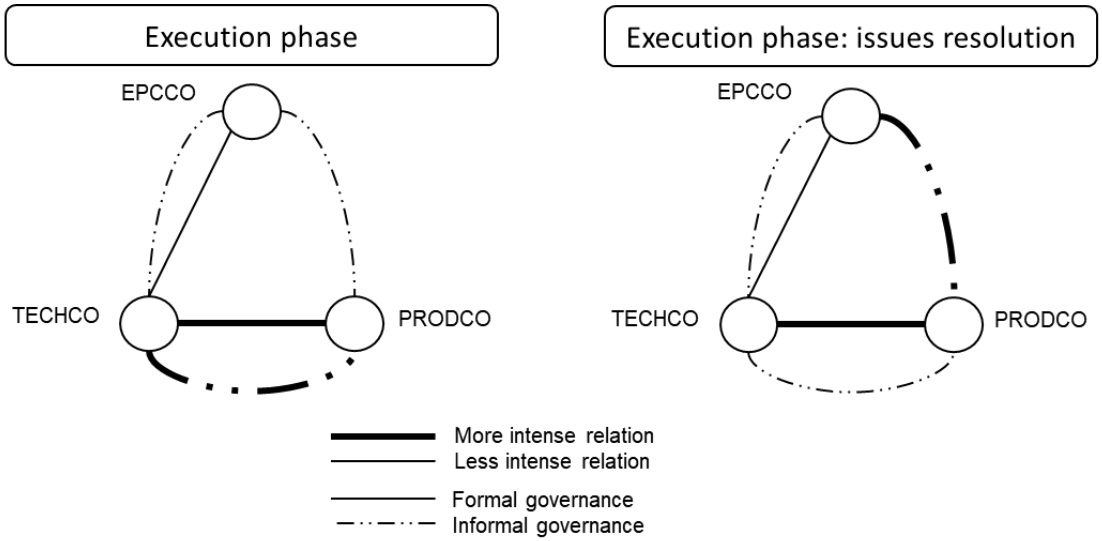

Figure 4-2 Case 2 Triad depiction

4.2.2.2 Influence of a node on a link

In this case, the governance of the EPCCO-TECHCO relationship (Table 4-5) was based primarily on the technical description of the expected performance of the system (a statement of work).

EPCCO - TECHCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance	◆								
Risk Management	◆					❒	◆		
Technical Performance	◆				◆		◆		❒
Cost Control						❒			

Key: ◆ instrument present ❒ added for issue resolution

Table 4-5 Case 2 EPCCO-TECHCO node on link

No specific contract was established to cover legal and commercial terms, relying on the General Terms and Conditions (GTCs) in use at EPCCO. These GTCs are meant as a one-size-fits-all, and do not cover risks specific to such projects. Especially, the GTCs do exclude liability for "*consequential damages such as power failures, production stoppages, loss of profits and other indirect damages.*"

(Document ‘General Terms and Conditions of Business for Purchasing, Edition June 2014, Art. 6, Clause 3’). Contracting was left to the appreciation of the project manager, who summarized his point of view this way:

“W*hen you work on a project, when you don’t have a standard, the price is not a problem, all you do is focus on performance and schedule, and the success comes from the persons who work on it and their ability to work together.”*

In the quote above, “standard” refers to an off-the-shelf solution, not to institutional standards on the end performance of the system as understood when using the same word to identify a governance instrument. Technical performance control relied on third party testing, not on process monitoring.

Thus, no specific contract was made for a project valued about two million swiss francs for equipment only. When the switchgear failed to perform, EPCCO was left without proper recourse vis-à-vis TECHCO, apart from the failure of technical performance -considered a late delivery- that can reach up to 10% of the contract price depending on the extent of the delay (Document ‘General Terms and Conditions of Business for Orders, Edition June 2014, Art. 7’), and with a liability towards its own Customer.

When issues appeared, C-level executives from EPCCO made contact with their counterparts at TECHCO, relying on their social embeddedness, and disturbing the existing flow of information between project teams. In parallel, EPCCO Project managers appealed to professionalism of their counterparts at TECHCO to resolve the technical performance issue, without much success. There was no recourse to EPCCO’s procurement team to support the efforts of the other functions of the organization.

The relation between TECHCO and PRODCO is highly formalized, through contracts and processes, and rely on a strong organization that supports systematic make or buy, especially for non-catalogue products. Obviously, standards complement the spectrum, as the delivery expected by TECHCO’s customer (EPCCO) is strictly defined. In Case 2, special attention was given to

the balance of costs versus price, given that the solution requested by EPCCO was special, as explained by a sales manager of PRODCO:

"We are afraid of [technical and financial] *risk because of the product, because we sell products and, let's say, when products go behind normal requirements, it becomes difficult sometimes to mobilise certain resources to match those special requirements."*

TECHCO - PRODCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance	◆			◆					
Risk Management	◆	◆	◆	◆			◆		
Technical Performance	◆	◆	◆	◆	◆		◆		
Cost Control	◆	◆	◆	◆					

Key: ◆ instrument present ❒ added for issue resolution

Table 4-6 Case 2 TECHCO-PRODCO node on link

The influence of TECHCO's goals on the governance used in the TECHCO-PRDOCO link can be defined as strong, given the large array of instruments deployed to ensure that the technical and financial risks will be kept under control.

Initially, the link between EPCCO and PRODCO is governed through information exchange (Table 4-7), enabling smoother work between project teams.

EPCCO - PRODCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance									
Risk Management						❒	◆		
Technical Performance						❒	◆		❒
Cost Control						❒			❒

Key: ◆ instrument present ❒ added for issue resolution

Table 4-7 Case 2 EPCCO-PRODCO node on link

When things went awry, i.e. the switchgear did not meet specifications at the commissioning stage, EPCCO's project management decided to contact the individuals in charge of the technical performance of the product, located at the technical centre of PRODCO's factory, completely bypassing the TECHCO and PRODCO central organizations located nearby EPCCO, as well as EPCCO's procurement. This last action was justified as follows:

"*In our company, our purchasing manager or purchasing colleague, he buys pencils, he buys my high-voltage systems, and he buys the computers for the secretaries team. He has no chance to understand all that has happened and how it connects.*"

This statement evidences the lack of organization & structure instrument used by EPCCO in the governance of its relationship with TECHCO: in spite of the existence of the human resources, these resources are not involved in projects and issue resolution. This was already hinted by the absence of a specific contract for this project: the procurement and legal departments were not involved in a multi-million deal for an idiosyncratic technical solution.

In addition, the contacts made by EPCCO's C-level executive at TECHCO were duplicated towards PRODCO, as explained by a sales manager at EPCCO:

"We have problems that even the CEOs have project meetings together about projects for which actually the project manager is responsible."

4.2.2.3 Influence of a link on a link

In Table 4-8 below, the use of contracts and standards is found in the two links that go upstream of the tiers. This reflects the transfer of legal obligations from the Buyer (EPCCO) to the supplier that will effectively execute and deliver (PRODCO). This shows influence of the link EPCCO-TECHCO on the link TECHCO-PRODCO.

		Formal Instruments					Informal Instruments			
Between	And	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
EPCCO	TECHCO	◆				◆	❒	◆		❒
TECHCO	PRODCO	◆	◆	◆	◆	◆		◆		
EPCCO	PRODCO						❒	◆		❒

Key: ◆ instrument present ❒ added for issue resolution

Table 4-8 Case 2 link on link

TECHCO used a wider complement of instruments, enforcing tighter control on its upstream chain.

As to informal instruments, information is systematically used, confirming the statement from EPCCO's project manager:

"*The success comes from the persons who work on it* [the project] *and their ability to work together."*

Informal governance is the one that was extended to support issue resolution, at EPCCO's initiative. The intensification of informal links between EPCCO and PRODCCO was paralleled with a reduction in intensity of the informal TECHCO-PRODCO link. This can be explained by the focus of resources of PRODCO towards EPCCO, matching the behaviour of EPCCO towards them.

These informal efforts were made through three paths, that correspond to three different informal instruments:

Firstly, project managers relied on higher levels of communication to foster cooperation and live the technical challenge.

"When you will have complex systems, you need more relationship between the project leaders, and the experience from the project leader."

"When you have to bring on track the project we developed together, then the main success point is the persons who work on this and how good is the connection."

Secondly, the above statements also relate to the professional competence and technical skills of these individuals. This reference to professional values was also linked to one's professional reputation:

"Where I get a machine or switch gear not working well, latest, after half a year, all colleagues know this."

The stakes for these project managers were obviously beyond the organizational goals. The likely influence of these individual-level stakes on how the project managers reacted is part of the mechanisms that will be explained in the Discussion chapter.

Thirdly, EPCCO's executives used their relations and embeddedness to apply a very intense pressure on PRODCO. This was explained by a project manager at EPCCO under these terms:

"When my CEO says, 'I will have this machine', and he's sitting together with another CEO at lunch and says 'We make this deal', and then I get the information and my technicians as well. The CEO gives the information to his sales managers and now they [the CEOs] *drink a glass of wine and they are finished. You can do this."*

Such an action resembles a disintermediation of TECHCO, without creation of a new formal link between EPCCO and PRODCO, nor the destruction of the EPCCO-TECHCO-PRODCO hierarchy of contractual obligations.

A cautionary note is required here, as there were similar executive contacts between EPCCO and TECHCO as explained by a sales manager at EPCCO (see above), and there was no evidence on how similar or different the conversations were. Nevertheless, the influence of the actions of EPCCO through the EPCCO-PRODCO link affected the informal TECHCO-PRODCO link.

4.2.2.4 Conclusion

EPCCO's project manager stance of not working with its procurement team drove him to intensify the informal relations with PRODCO, reaching to PRODCO's factory. The focus on technical resolution brought the project managers of EPCCO and PRODCO to work more closely.

Nevertheless, the risk management goal was failed, with serious delay in the start of production of the power generation system. EPCCO faced penalties for delayed production. Without access to the specific contract, nor confirmation by interviewees, it is not possible to say that TECHCO or PRODCO were charged penalties as well. Relying on EPCCO's General Terms and Conditions would mean that TECHCO did not pay such penalties as they are clearly excluded.

The influence of a node on a link, and especially on the choice of governance in relation to the goals of that node is evidenced. As well as the knock-on deployment of a different array of governance (values, embeddedness and relationships) to alleviate the consequences of what was not covered by the existing governance (non-specific contract).

The impact of a link on another link is observed through the evolution of interactions after issues were discovered: the shift of communication patterns and the intensification of contacts between EPCCO and PRODCO lead PRODCO to focus on EPCCO and lower the non-formal interactions with TECHCO.

4.2.3 Case 3: Under the highway, and beyond the triad

This case was selected because it reaches beyond the triad, to a tier 3 firm supplying to PRODCO, with well documented practices by EPCCO and PRODCO. It provides strong input on the phenomena under research.

4.2.3.1 Context

The purpose of this project was to upgrade a medium voltage substation built under a highway, by installing a new switch gear for the 16 kV circuit. A public tender was issued by the highway company (the end customer). TECHCO did not bid as the customer requested a statement of unlimited liability. EPCCO does accept such clauses, and was awarded the contract, offering TECHCO products. A project manager at EPCCO underlined that even though TECHCO were selected by EPCCO through a sourcing exercise run in collaboration with EPCCO procurement…

"TECHCO was our only supplier who offered us the whole package and it was the best choice."

The technical solution offered by TECHCO was also known to the customer, and already used by them, a point considered as a mitigation of risk, and assurance of technical performance.

"So that's why we choose TECHCO because it's a really good product, the customer knows this. So we thought that we had a good chance if we go with TECHCO."

The triad depiction (Figure 4-3) is extended to a tetrad, as, in the course of the project, EPCCO reached out to the tier 3 supplier (HIGHCO), de facto extending the scope of action from a triad to a tetrad.

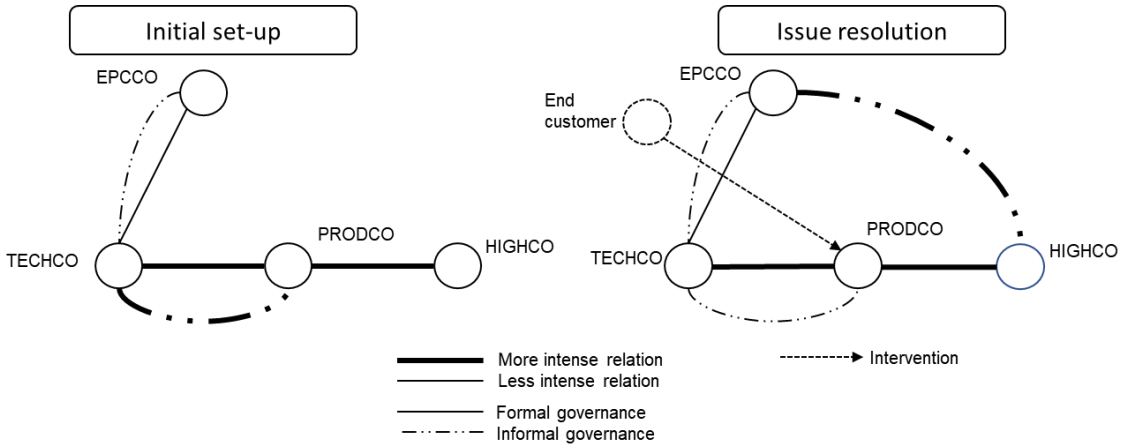

Figure 4-3 Case 3 Tetrad depiction

This extension provides insights on both the influence of a link onto another link, and the influence of the environment on the links in the triad.

Another point needs to be mentioned regarding this project: as the works were done under a highway, it is forbidden to intervene from December 1st until March 31st due to weather conditions (and possibly earlier / after if sustained freezing occurs). This placed a special emphasis on the schedule for the whole project chain.

4.2.3.2 **Influence of a node on a link**

The EPCCO-TECHCO contractual governance was established with a specific document raised to outline legal, commercial, and cost terms. All technical requirements (technical performance, schedule, standards) were carried over from the public tender bid documents established by EPCCO and based on the end customer's requirements and TECHCO's offer (Table 4-9).

EPCCO - TECHCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance	◆								
Risk Management	◆						◆		
Technical Performance	◆				◆		◆		
Cost Control	◆								

Key: ◆ instrument present ❒ added for issue

Table 4-9 Case 3 EPCCO-TECHCO node on link

EPCCO's project manager was very clear on governance rules: all goes through TECHCO, emphasizing that, in case of issues:

"First I try to make pressure directly on TECHCO. First time myself, if it does not work I take our buyer, because they are harder than me usually with the suppliers. And if it does not work, we escalate in our company and also at TECHCO. And they really have to make the pressure to their supplier by themselves."

Noteworthy is the explanation of why procurement can be tougher than project management, responding to a direct question on the topic:

"Because they [the buyers] *are not in the project directly. I think they have another relationship to the supplier than in my cases as the project manager. Because I have to make a consensus in the project, so it's like a relationship with all the people involved in the project. So it's the supplier, it's the team members; you have to take care that you are a good relationship with all of them. And the buyers on another level they can be hurt, they don't have to work with these guys from* [TECHCO] *anymore."*

This statement is far-reaching in the differentiation between functions, stating that procurement is not part of the team, and that interactions and good relations between the project management team and the suppliers are more important. Furthermore, the statement that there is no need for the procurement department to maintain good relationships with the suppliers displays a partial view of the role of this function. For both aspects, there is influence of the individual-level logics on the choices made regarding the governance of the link after issues emerged.

Still, the EPCCO-TECHCO-PRODCO-HIGHCO hierarchy of interventions will be broken, as shown in the description of the other links.

Regarding the TECHCO-PRODCO link, as summarized by a sales director at TECHCO, TECHCO has to…

"Make sure that [PRODCO] *delivers exactly what is required from the customer* [EPCCO] *in terms of quality, in terms of technical requirement, and competitive offer."*

Hence the use of instruments addressing each and every goal of TECHCO (Table 4-10) as they correspond to what is expected of PRODCO.

TECHCO - PRODCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance	◆			◆					
Risk Management	◆	◆	◆	◆			◆		
Technical Performance	◆	◆	◆	◆	◆		◆		
Cost Control	◆	◆	◆	◆					

Key: ◆ instrument present ❒ added for issue

Table 4-10 Case 3 TECHCO-PRODCO node on link

As noted in the context section (4.2.3.1 p. 152), this project was to use standard products, thereby with a lower risk profile than custom-made ones. Still TECHCO used a large array of formal governance instruments, following its own internal rules.

The EPCCO-PRODCO link is devoid of relations (Figure 4-3, and Table 4-11).

EPCCO's project manager was clear and adamant regarding relations between EPCCO and PRODCO:

"I'm not in direct contact with this other company, it's always over [TECHCO]*."*

And confirming at the cross-check question:

"No, no I think it's like a rule because you have one person who is responsible for you and this is my first contact. And I don't want to talk to the other people or to the other in this case, to the other company [PRODCO] *because it's*

not my responsibility to talk to them. So if I want something changed or so, [TECHCO] *should manage this for me."*

EPCCO - PRODCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance									
Risk Management									
Technical Performance									
Cost Control									

Key: ◆ instrument present ❒ added for issue

Table 4-11 Case 3 EPCCO-PRODCO node on link

PRODCO mirrors the same large number of formal governance instruments with HIGHCO (Table 4-12), as TECHCO does with PRODCO. And more, through specific investments made by PRODCO to manage its suppliers, and other ones required by PRODCO from its suppliers, especially regarding quality systems, production planning, and logistics. A procurement manager of PRODCO that did not want to be quoted, insisted heavily on the consistency of processes within PRODCO, and with PRODCO's suppliers (be it other plants of PRODCO, other business units of the energy division of TECHCO, or external independent firms). No place is left for improvisation, and strict adherence to processes is seen as the best protection against mistakes.

PRODCO - HIGHCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance	◆			◆					
Risk Management	◆	◆	◆	◆					
Technical Performance	◆	◆	◆	◆	◆				
Cost Control	◆	◆	◆	◆					

Key: ◆ instrument present ❒ added for issue

Table 4-12 Case 3 PRODCO-HIGHCO node on link

The same procurement manager at PRODCO indicated that PRODCO does not do back-to-back contracting, shielding its suppliers from its own sales contracts. This means that the content of contracts between PRODCO and HIGHCO are independent from the Case, beyond the fact that the product to be delivered by PRODCO was a standard item.

The absence of Information as informal instrument stems from the input given by PRODCO's procurement manager. This interviewee insisted on the formalisation of communication, and gave the example of the use of a communication platform for any issue. This formalisation supports knowledge capture, to avoid the repetition of mistakes.

The EPCCO-HIGHCO link did not exist initially (Figure 4-3, and Table 4-13). HIGHCO is PRODCO's supplier, and EPCCO's project manager has been very clear on the chain of command to be EPCCO-TECHCO-PRODCO-HIGHCO (see above).

EPCCO - HIGHCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance									
Risk Management						❒	❒		❒
Technical Performance						❒			
Cost Control						❒			❒

Key: ◆ instrument present ❒ added for issue

Table 4-13 Case 3 EPCCO-HIGHCO node on link

Nevertheless, when the project faced issues linked to delivery time and technical performance, the end-customer (that is EPCCO's customer) made direct interventions towards PRODCO, and that was resented by EPCCO's project management.

In spite of the initial reaction of:

"Not liking this, and not wanting to do this to TECHCO",

The project manager of EPCCO decided that:

"Maybe in this case with medium switchgear because I know a lot of people there",

knowing that:

"It is not the right way in the process."

The triggers for this individual initiative were expressed at personal level:

"Yes, the way the customer act with me influence the way I act with the supplier."

And at a functional level, regarding the relation with the procurement department (referred to as the tough guys who do not need to care about relations with suppliers, see above):

"Technical does everything from [Customer] *order to commissioning. Procurement does a bit of orders and the invoices."*

"*The procurement cannot do anything to help the project for the quality or for the time."*

Thus, the project manager of EPCCO contacted persons she knew at HIGHCO:

"In this case I know this guy is really good because one of these guys worked with me for 6 years."

Hence, the EPCCO-HIGHCO link was created (Table 4-13). The *de facto* disintermediation of TECHCO vis-à-vis PRODCO, and PRODCO vis-à-vis HIGHCO significantly changed the balance of the relation between EPCCO and TECHCO, as EPCCO got information faster than PRODCO and TECHCO on progress and issues. As TECHCO reacted negatively, demanding EPCCO to respect the chain of relations and formal processes, procurement was invited to help by EPCCO's project manager:

"Usually if success is possible then I'm also successful. But it's better to involve the procurement team because of the written part."

4.2.3.3 Influence of a link on a link

The influence of a link on another link is particularly well documented in this Case 3, beyond the summary in Table 4-14.

The creation of an “end-customer-PRODCO” link disrupted the links EPCCO-TECHCO and TECHCO-PRODCO. It also contributed to the creation of EPCCO-HIGHCO (Figure 4-3), as the project manager at EPCCO felt her abilities challenged by the intervention of the end customer. This last action generated disturbances in the EPCCO-TECHCO relation, triggering TECHCO’s reaction.

		Formal Instruments					Informal Instruments			
Between	And	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
EPCCO	TECHCO	◆				◆	❒	◆		❒
TECHCO	PRODCO	◆	◆	◆	◆	◆		◆		
EPCCO	PRODCO						❒	❒		❒
PRODCO	HIGHCO	◆	◆	◆	◆	◆				

Key: ◆ instrument present ❒ added for issue

Table 4-14 Case 3 link on link

A procurement director at TECHCO commented negatively on the interventions on the nodes in lower tiers towards PRODCO (by the end-customer) and HIGHCO (by EPCCO), underlining that…

“*Ownership of the relationship is a key element in issue resolution.*”

4.2.3.4 Conclusion

Formal contractual claims were established by EPCCO and were still in discussion at the time of interview.

On a personal level, the project manager of EPCCO confirmed:

“Yes, the way the customer acts with me influence the way I act with the supplier. The pressure I get from the customer, I try to give it further to the supplier.”

This Case 3 provides new insights on governance, partly thanks to its tetrad context.

Looking at governance instruments, it is worth noting that the range of formal instruments used by higher tiers (especially thanks to the documentation of PRODCO’s governance instruments deployed with HIGHCO) is wider and

deeper than the one used in lower tiers of the same chain: EPCCO relies on a contract, technical standards and testing certificates from third parties; TECHCO implements a larger choice of formal instruments, mobilizing significant internal resources; and PRODCO invests and requires suppliers to invest in specific systems and processes, and has removed the informal instruments from its quiver. In addition, PRODCO completely decouples sales and procurement governance. This escalation in the mobilization of resources is made in spite of the fact that all these organizations work toward the same set of goals.

In the influence of a link on another link, it appears that the presence of a directly common node is not a necessary condition for the link-on-link effect to exist: end-customer-PRODCO disrupts EPCCO-TECHCO and triggers EPCCO-HIGHCO. This would not have been evidenced in a triad, where two links always have one common node.

The newly created link (EPCCO-HIGHCO) is based on informal instruments, contributing to several recurring debates on the complementarity or substitutability of formal and informal instruments, as well as the time-precedence of one over the other. As well, this provides insights on the discussion relative to the importance of the underlying individual-level relationships in inter-organizational informal relations.

4.2.4 Case 4: High voltage cabinets

Again, a case extending beyond the EPCCO-TECHCO-PRODCO triad, with a tier 3 node formally linked to PRODCO.

4.2.4.1 Context

A public tender was issued by the end-customer for the refurbishment of several sub-systems of a substation, while the substation continues to operate.

Both EPCCO and TECHCO submitted offers to the end-customer.

Public procurement procedures impose that nothing can be changed between the offer and the realization, unless specifically requested by the end-customer. In the situation of this Case 4, EPCCO had an advantage over its competitors, as EPCCO had direct knowledge of the substations that it owned until 2012 and could therefore anticipate the specifics of the site that others wouldn't be cognizant of.

This tender included four main sub-systems, and the focus of this case is on the AC-DC converter sub-system.

This AC-DC converter sub-system comprises two series of 31 cabinets. One series for the AC side, and one series for the DC side. Plus all the interfaces between them. In addition, there are interconnections with the input and output power lines, and linking with the management system.

For the products and services it needed to source, EPCCO was entitled to use private procurement rules as the beneficiary was a third party (the end-customer).

EPCCO requested an offer from TECHCO and received a very competitive bid for the 62 cabinets with their interfaces, and the interconnections to power lines and to the management system. According to a project manager at EPCCO, the offer from TECHCO to EPCCO was really low priced, as was EPCCO's bid to the end-customer. In fact, to win the business form the Customer, both companies were eager to demonstrate their knowhow for a difficult-to-execute project.

EPCCO contracted with TECHCO. As the result of a make-or-buy analysis, TECHCO required PRODCO to deliver. These two sets of cabinets were considered different projects within PRODCO, subsequently managed by two different project teams, located in two different centres of expertise. One team was in charge of the AC cabinets, the other in charge of the DC ones. Then PRODCO decided to manufacture the AC cabinets in one of its plants, and to sub-contract the DC cabinets to an external supplier (DCABCO).

TECHCO does not favour bespoke solutions, as a representative of TECHCO Sales function explained:

"*We have limited resources to manage issues, and we prefer to sell only with slight customization"*.

When it was found that the cabinets engineered, manufactured and delivered by PRODCO and DCABCO were not compatible and that one of the sets had to be reworked, several incidents happened:

- TECHCO's sales made contact with the end-customer to negotiate a new schedule, bypassing EPCCO;
- PRODCO's project manager for DC cabinets went on extended leave, and was not replaced (!)
- Thus, EPCCO's project manager reached out directly to DCABCO, disintermediating TECHCO and PRODCO.

The improper design implied either a complete rebuild of the DC cabinets, or an adaptation of the interfaces. Due to timing (and costs), it is the latter solution that was chosen. The cost of this adaptation was carried by PRODCO. It is not known if it was passed onto the supplier of the faulty DC cabinets.

In addition, PRODCO failed to deliver adequate documentation with the cabinets, both AC and DC, generating further delays to the project. Documentation inadequacy caused the project manager at EPCCO to verify and redline it for revision and update by PRODCO and PRODCO's supplier. Several times.

The implications of these changes in the structure of the triad -and its extension into a tetrad (Figure 4-4), are discussed hereafter.

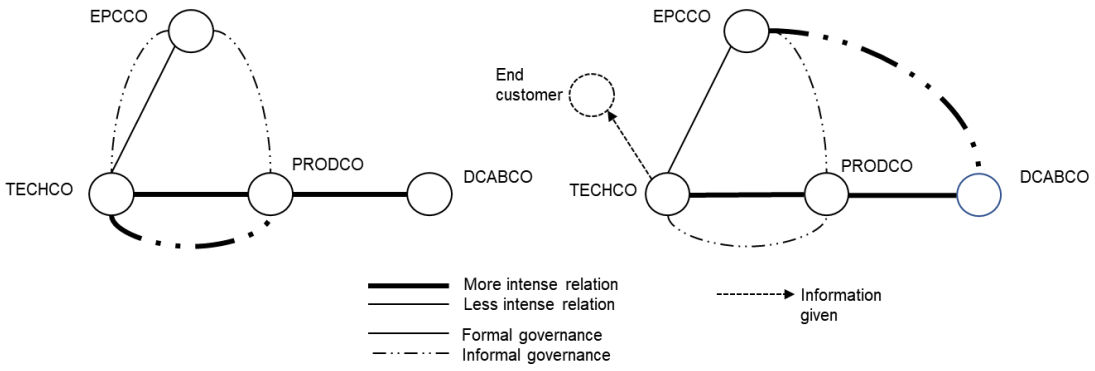

Figure 4-4 Case 4 Tetrad depiction

4.2.4.2 Influence of a node on a link

Between EPCCO and TECHCO, a contract was established, specific to this project. It is EPCCO's process to use General Terms and Conditions (GTCs) that are applicable to all projects, and, when deemed necessary, add a contract to handle the specifics of a given project. The technical aspects of the project were described in the tender documents, and in the statement of work agreed upon between EPCCO and TECHCO.

EPCCO has two different GTCs documents: one for Services, and one for Products. In this Case, it is the GTCs for Products that was applicable. According to a senior procurement manager at EPCCO, this organization is…

"*Very generous with its suppliers*"

due to the liability restrictions self-imposed by EPCCO in its GTCs. This assertion was verified by reading the said document available on EPCCO's website: there is no provision to obtain compensation for damages that are not of physical nature (i.e. to people, property, equipment).

The contract specified the transactional processes (ordering, invoicing, payment), the project organizational structure, and the escalation process for the resolution of issues. It was not used to transfer financial risk to TECHCO by mirroring the penalty system used by the Customer in its contract with EPCCO.

EPCCO - TECHCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance	◆								
Risk Management	◆						◆ ❖		
Technical Performance	◆				◆		◆ ❖		
Cost Control	◆								

Key: ◆ instrument present ❒ added for issue resolution ❖ lost after issues arised

Table 4-15 Case 4 EPCCO-TECHCO node on link

After the revelation of the incompatibility between the cabinets designed by PRODCO and DCABCO, TECHCO bypassed EPCCO to renegotiate a schedule change directly with the end-customer. Informal information exchange was lost

between the firms, further hindering the pursuit of a commercial solution. The end-customer applied pressure on EPCCO, specifically targeting the project manager. The evolution of the links is shown in Figure 4-4.

The TECHCO-PRODCO link (Table 4-16). It is part of TECHCO's strategy to execute a make-or-buy analysis for the projects that include customization of products. In the present case, it was decided to award the entire business to PRODCO.

Two specific contracts were established, one for the set of AC cabinets, one for the set of DC cabinets, as each set was entrusted to different legal entities of PRODCO. The contracts specifically included technical and commercial terms, as well as references to processes to be followed and the associated monitoring key performance indicators. As explained by a procurement executive of TECHCO:

"*We try to have back-to-back contractual terms and conditions, because you are then reducing your risk in the sense that, if there is a non-compliance with the contract, you can give responsibility to the supplier. You can expect from the supplier to correct in order to be in line with the contract, and, if this is not happening, then you are in breach of contract with the customer but your supplier is also in breach of contract with you and, ultimately, any type of contractual claim you can also cascade it to your sub-supplier, mitigating your risk as an OEM.*"

TECHCO - PRODCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance	◆			◆					
Risk Management	◆	◆	◆	◆			◆		
Technical Performance	◆	◆	◆	◆	◆		◆		
Cost Control	◆	◆	◆	◆					

Key: ◆ instrument present ❒ added for issue

Table 4-16 Case 4 TECHCO-PRODCO node on link

No information gathered suggested that TECHCO exerted influence on the choice of a specific supply chain by PRODCO, even though category management efforts at divisional level possibly played a role.

Between EPCCO and PRODCO, there is no specific contractual relation (Table 4-17). The internal set-up of PRODCO did not facilitate communications within PRODCO, nor upwards or downwards of the triad. EPCCO's project manager felt that the recourse to strict processes transforms PRODCO into a…

"*huge administrative machine*",

further hindering internal coordination and agility to face issues.

EPCCO - PRODCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance									
Risk Management							◆ ❖		❒
Technical Performance							◆ ❖		❒
Cost Control									

Key: ◆ instrument present ❒ added for issue resolution ❖ lost after issues arised

Table 4-17 Case 4 EPCCO-PRODCO node on link

After the incompatibility of AC and DC cabinets was found, and PRODCO's project manager went on extended leave of absence, EPCCO's project manager stepped in, to his great displeasure:

"*I had to regulate communication between PRODCO entities, and it was horrible.*"

His points to intervene towards PRODCO and DCABCO, especially without asking for support from procurement were that:

"*Work must be completed, and I can do it myself."*, and

"*Procurement is not very good to support."*

In absence of a direct counterpart at PRODCO, as well as a formal relation, this project manager relied on (a few) people goodwill and professional values (ability to complete a project respecting the technical requirements, not letting a customer down) to support him. This situation led to the creation of the EPCCO-DCABCO link.

The PRODCO-DCABCO link was governed according to the highly formalized standard approach of PRODCO (Table 4-18). A PRODCO procurement

executive described the use of processes as a warranty for supplier performance (on-time delivery, quality, costs). Unfortunately, in this Case 4, the lack of resources at PRODCO did not enable adequate follow-up internally and with external suppliers, especially DCABCO.

PRODCO - DCABCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance	◆			◆					
Risk Management	◆	◆	◆	◆			❖		
Technical Performance	◆	◆	◆	◆	◆		❖		
Cost Control	◆	◆	◆	◆					

Key: ◆ instrument present ❒ added for issue resolution ❖ lost after issues arised

Table 4-18 Case 4 PRODCO-DCABCO node on link

This lead to the direct intervention of EPCCO's project manager towards DCABCO.

The EPCCO-DCABCO link would not have existed without the very serious technical and scheduling problems that unfolded in this Case 4. Even though, EPCCO's manager was probably eager to do so, as he volunteered that:

"I think it is easier to communicate with the sub-suppliers."

This person deployed two instruments to govern the EPCCO-DCABCO (Table 4-19): firstly, information exchange, in order to receive the updates and documents he required; and values, as a motivation element to obtain support. From the conversation, he followed a self-made process (project tracking), that was not formalized with DCABCO.

EPCCO - DCABCO	Formal Instruments					Informal Instruments			
Goal	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
Compliance									
Risk Management							❒		❒
Technical Performance							❒		
Cost Control							❒		❒

Key: ◆ instrument present ❒ added for issue resolution

Table 4-19 Case 4 EPCCO-DCABCO node on link

This project manager was driven by several elements. The first one, is that this was his first project as project manager, having been recently hired at EPCCO (and with already significant technical experience in the industry, as

shown in Table 3-2), and needing to prove his ability. The second one, was his limited focus regarding the project deliverables and organizational goals:

"*My focus was the technical performance of the substation*",

recognizing *de facto* a partial disconnection with the Customer's

"*high demands in terms of technology, delivery time and costs.*"

4.2.4.3 Influence of a link on a link

The influence of a link on another link is apparent in this Case 4, beyond the summary in Table 4-20.

This Table intends to capture the influence of the governance of one link on another link. The escalation of governance instruments, especially formal ones, whilst going upstream of the tiers (i.e. the Buyer uses less formal instruments than the tier 2 supplier), is visible here. In the occurrence of threats to the goals of the Buyer (EPCCO), this node deployed more governance instruments (informal ones), disrupting the relations in the triad.

		Formal Instruments					Informal Instruments			
Between	And	Contract	Goal Alignment	Organization & Structure	Process	Standard	Embeddedness & Relationships	Information	Social norms	Values
EPCCO	TECHCO	◆				◆		◆ ❖		
TECHCO	PRODCO	◆	◆	◆	◆	◆		◆		
EPCCO	PRODCO							◆ ❖		❒
PRODCO	DCABCO	◆	◆	◆	◆	◆				
EPCCO	DCABCO							❒		❒

Key: ◆ instrument present ❒ added for issue resolution ❖ lost after issues arised

Table 4-20 Case 4 link on link

However, in this Case 4, additional events came to change the structure of the triad (from triad to tetrad, as depicted in Figure 4-4), and the links within it.

The creation of an "TECHCO-end-customer" link at the initiative of TECHCO's sales function disrupted the link EPCCO-TECHCO. The troubles in the PRODCO-DCABCO relation, caused by internal mis-coordination within PRODCO (the AC and the DC project teams did not ensure the compatibility of their products), led to the issue endangering the whole project. Then the absence of a project manager for the DC cabinets, that is the lack of enforcement of the

technical performance side of the governance between PRODCO and DCABCO, triggered the creation of the EPCCO-DCABCO link, the reduction of communication between EPCCO and PRODCO, and the complete disintermediation of TECHCO in the resolution of the technical and schedule issues.

The loss of the informal governance instruments in the links EPCCO-TECHCO and EPCCO-PRODCO (information exchange, shown in Table 4-20) lead to an increase in tension in the affected relations, as formal instruments are less adaptable and flexible than informal ones. It is worth noting that, in spite of the obvious failure of the highly formalized PRODCO-DCABCO governance (as illustrated by all the processes and formal communication tools described by the procurement manager), no attempts to create informal channels to contain the problematic situation were reported. The influence of the highly codified governance of the TECHCO-PRODCO link probably had an influence on this reported lack of flexibility by PRODCO in managing the PRODCO-DCABCO link, fostered by the need to conduct reportable actions and monitoring indicators.

The pressure applied by the end-customer's procurement department directly on the project manager of EPCCO stirred (amplified?) internal tensions within EPCCO. The initiative taken by EPCCO's project manager to create the EPCCO-DCABCO link without the input of the procurement department -that is without considering the consequences on the chain of governance materialized by the links within the triad, and -for EPCCO- contracts, generated resentment from EPCCO Sales and Procurement:

> "*Some people just follow what the Customer says";*
>
> *"Project instruction followers, not leaders or managers."*.

Here again, a link (TECHCO sales informing the end customer) influenced another link (end-customer actions towards EPCCO's project manager), that in turn influenced other links (creation of EPCCO-DCABCO, loss of informal link between TECHCO and EPCCO).

4.2.4.4 Conclusion

The refurbishment of the substation was therefore completed late, with severe financial consequences. As a project manager at EPCCO explained:

"*In this project, all companies lost money, the project was very costly*."

The term "*all companies*" refers to EPCCO, TECHCO and PRODCO. The same interviewee hinted – although he did not know for sure- that PRODCO's supplier of DC cabinets also lost money. The Customer, protected by the formalism of the public tendering process, was financially unaffected by the mishaps, and even collected late completion penalties from EPCCO.

At the time of the interview, even though the substation was running on its new systems since four months, the documentation was still not complete. The project manager at EPCCO reflected on one thing he would do differently in the future:

"*Next time I go to the procurement department."*

The influence of a link on another link can lead to consequences on multiple other links (creation, loss, weakening, strengthening), even when they are not directly connected.

The evolution of the governance deployed in this Case 4 shows that tense situations can lead to the loss of some governance instruments, and not only to the addition of new ones that would complement/ compensate for/ substitute to the ones in place and that could not prevent the tensions to turn into a crisis.

The influence of individual-level behaviour on organizational-level consequences, and even inter-organizational-level consequences, is shown.

In this case, as much as all organizations share organizational level goals, the focus of some individuals on their own-level, or at most functional-level goals, triggered a series of events significantly impacting the structure of the relations within -and beyond- the triad, the governance instruments used, and the balance of relations between the nodes (TECHCO and PRODCO have been

disintermediated, and their control on the resolution of the issues was severely affected).

4.3 Cross case analysis

The purpose of the cross-case analysis is to enhance generalizability of findings (Miles and Huberman, 1994; Yin, 2018).

One of the distinctive features of this research on triads, is that three of the cases include exactly the same actors (EPCCO-TECHCO-PRODCO), enabling for higher visibility of patterns of what-how-why causation chains. This supports strongly the literal replication approach taken for this step of the research project. Moreover, the inclusion of two cases that expanded from a triad into a tetrad provides an opportunity for additional understanding of link-on-link influence.

The cross-case analysis is conducted following the same steps as the individual case analysis: detailing the influence of node on link, and the influence of a link on a link. In addition, the changes between the initial governance and the one enforced after threats to goals materialized are highlighted. It is by comparing both phases that the dynamics of governance evolution can be identified.

A depiction of the causal network regrouping all four cases is proposed in Figure 4-5. It is purposefully positioned with its reading guide right before the cross-case conclusion section 4.3.3, as a summary of the events and changes discussed in the cross-case analysis. The actions depicted in Figure 4-5 are then integrated as a model depicted on Figure 4-6 in section 4.3.3.

4.3.1 Influence of a node on a link

The influence of a node on a link was construed through the choice of governance instruments by the lower-tier node in order to fulfil its goals.

The first point to underline is that all nodes belonging to the initial triads (that is, excluding the tier 3 nodes in Cases 3 and 4), had the same goals: compliance,

risk management, technical performance, and cost control. No information was collected from the tier 3 nodes HIGHCO and DCABCO, however -apart from the compliance part on public procurement rules that would not affect them in these cases- the assumption that a private enterprise would adopt goals such as on time delivery, respect of technical standards, and cost control, can be considered valid.

The extent to which each goal is pursued by each node can be debated, in the given context. Compliance, as an example, may have concerned the nodes beyond the Buyer to a lesser scale: to the extent that breaching public procurement rules may lead to significant consequences, e.g. cancellation of the award and a re-run of the whole tender, generating delays and costs, claim for damages and compensation by the parties put at an unfair disadvantage, and negative impact on the image of the organization that broke the rules, within private firms, the consequences are generally contained to individual or departmental level, not triggering tender re-runs, although the organization's image may be affected.

In Case 1, the value of the services was under the threshold for which public procurement rules had to be adhered to, and the services were acquired in the frame of a general agreement between EPCCO and TECHCO; even when the direct dealings between EPCCO and SERVCO led to a breach in the hierarchical and contractual flow of information and approvals within the triad, and within EPCCO as a node.

In the three other cases, the tenders were issued by EPCCO in the scope of its EPC activities. Still, even when EPCCO's purchase was outside of the scope of public procurement rules, it had to bid to its own customers within these rules. The most stringent consequence of this, is that no amendments can be made to the offer (financially-, technically, and schedule-wise) from the moment the tender is closed, unless changes are requested by the end-customer.

The goals of risk management (no interruption to the service of electricity to customers) and technical performance were referred to repeatedly in the organizational brochures of the firms observed, with words such as "reliability",

“security”, as well as strong statements “We want your equipment to work. Work properly. Work all the time.” They also reflect the engineering and industrial background of the sector.

Cost control is the most controversial goal in this research. Controversial in that it is highlighted in firms’ brochures, with references to the improvement of financial indicators (operational margin, EBIT[8], etc), whilst it is not endorsed as clearly by some key individuals. Notably, EPCCO’s project managers mentioned unequivocally that cost was not their focus, and that the priority was the technical performance of the products and systems they were in charge of. A possible consequence of this lack of focus, can be found in the outcomes of the projects in the cases: as much as the technical performance goal was reached, the cost control goal was systematically failed.

We have here a repetitive pattern for each node-link analysed across all cases. This demonstrates a constant behaviour of the nodes in the governance of the relationship when deals are concluded on projects: contracts are established -the extent to which such documents are providing the expected support to the fulfilment of organizational goals is not to be discussed in this section- and the project goes on. The initial governance deployed by each node for the link to the next higher node is the same across all projects.

The analysis is here conducted to show two phases in the management of the relations: an initial governance deployment, and an issue resolution.

4.3.1.1 The initial governance phase

At the start of all the cases, each node was using the same array of instruments in its governance of the link to the direct upper tier. These instruments are the enacted governance to fulfil the organizational and project-level goals. At this

[8] Earnings Before Interest and Taxes: it is a measure of a company's profitability from ongoing operations, equal to earnings before deduction of interest payments and income taxes.

point there is no indication that project-level and organizational-level goals are not aligned.

EPCCO used a contract, industrial standards, and some informal instruments to govern the link with the tier one node. TECHCO used contracts, goal alignment, organizational structures, processes, standards, and strong informal interactions in its links with PRODCO and SERVCO. And in cases 3 and 4, where a tier 3 node was included in the analysis, PRODCO used a complement similar to the one used by TECHCO, added in depth processes, standards, and specific structures and information systems, and didn't use informal contacts with the tier 3 node.

The instruments were in their vast majority formal, following the principles of transaction cost economics theory to focus on the reduction of risks and avoidance of opportunistic behaviour by the other party. The use of informal instruments was limited to information exchange, except in Case 1 where the one informal instrument was 'professional values', used in relation to the cost control goal.

In the initial governance phase, EPCCO was the only node with direct links beyond its direct next tier (TECHCO). These links were informal, and the governance used varied notably between cases. In Case 1, the link with SERVCO was intense, even overshadowing the contractual path, with the operationalization of relationships, information exchange, and values. As indicated by EPCCO's project manager, this intensity was based on a personal relationship:

"It is nice to have a good relation… but it is not necessary"; "I can just reduce this on the technical side of the communication."

The context (i.e. the individuals on both side of the link) played here a major role in the configuration of the links in the triad.

In contrast, the direct links between EPCCO and PRODCO in Cases 2 and 4, used only information exchange, and were focused on the technical aspects of the project: risk management, and technical performance.

In Case 3, there was not direct link between EPCCO and PRODCO, as was explained by the project manager:

"I'm not in direct contact with this other company, it's always over [TECHCO]*."*

"I think it's like a rule because you have one person who is responsible for you and this is my first contact. And I don't want to talk to the other people or to the other in this case, to the other company [PRODCO] *because it's not my responsibility to talk to them. So if I want something changed or so,* [TECHCO] *should manage this for me."*

The TECHCO-tier 2 links were the richest, with the use of a large array of instruments. TECHCO engaged all formal instruments in a systematic way, addressing all of its goals, with technical performance receiving most attention. The use of standards for technical performance was mandated by the industry. This extremely formal approach was confirmed by a procurement director at TECHCO in his description of the organization and structured approach:

"Part of the procurement and logistic operations, we have a global category team, we have people in charge of the product from a procurement perspective, then there is supplier quality, and then a regional organization, each with a head of procurement and logistic."

"We have standard terms and conditions, then we have contracts, then we have frame agreements to define our relationships with them [the suppliers]*, and then with all the top suppliers, every year we define prices and where applicable, also lead times."*

TECHCO also uses the informal instrument information sharing, especially regarding the risk management and technical performance goals.

In the two tetradic cases, PRODCO used a very strict governance approach with its upstream supply chain. This had a significant influence on its links with the tier 3 suppliers: they operationalize only formal instruments. Informal communication was forbidden, every interaction having to be documented, in the frame of

contracts and processes. PRODCO invested in specific systems to control and monitor supplier performance, and ensure that the targets set for compliance, risk management, technical performance and cost control were met. As described by a procurement manager of PRODCO, they even negotiate raw materials that are internationally traded (e.g. copper and silver) in bulk including the requirements of their own suppliers in order to achieve better financial results and standardized input quality. PRODCO also requires quality certifications from its supply network, such as ISO 9000, investigating deep in the manufacturing and quality assurance processes implemented to deliver the expected products and services.

Thus, the main differences in governance choices are seen between tiers, with an increase in the breadth and depth of the instruments used by the higher tiers in comparison of the lower tiers.

In spite of this large complement of obligations and monitoring in the tier 1 - tier 2 and tier 2 - tier 3 links, things went astray, and all projects faced issues. As much as technical projects can (and will) face issues, the fact that all of them went significantly beyond deadlines and budget shows that the governance choices of EPCCO -and probably TECHCO- need revision.

4.3.1.2 The issue resolution phase

The issue resolution phase evidences reactions that are very different for each node, and sometimes for each case. The most obvious changes affect the links between nodes: creation, loss, weakening, strengthening.

EPCCO is the node whose actions were most influential on links, directly, through a node-on-link influence, or indirectly, through a link-on-link influence. Obviously, the goals did not change; it is the governance enacted that evolved in order to respond to the threats to the goals.

EPCCO’s reactions were similar in all cases: intensification of communication through informal instruments, towards the node closest to the issue that EPCCO could identify. This is where the focus of EPCCO’s reaction is illustrated: EPCCO

strived for resolution of complex technical issues that were supposed to be handled by TECHCO and PRODCO. In absence of this, EPCCO reached beyond the triad, to the tier 3 nodes, HIGHCO and DCABCO. EPCCO created links directly to HIGHCO and DCABCO -intense links- based on information exchange, and professional values. These initiatives stemmed from the project managers of EPCCO, who both indicated their focus on the resolution of technical issues as a priority. By doing so, they bypassed their own organizations (procurement, and sales), and relegated non-technical goals (compliance and cost control) to the backstage.

A similar phenomenon happened in Case 2, although the node closest to the issue was PRODCO, part of the triad. EPCCO project manager significantly intensified the contacts with PRODCO's project manager, calling upon his professionalism to find a solution to the dysfunctional system, beyond costs considerations. In parallel, EPCCO executives reached out to TECHCO executives, using personal contacts, to press the issue.

Therefore, without changes in the goals of the nodes, under changing circumstances (threats to goals), the governance of links was drastically changed. Not only new instruments were used (embeddedness and relationship in cases 2 and 3, information exchange in cases 3 and 4, professional values in cases 2, 3 and 4). But the structures of the triads were affected, through the creation, reinforcement, weakening, or even loss of links. In Cases 3 and 4, the triads were *de facto* extended into tetrads. All links affected were informal links; there was no creation of loss of formal links. As well, these changes resulted in the disintermediation of one or mode nodes in each case.

In the specific Case 1, it is a weakening of the formal link between EPCCO and TECHCO that is evidenced, through the circumvention of compliant practices. This is detrimental to EPCCO (failure to meet of cost control and compliance goals), and to TECHCO (failure to monitor behaviour of SERVCO, disintermediation with possible loss of revenue). This triggered a reaction by EPCCO's procurement, in the form of a planned implementation of monitoring queries in the information system of the firm.

In the interviews, there were no references to the enforcement of the formal instruments in place – or only to comment on their limited range as in Case 4. A few abrupt question stem here: why have these instruments, if they do not help preventing nor resolving issues? Why not upgrade them from one project to another (the documents were published in 2014)?

On the one hand, this situation is known within EPCCO, as indicated a senior procurement manager:

"*We don't have a strict regulation where have to have a contract. The general terms and conditions always apply. We have it as appendix to the contract and everything that is not ruled in the contract is ruled by general terms and conditions."*

At the same time, these general terms and conditions are not efficient, according to the same person:

"[EPCCO] *is very generous with its suppliers, if you look at general terms and conditions. So, everything that is above the cost of the project that you realise with a supplier is not within the responsibility of the supplier. So, any cost that appears due to the fact that something is not being delivered is regarded as our risk in the general terms and conditions. Did you read through those already? It's very strange."*

Here again, the procurement function had a plan to mitigate the situation:

"The initiative is to increase the contract coverage. So, what you do is then you go for the large parts, the large spend you invest first for the contracts, but risk, from my perspective, is not evaluated. Although we established quite a few contracts in the past, but, as I said, I think the rules should be established when and how to establish contracts."

On the other hand, TECHCO and PRODCO both described their very codified and structured approach to supplier management (see above); and still did not prevent the threats from emerging.

Similarly, at functional level, reactions came initially from the project managers. In contrast, unless directly put in the limelight, EPCCO's procurement (Case 3), and EPCCO's executives (Case 2), appeared silent. Even when TECHCO disintermediated EPCCO to contact the end customer directly (Case 4), EPCCO's sales did not officially react to these parties, nor was EPCCO's procurement involved to reign TECHCO's in, as TECHCO sales did towards EPCCO in Case 3. As a moderator, EPCCO's project managers did not ask for internal support; and several comments made on the procurement function evidenced their disregard for it.

From a sales manager, responding to a direct question on the involvement of procurement in the management of relations with TECHCO:

"Either you let this function fulfil its role, or you cancel it."

The same sales manager indicated that, for his own function:

"It is a problem of the organization. I have in my team a key account manager for [a customer] *but nobody takes care that he is the account manager. So everybody wants to be the responsible person to communicate."*

In sum, the behaviour of functions -through the individuals- by their actions or absence of actions, also affects the actions of other functions, and thereby the evolution of the governance of the links.

4.3.2 Influence of a link on a link

4.3.2.1 The initial governance phase

Going upstream of the triads, there is a general trend to the increase in the breadth and depth of formal instruments used. This reflects the transfer of obligations from one tier to another, and the stricter control and monitoring exerted on the higher tiers.

From the two formal instruments used by the lowest tier (the Buyer), the focus is on what is to be delivered (system performance, schedule), with a limited attention to costs, and no reference to how this is to be achieved. The outcomes were checked against contractual specifications, industry standards and a timetable. In the next links, the attention expanded to how the results were to be achieved, as shown by the use of processes and monitoring structures. The need to comply to the lower tier requirements as reflected by the formal governance instruments it used influenced the breath of governance instruments in the subsequent links. At a point, in the tier 2 - tier 3 links, the extension of governance went from breadth to depth, with more details being required from tier 3 parties, a uniform approach similar for all suppliers, and introduction of dedicated information systems for automated monitoring and even avoidance of informal exchanges. This amounts to an in-depth implementation of the transaction cost optimisation logic towards the standardisation of transactions through contracts, and establishment of hierarchical control to safeguards the specific investments of PRODCO in its own performance optimization processes.

However, other elements seemed to contradict this logic. In the conversation regarding procurement practices, a procurement director at TECHCO informed that they tended to implement back-to-back contracting (Case 3), i.e. passing the obligations imposed on them by their customer onto their suppliers, whilst a senior procurement manager at PRODCO indicated the contrary (Case 4): their supplier management practices focused on PRODCO's own needs and obtaining the best overall performance based on PRODCO's technical, manufacturing, logistical and financial requirements. Thus as much as the influence of the buyer - tier 1 link on the tier 1 - tier 2 link is supported by TECHCO's statement, the business strategy enacted by PRODCO of focusing on its own requirements limits the influence of the tier 1 - tier 2 link on the tier 2 - tier 3 link.

The increased number of formal instruments used in the links moving upstream in the triad tiers was not true regarding the informal instruments. Informal instruments even disappeared in the PRODCO-HIGHCO and PRODCO-

DCABCO relations, as per PRODCO's supplier relationship management rules. However, to the notable exception of Case 1, there was an intensification in the informal exchanges when comparing the buyer - tier 1 link to the tier 1 - tier 2 link. This can be explained by the information exchanges necessary to the management of activities across multiple functions, as well as the duration of the relation between TECHCO and PRODCO as time is one of the factors supporting the development of relational ties

Case 1 is an exception, as the intense informal link is between EPCCO and SERVCO, that is the buyer and the tier 2 node, reflecting the lesser importance of TECHCO in terms of daily interactions. As indicated by EPCCO's project manager, this intense relation was *intuitu personae*, and could be resumed to a purely technical exchange were the individuals to be different. This is also why it the link was described as intense rather than strong.

In sum, in the initial phase, the influence of the formal governance deployed in a lower link on the next upstream link (e.g. buyer – tier 1 on tier 1 – tier 2) is not obvious. And an influence beyond the next higher link, for the tetradic cases 3 and 4, is even less visible. However, the intense informal relation between Buyer and tier 2 in Case 1 has an influence of the intensity of the informal relation between tier 1 and tier 2, reducing it.

4.3.2.2 The issue resolution phase

The issue resolution phase evidences the consequences of the reactions by functions and individuals, affecting the links and subsequently the structure of relationships within the triads and tetrads.

The most noticeable reactions were the ones of the project managers at EPCCO, the focal company. Thereby, these individuals were the most influential on the evolution of the governance, and links in the cases observed. This is depicted in Figure 4-5 in the 'interventions' and 'consequences' zones.

The project managers reached out to whoever they saw to be best positioned to solve their immediate issue (risk, or technical performance). As a matter of fact, the ‘targets’ were functional counterparts (project managers) at the node closest to the issue. These actions were undertaken knowing that they were in breach of normal work processes (e.g. quote of project manager in Case 3) and could only be based on non-formal governance. The informal governance instrument that was systematically used is professional values: one could summarize it as “project managers deliver”. In fact, all projects ended up being delivered, or at least the technical performance goals were met.

In some instances, embeddedness and relationships were used, based on personal connections (e.g. Case 3). This is also this path that was followed by EPCCO’s executives in Case 2, to engage TECHCO’s executives.

The actions described had distinct consequences on the links: intensification (stronger links), weakening, creation, loss, and some were unaffected. Notably, the formal links were unaffected: they have the advantage of permanence, and remain until they are deliberately cancelled, or their object ceases to exist.

Intensification of informal links materialized in cases 1 and 2, between buyer and tier 2 suppliers.

Weakening of informal links happened to the tier 1 – tier 2 link in all cases, the buyer-tier 1 link in Case 3. The change witnessed to the buyer – tier 2 informal link in Case 4 is triggered by the leave of absence of PRODCO’s project manager: EPCCO’s project manager stepped in to regulate some interactions with and within PRODCO, and directed his attention to the tier 3 node, DCABCO. This experience was described as “*horrible.”*

Links were created in cases 3 and 4, both beyond the triad, towards the tier 3 node. They were immediately intense, mirroring the activity necessary to solve the technical issues faced by the projects.

The one link that was lost is the informal link between EPCCO and TECHCO, after TECHCO reached out to the end customer to inform of scheduling issues.

The modification of links triggered the disintermediation of nodes. Across all cases, EPCCO disintermediated TECHCO, leading to the weakening of the informal TECHCO – tier 2 link. Interestingly, the creation of direct links between EPCCO and the tier 3 suppliers in cases 3 and 4 did not affect the formal links between PRODCO and these nodes (contractual obligations, processes, structures, etc, remained), nor the informal links because they did not exist (!). The same can be noted regarding the TECHCO-PRODCO and TECHCO-SERVCO formal links. The bypassing of the organizations that can be considered as intermediates between the node source of the issue and the buyer (EPCCO) does not directly change their obligations, nor their general *modus operandi*. Still, it is not because the governance link is not affected, that the relation between the parties can be said to be unchanged.

An important reminder is that these cases, and therefore these events, occur contiguously: Case 1 is continuous, Case 2 was completed in 2018, Case 3 and Case 4 were commissioned in the first half of 2019. There is parallel existence of similar links between nodes at function / team / individual levels. Hence the links affected in the cases are the links relative to the Case itself. The simultaneity and multi-levelness of changes are depicted in Figure 4-5. The implications for goals and governance can be assessed at three levels:

Firstly, at individual level. The persons in charge of running and supporting projects (procurement managers, project managers, sales managers) are, in principle, cognizant of organizational goals and policies. Still, in several cases, they did act outside of prescribed policies (e.g. bypassing other functions, disintermediating nodes), with the intent to protect the fulfilment of one or more goals of their organization.

Secondly, at organizational level, at which the goals are determined, and, in principle, cascaded through the functions. Also, in principle, the choice of governance instruments is determined by policy. Albeit it is not the case at EPCCO, in contrast to TECHCO, PRODCO and SERVCO. Hence, the decision

relies on the function, or even at individual level, as explained by a senior procurement manager at EPCCO.

Thirdly, at interorganizational level. The goals of organizations, even when they are similar between organizations, may be prioritized differently, leading to different governance arrangements. This also means that besides case-level arrangements, there is a web of informal links -and especially in this industry and this geographic context, that keep communication between nodes possible even when case-level ties are shaken.

Guide to Figure 4-5

This Figure intends to visualize the events described in the cases, as a three-stage progression: context – interventions - consequences. The stages are delineated by the vertical black thick dotted lines. There is also a progression from organizational level (in context) down to function-level, with projects as a connecting element between the two. Here is how to read the Figure.

On the left side, the first stage is the context. It starts with project inception (thick black lined box, with red letters), that leads (solid single line arrow) to the selection of a supplier (sourcing) by EPCCO. This action is influenced (solid double lined arrow) by the rules and practices of EPCCO, themselves influenced by the Market rules and practices. The sourcing by EPCCO leads to a sourcing by TECHCO and influences the governance of EPCCO's relations with TECHCO. The Sourcing by TECHCO influences the governance with SERVCO, leads to the sourcing of SERVCO as provider for Case 1 (solid blue line to box Execution by SERVCO); leads to the sourcing of PRODCO for Case 2 (solid orange line to box Execution by PRODCO), influences the governance with PRODCO (solid double line), leads to sourcing executed by PRODCO (black solid line to box Sourcing by PRODCO) for cases 3 and 4.

Using the case 1 as an example, let's focus on the elements in blue. In the context, the governance used by TECHCO with SERVCO is influenced by Sourcing by TECHCO and influences the execution of service by SERVCO.

Shifting to the execution of the service by SERVCO (square box in Interventions stage), this leads to action by EPCCO project management function. For case 1, the solid blue line from 'EPCCO project management' bubble leads to the box 'EPCCO project manager bypasses EPCCO compliance rules'. This describes an action (intervention) of EPCCO's Project Manager (PM). As the only solid line reaching to this box is blue, this intervention was seen only in the case 1. In this column of actions boxes in the 'Intervention' stage, looking at the fifth box from the top (the box 'EPCCO PM bypasses TECHCO contact'), a solid black line leads to it from the bubble 'EPCCO project management' denoting that actions in several cases have led to this. These two actions boxes (1st and fifth from top) display blue arrows to their right, leading to boxes in the 'Consequences' stage area. These target boxes identify a specific link affected by an action in the intervention stage. A box can be specific to a case. In the example for case 1, in this column, the 6th and 7th boxes from the top 'EPCCO SERVCO informal link' and 'TECHCO SERVCO informal link' are specific to case 1 as no other case has SERVCO involved. From the action boxes in the 'Interventions' stage, solid blue lines lead to three target boxes identifying affected links: the 1st; 6th and 7th in the column. From these affected links boxes, solid arrows lead to change boxes, that indicate if a link is lost, weakened, remains the same, is created or is made stronger. The affected link 'EPCCO-TECHCO formal link' (first box from top) has a solid blue line to the 'weakened' change box, indicating that the link was weakened in case 1. The affected link 'EPCCO-SERVCO informal link' (6th box from top) has a solid blue line to the 'Stronger' changer box, indicated a reinforcement of the informal exchanges between EPCCO and SERVCO. The affected link 'TECHCO-SERVCO informal link' (7th box from top) has a solid blue line to the 'Same' changer box, indicated no visible change in the informal exchanges between TECHCO and SERVCO.

An important point to consider is that some actions (solid black lines) are common to several cases, and lead to interventions boxes (e.g. EPCCO PM bypasses EPCCO Procurement) also common to several cases. Hence some of the consequences (where a solid black line connects an intervention box to an affected link box) are common to several cases.

4.3.3 Insights

From the analysis of cases, a consistent series of “situation-event-action-consequences” can be established. As indicated in the research design, the focal node is the buyer (EPCCO), hence the pattern is drawn from their lens.

An organizational level governance model was used to control organizational-level goals applied to specific projects. This governance was based on formal instruments. In their course, the projects faced issues, that were not resolved by the existing governance.

Interestingly, the target organizations and functions accepted these new governance patterns (links and instruments), in contradiction of their highly formalized set-up at both organizational and functional levels.

From these elements, a conceptual causal network was created (Figure 4-6) to show the multilevel interplay of the influence of context, goals and governance model on decision making during the path of events.

A project-level reaction was led by the project management function. This reaction was to reach to the node closest to the issue, and specifically to the functional counterpart. Hence new links were created. These links were based on informal instruments, sometimes relied on personal connections, and called on professional values. The goals then pursued were function-focused, losing the ‘cost control’ goal. The function supposed to enforce the formal governance -that is procurement- was kept out of the problem resolution initiative as long as possible.

The technical performance goal were addressed and fulfilled; this met the project management function’s most pressing goal (technical performance), as the time-related goal was already missed. The cases resolved with a financial loss to buyer due to a penalty system implemented at buyer’s end customer contract level. The exact financial impact that the buyer could recoup from the other nodes was not determined, albeit it was described as low due to weak contractual safeguards used by the buyer.

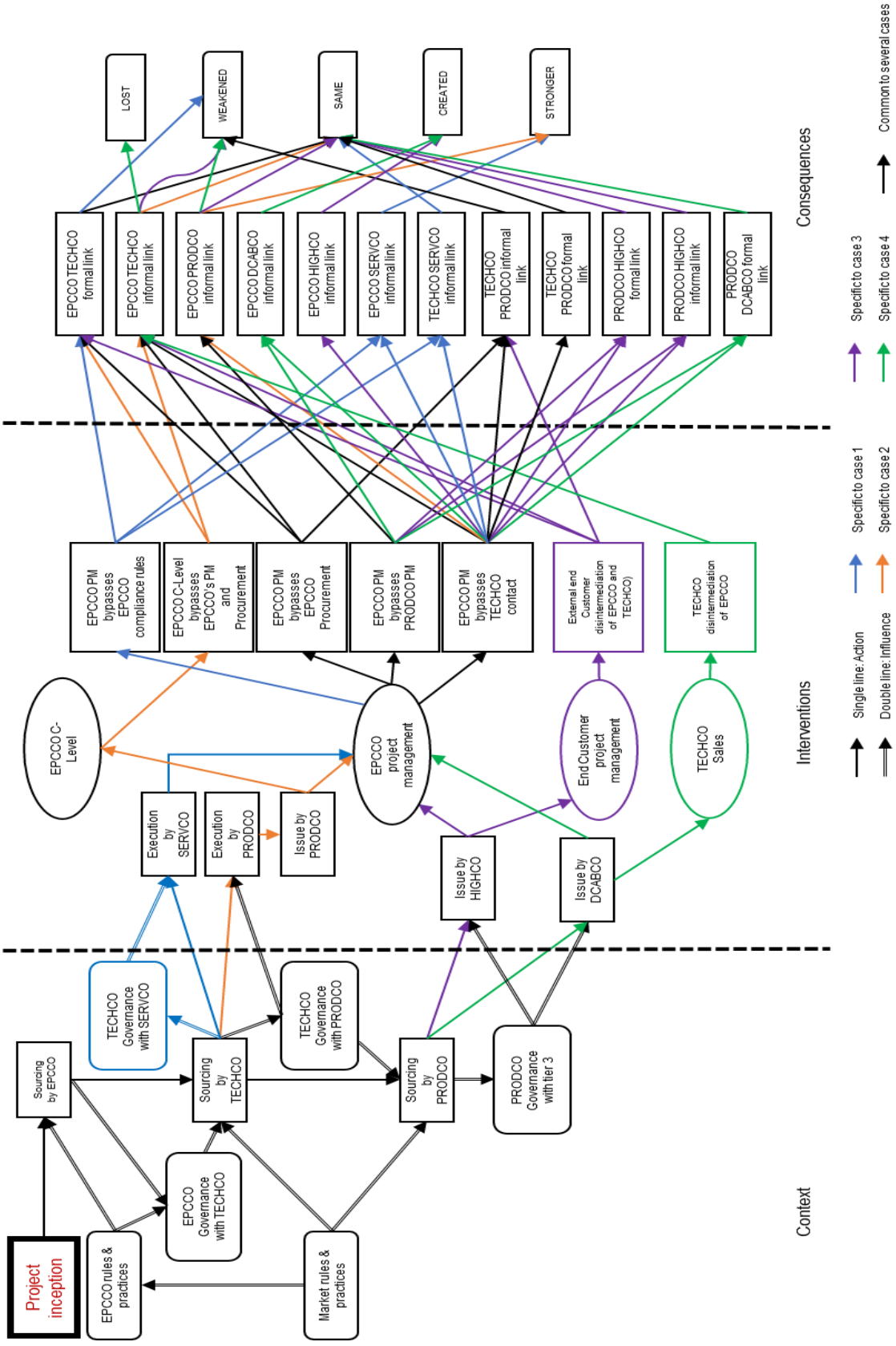

Figure 4-5 Overview of causal network

Under tension, we therefore see a decoupling between organizational goals and their associated governance and the attainment of function-level goals and the corresponding governance arrangements. This leads to a change in the structure of inter-organizational project-level links, at the initiative of the project-management function.

Interestingly, the target organizations and functions accepted these new governance patterns (links and instruments), in contradiction of their highly formalized set-up at both organizational and functional levels.

From these elements, a conceptual causal network was created (Figure 4-6) to show the multilevel interplay of the influence of context, goals and governance model on decision making during the path of events.

This conceptual causal network reads from top left, starting from the sourcing decision. This decision is influenced by contextual elements (the institutions and competitive market), as well as a number of intra-organizational elements (organization level goals and governance model; project level goals). From the sourcing decision, the triad structure and the link-level governance are established. They hold until adaptation is needed, and the project is derailed. At this point, a change of governance logic occurs, and function level goals become the focus. The project managers resort to a function level focused governance practice, that triggers the evolution of the structure, the enactment of a governance model specific to the new links, and a change of governance model to the existing links.

This conceptual causal network highlights three different levels: an organization level, a project level and a function level. Until adaptation is needed to face issues, it is the combination of the organization and the project levels that steer the decision making on partner selection, triad structure and governance model. From this tension event on, it is the function level that takes over.

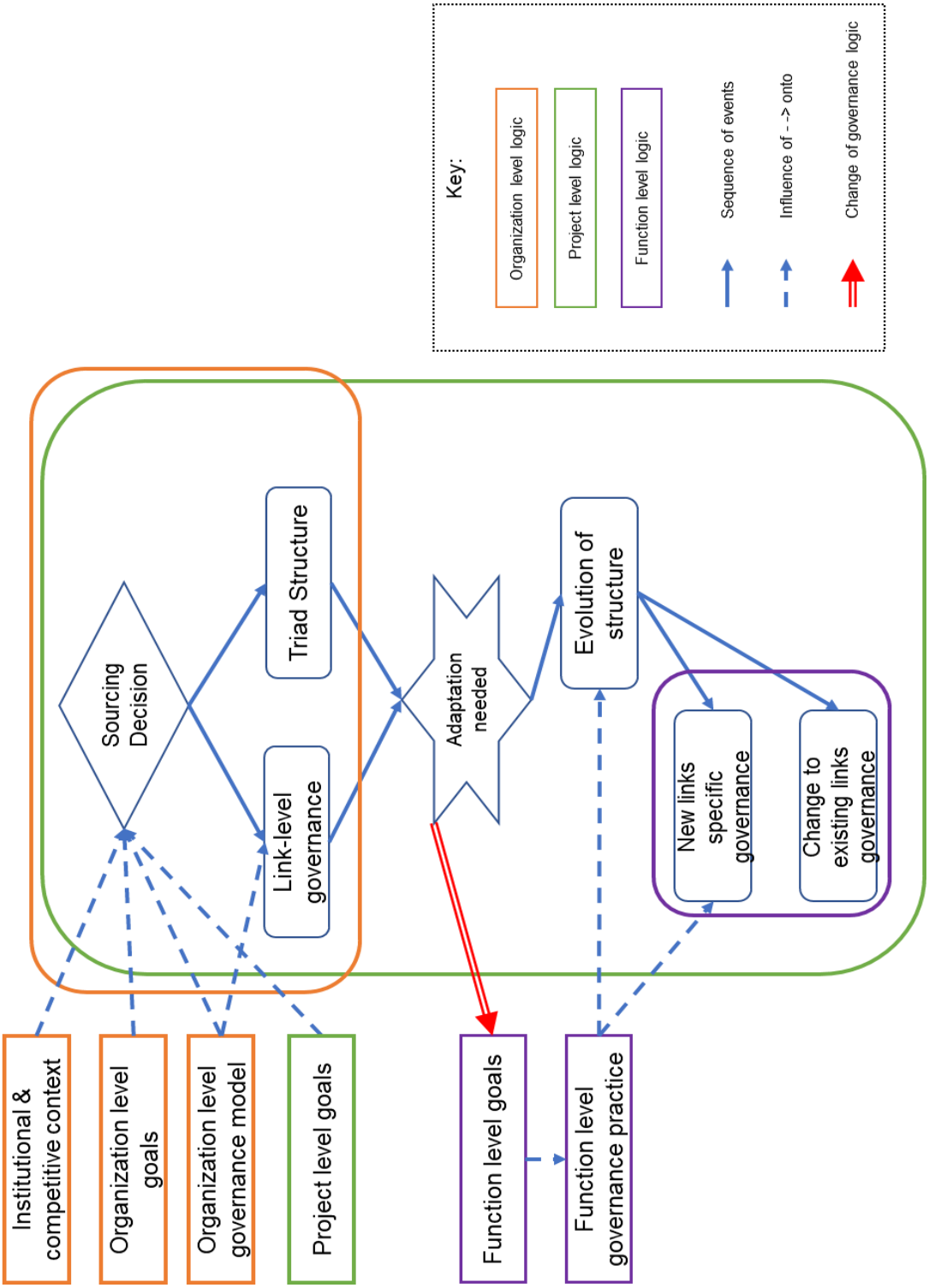

Figure 4-6 Conceptual causal network

In the next chapter, findings are debated and related to the research question. Then managerial implications are offered, drawing on the practical Continuous adaption model developed from the findings. Research limitations and avenues for further investigations are discussed. Finally, the conclusion summarizes the work accomplished, the findings and the managerial implications.

5 DISCUSSION

This chapter is structured as follows: first part is a discussion regarding the contribution of the case studies to respond to the research question. This includes a section for each sub-question, one for the new insights gained beyond the sub-questions, and then the more complete answer to the research question. In the second part, the managerial implications of these findings are offered. This starts by the presentation of a model showing the interplay of external and internal elements of an organization in the continuous adaptation to the flow of events in business. Then detailed recommendations are given on how to respond to the challenges posed, and sustainably improve the practice of supplier portfolio management and purchasing strategy.

5.1 Findings

In this first part, the learnings from the case studies are put in perspective with the exiting literature, to propose an answer to the research question, and its two sub-questions:

> ***How does the governance of buyer-supplier relationships influence the other relationships within a buyer-supplier-supplier triad?***

And sub-questions:

- How do the goals of a node affect the governance of a link?
- How does the governance of a link affect the governance of another link?

The sub-questions are addressed first, followed by insights on the evolution of governance evolution in the wake of problem resolution. These discussions lead to the proposed answer to the research question.

5.1.1 How do the goals of a node affect the governance of a link?

The purpose of governance is to align goals and incentives. It is enacted through formal and informal instruments that define what has to be achieved (the outcome) and how it has to be achieved (the behaviour). It is through the establishment of a set of proper control instruments that the predictability of goals fulfilment is enhanced (Das and Teng, 1998; Dekker, 2004). The logic is that the nature of the goal directs the nature of the governance implemented (Dyer, 1996; Liu, Luo and Liu, 2009). That is for an outcome-based goal (e.g. a delivery date, a level of technical performance, a budgetary value), an outcome-focused instrument will be used (e.g. a contract, a standard, goal alignment), and that for an behaviour-based goal (e.g. compliance), a behaviour-focused instrument will be used (e.g. a process, a structure) (Dekker, 2004). The view of agency theory is that is case of conflict of interest (and therefore goal mis-alignment) between the parties, or when the outcome is easily measured, it is the interest of the buyer to use an outcome-based contract; otherwise a behaviour-based contract should be preferred (e.g. Eisenhardt, 1989). The transaction cost economics theory suggests managing uncertainty either through price competition or the use of formal control mechanisms (e.g. Williamson, 1979). The instruments referred to do not include informal ones. However, the adoption of the “right” mix of governance instruments in the context is the subject of a lasting debate among scholars. In this conversation, the researchers having a strong link to the field of operations (Dubois and Fredriksson, 2008; Grimm, Hofstetter and Sarkis, 2014; Mena, Humphries and Choi, 2013; Odongo et al., 2016; Reusen and Stouthuysen, 2017; Rossetti and Choi, 2005, 2008) tend to focus on selecting the adequate combination of formal instruments (e.g. contracts, processes, etc) in order to protect the focal actor’s (in general, the buyer) best interests. This does not ignore the importance of relational governance, associated with trust and informal instruments (e.g. Cao and Lumineau, 2015; Poppo and Zenger, 2002). Nevertheless, a recent study in the construction industry concluded that if the sourcing process is heavily based on price competition, then execution governance should provide a balance by being “heavily non-contractual”; and vice-versa (Chen et al., 2018).

Thereby, the goals affect the governance of a link through the choice of instruments retained to fulfil them.

Goal alignment between organizations has been shown to be the foundation of effective, value creating collaboration (Håkansson and Snehota, 1995; Monczka et al., 2011; Provan and Kenis, 2008), whilst mis-alignment is a source of opportunistic behaviour (Olsen et al., 2005). This organizational-level goal alignment is expected to happen at project level as well. Parties contributing to a project should have joint goals (Olsen et al., 2005; Pathak, Wu and Johnston, 2014; Rossetti and Choi, 2005), and the governance used has to be aligned with the goals (Dyer, 1996; Liu, Luo and Liu, 2009). In fact, the project management literature stipulates that project-level governance has to be aligned with organizational-level goals (e.g. Biesenthal and Wilden, 2014).

The cases revealed that there was a lack of adaptation of the governance, and thereby the instruments used, to the specific context of the projects, at all tiers in the triads. The detrimental effect of simply transferring governance from organizational level to project level was evidenced in large projects in the Norwegian oil and gas industry (Caniëls, Gelderman and Vermeulen, 2012). In the situation described in this article, cost doubled, and the projects were significantly delayed; still the technical performance goals were met, thanks to the high quality focus of the parties. A striking parallel to the case study in this document. This highlights the role of the procurement to finetune the choice of governance instruments to the context, beyond the relation between the buyer and the supplier, to the specifics of the project. The trend in large projects procurement is to move away from a supplier selection process based on price competition to performance-based incentives (Chen et al., 2018; Howard et al., 2019). This puts a higher emphasis on the selection of adequate governance instruments and associated incentives, to obtain the right mix of outcome and behaviour control (Biesenthal and Wilden, 2014; Chen et al., 2018; Gadde and Snehota, 2019; Micheli and Cagno, 2016; Wilhelm et al., 2016). However, the impact of the governance enacted by the end-customer is key, as it determines the distribution of risk and rewards across the tiers.

5.1.2 How does the governance of a link affect the governance of another link?

The goals of a node affect the governance of a link through the instruments used. And each node is, in principle, independent in the choice of its organizational goals and the governance used to meet them. However, it is known that the context has an influence on the goals an organization is pursuing (Choi et al., 2002; Choi and Kim, 2008; Grimm, Hofstetter and Sarkis, 2014; Håkansson and Waluszewski, 2016) Thus the governance of a link may affect the governance of another link.

How it happens can be described in different ways. The first one is through the alignment of goals across tiers, as it may sometimes be attempted through contractual means (Salonen, 2004; Van der Valk and Van Iwaarden, 2011). In this situation, a multi-tier formal agreement simply dictates what the governance has to be in the triad. This seems to be the most common method in the implementation of sustainable supply chain policies (Grimm, Hofstetter and Sarkis, 2014; Wilhelm et al., 2016). An issue associated with this one is the prioritization of the goals, often enacted through the incentives proposed. In the cases investigated, the organizations had the same overarching goals, without the same emphasis. Thus, the alignment of incentives with goals is a mean to influence governance across several tiers. In infrastructure projects, failure to do so has led upstream suppliers to prioritize the minimization of their costs to the detriment of on-time delivery (Caniëls, Gelderman and Vermeulen, 2012; Olsen et al., 2005), for which only the buyer ended being penalized. In the cases observed, the buyer had a low emphasis on cost control, whilst the suppliers were more sensitive to this aspect and managed their efforts in order to preserve this goal, even to the detriment of other ones for which the dis-incentive was not strong enough (in general, the date of delivery).

The second one is through the management of relationship archetypes, notably cooperation, competition, coopetition (Choi et al., 2002; Dubois and Fredriksson, 2008) to influence the relative behaviours between the upper tier nodes (Wu and Choi, 2005). In such situations, the buyer influences the relationships between

the suppliers to maximize its own outcomes. Such practice is also described in the context of large projects through the use of a collaborative procurement process (Chen et al., 2018), in which relational governance is emphasized as the preferred choice even when not barring the existence of contractual instruments. This process was found to support higher success rate in large projects even though it reduces initial bidding competitive intensity (Manley and Chen, 2016).

The third one is imitation, that is the simple copy (possibly with slight adaptation) of governance applied in one link to another link. This practice was shown to be enacted up (Phillips, Liu and Costello, 2001; Reusen and Stouthuysen, 2017) and down (McFarland, Bloodgood and Payan, 2008) of tiers. In the cases no evidence of cross-tier imitation was found. In fact, each node and tier enacted governance systems established on different operating bases, which leads to the issue of coupling and decoupling of governance across tiers.

The choice for a node to transfer or absorb the risk portion of the relationship with its downstream buyer has a significant influence on the governance of the upstream links. Notably by retaining, or not, the decision-making power on the incentives, and thus the prioritization of goals. If a supplier accepts to take on the risks associated with the goals determined by its buyer, the said supplier can freely allocate risk and rewards to its upper tiers -to the extent that this upstream governance still ensures that the buyer's goals are met, in a profitable manner. On the contrary, if a supplier simply transfers the risks bestowed by its buyer, it can't decide on the goals it is setting to its own supplier(s). One moderator to that is when the incentives and dis-incentives imposed by the buyer are not sufficient to ensure the alignment of goals with the tier 1 supplier; this is the situation witnessed in this case study.

These considerations are focused on initial governance set-up, and do not discuss the adaptation to changing circumstances. The evolution of governance after issues appeared is evidenced in this case study. These changes impacted both the structure of the triads -becoming tetrads in cases 3 and 4- and the instruments implemented through the links.

5.1.3 Governance evolution in the wake of problem resolution

Multiplexity, that is the coexistence of ties at several levels between nodes (e.g. Artto, Eloranta and Kujala, 2008; Obstfeld, Borgatti and Davis, 2014), is the basis for the possible differentiation between organizational and project-level governance. Project-specific networks are temporary and reconfigured as necessary from one project to another (Artto, Eloranta and Kujala, 2008). So far, the literature has shown that a node could have several roles (buyer, supplier, competitor) from one project to another even within the same closed triad (Harrison, Holmen and Pedersen, 2012), and that the same triad could have several projects running in parallel using the same governance arrangements (Dubois and Fredriksson, 2008). Both these examples were set in closed triads and did not differentiate between organizational-level and project-level governance. In contrast, the cases investigated here evidence the evolution of temporary triad structure, through the creation or modification of informal links in order to solve project-level issues, within an existing stable organizational-level open triad. The literature on project governance (e.g. Biesenthal and Wilden, 2014; Chen et al., 2018) does recognise that multiple governance levels co-exist, albeit only in consideration of tasks allocation between functions, or to distinguish the difference in specific details of governance instruments between these levels. As well, little project management literature have shown the evolution of triad structure to resolve issues (Caniëls, Gelderman and Vermeulen, 2012). More literature exists that documents the evolution of contractual arrangements and the mix of formal and informal governance to resolve issues in projects, without evolution in the structure of the links (Howard et al., 2019; Micheli and Cagno, 2016; Roehrich and Lewis, 2014).

The project-level data collected in the cases evidenced that the buyer's project managers, at project level, acted to have first-hand access to idiosyncratic information to make informed decisions and influence the outcome of their respective projects, and thus created links to their counterparts closest to the issue. They changed the brokerage situation in order to gain a *tertius iungens*

position, that is closing the triad instead of being at one end of a branch. The new position obtained, linking nodes, has been shown to facilitate access to information and enable coordination of action (Obstfeld, 2005; Obstfeld, Borgatti and Davis, 2014; Pathak, Wu and Johnston, 2014). At the same time, in cases 3 and 4, the tier 2 supplier (PRODCO) has been disintermediated when the buyer introduced the tier 3 supplier in its span of control. This inclusion of a new member in the triad is also a recognized role of nodes endorsing *tertius iungens* position and role (Obstfeld, 2005; Obstfeld, Borgatti and Davis, 2014).

The relation between change in roles, and especially brokerage roles, and evolution of a network structure (Pathak, Wu and Johnston, 2014) is another evidence of the influence that a link can have on another link.

The new role of the buyer indicates an evolution in the power structure of the triad, whilst the position of the nodes in the supply chain triad (or tetrad) did not evolve. Such phenomenon had been described through the lens of coalition formation (e.g. Bastl, Johnson and Choi, 2013; Shi et al., 2014). In the two tetrads (cases 3 and 4), the buyer and the tier 3 node could both be considered as dependent on the other two nodes. The buyer is committed to obtain the systems from the tier 1, and the tier 3 is committed to deliver to the tier 2; neither the buyer nor the tier 3 have alternatives to respectively acquire or sell the equipment. The buyer and the tier 3 node have a common interest and could be construed as two weak players allying against stronger ones. The buyer would use the direct link to tier 3 to counterbalance the tier one's power (control of project information, and delivery, possibly control of costs and capture of value to the disadvantage of the buyer), and the tier 3 would communicate directly with the buyer to rebalance its relationship with the tier 2. However, here, no element supports that the tier 3 node had such intention. Moreover, the newly created links at project-level bypass the set internal and inter-organizational governances of the firms involved, further weakening the hypothesis of coalition intent of the buyer as such endeavour entails a change in the strategic position of the node. And last but not least, the interests of these project managers required actions within too short a time span to warrant elaborated approaches such as the one described above:

they want to solve the issue (Artto, Eloranta and Kujala, 2008; Caniëls, Gelderman and Vermeulen, 2012).

Conversely, closing the triad, which is done by the buyer by reaching out to the tier 2, or the tier 3, is a way for the buyer to prevent coalition behaviour by the suppliers (Wuyts, van den Bulte and Franses, 2004). This would be when the buyer believes that the suppliers work together for its demise. At project level this means that there is a deliberate delaying of the delivery of the finished products and systems in order to embarrass the buyer. The only situation one could see as suspicious is in Case 4, when the tier 2 supplier fails to ensure compatibility between products it has designed or subcontracted itself and fails to backfill its own project manager whilst the project is confronted by/with serious delay and technical performance issues. This would imply an organizational-level coalition with the tier 1 -who views the buyer as a major competitor- as this node will be in the “hot seat” when the situation is discovered. No evidence supports this view; however, none who have disclosed it, one can guess.

In sum, the project managers, enacting informal links at individual level, used the simplest solution they could see. They applied a principle of parsimony to the resolution of their problems, reflected in the evolution of governance.

This highlights the importance of the role of the project managers -as a function and as individuals- in the prioritization of goals and thereby the choice of governance instruments to resolve the problems faced in their projects. It appeared in several interviews that the project managers focused on the technical delivery, creating a dis-alignment between organizational-level goals and functional-level goals. In procurement and supply chain literature, the theory most commonly used to highlight goal convergence or divergence between agents and principals is agency theory (e.g. Fayezi, O'Loughlin, and Zutshi, 2012). However, critical realism explanatory approach is to consider individual intentionality and the actor’s position in its context and social structure (Welch et al., 2011): agency theory does not include this aspect. It is rather linear in its conception of principal-agent consideration and presupposes that the agent must be controlled to avoid opportunistic behaviour to the prejudice of the principal. Stewardship theory (e.g.

Donaldson and Davis, 1991), is also interested in the relation between a manager and its corporate organization, in the long term. According to stewardship theory, the project manager acts in the best interest of the project sponsors (Davis et al., 1997). Here again, the inquiry is based on the assumption of alignment of goals between an individual and an organization for their mutual benefits, with a relationship based on trust whilst agency theory is a proponent of power-based control and monitoring. However, the specific context of the individual is not considered. In contrast, institutional logics theory does take into account the context in which the individual is situated, as well as the intrinsic and extrinsic influences that drive his behaviour. This more recent theory encompasses macro, meso and individual levels (Thornton and Ocasio, 2012) and is therefore particularly appropriate to the situation analysed.

Institutional logics represent the values and references which individuals and organizations draw upon to guide their decisions and actions (Thornton and Ocasio, 2008). Six institutional orders (the family, religion, state, market, professions, and corporation) have been recognized to “shape how reasoning takes place and how rationality is perceived and experienced” (Thornton and Ocasio, 2012, p.2). Three types of logic were described by Martin et al.2017): professional logic is characterized by the dominance of professionals over decision-making and deference to knowledge and skills; corporate logic refers to managerial techniques to monitor and control professionals' and organisational performance; market logic encompasses all signals given by market about its requirements, and the measures taken by organisations to address them (e.g. costs containment, performance of products and services). They are observed at individual (micro), organizational (meso), and industry (macro) levels, respectively. It is the embeddedness of agency across these three levels (Thornton, Lounsbury and Ocasio, 2012) that renders this theory well-suited to the understanding of the phenomena in the cases retained in this research. Furthermore, recent literature on intraorganizational conflicts based on institutional logics (Besharov and Smith, 2014) brings useful insights on the evolution of the balance of institutional logics within the focal organization.

In contrast, agency theory focuses on the contract between a principal and an agent, and how can the principal ensure that the agent resolves the potential conflict of interest in favour of the organization (Eisenhardt, 1989; Tate et al., 2010), through control and monitoring. In agency theory, the assumption is that the agent is seeking self-interest (Eisenhardt, 1989). To the contrary, in the interviews conducted in this research, the participants referred to protecting the interests of the organisation -meeting the goals- and to professional values as guides for their actions, thereby eliminating the main driver of agency theory: goal conflict between the principal and the agent and fostering institutional logics as the relevant frame of understanding.

As shown below, applying the lens of functional logics to the actions of the project managers from both the buyer node and the node that was targeted by the new links at the tier 2 supplier and even more notably at the tier 3 nodes brings clarity to the phenomenon observed.

The project managers of the buyers reached out to their peers closest to the issue, using informal instruments. Only the project manager in Case 3 indicated that she effectively knew the persons from previous experience. Accepting that such links were discretionary links (Wynstra, Spring and Schoenherr, 2015) implies that they were meant to convey information, thereby confirming their nature as an informal instrument. However, beyond information, instructions were given, as confirmed by the buyer's project managers in case 2, 3 and 4, meaning that particular circumstances led the target individual (a project manager) to accept such governance. Institutional logics applied at functional level seem to explain the behaviour of the individuals involved. Both sides were driven by professional values, that enabled them to bypass the instituted governance of their organizations, also excluding the other functions that one would expect to be in charge of interorganizational relations (procurement and sales, respectively). Such values, focused on technical excellence and project-level focus driving the achievement of "tactical objectives of a particular project" (Biesenthal and Wilden, 2014, p.1303), were also confirmed by the same project managers. Being shared by both individuals involved as project managers in each

project, professional values were the likely conduit, and supported the acceptance of the out-of-structure action. That the interventions aimed primarily at meeting technical goals -and they were met- mirror the findings that in order to solve issues in project, technical teams are prone to make changes to the project-level actors involved in interorganizational collaborations (Majchrzak, Jarvenpaa and Bagherzadeh, 2015). The focus on the resolution of technical problems to the detriment of other goals has been evidenced (Caniëls, Gelderman and Vermeulen, 2012), although other goals can also be addressed in parallel when the project management function does not act in isolation. In fact, three cases studies involving EPC firms working -among other sectors- in the energy industry in which "all the companies interviewed use procurement levers for the recovery of delays" (Micheli and Cagno, 2016, p.7) demonstrated that the alignment of the functions is a key factor to facilitate issue resolution and coordination (Harrison, Holmen and Pedersen, 2012). Still, in two of the three phase two interviews (see data collection approach in section 3.3.1, and 'transferability' in section 3.5), the participants -from the procurement function- disclosed that project managers in their firms would focus on technical delivery above other considerations.

As an example, the interviewee from the energy sector volunteered:

"The project manager does not always have that objective, which is to lower the service price. He wants to deliver the infrastructure, give the key to the client, and he walks away back to his next project whereas us, as a central procurement hub and way of operating, we have been very strong at advocating for the total cost and not just buying the cheaper equipment but the equipment that costs less over the long run."

Moreover, these interviewees both mentioned that, in spite of being driven by the same organizational goals and customer demands, the functions had different objectives.

In sum, project managers confronted to severe threats to the completion of their objectives, initiated changes to the temporary project-level interorganizational structure and associated governance instruments enacted through the links. The mis-alignment of functional objectives at project level, amplified by individuals'

professional logics focused on technical achievement, incited the said project managers to act without engaging internal cross-functional coordination. Here, the negative impact on goal attainment (only one goal -technical performance of the product- was met, and the threats to other ones were not mitigated, notably leading to significant financial loss to the buyer) meets the “conclusion that companies that suffered from low internal integration between corporate functions, performed worse than the more integrated firms” (Araujo, Gadde and Dubois, 2016, p.13).

5.1.4 Answering the research question

The answer to the research question…

> ***How does the governance of buyer-supplier relationships influence the other relationships within a buyer-supplier-supplier triad?***

…proposed here is in three parts.

The first part addresses the initial circumstances under which the governance of particular relationships are decided. The second part relates to the execution of the choices made. The third part to the evolution of governance in time.

5.1.4.1 Choice of instruments in context

The governance of buyer-supplier relationships influences the other relationships within a buyer-supplier-supplier triad through the instruments retained to fulfil the goals of the buyer. These instruments reflect the prioritization given by the buyer to each of the goals, through the incentives or dis-incentives provided for by these instruments. The intention is to ensure alignment of goals across the triad. That is to determine which risks and rewards are bestowed onto the upstream node.

Although, decoupling can occur when a node decides to bear the risks transferred by the downstream node. The decoupling node regains control on the allocation of risks and benefits between itself and its upstream nodes. If the node is in

control of valuable, rare, inimitable, non-substitutable resources or capabilities (Barney 1991), it can have a stronger negotiation power with the downstream node to avoid being left with risk it can't mitigate. This consideration is particularly important if the said node is at the last level of the chain (e.g. primary resources like minerals or plants, labour).

5.1.4.2 Implementation performance

Implementation performance includes the choice of the appropriate instrument to control the outcomes and monitor the behaviours as well as the adequate incentive and dis-incentives. In the cases observed, the lack of adequate safeguards regarding delivery performance and cost control in the buyer's contractual terms led to severe discrepancies in the outcomes, at buyer's expense.

In addition, the issue is to be addressed both with the suppliers and across the internal functions. Internal mis-alignment is a clear source of low performance in projects (Araujo, Gadde and Dubois, 2016) and cross-function cooperation is a strong contributor to risk mitigation and issue resolution (Harrison, Holmen and Pedersen, 2012; Micheli and Cagno, 2016). Internal mis-alignment was also pointed out in several interviews within cases, and in all the replication interviews.

A caveat was given on imitation behaviour. Imitation of the governance enacted by downstream or upstream nodes was proved to increase the risk borne by the imitator, mainly due to the lack of adaptation to its particulars (e.g. Reusen and Stouthuysen, 2017).

Implementation performance is therefore closely associated to the adaption of the governance to the context in which it is to be enacted, and internal collaboration.

5.1.4.3 Evolution and adaptation to context

The papers identified in the systematic literature review focused on the stabilization of relationships at organizational level, possibly to the benefit of the

buyer (Choi et al., 2002; e.g. Choi and Wu, 2009a; Wu, Choi and Rungtusanatham, 2010; Wuyts et al., 2004). Here, the existing governance was obviously not effective to prevent, and rapidly correct, problems in the projects.

In a given project, notably from the point of view of procurement, evolution of relationship governance should follow the main phases: bidding and execution. This was clearly evidenced in large projects: “Governance for project execution needs to complement governance for project procurement: if procurement governance is heavily contractual (price competition), then execution governance needs to be heavily non-contractual to provide balance, and vice versa.” (Chen, 2018, p. 7). However, rather than a deliberately planned undertaking, changes to the structure of interorganizational collaborations, or to their governance, were shown to occur following “failure to reach initially planned goals or provide expected value to partner firms, […] the failure to move the project forward as expected, […] achieving less success than the initial expectation.” (Majchrzak, Jarvenpaa and Bagherzadeh, 2015, p. 1350). As evidenced in the cases, such organizational-level evolutions frequently include an increase in the use of informal instruments (Choi and Kim, 2008; Majchrzak, Jarvenpaa and Bagherzadeh, 2015).

In the first phase, the commitment to interdependence requires highly formalized governance (Chen et al., 2018; Dekker, 2004), in order to establish safeguards for all parties. This first phase aims at establishing cost control and behaviour monitoring instruments.

In the second phase, when interdependence is enacted and can’t be easily modified (Olsen et al., 2005), relational governance aims at developing trust (Poppo and Zenger, 2002). This implies a significant investment in temporary idiosyncratic capabilities (e.g. leadership skills, fostering communication, boundary spanners, possibly co-location). This relational governance comes in addition to the formal governance that was established in the first phase, and against which financial rewards will be distributed.

The evolution of the governance between these two phases corresponds to the recommended “effective alignment of governance instruments with transactions”

(Dyer, 1996, p.652). This was recently demonstrated (Howard et al., 2019), by contrasting functional and dysfunctional governance arrangements in the two major phases of ship building and ship operational maintenance of two projects: depending on the adequation of the governance mix to the requirements of the project phase, one project was successful, and another one did not deliver.

An important contribution of this research is that it proposed an explanation as to why, in the observed cases, execution being mainly driven by the project management function, this led to a change in focal objectives without cross-functional alignment. Subsequently, for problem resolution, project managers applying their functional logics, only technical performance mattered, with new links structure and governance instruments.

This research has significant managerial implications, outlined in the following section. First, a practical model is introduced, showing the interplay of the various external and internal influences on governance. Then the implications of this framework are discussed in three steps: multilevel consideration of goals, prioritization and alignment of goals, and their consequence on the granularity of supplier portfolio management.

5.2 Managerial implications

The issue investigated stemmed from the rising dependence of firms on their supply base, due to the increased externalization of activities and the need to access specialized resources in a globalized competition. Not only the supply networks have become extremely complex, even reducing the scope of procurement activities to the supplier portfolio still implies reaching out beyond the first tier of suppliers. As well, the way buyer-supplier relationships are managed has progressively evolved from the straight arm’s-length transactional approach, to consider the value creation and capture opportunities offered through cooperation. Procurement managers are eager to understand how to influence the behaviour of suppliers beyond the tier 1, to ensure alignment of

goals and efforts. Reflecting beyond the classic governance approach based focused on external relations is the answer proposed here.

In order to guide managers in their approach, a comprehensive model is proposed. It shows the interactions between external and internal factors that shape the governance of relations, and how they co-evolve. It is through the careful identification of the influences, and how to take them into account in the supplier portfolio management activities, that procurement managers will build a solid foundation to continuously adapt their practice to an ever-changing world.

5.2.1 Continuous adaptation model

This model (Figure 5-1) builds on the combination of multi-level analysis, institutional logics, and the observation of the interplay between external and internal forces.

It shows the necessary alignment between functions, projects, organization, and the broader environment, as well as the governance flow relative to projects.

The colour coding distinguishes the four levels considered: yellow is the institutional and competitive environment; orange for organizational level; green for project level; violet for function level. Dotted arrows show the influence exerted by one element on another one. The institutional and competitive environment encompasses customers, competitors and suppliers. Each of the internal levels have two dimensions (goals, and governance practice).

The black ‘Alignment’ arrow points downwards as the driving forces emanate from the institutional and competitive environment, to shape organizational goals and governance. Corporate-level goals also influence corporate-level governance. Both organizational levels dimensions in turn impact project-level goals, and governance. And the cascade goes down to the function-level governance practice. Function-level is considered ‘lower’ in comparison to projects as it is projects that enable the firm to fulfil its goals, not functions. The functions are mobilized to deliver on the projects, and each project involves several functions. Link-level governance is to be considered for each link and

each level. That is external context, organizational level, project level, function level. ‘Each link’ refers to meaningful relations, that can have an influence on the outcome of business activities. These may evolve with time; possibly at a fast pace.

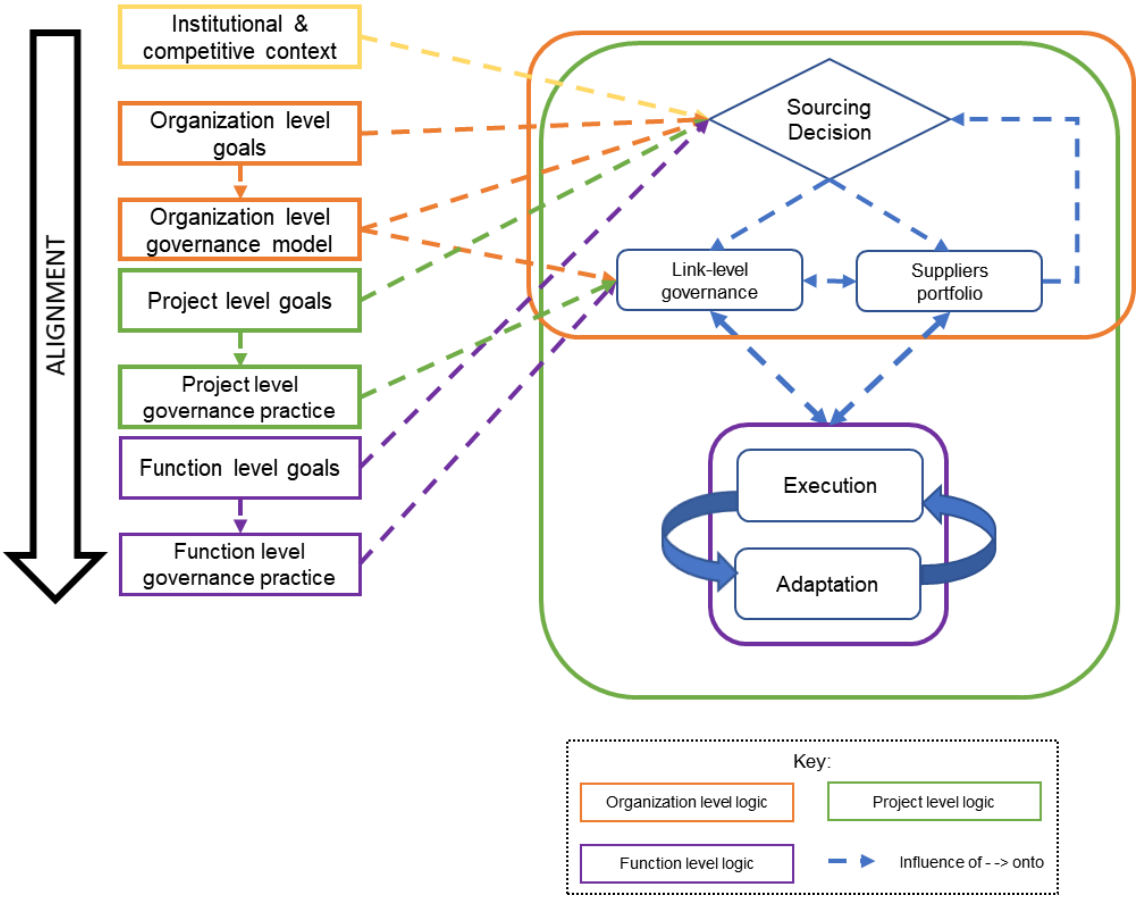

Figure 5-1 Continuous adaptation model

These four external and internal levels influence the flow of governance relative to a project. Primarily by weighing on the sourcing decision (this could be a make-or-buy decision, as ‘make’ is sourcing internally, which requires resources that may be external, is influenced by and has an influence on the portfolio of suppliers).

The sourcing decision is made within corporate and project-level, with the support of necessary functions, and takes into account the possibilities offered by the

portfolio of suppliers and its structure. This decision impacts the supply base, as an example by inviting in or expelling a supplier, and through any change in the relative weight and power of the supplying firms among themselves and towards the awarding organization. The sourcing decision also impacts the governance of supplier relationships, one by one, through the nature of the expected delivery (mix of outcome and behaviour), and the instruments enacted to ensure that the performance matches the expectations. Most firms rely primarily on contracts and similar legal safeguards. However, the importance of adapting the means to the ends, and to the various phases in procurement cycle, project or product lifecycle phase, and supplier lifecycle phase have shown to be of essence to the success of projects. Beware to pay attention to the reciprocal influence between the portfolio of suppliers and the link-level governance, as was demonstrated through the cases.

The next stage is when the functions execute their project-specific tasks. This violet box in the lower-centre part is connected to the link-level governance and suppliers portfolio boxes by bidirectional arrows, also displaying the influence of functional-level actions on these two organizational-level elements. Within the violet box two actions represent the execution of project tasks, and the adaptation to circumstances. Thus, execution and adaptation have reciprocal influence on link-level governance and suppliers portfolio structure. The two large blue arrows connecting execution and adaptation cross the boundaries of the function level into project-level logic. These arrows are large to evidence the intensity of interactions between these two levels, and the dynamism of feed-forward and feed-back between execution adaptation.

By understanding the interactions between external and internal levels and their associated dimensions, managers can anticipate possible ripple effects of decisions made, in goal setting, choice of governance, enactment of governance, business award, and during the execution of sourced tasks.

Obviously, conducting an exhaustive analysis -notably including a large swath of the supplier portfolio- may require a commitment of resources that would not be justified. Still, perusing beyond the boundaries of the organization, until the tier 2

or 3 -also exerting judgment on the risk associated with each of the suppliers involved- can prove useful to foresee if not prevent issues in the delivery of projects.

5.2.2 Multilevel consideration of goals

Goal setting is considered to be an essential task entrusted to managers. It has significant impact on the life of the organization, and of its internal and external stakeholders. When a profit margin goal is set, it is broken down into contributing factors, among which the cost of direct and indirect procured goods and services may form a significant part. This well-known cascade ends-up in the determination of ‘savings targets’ to the procurement function. These targets are more often than not considered to be price reduction to be obtained from suppliers, and purchasing staff works hard to achieve the said goals. Sometimes in good collaboration with the other functions of the firm, and even in collaboration with the suppliers. This has been advocated for decades in academic and practitioners’ literature. What this research has shown is that even when organizations have fundamentally similar goals, directly influenced by the institutional and competitive context, percolating these goals within the organization requires more than the simple cascade process every manager has been part of. It is also necessary to consider that the portfolio of suppliers is part of the overall goals determination process, rather than a simple ‘target’ or ‘source of performance’. The issue there is prioritization and alignment.

5.2.3 Prioritization and alignment

The organizations and the market investigated had relatively simple goals: compliance, quality, on-time-delivery, and cost control. Nothing anyone should deem unreasonable in a competitive environment. The tenets of procurement are often summarized as “the five rights: getting the right quality, in the right quantity, at the right time, for the right price, from the right source.” (Monczka et al, 2011, p. 10); compliance and corporate social responsibility are part of the process and

criteria applied. Determining the ‘right’ is a delicate exercise. Prioritization and alignment are an essential part of it, that is why these activities require to be conducted collegially. And in this order.

The first step is to identify the priorities (what), and then to ensure that all parties adhere to them and to how they are going to be met (how). “Do the right thing and then do it right” is an old axiom. The question that often represents the hurdle is ‘who?’. Who is going to execute? Thinking in multilevel goals and governance terms, it means addressing the distribution of tasks, incentives and rewards. From a procurement perspective, it is also showing the ‘what’s in it’ for the suppliers. Sticking to the purely economic aspects of sales turnover and profit margin restricts the discussion to the transactional aspects, and end-up in penny and dime discussions that might not correspond to the bulk of the goals the organizations are trying to meet together. To be able to offer other dimensions in which suppliers can see a benefit implies to know both the dimensions and the suppliers, that is to have a vision of one own’s business and how the portfolio of suppliers fits in. The interplay with internal functions is highlighted here: What are their goals? How do they intend to achieve them? What are the current and foreseeable needs and requirements? What would the firm value or be interested in in the future?

The adjustment of priorities means and resources can’t be restricted to within-firm discussions, nor only mediated through formal agreements. The conversations have to be crossing the boundaries of organizations, projects and functions. As the cases demonstrated, the conversation should also include the suppliers beyond the tier 1 that deliver the unique resource critical to the project: a system integrator delivers a valuable service, however, the organizations actually engineering and manufacturing the products to be integrated should not be kept out. Without applying the principle of requisite variety *stricto sensu*, as it would generate disproportionate costs, engaging meaningful suppliers is part of ensuring that the ‘five rights’ are met.

5.2.4 Management of supply base, granularity of analysis

As indicated above, it is essential for the procurement function to construe an organization's supplier portfolio beyond the first tier to understand buyer-supplier and supplier-supplier interdependencies. Keeping the analysis at the dyadic level would not have enabled to uncover the structure of the upstream supply chain, nor understand the interactions between the tier 1 and the tier 2, and even less those of the tier 2 and the tier 3. Even when the buyer is aware of the existence of upstream tiers, not knowing how they are managed is endorsing a risk that can be mitigated with reasonable efforts. A number of managers sit on the principle that they have transferred obligations and risks onto the tier 1, and thereby they are safe; they have 'done their job'. The point, as illustrated in the cases here, is that when you do not have the products or services you need, you can't deliver to your customer. The blame is on you as an organization, as a function within the firm, and possibly as an individual. The goals have not be met. Even when you have strong safeguards and penalty provisions in place, they won't replace the 'the right quality, in the right quantity, at the right time'. And when, as in the case of the buyer in this research, such safeguards are missing, you simply swallow the bill and learn from your mistakes[9].

The point is to apply adequate granularity in the definition and alignment of goals, means, and monitoring internally and across the supply base. As shown by Buxbaum-Conradi et al. (2015), vertical dis-integration leads to reintegration through different sub-levels, therefore increasing interdependence with suppliers at a further organizational distance. This underlines the importance of analysing relations and interactions beyond the first tier, and, as necessary, influence them. The tool most frequently used is the Kraljic matrix (Kraljic, 1983), that focuses on supply risk and financial impact. Unfortunately, the way practitioners use it generates severe limitations. First it is mostly enacted based on past data, which is a reputedly poor indicator of the future, failing to account for product life cycles and the natural evolution of the business. Second, it is mostly used at supplier-

[9] As a side note, a visit on EPCCO's website on Aug. 29th, 2019 evidenced that the General Terms and Conditions had still not been revised from their June 2014 version.

level, again not accounting for product life cycles, or the mix of commodity and strategic components a supplier delivers. And third, it is applied to first-tier suppliers only, not taking the subsequent tiers into account, thereby failing to recognize the risks and opportunities possibly arising from beyond the horizon. It is the whole idea of interdependence of the firm with its portfolio of suppliers that is overlooked through these practices. Therefore, the identification of the sources of risks, as well as of value creation and capture is to reach farther than the tier 1. Obviously, the effort is to be targeted at first. Start with the few star products (the ones that generate value and profits for your firm, as per Henderson's BCG matrix), and one or two upcoming products. If possible, conduct the analysis up to the third tier (that may already be a huge effort, apply judgement). As indicated above, think beyond financial values, and reflect on how to identify common goals and the reward distribution scheme that will steer the efforts of these firms towards meeting them. And repeat as necessary.

Thus portfolio management activities should include active management of buyer-supplier as well as suppliers' interrelations (Gadde and Snehota, 2019), which entail significant upfront investments, with the possibility that the anticipated benefits do not materialize (Håkansson and Snehota, 2017).

5.2.5 Constant adaptation

This last managerial implication is the necessary incorporation of agility and flexibility in the governance of external relations. As discussed above, taking into account the external and internal specifics at market, organizational, project and function levels is necessary to strike the right balance in the governance of relationships. Evidence has been given that different phases in a project entail different governance principles and instruments, to ensure the recommended "effective alignment of governance instruments with transactions" (Dyer, 1996, p.652). This was recently demonstrated in the ship building industry (Howard et al., 2019). In this last example, project success was associated with the adequation of the governance mix between formal and informal instruments to the requirements of the project phase. In the first phase, the commitment of the

parties to interdependence requires highly formalized governance (Chen et al., 2018; Dekker, 2004), in order to establish safeguards for all parties. This first phase aims at establishing cost control and behaviour monitoring instruments. In the second phase, when interdependence is enacted and can't be easily modified, relational governance aims at developing trust (Poppo and Zenger, 2002). That implies a significant investment in temporary idiosyncratic capabilities (e.g. leadership skills, fostering communication, boundary spanners, possibly co-location). *De facto*, relational governance comes in addition to the formal governance that was established in the first phase, and against which financial rewards will be distributed.

Flexibility is not restricted to the balance between formal and informal instruments, it also encompasses the extent to which these instruments allow adaptation to changing circumstances. These changes can occur in several dimensions (Majchrzak, Jarvenpaa and Bagherzadeh, 2015): evolution of the parties themselves (e.g. change to the size, strategic intent, of a node), evolution of the conditions of participation to the supplier portfolio (e.g. goals, value distribution), evolution of the structure of the portfolio and therefore possibly the position and/or role of one or mode nodes, the balance of power or hierarchy, changes to the characteristics of the project. Any or all of these can happen and call for a re-evaluation of the governance used.

As shown in the Continuous adaptation model (Figure 5-1), evolution and adaptation originate from the functional level. This is where individuals have their goals determined and performance assessed, where they enact governance, and where they find the landmarks to guide their actions. That is why a cross-functional, cross-boundaries and multilevel approach to the management of suppliers is necessary.

Two elements should also be kept at the forefront of managers minds. First, is that the pace of business life can be significantly different from financial reporting cycles. Second, is that considering business relationship management as a dynamic capability will add to the agility and flexibility of the organization, and therefore to its performance in the constantly changing world.

5.3 Limitations and further research

Obviously, this research has limitations. The first one is the heavy emphasis on the buyer's perception. This is partly explained by the fact that the problem this research tried to answer was identified inside the procurement function. A second one, is that, a fully reciprocal recounting of events was not achieved due to access restrictions even when data was collected from all parties in the triads. Some individuals simply refused to participate, or let their teams contribute. This leads to a third limitation: the specific context of this industry in Switzerland; it is a small-world in itself. On the flip side, the context displayed many important characteristics found in other industrial contexts, such as project-based engineering and manufacturing (e.g. aeronautics, automotive, construction and infrastructure), and a dimension of knowledge-based services. As well, the dynamics of the energy transportation market itself, the complexity of the products, the structure of the supply market, and the low maturity of procurement and cross-functional coordination in the buyer organization contributed to the emergence of situations worth observing.

Future research avenues are numerous. From a practical standpoint, I would consider investigating why did the governance in place not prevent issues in these projects? Notably in the upper tiers where control and monitoring of supplier activities seemed ineffective despite an apparent abundance of resources invested there. Is this a matter of adequacy to the project? Or of operationalization? Was multilevel prioritization and alignment implemented? Also, investigating the current practice of adaptation of relationship and supplier portfolio management in contrast to the pace of business change could offer interesting insights and highlight industry differences.

From a conceptual point, replicating the findings in other contexts, and probably on a larger scale thanks to quantitative tools, would possibly provide finer-grained insights and highlight contextual dimensions supporting or disproving the findings and recommendations. Possibly cross-category analysis, inclusion of cultural factors (e.g. investigating in different continents, or relations with actors located

on different continents). Lastly, designing tools that would facilitate the recommended product-centric, forward-looking, multi-tier analysis of spend and relations would certainly be of considerable value to practitioners.

CONCLUSION

This research intended to address the question of the impact of buyer-supplier relationships on the other relationships within a buyer-supplier-supplier triad. The triad was selected as “the smallest network unit where one can observe how a link affects a link or a node affects a link directly or indirectly connected” Choi and Wu (2009c, p.269).

Empirical research in triads is scarce, notably because “It is usually very difficult to collect data from the exact counterpart service providers. […] It is unlikely that reciprocal data could be collected from all the participants in a particular triad” (Wynstra, Spring and Schoenherr, 2015, p.11), limiting the credibility of the findings. Still, it was achieved here, providing rich contextualized data in spite of access restrictions. Another distinctive feature of the research is that it took into consideration the evolution of projects; I would not claim that it is longitudinal, although it does compare the initial governance arrangements with the ones enacted after severe problems occurred. As the four cases included the same buyer and tier 1 organizations, and different teams, the comparison between organizational-level arrangements and project-level reality was possible. This also highlighted the multilevel nature of governance and provided the grounds on which the Conceptual causal network (Figure 4-6) and the Continuous adaptation model (Figure 5-1) were built. So far triad governance was considered at organizational level, or at project level, sometimes comparing distinct triads. To my knowledge, it is the first study to investigate several simultaneous projects involving the same organizations, across two or even three tiers (cases 3 and 4), and evidencing the dichotomy between organizational intent and operational reality.

This study confirms previous knowledge on the structure of triads and their evolution through disintermediation. It highlights the separation between organizational level and project level (temporary) links, where the dynamic evolution of project-level links and governance does not affect the existing

organizational-level arrangements. Moreover, it confirms the complementarity of formal and informal instruments, as well as the importance of relational governance in the execution phase of projects when the bidding phase was heavily transactional.

It also provides several insights on how goals determine the governance of relationships, at organizational and, through the functional level, at project level. This influence can be seen across several tiers, unless a node acts as a decoupling actor, bearing the risks transferred by the lower node, and re-distributing risks and rewards according to its own agenda.

Moreover, evidence was given of the interplay of external, organizational, project and functional levels in the governance of supplier relationships. Notably, that goal prioritization and alignment externally and internally is of the essence. In addition, thanks to the dynamic incorporation of other fields of literature along the research, such as institutional logics, valid explanation of the unexpected dichotomy between organizational and functional level governance management was possible.

Managers are offered the Continuous adaptation model (Figure 5-1) as the basis to reflect on the multilevel interplay between external and internal influences on supplier portfolio management. This model highlights the multilevel nature of goal determination and draws the attention of the necessary internal prioritization and alignment on which external prioritization and alignment will be possible. Several recommendations were made relating to the management of supplier relationships, notably the need to reach beyond the first-tier horizon to foster prioritization and alignment on clearly identified and understood goals, means to achieve them, assessment of what success looks like, and associated rewards and penalties. In addition, advice is given as to the adaptation of the unit of analysis to the particular context of relations and projects, using product-level forward-looking data rather than organizational-level historical records. And last but not least, constant adaptation is required, independently of formalized financial reporting.

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APPENDICES

Appendix A Literature review results

A.1 List of 36 papers retained

❖ *Denotes a paper rejected during screening and given as example in section 2.3*

❖ Aarstad, J., Ness, H., Haugland, S.A. (2015) Network position and tourism firms' co-branding practice, *Journal of Business Research*, 68(8): 1667-1677

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❖ Win, M. Z., Ruan, L., Rabbachin, A., Shen, Y., Conti, A. (2015) Multi-tier network secrecy in the ether, *IEEE Communications Magazine*, 53(6): 28-32

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Appendix B Data collection instruments

B.1 Semi-structured interview guides

For Project Managers	Topics
Short introduction	Role, background
Project description	Type of work, main suppliers, status, issues
Interactions with procurement department	How do project managers and procurement personnel work together
Interactions with suppliers	Who dod they work with? Governance of interactions?
Changes and problems resolutions	Who did what? Why? Outcomes?

For Procurement	Topics
Short introduction	Role, background
Interactions with other departments	Especially working with project managers
Interactions with suppliers	Governance, rules, actions, outcomes
Changes and problems resolutions	Who did what? Why? Outcomes?

For Sales	Topics
Short introduction	Role, background
Interactions with other departments	Especially working with project managers
Interactions with customers	Governance, rules, actions, outcomes
Changes and problems resolutions	Who did what? Why? Outcomes?

B.2 Pilot interviewees

Industry	Function	Role	Interview duration in minutes (audio file sent for transcription)	History in company	Native Language
Pharmaceutical products	Procurement	Regional Category Manager Marketing Services	70	Ten years experience in pharmaceutical industry in Spain and Switzerland. Previous experience in FMCG	Spanish
Pharmaceutical products	Procurement	Global Category Manager IT services	46	Ten years experience in IT procurement, in three countries and several industries.	French

B.3 List of documents used

By document type:

Document type	Published by	Content	Date of publication	Pages
Brochure	EPCCO	Introduction to EPCCO	2016	9
Brochure	PRODCO	Introduction to power grid automation center	2015	12
Brochure	SERVCO	Automation systems	Not indicated	12
Brochure	Swissgrid	Introduction to Swissgrid (French)	2018	5
Brochure	Swissgrid	Supplier guide	2014	7
Brochure	TECHCO	Divisions fact sheet	2019	14
Brochure	TECHCO	Substation EPC solutions	2016	12
Brochure	TECHCO	Substation reliability management services	2016	4
Brochure	TECHCO	Substations services: presentation of EPC services	2010	8
Brochure	TECHCO	Supplier qualification system presentation	2014	16
Brochure	TECHCO	Transmission and distribution substations	2013	2
Commercial	EPCCO	General terms and conditions for orders	2014	5
Commercial	EPCCO	General terms and conditions of business for purchasing	2014	2
Commercial	EPCCO	General terms and conditions of business for services	2014	3
Commercial	Swissgrid	General terms and conditions for contract for work and labour	2013	4
Commercial	Swissgrid	General terms and conditions for purchase agreements	2013	2
Commercial	Swissgrid	General terms and conditions for service agreements	2013	3
Commercial	TECHCO	General terms and conditions for purchase of goods and or services version 2019/1	2019	5
Commercial	TECHCO	General terms and conditions for purchase of project designed goods version 2018/1	2018	11
Instructions	EPCCO	Code for business partners	2014	14
Instructions	EPCCO	Code of Conduct	2014	64
Instructions	PRODCO	Process control plan (excel file)	2014	1
Instructions	PRODCO	Supplier requirements, rev C	2011	10
Instructions	TECHCO	Supplier code of conduct	2018	4
Presentation	EPCCO	Framework for supplier relationship management of TECHCO (draft)	2018	8
Presentation	PRODCO	Supply chain management operations in PRODCO	2018	19
Press release	Swissgrid	Swissgrid takes over additional parts of the transmission grid	Jan 4, 2019	2
Report	Conseil Fédéral Helvétique	Stratégie réseaux électriques; concept détaillé dans le cadre de la stratégie énergétique 2050	2013	47
Report	Cornwall Insight	Supply & beyond: what does the future hold for business energy customers?	2018	20
Report	ENTSOE	Annual report 2017	2018	47
Report	EPCCO	Annual report 2017/2018	2018	8
Report	EPCCO	Business principles	2014	20
Report	European Commission	EU Energy markets in 2014	2014	172
Report	IEA	Energy policy report Switzerland 2018	2018	178
Report	IEA	Energy: technology perspectives 2017	2017	443
Report	IEA	Technology roadmap: smart grids	2011	52
Report	IEA	World energy and air pollution report 2016	2016	266
Report	OFEN	Energy strategy 2050 once the new energy act is in force	2018	25
Report	OFEN	Feuille de route Suisse pour un réseau intelligent	2015	100
Report	OFEN	Sécurité d'approvisionnement et développement de la concurrence sous la LApEl et l'OApEl	2013	45
Report	OFEN	Stratégie réseaux électriques ▪ nouvelles conditions-cadres pour le développement du réseau	2016	30
Report	Swissgrid	Annual report 2018	2018	82
Report	Swissgrid	Strategic grid 2025 brochure	2015	24
Report	Swissgrid	Strategic Grid 2025 technical report (French)	2015	226
Report	TECHCO	Annual report 2018	2018	244
Webpage	IEA	Will system integration of renewables be a major challenge by 2023?	2019	2
Webpage	Swissgrid	Swissgrid shareholders pie chart as of January 4, 2019	2019	1
Work document	EPCCO	Example of Request for quotation document (word file)	2018	4
Work document	EPCCO	Exemple of offer analysis document (excel file)	2018	3

IEA: International Energy Agency ENTSOE: European Network of Transmission System Operators

OFEN: Office Fédéral de l'Energie

By publishing organization:

Document type	Published by	Content	Date of publication	Pages
Report	Conseil Fédéral Helvétique	Stratégie réseaux électriques; concept détaillé dans le cadre de la stratégie énergétique 2050	2013	47
Report	Cornwall Insight	Supply & beyond: what does the future hold for business energy customers?	2018	20
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Brochure	Swissgrid	Introduction to Swissgrid (French)	2018	5
Report	Swissgrid	Annual report 2018	2018	82
Webpage	Swissgrid	Swissgrid shareholders pie chart as of January 4, 2019	2019	1
Press release	Swissgrid	Swissgrid takes over additional parts of the transmission grid	Jan 4, 2019	2
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Instructions	TECHCO	Supplier code of conduct	2018	4
Report	TECHCO	Annual report 2018	2018	244
Brochure	TECHCO	Divisions fact sheet	2019	14
Commercial	TECHCO	General terms and conditions for purchase of goods and or services version 2019/1	2019	5

IEA: International Energy Agency ENTSOE: European Network of Transmission System Operators

OFEN: Office Fédéral de l'Energie

B.4 Informed Consent Form

INFORMED CONSENT FORM

Title of the project:	Supplier relationship management doctoral research
Name of the researcher:	Thierry Fausten
Researcher's contact details:	thierry.fausten@cranfield.ac.uk - +33 615 454 176
Participant number:	
Date:	

1. I confirm that I have been informed about the aim and objectives of this research project and agree to give my inputs.
2. I understand that all personal information that I provide will be treated with the strictest confidence and my name will not be used in any publication[1].
3. I understand that the data I provide will be used for the purpose of research and dissemination of knowledge.
4. I have been provided with a participant number as shown above. The researcher(s) will record data against my participant number instead of recording my name. The file linking my name to my participant number will be accessible only to the researcher, and will be stored in an encrypted folder.
5. I understand that I am free to withdraw from this project at any stage, up to twelve days after the interview, by informing the researcher, for whom contact details have been provided above. Would I choose to do so, my data - if any- will not be used in the research.
6. Interviews will be recorded and securely stored as audio files. These audio files will be securely deleted within five years of the end of the research. After expiration of the withdrawal period, the recordings will be transcribed and saved as text files. Identifiers -if any- will be removed from the transcript. The transcript files will be securely stored in an encrypted folder and will be securely deleted within five years of the end of the research. I understand that I can ask to review the transcript within 21 days after the withdrawal period. After this time, the transcript will be deemed satisfactory.

   I am happy for my transcript to be published: Yes / No (delete as appropriate)

7. Documents will be scanned and securely stored as electronic files in an encrypted folder. These files will be securely deleted within five years of the end of the research.
   When used, the data from the documents will be anonymised. Identifiers such as firm names, individual names, products, will be removed/replaced before publication.

   I am happy for quotes from my documents to be published: Yes / No (delete as appropriate)

8. An analysis of all results will be made using specialised software, aggregating results. Direct identifiers such as names will be excluded and all reasonable steps will be made to anonymise this data as far as possible.

   I understand that the final analysis will be published in support of the research findings. ☐

I confirm that I have read and fully understand the information provided on this form and therefore give my consent to taking part in this research.

Executed in two original copies (one for the participant, one for the researcher).

Participant's signature:		**Date:**	
Participant's name:			
Researcher's signature:		**Date:**	

[1] Publication encompasses any form of dissemination of knowledge, in written, audio or electronic form, including and not limited to the reports issued from this research, any subsequent articles, books, conference papers, presentations, workshops, lectures or trainings… as long as the source anonymity is respected.

ADDENDUM

CRANFIELD UNIVERSITY

School of Management

DOCTOR OF BUSINESS ADMINISTRATION

Thierry FAUSTEN

Addendum
In response to the Examiners' Report issued on 14 November 2019.

Supervisor: Dr. Colin PILBEAM
Associate Supervisor: Dr. Leila ALINAGHIAN
March 2020

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ABSTRACT

The management of supplier relationships is asserted to be a key contributor to the performance of firms and organizations. The interdependence of organizations, notably experienced in large scale infrastructure projects, demands a finer understanding of the interplay of relationships across multiple tiers. After a thorough literature review on the governance of triads, an empirical investigation was conducted in the energy sector in Switzerland. Data was collected during semi-structured interviews and complemented with documentary evidence, on four concomitant projects involving the same organizations. From these cases studies, four propositions regarding the evolution of governance structures in response to project-critical incidents were made. These propositions highlight that, confronted with goal-threatening incidents, the governance of interorganizational relationships may evolve outside of the established formal governance structure, beyond contractual boundaries as well as the principled roles of functions. As well, they assert that informal instruments can simultaneously be used as complements of and substitutes for formal instruments, and can affect the power position of nodes without changing the formal governance structure in place. Managerial implications encompass supplier portfolio management and project management practices, and underline the interrelatedness of these fields. A limitation is the upstream, buyer's view approach taken in the analysis, even when data was collected from all parties in the triads. The value of this research lies in the demonstration that functions are at the core of incident-resolution interventions, and that in such circumstances, the structure of relations evolves to give a higher centrality and information control position to the node initiating the intervention. It also shows the interest of triads and tetrads as research contexts. The contribution to managerial practice provides insights to improve readiness and flexibility in the management of intra and inter organizational relationships.

Keywords: Adaptation; Buyer; Buyer-Supplier Relations; Inter-organizational relations; Project management; Purchasing; Supplier; Supplier portfolio management

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1 Introduction

Governance has been notably defined as an organizational control mechanism that uses formal and informal instruments (Biesenthal and Wilden, 2014; Chen et al, 2018). The main objective is to foster alignment of goals between organizations participating in a common endeavour such as a project (Herbst, 1976; Zwikael, 2015). The locus of decision-making can vary significantly, depending on the governance form adopted (Provan and Kenis, 2008).

Large scale infrastructure projects typically involve numerous organizations, hence the awarded company acts as lead organization (Provan and Kenis, 2008) in the management of this project-level network. In this multi-tiered supply chain, the awarded firm has the role of buyer, and it strives to have the project goals adopted as common goals. When a project-critical incident occurs, one or more of these goals are at risk, and the governance structure set in place is supposed to support the identification and implementation of the adequate solutions (Manley, 2016). However, goals are established at organization, project and function levels, sometimes with different priorities, posing a challenge to the interorganizational governance structure (Micheli and Cagno, 2016).

The extant literature on the subject has evidenced that the governance structure typically responds to such incidents by changing the contractual arrangements (e.g. Ellegaard and Andersen, 2015, Howard et al, 2019; Ruuska et al, 2011), and sometimes the hierarchy of nodes in the multi-tier structure (e.g. Ruuska et al, 2011). However, such changes are time consuming and resources intensive. There comes the question: How does the governance structure evolve when project-critical incidents require fast resolution?

An appropriate context to conduct a corresponding investigation was found in the energy distribution sector in Switzerland.

After structural market reforms in the energy distribution sector in Switzerland, the ownership and management of the high-voltage distribution network was by law concentrated to one public actor. A few other intensive energy users also own

high-power transformation and distribution sub-stations, for their own needs. To manage and execute the necessary upgrade and maintenance works, these organizations call upon specialized firms to provide Engineering-Procurement-Construction (EPC) services. These EPC providers have to complete the works within determined timelines, to reduce the impact on the operations of their customers, and call on suppliers to provide specialized equipment and software. In this context, four buyer-supplier-supplier vertical triads and tetrads, where the buyer was the EPC firm, were identified. Data was collected from managers of procurement, project management and sales functions during semi-structured interviews with individuals from the buyer, tier 1 and tier 2 nodes.

This study aims to investigate how do interorganizational structures respond to project critical incidents, through the evolution of links and instruments. In particular it extends the existing understanding by using a multi-tier context instead of dyadic lens. In addition, it increases the granularity of analysis with a multiple level approach (node and function).

This work contributes to the interorganizational governance literature, and offers managerial implications in the fields of supplier portfolio management and project management. First, the use of triads and tetrads enable to evidence the influence of the interventions of parties beyond the well-trodden dyadic lens; in fact, this expanded lens is a key contributor to the findings. Second, it contributes to the understanding of the response of the governance structure after project-critical incidents by identifying the initiators and targets of the interventions undertaken to resolve the situation. Third, it adds to the literature on the complementarity and substitutability of formal and informal instruments. Fourth, it shows that the power position of a node in a network can evolve without changes to the formal relations between the nodes.

This addendum is organized as follows. The following section introduces the key concepts used in this document. Then findings are presented for each of the four cases. The fourth section offers a cross-case comparison of the response of governance structure to project-critical incidents. It is followed by a discussion where four propositions are presented, contributing to the conversation on the

governance of multi-tier supply chains. Then managerial implications for project management and supplier relationship management practices are offered. Afterwards the conclusion summarizes the main findings, managerial implications, displays the limitations of this research, and proposes directions for future research.

2 Key concepts

Governance structure includes both the links between the nodes, as well as the instruments used to govern the relations between the nodes (Olsen et al., 2005). Therefore, the governance structure responds to project-critical incidents through changes (or not) to the links or the instruments or both. Such changes are initiated by nodes and functions designated as source of intervention.

Two sets of instruments are recognized in the literature (Pilbeam, Alvarez and Wilson, 2012). First, formal instruments: standards (for output and for participation); processes (control systems, coordination); structures and organizations / role functions at macro or micro level; and contracts. They are meant to limit opportunistic behaviours and change in the balance of power by using material (usually financial) incentives. Second, informal instruments: social norms; value systems, schema and culture; structure – relationships / embeddedness; information sharing. These are used to develop relationships and prevent opportunistic behaviours by using incentives based on soft factors such as trust, reputation, reciprocity and equity or justice. In response to an incident, existing instruments can remain unaffected, cease to be used, and/or new instruments can be enacted.

Links can be created, lost, reinforced, weakened, or remain unchanged. Reinforcement or weakening of a link describe sustained changes in intensity, be it through a change in the number of instruments used by the downstream node on that link (e.g. the number of instruments used by the buyer in its relations with the tier 1 and tier 2 suppliers), or the frequency of exchange (e.g. Holma, 2012,

figure 1 p. 103). The latter -notably for the informal relations- stems directly from the input by the participants (e.g. “We are frequently in contact”, or “I don’t talk to them”). It is clearly distinct from the notion of strong ties (Granovetter, 1973), where tie strength is founded on characteristics of the relationship such as amount of time, intimacy, emotional intensity and reciprocal services (*ibid*., p. 1361). The distinction is made between “friends” with whom ties are strong, and “acquaintances”, with whom ties are weak (ibid., p. 1368). Even though the strength of ties is often assessed through the frequency of contact in the literature, it is not the definition given by the original author. In this research, that respects the original definition, nothing warrants that the temporary links created to solve a project-critical incident might evolve into long-standing relationships (the time factor), with ‘intimacy’ and ‘emotional intensity’. That is why, as enacted by Ateş, Van den Ende, and Ianniello (2015), the notion of ‘intensity’ used here was based on the frequency of contacts divulged by the interviewees.

3 Case findings

As triads are the smallest network unit where the evolution of a multi-tier governance structure (links and instruments) can be observed (Choi and Wu, 2009), the four cases were selected accordingly. To reduce the influence of contextual factors, the Buyer and the Tier 1 firm are the same across all cases. The Tier 2 is the same for cases 2, 3 and 4. Cases 3 and 4 were investigated as tetrads. Moreover, the scope was expanded to include the Tier 3 node source of the critical incident. This commonality of actors also contributed to identify goals common to all firms in the triads. These were: regulatory compliance, delivery performance (to avoid interruption of electricity service), technical performance, and cost control. These cases represent projects that unfolded in the same time-frame, with operational delivery planned for 2018-2019.

For each case, contextual information is given as stage of project, incident type and source of the incident (node and function). Here, stages were defined as

Project definition (specification writing), Sourcing (supplier selection), Engineering, Construction, Commissioning, Production (daily operation and maintenance). The 'incident type' relates to the goal(s) at risk, from those defined as common to all nodes (compliance, delivery, technical performance, cost control). Then the actors of incident and intervention -that is the source of incident, source of intervention and target of intervention- identify the involved node in the triads and tetrads and the functions within the nodes. For each intervention, the response of governance structure to project-critical incidents is captured as evolution of links and instruments.

Each case is briefly described hereafter, with a summary of findings in Table 3-1.

		Case 1	Case 2	Case 3	Case 4
Contextual information	Project stage	Production	Commisionning (*in situ* performance testing)	Construction	Construction
	Incident type (goal threatened)	Process compliance	Technical performance & Cost control	Delayed delivery & Technical performance	Technical performance & Cost control
Actors of incident and intervention	Source of incident (node)	Buyer	Tier 2	Tier 3	Tier 3
	Source of incident (function)	Project management	Engineering	Project management	Engineering
	Source of intervention (node)	Buyer	Buyer	Buyer	Buyer
	Source of intervention (function)	Procurement	Project management	Project management	Project management
	Target of intervention (node)	Buyer	Tier 2	Tier 3	Tier 3
	Target of intervention (function)	Project management	Project management	Project management	Project management
Governance structure evolution	Link Creation	not applicable (within node intervention)		Buyer - Tier 3	Buyer - Tier 3
	Instrument used	Process		Embeddedness - Information - Values	Information - Values
	Link Reinforcement		Buyer - Tier 2		
	Instrument used		Embeddedness - Values		
	Link loss				Buyer - Tier 1
	Instrument impacted				Information exchange
	Link weakening		Tier 1 - Tier 2	Tier 1 - Tier 2	Tier 1 - Tier 2
	Instrument impacted		Information exchange	Information exchange	Information exchange

Table 3-1 Cross-case summary of governance evolution after occurrence of project-critical incidents

3.1 Case 1: Service delivery

In this case, the Buyer was buying specialized software to monitor and report the condition of electricity transmission grids from Tier 1, who in turn acquired them from the Tier 2. The Buyer is dependent on the Tier 2, the only one firm that can intervene on such systems. There is no contractual link between Buyer and Tier 2, however there is regular (intense) contact between the project managers of both nodes for the execution of the contract that includes maintenance, updates and upgrades.

In order to avoid administrative hassle and authorization limits in Buyer's order approval process, both Buyer and Tier 2 project managers have developed the habit to split service requirements into several low-amount orders. However, invoices aggregated into large sums and triggered investigation by Buyer's procurement department to resolve the threat to the organization's and the function's compliance and cost control goals.

The intervention by Buyer's procurement department focused on the improvement of internal processes, notably through the introduction of additional controls of orders, service deliveries and invoices via the ERP system (SAP R/3). The impact on the triad shall be seen in the enforcement of processes, following the upstream hierarchy of tiers and contracts, and the increased role of the Tier 1 in the management of the activities of the Tier 2.

3.2 Case 2: Compact design

Having won a public tender, Buyer had a compact system developed by Tier 1, who subcontracted a critical element to a Tier 2. The small-scale prototype delivered by Tier 2 gave satisfactory results, and a full-scale system was built and installed.

Unfortunately, at commissioning stage (*in situ* performance testing), the equipment from Tier 2 underperformed. The technical performance goals of

Buyer, Tier 1 and Tier 2 were at risk, and Buyer faced penalties from the end customer that it could not recover from the Tier 1 due to lax contracting practices.

Based on the assumed inability of Buyer's procurement department to understand and support issue resolution, Buyer's project manager reached out to the project manager of the Tier 2, bypassing the Tier 1 organization. His view was that "*When you will have complex systems, you need more relationship between the project leaders, and the experience from the project leader."* This person was also motivated to keep his professional reputation intact, stating: *"Where I get a machine or switch gear not working well, latest, after half a year, all colleagues know this."* He therefore engaged intense discussions and information exchange with his peer at Tier 2, with whom he only had cursory contacts before. The link Buyer -Tier 2 was reinforced through informal instruments. In parallel, the information exchange between Tier 1 and Tier 2 shrank considerably, in spite of the formal contractual link between the firms, Tier 2 being a supplier to Tier 1.

Even when the technical performance goal was achieved after modifications were made to the system, Buyer's cost control goal had failed.

3.3 Case 3: Under the highway

The Buyer won a tender to upgrade a power substation located under a highway. Buyer selected Tier 1 to deliver a complete system. A subsystem (switchgear) was subcontracted to Tier 2 by Tier 1. And Tier 2 in turn sourced some elements from Tier 3. The chain of formal instruments follows the chain of contracts (Buyer - Tier 1, Tier 1 - Tier 2, Tier 2 - Tier 3).

Buyer's project manager was very determined to adhere to this chain of upstream responsibilities, until a critical incident derailed the project planning due to unacceptable technical performance. As it is forbidden to work under highways during winter, the delivery would be delayed by at least six months (four months of "winter freeze" and then time to complete the works).

Buyer's project manager, in spite of her reluctance, ended up contacting the Tier 3 node. She did so *"In this case with medium switchgear because I know a lot of people there"*, relying on her personal network.

There was creation of a direct link between Buyer and Tier 3, based on personal relationships. Intense information exchange occurred, supported by professional values (product performance, deliver the project). In parallel, the information flow from Tier 2 to Tier 1 was significantly reduced.

Thanks to this direct access to the project manager of Tier 3, Buyer's project manager could take control of the situation, and the incident was resolved in time for works completion right after the winter truce. Buyer's technical performance goal was met, even though the delivery was delayed.

3.4 Case 4: High voltage cabinets

A public tender was issued by the end-customer for the refurbishment of several sub-systems of a substation, while the substation continued to operate. A particularly delicate situation, however Buyer had particular knowledge of this sub-station as it owned it prior to the mandated transfer of high-voltage assets to a public actor. Buyer won the contract, and awarded one of the sub-systems works to the Tier 1. In turn, part of this -the AC-DC converter sub-system- was sub-contracted to the Tier 2, who split it in two lots. One for AC cabinets, one for DC cabinets. Tier 2 decided to engineer and manufacture the AC cabinets internally, and sub-contract engineering and manufacturing of DC cabinets to Tier 3.

When Tier 3 was ready to deliver, it was found that the interfaces designed and produced by Tier 3 were not compatible with the cabinets designed and produced by the Tier 2. This critical incident was a clear threat to technical performance, delivery and cost control goals of all actors.

This coincided with a vacancy of the project manager at Tier 2. Challenged by this, Buyer's project manager decided to take the lead of the Tier 3 supplier to

have the DC cabinets modified to match the AC cabinets ready at Tier 2. He engaged Tier 3 through professional values (to obtain support from Tier 3 in spite of absence of a formal link) and intense information exchange. The informal information flow between Buyer and Tier 1 ceased, and was significantly reduced between Tier 1 and Tier 2.

Focus was on resolution of the technical performance issue, to minimize delivery delay, without consideration of costs. As indicated by the project manager of Buyer: "*In this project, all companies lost money, the project was very costly*."

4 Cross-case comparison and discussion

The response of governance structure to project-critical incidents in the four cases is summarized in Table 3-1.

Across these cases a pattern emerges:

a) it is the downstream node and function whose goal(s) is (are) put at risk by the critical incident that is the source of intervention;
b) this is independent from the node and function source of the critical incident;
c) the targets of the intervention are the node and function closest to the source of the critical incident;
d) the intervention towards other nodes are enacted by using only informal instruments;
e) the intervention bypasses the existing formal structure, and thereby the hierarchy of contracts across the tiers;
f) the intervention focuses on securing the goal perceived as most important by the intervening function (compliance and cost control for procurement in case 1; technical performance for project management in cases 2, 3 and 4).

These interventions lead to the creation, loss, reinforcement and/or weakening of links, and/or introduction of instruments directly affecting the structure and balance of relations in the triads and tetrads.

The pattern described above, and its consequences on the governance structure are discussed hereafter. As well four propositions are made.

5 Discussion

5.1 Intervention sources and targets

As shown in the cross-case comparison (Table 3-1), independent from the locus of critical incident, the source of action and the target of action share common characteristics across cases. These are discussed hereafter, at node and function levels.

5.1.1 Source of intervention

5.1.1.1 Node level

Let's start at the node level. In all cases, changes were initiated by the Buyer, the node having the highest exposure to the critical incidents.

In case 1, the Buyer faces multiple low-amount orders used to circumvent procurement policies and controlling rules, resulting in invoices to be paid without *a priori* verification of price levels. This would result in possible overpricing by the supplier, and in additional process costs incurred by the Buyer (processing of multiple orders, invoice reconciliation, incident resolution).

In cases 2, 3 and 4, the Buyer is confronted with late-delivery penalties that it can't recover in full from its own supplier due to poor contract wording. The Tier 1 supplier has a limited stake, notably financial, thanks to the practice of back-to-

back contracting: it has passed all identifiable risks upstream to the Tier 2 node. The Tier 2 node benefits from the limited liability negotiated by the Tier 1. In addition, the perceived performance of the Buyer by the end-customer would be detrimental to Buyer's reputation, and associated trust, on the market.

Another element brings additional support to the point.

In case 3, the end-customer, whose normal operation of its highway would resume only after completion of the substation upgrade – thereby suffering from a significant impact due to the delayed delivery, intervened towards the Tier 2 firm, requesting information. This shows that the most downstream node -even if out of the observed triad, albeit with an important stake in the completion of the project- was incited to intervene.

5.1.1.2 Function level

At function level, the diversity of the cases also shows that interventions are initiated by the function whose goals are most at risk.

In case 1, where multiple small orders have been used by Buyer's project manager to circumvent spend-level-based process controls, the initiating function is Buyer's procurement function. This function has the highest stake in the enforcement of adequate supplier selection and subsequent ordering processes, avoiding maverick spend, and asserting control of the contractual relationship between Buyer and its suppliers.

In case 2, 3 and 4, the Buyer's goals of technical performance and on-time delivery are clearly jeopardized, triggering the project managers to take action. These three different individuals similarly opted not to involve their colleagues from the procurement function perceived as cost-focused and unaware of project specifics, therefore unable to support the resolution of incidents of technical nature. The visible nature of the incident (technical incident) dwarfed the consequential risks (delay, costs) affecting other goals of the organization. Hence action was initiated by the most technical function.

The initiative of Tier 1's sales function to reach out to the end-customer in case 4 brings another piece of evidence that supports the finding: the biggest risk of the Tier 1 firm in this project is not financial (it has limited its liability to the Buyer, and passed as much risk as possible upstream), nor technical (the error made by the Tier 2 can be solved), but reputational and subsequently commercial. There is clearly a failure in project management at this Tier 1 node (the incompatibility of interface designs between AC and DC cabinets prevents integration, and is *a priori* easily avoided through clear specifications and design reviews for integration in the main system), and this could affect the willingness of the said end-customer -and even other ones- to invite the Tier 1 firm to further tenders.

Thus, the following proposition is made:

> Proposition 1: **"The initiator of the intervention is the entity whose goals are most at risk."**

5.1.2 Target of intervention

5.1.2.1 Node level

At node level, the initiator of intervention reached out to the node perceived to be closest to the source of the incident.

In project-critical incidents involving suppliers, the expectation is that the target node would be the one immediately upstream of the source of intervention. However, as shown in case 1, the source of critical incident can also be internal to the intervention source node – the Buyer in this instance. Hence the intervention was targeted at the node closest to the source: Buyer itself.

The other cases illustrate that the intervening node can reach beyond the first tier supplier, bypassing the established hierarchy of formal links, to access the node closest to the incident.

In case 2, Buyer reached out to the tier 2 node, through existing informal links. Interestingly, in cases 3 and 4, the Buyer targeted the tier 3 nodes with whom it had no existing connections. This reaching out across two tiers without

involvement of the intermediate nodes, without support of formal instruments - even trampling on the existing hierarchy of contracts in the chain- and without active relations between nodes has not yet been documented in literature.

These tier 3 nodes were considered the source of the critical incidents preventing the completion of the projects in scope, and thereby threatening Buyer's goals.

The notion of 'perceived source of incident' is confirmed by the behaviour of the end-customer in case 3: this organization reaches out to the tier 2 node -the firm in charge of delivering the equipment at the heart of the system- as it perceives it as being the source of the incident. This end-customer also showed no consideration for the hierarchy of contracts in the chain.

5.1.2.2 Function level

At function level, the same behaviour is observed.

Thanks to its specificity of having an internal source of critical incident, case 1 illustrates that the remedy may not be found within, or limited to, the function source of the incident: whilst the incident (splitting purchase orders into amounts too small to fall within a controlled ordering process) stems from the project management function, the resolution is initiated by the procurement function. In this case the source of the incident, and the nature of it (a generic process being bypassed) show that critical incidents can reveal issues that are not project-specific, and can attract solutions that are not project-specific. Here, in this case 1, the action undertaken consists in a change in the ERP system that will affect all functions and other projects in the organization: the resolution aims at where the source of the problem is perceived to lay (the control system is not tight enough).

In cases 2, 3 and 4, where the critical-incident affects technical performance (with cascading effects on delivery time and costs), the target function and the initiating function are focused on the technical performance dimension. Even though these specialists are closest to the incident, and likely to have a prominent contribution to the resolution of the incident, project management includes non-technical aspects that are obviously pushed down the list of priorities in these examples.

Similarly, the intervention of the end-customer in case 3 was directed to the technical function of the tier 2 firm, contributing to the significance and broader generalizability of the cases.

Hence the following proposition is made:

> Proposition 2: **"The target of intervention is the entity closest to the perceived source of the critical incident."**

Why is it important?

It appears that the prompt for intervention is linked to the risk carried by a node or a function. This comes in contradiction with the hierarchy of contracts (formal links) as conceived in the concepts of supply chain and tiers. In principle, the one acting should be the one owning the relationship, that is the node directly downstream from the source of incident (refer to e.g. Grimm, Hofstetter and Sarkis, 2014, for their discussion on managing sub-suppliers). As underlined by a procurement director of the Tier 1 firm interviewed in case 3 *"Ownership of the relationship is a key issue in issue resolution"*. The first two propositions imply, and the cases illustrate, that confronted with goal-threatening incidents, the governance of interorganizational relationships may evolve outside of the established formal governance structure, beyond contractual boundaries, as well as the principled roles of functions (i.e. procurement as conduit for interactions with suppliers). And that is precisely what project governance is supposed to avoid, or at least provide a framework for if it can't be avoided (Biesenthal and Wilden, 2014).

5.2 Use of informal instruments to intervene

This section focuses on cases 2, 3 and 4, as the intervention in case 1 was internal.

As the relationship structure based on formal instruments was not effective to prevent or resolve the incidents, Buyer's project managers reached out to the

entity closest to the source of incident through informal instruments. However, a vast body of the literature stipulates that informal relationships are based on trust (e.g. Cao and Lumineau, 2015; Pilbeam, Alvarez and Wilson, 2012), and that trust requires a long time to be built (e.g. Gulati and Sytch, 2008; Day, *et al.*, 2013).

Here, in only one case did Buyer's project manager (the intervening individual) refer to existing personal connection to the target function at the tier 3 node (having previously worked together). And precisely in this case 3, this direct intervention was clearly identified as *"It is not the right way in the process"* by the project manager initiating the intervention!

Still, the links were created and enabled the completion of the technical performance goal – the most important to the initiating function.

Extant literature proposes very few examples of multi-tier governance relying only on informal instruments in a lasting interorganizational relationship. In the case of Nestlé Nespresso introduction of sustainability requirements with its coffee bean producers (Alvarez, Pilbeam and Wilding, 2010), behavioural norms (an informal instrument) were the basis before the introduction of a formalized program. However, these relations were long-standing and with time-tested trust, which is not the situation in the cases observed here. A common element though is the high level of motivation, and shared professional values of the source and target individuals, that enabled intense communication. These two factors can be seen as precursors to forming a trusting relationship; however, nothing indicates that this ended-up being the case. On the contrary, in case 4 the project manager initiating the intervention volunteered that he had to control and regulate everything, because "*Work must be completed, and I can do it myself*".

Two elements can account for the use of informal instruments.

First, is the need for speed. In spite of the focus on technical performance, the time dimension is not neglected. It can even be a critical factor in the project (e.g. in case 3, when work is prohibited in winter times), or to the individual project manager (case 2, the Buyer's project manager needs to find a solution before his

reputation is tarnished). In all cases, delays have an economic impact. When speed is of the essence, recourse to informal instruments makes sense. Setting, or modifying, formal arrangements is known to take time (e.g. Howard et al, 2019), and possibly open the door to opportunistic renegotiation of terms (Micheli and Cagno, 2016).

Second, as previously documented in Alvarez, Pilbeam and Wilding (2010), high levels of motivation and initial goodwill of the source and target individuals enable intense communication. This indicates the existence of cognitive social capital - understood as the existence of shared interpretations and a system of meanings between actors that supports the emergence of common narratives and codes of conduct (Nahapiet and Ghosal, 1998). In the cases observed, where the initiating function reached out to its most similar peer in the target node, cognitive social capital was used to support a functional-level approach to incident resolution. Hence, the combination of elements pertaining to the realm of informal instruments, that is shared values and professional references, motivation and goodwill, was the fertile ground on which intense communication developed in spite of the absence of previous inter-organizational formal links.

Why is it important?

This contributes to the conversation on complementarity and substitutability of formal and informal instruments.

The complementarity view proposes that while contractual governance mechanisms and relational governance mechanisms serve different goals and have different functionalities (Caniëls, Gelderman and Vermeulen, 2012; Dans and Teng, 1998), they support one another (Olsen et al, 2005). The substitutability view is that relational norms and trust can favourably be used instead of formal instruments (Granovetter, 1985).

In these cases, the informal links did both: they complemented existing formal links spanning across the various tiers in the achievement of speedy unfiltered communication between the highest-tier node and the Buyer; and they

substituted for the creation of a formal link between the target node and the Buyer, thereby contributing to faster resolution of incidents. The recourse to formal instruments (e.g. creation of a contractual relationship between the Buyer and the tier target of intervention) would impact the tier-bound existing formal relations between the nodes, and require a renegotiation of contracts for every dyad in the triad (case 2) and tetrad (cases 3 and 4). Even without considering the risk of opportunistic behaviour by one of the parties, given the time it would require, and the constraints posed by public procurement rules on Buyer, this would create additional delay to the resolution of the incident, thus to the project completion. Hence, the use of informal instruments facilitates the evolution of a governance structure in response to project-critical incidents, by enabling fast connection and exchanges between individuals sharing a common drive to resolve the situation.

This paves the way to the **third proposition:**

> **"In the resolution of project-critical incidents, informal instruments can simultaneously be used as complements of and substitutes for formal instruments, to accelerate communication between the source and the target of intervention."**

5.3 Consequences on interorganizational relations

The creation of links, even informal ones, contributes to a significant change in the structure of the triads and tetrads observed in these cases. The tier 1 node has a weakened brokerage role, and is therefore losing its dominant position to the benefit of the Buyer, through the change in the flow of communication between the upper node (those beyond the tier one) and the buyer. This parallels the well-documented benefits of closing the structural hole for increased information exchange and problem resolution (e.g. Burt, 1992; Madhavan, Gnyawali and He; 2004, Obstfeld, 2005). Furthermore, "[when studying communication] the actors with the most access or most control or who are the most active brokers will be most central in the network" (Wasserman and Faust, 1994, p. 174). The increased centrality of the Buyer node grants it easier and

faster access to resources of other nodes (e.g. Gnyawali and Madhavan, 2001; Zaheer, Gözübüyük and Milanov, 2010), and increased power in the network. Power is construed as “the ability to influence, control, or resist the activities of others” (Huxham and Beech, 2008, p.555). In these cases, the influence and control dimensions are clearly established, as Buyer gains control of exchanges and communication supporting the resolution of the critical incidents, furthering the achievement of its goals. In addition, the centrality of a node contributes to its ability to initiate an intervention, and decreases the likelihood of counteractions by the other nodes (Gnyawali and Madhavan, 2001). It is important to note that the same consequences are witnessed in case 2, where the informal link between the Buyer and the tier 2 (the source of incident) already exists and is strengthened (higher intensity): it is the increased communication in itself that causes the shift in structure, not necessarily the creation of a link.

Extant literature has not addressed the evolution of intensity of a link in terms of the frequency and volume of exchange. As indicated above, the notion of ‘intensity’ used in this research was based on the frequency of contacts divulged by the interviewees (Ateş, Van den Ende, and Ianniello, 2015). Reinforcement or weakening of a link mean sustained changes in intensity, be it through the number of instruments used by the lower node on that link (e.g. the number of instruments used by the buyer in its relations with the tier 1 and tier 2 suppliers), or -notably for the informal relations- the input by the participants (e.g. “We are frequently in contact”, or “I don’t talk to them”). The reinforcement of a link, e.g. the Buyer - Tier 2 informal link in case 2, was done through an intensification of exchanges between the nodes involved. This reinforcement was limited to the same set of instruments, that is informal instruments only; no formal instruments were introduced. The intensified exchange of information was supported by the introduction of informal instruments (embeddedness & relationships, and values). This significant increase in information exchange resulted in a shift in the triad balance, the reinforced link (Buyer - Tier 2) becoming dominant in the resolution of the critical incident, bypassing the hierarchy of formal links and tier chain. It is to be noted that in cases 3 and 4, the introduction of intense information exchange links between Buyer and Tier 3 have seen the weakening of the Tier 1 - Tier 2

information exchange intensity, contributing to the increased centrality of the Buyer.

Why is it important?

The learning of this point is that even a temporary, informal, change in governance structure can have significant influence on the power position of nodes in triads and tetrads. The increased centrality of the buyer enabled it to gain broader access to information, and direct the actions of other nodes without hindrance or retaliation from the tier 1 and tier 2 nodes, those that were losing their positions of advantage and brokering roles.

This contrasts with extant supply chain literature (e.g. Choi and Wu, 2009; Mena, Humphries and Choi, 2013; Rossetti and Choi, 2008) that focuses on formal instruments-based structural evolution through definitive disintermediation. And leads to the **fourth proposition**:

> **"The power position of nodes in project-level triads and tetrads can be significantly affected by interventions that don't change the formal governance structure."**

6 Managerial implications

The observations and learnings of this research contribute to supplier portfolio management and project management practices. They are made from the perspective of the buying firm.

6.1 Supplier portfolio management

Regarding supplier portfolio management practice, recommendations can be made on two topics: alignment on goals and adaptation of governance instruments mix.

6.1.1 Foster alignment on common goals

First, start by internal alignment.

Resolving the question of which collaboration and coordination instruments to use -notably regarding goal alignment and communication, and the risk and rewards distribution mechanisms in place, is expected to make it easier for the functions to work in harmony on projects with suppliers. The approach suggested here is broader than the ‘performance monitoring’ focus commonly taken as it includes the management of interactions with suppliers.

This research effort demonstrated that the lack of internal alignment led to a function-level focus on certain aspects and goals in the collaboration with suppliers, at the expense of the broader (project and organization levels) goals and cross-functional coordination, causing significant damages (costs, reputation) to the firm whilst those nodes (i.e. tier one and tier two, project-depending) that should have performed upstream alignment and management were largely unaffected.

Even though poor contracting practice by the Buyer node can bear a portion of the blame for that, several statements highlighted internal mis-alignment and poor cross-functional collaboration and coordination within projects.

This situation also contributed to the single-handed undertakings of intervention by the project management function that triggered the evolution of governance structure in order to resolve the project-critical incidents. As much as these interventions contributed to the completion of technical performance goals, they did not consider other goals of the project and organization that were seen as ‘minor’ or within the scope of other functions.

It is the role of governance to foster alignment on goals within and between organizations participating in the common endeavour. **Therefore, managers at all levels and in all functions involved in a given project should strive to ensure that everyone is pulling in the same direction.**

Once internal alignment is achieved, then external alignment is possible.

On this account, **managers in charge of supplier relationship management efforts should expand their span of interest beyond the immediately visible horizon – that is beyond tier 1 and beyond their own individual and functional goals.**

It is a recommendation often applied to supply chain management to enable coordination of materials and information flows in a logistics optimisation objective, with the support of integrated information processing systems.

Applying the same approach to relationship management directly supports taking advantage of elements well identified in the inter-organizational networks literature, such as connectedness and information brokerage positions (e.g. Gnyawali and Madhavan, 2001). This can't be done using a purely dyadic approach to supplier relationship management, as such an approach does not consider the organizations and relationships beyond the dyad. Context has an influence on behaviours and decisions, as managers who use SWOT and PESTLE analysis tools know so well.

It is the best interest of firms and functions to establish and maintain informal links with those firms beyond the tier 1 suppliers that can have a significant impact on the buyer's goals and performance.

'Supplier significance' can be determined with well-known supplier segmentation techniques. From the large number of existing models (see Svensson, 2004), two are recommended for their item-level lens: the Kraljic matrix (Kraljic, 1983), and Olsen and Ellram's portfolio model (Olsen and Ellram, 1997). Both take into consideration the characteristics of the products to be obtained rather than restricting themselves to firm-level considerations.

Such pre-existing links contribute to a stable structure of relations, formal and informal. The buyer shall benefit from this, having asserted its central position from the start, with clear formal and informal connections that not only enable coordination and performance monitoring, delineate risk and rewards allocation, but also stimulates the flow of information that contributes to early detection and resolution of incidents stemming from tiers farther upstream. Consequently, this also provides benefits at project level, as containment and mitigation interventions can occur as close in time and place to the source of the incident as possible.

It is recognized here that such set up, both for internal alignment and visibility of external relations, requires additional resources and efforts from all parties, and at all levels. Nevertheless, from the cases presented in this research, this would have provided advance warning to the buyer, allowing for contingency actions way earlier in the project time lines, avoiding the disruption of the balance of relations with the upstream nodes as well as the end-customer, and reduced the time, cost and reputational impact of the incidents.

From an implementation perspective, it is recommended to start by internal alignment, otherwise not only will the suppliers likely receive mixed -and even possibly contradictory- messages, but the benefits of the upgraded management of supplier relations will be lost in the internal maze of projects and functions.

6.1.2 Adapting governance instruments mix

Adapting the mix of governance instruments (formal and informal) intends to ensure that the selection made is adequate for the goals and the parties.

Most managers (and organizations) focus on the contractual part, in line with the long tradition of power-based relations and requirements of material safeguards to control supplier behaviour. Unfortunately, even a full complement of such ensures neither the avoidance of issues, nor their resolution as per the established hierarchy of obligations. Furthermore, as demonstrated in previous research (e.g. Roehrich and Lewis, 2014), increasing exchange governance

complexity to counteract multi-tier structure complexity is inefficient when manageability and enforceability of complex contracts is taken into consideration.

Still, contracts enable a clear definition of rewards and penalties, and contribute to the alignment of parties around shared goals. Managers must keep in mind that focusing on technical and quality aspects tends to lead to time and cost deviations (Caniëls, Gelderman and Vermeulen, 2012). **Risk-and-rewards contracts have to be tailored for each project, especially for complex engineering-focused projects, and the use of generic wordings is to be reduced to the minimum.**

Another dimension frequently referred to is trust, built on a common history and positive past experiences. Managers are advised to distinguish between three high-level types of trust: competence trust (based on skills and capabilities to fulfil what is expected), contractual trust (based on the assumption that individuals stick to their word and 'fulfil the contract'), and goodwill trust (based on commitment to the other); and furthermore to consider the mix of these that comes into play in their relations with their suppliers. Making such distinction allows to adjust the risk and rewards mechanisms and the monitoring system according to the mix of trust types they have in the other party.

However, trust in absence of contractual incentives and controls has been shown to lead to unfavourable project outcomes (Caniëls, Gelderman and Vermeulen, 2012). **Therefore, it is the mix of governance instruments, rather than each one in isolation, that is to be considered, as they are mutually dependent.**

This comprehensive view entails a finer management of external interactions when confronted to project-critical events. In particular, the appropriate mix of instruments shall allow transparency regarding incidents, their causes and possible remedies, increase speed of reaction, and clearly outline risk and rewards across the actors.

A cautionary note is made on the idea of systematic risk transfer touted by a large number of procurement agents (*"My job is to transfer as much risk as I can"* as declared by an interviewee at Buyer's procurement department): risk entails

reward, or the balance of exchange is lost, meaning that the party carrying the most risk should obtain the highest reward. Unbalanced exchange relations do not last. Without asserting that a firm should want to endorse large risks, it is good practice not to try to transfer all of it as the purchasing price and the total cost of ownership to be paid will reflect it.

6.2 Project management

Regarding project management, three avenues to improve project management practice are highlighted.

6.2.1 Prioritization of goals

There is abundant literature and advisory recommendations on the necessity to align goals with suppliers. It is also repeated above.

One aspect that is less spoken of is the necessary prioritization of goals, internally and externally. The cases presented here demonstrate that organizations, projects and functions can have different priorities. The emphasis of technical issue resolution was made at the expense of increasing costs, and negatively impacted delivery times. As well, when an organization is focused on safeguarding its financial performance rather than fulfilling the project-level delivery and technical performance goals, mis-alignment and incidents can occur or be amplified (as in case 4, when the tier 2 does not provide a backup for the absent project manager).

Hence it is recommended to **implement a governance structure that addresses internal and external alignment and prioritization of project-level goals.**

This is to be done *a minima* between the buyer and the tier 1 suppliers. And the better when project-significant tier 2 suppliers are also taken into consideration. Identification of significant suppliers can be done using the same approach as

the one recommended to foster alignment on goals in the supplier portfolio management section (6.1.1), focused on the items and suppliers relevant to the project in scope. However, this does not replace specific technical risk analysis techniques such as Failures Modes and Effects Analysis (FMEA), that deal with the technical performance and reliability of products. Ideally, they could be used in conjunction to identify project-specific supply risks.

The recommended governance structure shall ensure cross-functional alignment on project goals to foster cooperation and coordination of efforts, as well as a cascade-down effect from project goals onto function goals: achieving (failing) project goals thereby significantly contributes positively (negatively) to the achievement of function-level goals. Thereby, it shall be the best interest of the involved functions to prioritize project goals rather than function goals. This mechanism also reduces the risk that in front of a project-critical incident, a single function takes the initiative to seek resolution for its own goals without consideration of the wider scope and consequences for the organization, the project, and the other functions.

6.2.2 Decision-making body

In many projects, one individual, the project manager, is making all decisions - usually up to certain limits of financial risk set by internal rules. Beyond this point, escalation is made to higher management levels, who often make collegial decisions in steering committees (an example of such structure is given in Zwikael and Smyrk, 2015). One drawback of such a setting, is that, for each of these individuals, whatever the level, individual and functional-level goals are predominant in the decision-making process.

Another avenue, is to have a dedicated project management function whose goals are fully project-focused. This can ensure that all projects goals are given equivalent consideration. On the flip side, this can lead to ‘deliver and forget’ behaviour that does not entail taking into account of the long-term life of the project, summarized as total cost of ownership in procurement parlance. Thus,

this configuration also calls for careful balance between functions and levels. One way to achieve this balance is to share leadership responsibility and decision-making between the technical aspects (e.g. technical performance and quality) and the economic performance aspects (e.g. costs, on-time delivery, compliance). Therefore, each project has two heads with specific goals. Decisions must thus be made by consensus between both co-leads. Such a set-up does not prevent from escalating when decision-making limits are exceeded, or consensus can't be reached.

The two possibilities described above tend to have a strong internal focus, and lack the interorganizational coordination and alignment dimension recommended earlier in this document.

Looking at interorganizational relations, a possibility is to establish a multi-tier project management board that involves the Buyer, the tier 1 and tier 2 nodes that have significant project coordination, engineering and sourcing responsibilities. Such a body would make consensus-based decisions, by which the participants would be informed of, and accept the consequences of, without being forced into it. As much as this sounds very optimistic, if not idealistic, such consensus-based decision-making is relevant in projects requiring balancing acts that may affect several project goals (typically, technical performance, delivery, costs control) at once. If intended from the project inception, it also potentially relieves a number of discussions on the distribution of risks and rewards, as these shall be taken into consideration collegially. Such a set-up potentially reaps the benefits of centralized decision-making (there is one body acting as lead organization) and shared governance (Provan and Kenis, 2008): they require high goal consensus, foster trust, and demand only moderate efforts and skills in managing the interactions. Relating to the cases presented in this research, such collegial decision-making would clarify the source and target of any intervention, improve coordination within and across the project teams, enable bespoke distribution of risks and rewards, and support clear communication with the other nodes in the project's multi-tier structure.

It is recognized that this solution is mostly applicable to projects where the number of parties involved is limited, as the ones observed in the four cases. Still, with few firms in scope, these observed projects delivered systems of significant technical, financial and societal significance.

6.2.3 Incident resolution mechanism

Confronted with a project-critical incident, having a pre-planned behaviour can support resolution in ways that protect the project-level goals -and thereby the organizational and functional goals of the participants; That is if the governance was adequately set-up.

Many organizations and projects agree on an escalation process to be followed in case of critical incidents. These are typically focused at getting higher-level management involved to resolve the financial consequences of an incident. That is useful to do, however it does not solve the issue.

Similarly, some organizations limit the effort to establishing RACI charts. These charts indicate, for a number of tasks pertaining to a project, who is Responsible (the person who executes the task), Accountable (the ultimate accountable for a work/ decision to be made), Consulted (those whose input and advice is requested priori to a decision to be made), and Informed (those who are informed when a decision is made, or a task accomplished)[10].

The recommendation is to have an incident resolution process, based on scenario planning tools. This process should encompass the task allocation and management process, the communication flows, the decision-making process and authorities, and eventually the conditions to recourse to an escalation mechanism. Such a process will probably include a RACI chart, as supporting document.

[10] More details can be found at e.g. http://www.racichart.org

Scenario building tools are well-known in strategy planning (e.g. process and operational tools in, Vuorinen, Hakala, Kohtamäki and Uusitalo, 2018), or crisis planning and management (e.g. scenario planning and scenario-based training, in Moats, Chermack and Dooley, 2008); their transferability to incident resolution is relatively easy due to their procedural nature. Moreover, incident resolution processes can be relatively generic in the domain of projects, as they are not operational procedures. As an example, the incident response procedure if case of failure of the cooling system of a nuclear powerplant is extremely detailed and covers many scenarios of potential causes and developments. In such circumstances, reaction times and precise sequences of actions are of the essence as consequences can be, literally, catastrophic. In contrast, during a project, it is the management of the processes, notably communication, tasks allocation and decision making, that is to be detailed.

7 Conclusion

This research project focused on understanding the evolution of the governance structure of projects confronted by critical incidents in multi-tier supply chain settings. It shows that functions are at the core of incident-resolution interventions, and that the structure of relations evolves to give a higher centrality and information control position to the initiating node. It also provides empirical evidence to ongoing conversations on the importance of the triad as a research context, as well as the necessary mix of formal and informal instruments in the governance of interorganizational relations.

Based on four cases involving triads, including two extending to tetrads, three phenomena were identified. First, the node and function initiating the intervention to resolve the incident are the ones having the highest stake in the situation; and they reach out to the node and function closest to the incident. Second, the resolution of incidents stemming from other nodes relied on informal instruments, namely information sharing and professional values, to foster collaboration

between the parties involved. Third, the said instruments enable direct communication between the parties source and target of the intervention, shifting the structure of the triads – or tetrads- in scope towards a higher centrality of the Buyer as initiating node, and reducing the brokerage role of the nodes situated between the Buyer and the target node.

Four propositions were made, that, taken together, outline the entanglement of node-project-functional levels in actions, outcomes and consequences.

Expanding current knowledge focused on dyads, this work also shows the influence of the third in a triad, notably through interventions based on informal instruments, that is without modification of the formal structure and hierarchy of contractual obligations between tiers. In addition, this contributes to the conversation on the substitutability and complementarity of formal and informal instruments, as both properties are evidenced in the cases observed.

Managers will benefit from these findings by implementing supplier relationship management models that develop governance beyond the traditional view of performance monitoring, and reach to tiers further upstream than tier 1. Such models should include both the internal alignment of firms' resources at project and function levels, as well as the consideration of the mix of governance instruments enacted towards the upstream. The expected gain, notably in projects-based businesses, is an improved flow of information that shall provide advanced warning of project-critical incidents occurring in the upstream tiers, and therefore allow opportunities to mitigate them early thanks to inter-firm and cross-functional cooperation.

Limitations

Obviously, this research has limitations.

From a methodological point of view, the first one is the purposeful sampling of nodes, necessary to obtain a fixed set of buyer and tier 1 actors at organizational level. Purposive sampling reduces the diversity of inputs, possibly skewing the

results. However, in this precise research where context (triads and tetrads) was a defining element, it enabled a solid comparison between cases through literal replication.

In addition, there is a heavy emphasis on the buyer's perception. This is partly explained by the fact that the problem this research tried to answer was identified inside the procurement function. It is also representative of the fact that most efforts deployed in governing projects and suppliers come from the Buyer organization. Furthermore, this opened the way to provide managerial implications on both supplier portfolio management and project management.

Lastly, this research was conducted on engineering-dominant projects, were technical difficulties are predominant (Kaulio, 2008), possibly skewing the identification of intervention source and target at function-level. However, the context of project-based engineering is found in many industries (e.g. aeronautics, automotive, construction and infrastructure), and has a dimension of knowledge-based services, thereby having a significant audience.

Further research

In order to support generalizability, a first step would be to investigate a larger subset of triads and tetrads, in different sectors and geographic areas. This may not be easy, as firms are not keen to divulge their chains of supply, nor the specific arrangements made with their suppliers, notably when they know that several tiers are being investigated simultaneously. Still, several studies have been published on the importance of managing upper tiers in sustainable supply chains: this can open a path for the investigation of other phenomena in triads and tetrads.

Moreover, conducting a research aimed at capturing the views of each node in both its role as buyer and in its role as vendor would provide a fuller understanding of the consequences of the interventions across each tier. For this, the participation of a larger number of interviewees from each node and for each project would be necessary.

A similar endeavour can be undertaken in parallel regarding the motivations of the intervention source and target to act outside of established governance. Conducted at node and functional level, this would contribute to a better understanding of internal cross-functional collaboration and inter-organizational inter-functional cooperation.

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