Disclosure under control: how transparency complement contractual and relational governance mechanisms in interorganizational relationships?

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Abstract

Prior research on SCM transparency primarily focuses on the transparency technological capability's view, improving buyer-supplier relationships. By contrast, other burgeoning literature suggests that transparency should be considered as an interorganizational governance mode as well as more usual relational or contractual mechanism.

Since the seminal article of Poppo and Zenger (2002), most of SCM literature has confirm the complementarity of formal contracts and relational governance on dyadic relationships performance. In the actual context where many organizations are confronted with the challenge of increasing stakeholders' scrutiny and become more accountable for their supply chains' operations, understanding how transparency interact with these two typical complementary governance modes is key. From this stance, pioneering research shows that relational governance associated with transparency facilitate interorganizational relations. Beyond the importance of these promising research, the role of transparency on the complementary governance mode remains unexplored.

In line with this emerging trend of literature, this study aims to investigate how, and in what conditions, transparency is associated with conventional interorganizational governance mechanisms. To this end, we conduct a survey of 204 operational managers (buyers, sellers, supply chain manager, logistics manager, etc.). Using a FsQCA method, our result highlights three main contributions. First, we find that transparency alone is insufficient for high performance, even though it appears as a necessary condition for high dyadic performance. Second, we not only empirically confirm the hypothesised complementarity of transparency with the conventional interorganizational governance mode, but we also show that different constrained relational contexts equally support this requested combination. Third, as it is suggested by the literature, we demonstrate empirically that transparency can be considered as a valuable governance mode. Accordingly, our research contains suggestions for further research and managerial implications.

Keywords: relational governance, transparency, trust, contract, FsQCA

INTRODUCTION

Informational transparency (IT) among dyadic partners relations is widely recognized as a critical success factor to reduce bullwhip effect and improve dyadic performance (Steinfield and al. 2011; Bastian and Zentes 2013; Bailey and Francis 2008; Ahmed and Omar 2017). Moreover, developing IT is considered as a key factor to reduce opportunistic behaviour in principle-agent relationships (Akkermans and al. 2004; Cho and al. 2017; Kumar and Ganguly 2020). Accordingly, Cho and al. (2017) show that sharing manufacturing schedules, inventory status, and forecasting information in dyad lowering information asymmetry thus deters agent to behave opportunistically. However, some authors (Lamming and al. 2004; Flyverbom and al. 2015; Albu and Flyverbom 2019; Montecchi and al. 2021) denounced this simplistic view of IT and posit that it can play a more ambivalent role in dyad. Lamming and al. (2004) highlight that a firm can apply different levels of IT to control their partner. In line with these authors, Flyverbom (2016) suggested that IT can be considered as a governance mechanism to share or control information flow.

Accordingly, our study takes place on this second stream of research. To our knowledge, this ambivalent role of IT has not been empirically investigated, especially in the field of interorganizational relationships.

Many empirical research on interorganizational governance pay attention to the complementarity between contractual and relational modes of governance (Poppo and Zenger 2002; Cao and Lumineau 2015; Roehrich and al. 2020). Nevertheless, these studies do not address the issue of IT. Although, as some authors associate IT to control, it's surprising that it has not been yet integrated in the empirical studies of interorganizational governance. Thus, the objective of this paper is to fill this gap, investigating how, and in what conditions, IT is associated or interact with conventional interorganizational governance mechanisms.

To this end, we conduct a survey based on 204 operational managers. According to the combinatorial issue of interorganisational modes of governance, we select a configurational approach (FsQCA). Our results show that high dyadic performance is associated with two configurations. The complementarity of three necessary governance modes (contractual, relational and IT) is the common feature of these two configurations. However, these three

complementary necessary conditions are insufficient alone to reach high dyadic perceived performance. To achieve it, necessary conditions are associated to partner lock-in (configuration 1) or task lock-in (configuration 2). Whatever the type of lock-in, high dyadic performance configurations suggest that IT is systematically associated with multiple kind of controls.

In the following sections, we discuss the literature background explaining how different governance mechanisms enhance information processing requirements and capacity. Then, we describe the research methodology based on configurational approach. Finally, we conclude the paper by discussing how our results contribute to IT and interorganisational governance literature.

LITERATURE BACKGROUND

Information processing theory (Galbraith 1974) studies the relationship between the need for information and the mechanisms by which the flow of information can be improved. According to IPT, organizational decision-making is a process governed by task uncertainties (Melville and Ramirez 2008). It suggests that organization is an imperfect decision-making system due to incomplete knowledge. Therefore, organizations seek to systematically evolve to support decision making to cope with the increased uncertainty of the tasks (Van de Ven and Ferry, 1980). Task uncertainty is associated with a lack of IT for decision making (Hillegersberg and al. 2003; Zhu and al. 2018).

When task uncertainty in client-supplier relationship is high, management of routines and procedures become difficult. As a result, each firm should cope with a wide range of problem which require acquisition of some related task information from other parties. Therefore, task uncertainty creates a repetitive interorganizational information exchange, enhancing coordination (Thompson 1967; Barua and Mani 2014). Drawing on previous literature (Thompson 1967; Premkumar and al. 2005; Barua and Mani 2014), complexity and interdependency, are the main sources of task uncertainty.

Task complexity is constituted by its level of analysability and variety (Rice 1992; Dunegan and al. 1992; Bensaou and Venkatraman 1995; Barua and Mani 2014). A task is analysable when its outcomes are well understood by the actor and when it follows a precise procedure to achieve an objective (Daft and Weick 1984). Task variety is defined as a frequency

of occurrence of events which may disturb stability of task's inputs and outputs (Barua and Mani 2014). Therefore, a complex task is characterized by high level of variety and low analysability. IPT approach suggest that the more a task is complex, the more quantity and quality of information is required to reduce uncertainty (Barua and Mani, 2014).

Task interdependency (Thompson 1967) happens when any modification on the task of a partner changes the task of another partner. According to Tushman and Nadler (1978), when uncertainty and interdependency are low, task can be easily pre-planned with a minimum information requirement. However, high level of uncertainty requires reciprocal interdependencies (Thompson 1967; Street and Goldsmith 2004) to enable coordination. Therefore, as for complexity, IPT suggests that high level of interdependency requires more information to coordinate tasks.

According to IPT, the lack of IT results of inadequate support for companies' information processing requirements or their information processing capacity. As such, drawing on previous literature (Tushman and Nadler 1978; Lumineau 2017; Zhu and al. 2018; Aben and al. 2021) firms apply governance mechanisms to improve their information processing based on three logics: ease access to necessary information while task uncertainty is high; control the interorganizational relationship in order to gather, interpret and synthesize information in a meaningful way to decrease uncertainty and to reduce informational asymmetry facilitating decision making (Tushman and Nadler 1978; Zhu and al. 2018); and finally to "fit" between information requirements and information processing capabilities, in order to improve operational dyadic performance (Premkumar and al. 2005; Zhu and al. 2018).

Based on IPT, different governance mechanisms associate with IT, support information requirements and information processing capacity and how they fit each other to improve dyadic performance.

Relational mechanism and information processing

High level of task interdependency in dyad increases information requirement by partners. Previous literature highlights the key role of relational mechanism to foster information accessibility. This mechanism (Dyer and Singh 1998; Jayaraman and al. 2013) refers to how an inter-organizational relationship is governed by social relationships, shared norms (Poppo and al. 2008; Zhou and Xu 2012) and relies on an informal structure where self-execution of each party is promoted (Dyer and Singh 1998; Malhotra and Murnighan 2002). According to this literature, trust is the most discussed type of relational governance (Gulati

1995; Griffith and Myers 2005). Trust refers to integrity, credibility, and benevolence of the partner in a risky exchange relationship (Das and Teng 1998; Zaheer and al. 1998).

Previous literature studied the role of trust addressing information asymmetry in client-supplier relationship (Poppo and al. 2008; Roehrich and Lewis 2014; Chakkol and al. 2018). Trust fosters collaboration (Inkpen and Tsang 2005; Carey and al. 2011) and seems to be vital for information exchange between partners (Ghosh and Fedorowicz 2008), helping them to provide useful information to overcome the uncertainty. Aben and al. (2021, 1163) suggest that while high level of trust exists in dyad, a firm can inform its partner "about what is happening and what should be done". Therefore, while task uncertainty is high, thus require an important quantity of information, trust enhance information processing, gathering partners and help them to exchange required information (Poppo and Zenger 2002; Kreye and al. 2015).

Trust can also be used by partners to improve information processing capacity. Some research (Heide and John 1992; Carson and John 2013; Aben and al. 2021) posit that high level of trust between partners encourage them to exchange and provide not only useful information but also the synthesis of information. For example, Aben and al. (2021) show that while partners facing a high level of uncertainty regarding asset maintenance needs, trust help them to collaborate to understand the information. This collaboration helps them not only to avoid wrong interpretation of information but also to facilitate decision making.

Though wide range of studies shows the benefit of trust for information processing, other study (Bailey and Francis, 2008) shows that high level of relational governance supported by trust, enhances passive sharing of information (Aben and al. 2021) and favours informational load that ultimately may affect the quality of data. Thereby, beyond its virtues, trust seems not to be sufficient to support all information processing requirements. Partners should combine trust with other governance mechanisms to figure out which information should be shared and the way it should be interpreted.

Contractual mechanisms and information processing

Drawing on IPT, Lumineau (2017) argue that governance mechanisms and especially contractual governance can shape the nature of actions taken by partners to collect and interpret information required for making decisions. According to this author, contractual mechanisms based on rules and procedures, create frames and filters which influence the information processing (Makhija and Ganesh 1997; Halldórsson and Skjøtt-Larsen 2006; Mani, Barua, and Whinston 2010; Lumineau 2017). Contract mechanisms exist either with the objective of

controlling the partner and having access to his information or to face the changing situations of the interorganizational environment by allowing the partners to coordinate better (Roehrich and al. 2020; Aben and al. 2021). As such, the contracts are based either on "control" or on "coordination" (Faems and al. 2008; Malhotra and Lumineau 2011; Lumineau 2017). Contractual control and coordination mechanism ease information requirements and processing by explicitly specifying type, frequency and quality of information exchanged (Mayer and Argyres 2004; Faems and al. 2008; Jayaraman and al. 2013).

In the contexts of high task uncertainty, firms commonly apply contractual coordination mechanism. According to Young-Ybarra and Wiersema (1999) and Selviaridis (2016), contractual coordination refers to the ability of customers and suppliers to adjust the terms of the agreement in response to environmental changes or to adapt to the evolution of needs of their partners. Heide and John (1992) and Brown and al. (2006) define contractual coordination as a set of mutual group-oriented expectations and understandings, reflecting social consensus and the reinforcement of specific behaviours. These social interactions give rise to patterns of exchange between trading partners (Macaulay 1963; Macneil 1978; Ryall and Sampson 2009; Mooi and Ghosh 2010; Malhotra and Lumineau 2011). To face environmental changes and task uncertainties, partners need to be flexible by adjusting their operations. Applying contractual coordination mechanism in communication process - such as the frequency, relevance, and timeliness of exchanges (Lumineau 2017), helps partners to deal with unexpected events. This mechanism allows the parties to acquire collective judgment and thus reach mutual agreement on the necessary adjustment (Noordewier and al. 1990; Heide and Miner 1992; Weick 1995; Lusch and Brown 1996). In contexts of frequent unforeseen events with high informational asymmetry, Wang and al. (2013) show that contractual coordination requires less negotiation to take decisions to adapt to the situation.

Furthermore, if a partner does not understand the information in the same way about the necessary adaptations, decision-making during joint problem solving can lead to substantial coordination and negotiation costs. High level of task interdependencies enhances the need for adopting a contractual control mechanism which enable information exchange (Gattiker and Goodhue 2004; Barua and Mani 2014; Aben and al. 2021). Contractual controls refer to a set of mutual expectations and understanding between partners (Lusch and Brown 1996; Brown and al. 2006) and can therefore be used to establish a common framework for understanding information and to facilitate joint problem solving (Artz and Brush 2000).

In addition, contractual control mechanism can be used to implement the rigorous procedures precising the way information should gather and be activated (Lamming and al.

2004; Lumineau and Malhotra 2011). Therefore, this mechanism allowing firms to monitor and control the activities and behaviour of their partners against possible opportunism (Provan and Skinner 1989; Wu and al. 2007; Steinbach and al. 2018). Lumineau (2017) argue that contractual control by determining the rules, procedures, and penalties (in the case of violation of this rules), not only improves information processing requirement and capacity but also, reinforce trust.

To date, research demonstrates benefits to combine relational and contractual mechanisms to improve information processing (Lumineau 2017; Aben and al. 2021). More recent studies point out the importance of information transparency as a mechanism influencing information requirements but also information processing capacity (Akkermans and al. 2004; Kumar and Yakhlef 2016; Albu and Flyverbom 2019; Montecchi and al. 2021).

Informational transparency and information processing

Informational transparency implicitly takes its roots in the principal-agent theory (Hood and Heald 2006; Heald 2006) which assumes that the actors under surveillance adopt a better behaviour. This approach suggests that in the presence of complete transparency, no more governance mechanism would be necessary (Berglund 2014), as information asymmetry disappeared. However, information is rarely totally transparent, and agents often disclose only one part of their available information (Lamming and al. 2001).

In line with Lamming and al. (2001), Brighenti (2007) and Flyverbom (2016), making information transparent and knowable means creating opportunities for other parties to control and exercise their power. Therefore, according to Flyverbom (2016), transparency is less an informational or a communicational state, than a mode of management, involving the exercise of social control (Flyverbom and al. 2016) which supports direct (observational control) or indirect (regularizing control) control mechanisms. Thereby, Flyverbom and al. (2016) conceptualize information transparency as a governance mechanism which should be managed. According to these authors transparency governance "is about attempts to act on the world by controlling and facilitating possibilities for seeing, knowing, and governing." (Flyverbom and al. 2016: 101).

Previous literature on IT studied the role of formal and informal governance mechanisms defining the rules of information exchange between client and supplier (Akkermans and al. 2004; Bailey and Francis, 2008) – supported by relational and contractual

governance mechanisms (Poppo and Zenger 2002). As such, some research studied IT as a factor which could influence the choice of governance mechanism in client-supplier relationship (Akkermans and al. 2004; Wei and al. 2012). For example, Bastian and Zentes (2013) and Xiao and al. (2012) argue that to improve dyadic operational performance, IT should be associated with contractual governance to avoid opportunistic behaviour. Zhu and Zhou (2017) precise the importance of associating IT and relational governance to enhance collaboration between partner in order to better understand exchanged information.

However, Montecchi and al. (2021) posit that IT could be used by partners to control not only information flow but also other governance mechanisms in dyad (Akkermans and al. 2004; Xiao and al. 2012). For example, the study of Sodhi and Tang (2019) shows that when failures appear within the supply chain, IT may provide necessary information about the event from the partner side, thus improve trust and strengthen relationships. Information transparency can also be applied by partners to provide some equilibrium over relational and contractual mechanisms in dyad (Lamming and al. 2004; Akkermans and al. 2004; Kembro and Selviaridis, 2015; Aben and al. 2021). For example, Xiao and al. (2012) highlight the situation in which a firm applying contractual control mechanism to monitor supplier's product quality. In this case, the supplier who feels watched by his partner try to reduce their IT to balance their relationship with their partner.

Furthermore, transparency cannot exist by itself, and it has a complementary role with contractual or relational governance mechanisms (Akkermans and al. 2004; Kembro and Selviaridis 2015; Aben and al. 2021). Although, since the seminal article of Poppo and Zenger (2002), most of literature (Ryall and Sampson 2009; Abdi and Aulakh 2017; Zheng, and al. 2019; Roehrich and al. 2020) has confirm the complementarity of contractual and relational governance in dyadic relationships, there is a lack of empirical research on literature on information transparency to understand how these difference governance mechanisms associate together to improve dyadic operational performance. To this aim, next section presents our methodological approach and how we are going to shed more light on this gap.

METHODOLOGY

1. Study design and participants

We collect data using an online survey from 2,145 managers / managers (buyers, salespeople, logisticians, etc.) contacted through LinkedIn. LinkedIn's advanced search allowed us to control several parameters including the function of respondent, their professional experience, the number of people contacted per company and the type of industry. We selected people with at least three years of experience. After relaunching three times during the month of April 2019, we obtained 375 responses, including 204 complete anonymous responses. Thus, the response rate is near 9.4%.

The questionnaire was written in French and English. To minimize contexts bias such as country, type of industry, etc., we used the back-translation method (Douglas and Craig 2007) to ensure the conceptual equivalence of each question in French and in English.

2. Measurement of the main variables

The variables of the study are built from empirical literature review. Following Leung (2011) and Bhattacherjee and Park (2014), questionnaire items were constructed using six-point Likert scales. Appendix A present the items deployed for measuring the constructs.

1.1. Dyadic performance

Following previous studies (Oh and al. 2012; Sanders 2005; Wu and al. 2014), dyadic operational performance was operationalized using Subramani (2004) measures. Better access to information in the dyad reduces transaction and production costs, such as automated invoicing and inventory tracking, and translates directly into operational performance (Sanders 2008). In other words, several studies have shown that when an actor (e.g., the customer) demands greater access to information from his/her partner, the effort of the latter is rewarded by higher sales volumes. In addition, according to Subramani (2004), access to accurate information could help partners eliminate order entry errors, or alternatively, access to delivery window information could reduce truck idle time in warehouses around the world. partner. Therefore, each actor could increase its overall profitability thanks to the efficiency gains created using the information made available to it by its partner.

1.2. Informational transparency (IT)

IT refers to understandability and accuracy of the information which are accessible to the partners (Aghhavani-Shajari and Brion 2021). Using Churchill paradigm, in our previous paper, we show that informational transparency as a second order variable which is composed

of three reflexive constructs: information accessibility, accuracy, and understandability. While the two first dimensions reflect the objectivity of shared information, information understandability considers the subjectivity of information and measure in what extend shared information is understandable by partners. As a measure of dyadic information disclosure, this integrative scale supports the observational control suggested by Flyverbom (2016). Thus, we use this IT measure based on a second order construct. After creating the first-order constructs 'information accessibility', 'accuracy' and 'understandability', we used them to reflect the second-order construct 'IT'. The model that measured this proposed construct had a very good fit (X^2/Dll = 1,069 (p = 0.342); RMSEA = 0.026; NFI = 0.922; CFI = 0.994; IFI = 0.995; TLI = 0.993; AIC (132,512<743,605) and ECVI (1.325 < 7,436)).

1.3. Contractual control

The contract between customer and provider represents promises, obligations, rewards and penalties for performing particular actions in the future (Macneil 1978). Srivastava and Teo (2012) point out that a control-based contract includes very precise and specific details. Indeed, the specificity of the contract describes the degree of explicitness of the details specified in the contract to coordinate the relationship between the customer and the supplier (Mooi and Ghosh 2010). The standards specified in the contract serve as benchmarks that the supplier must meet in terms of quality and cost parameters. Thus, we used the measurement scale proposed by Srivastava and Teo (2012) constructed to assess a control-based contract through its specificity on obligations and penalties. The factor analysis of this model is constituted of 5 items, showed a good composite reliability (CR= .928).

1.4. Contractual coordination

Nevertheless, client-supplier relationship is by default uncertain, so it is often impossible for a control-based contract to foresee all the details allowing the actors to adapt to the situation. Thus, some companies are turning to coordination-based contracts that refer to a set of mutual expectations and understandings between business partners. Indeed, unlike the contract based on control which promotes the agency relationship between the partners, the contract based on coordination tries to diminish the agency relationship by promoting collaboration between the partners to deal with changes in their environment (Cao and Lumineau 2015; Lumineau 2017). The particularity of a contract based on coordination is in its flexibility which allows the partners to adjust their behaviors or the terms of the agreement in response to environmental changes and evolutions of needs. Therefore, contractual

coordination was operationalized using Wang and al. (2013) measurement scale. The factor analysis of this model is constituted of 6 items (CR = .898).

1.5. Trust

Trust has long been considered a key element that reduces tensions and conflicts between companies and facilitates the disclosure of information, thus improving coordination and encouraging future transactions (Dwyer and al. 1987; Cho 2006). Trust concerns the behavior that an actor expects from his/her partner (Morgan and Hunt 1994; McKnight and Chervany 2001; Sirdeshmukh and al. 2002). Our analysis of the literature highlights the role of trust as a condition often associated with IT. Therefore, the measurement scale proposed by Cho (2006) is used to assess trust between partners. The factor analysis of this model is constituted of 4 items, (CR = .921).

1.6. Task interdependancy

Task interdependency refers to degree to which changing of a task in an organization modify the tasks of its partner (Thompson 1967). In a low task interdependency, partners need a low amount of information to organize and pre-plan the tasks, while high level task interdependency is required in high volume information context, to stand up with uncertainties. Task interdependency is operationalized by applying Bensaou and Venkatraman (1995) measurement scale. The factor analysis of this model is constituted of 1 item.

1.7. Task complexity

Task complexity measured on the basis of its two dimensions: analysability and variety of the task (Bensaou and Venkatraman 1995; Barua and Mani 2014). Following previous literature (Hoppe and Schramm 2004; Nunez and al. 2009; Caglio and Ditillo 2012; Ditillo and al. 2015), task complexity is measured by using the two items proposed by Bensaou and Venkatraman (1995). The factor analysis of this model is constituted of 2 items (CR = .601).

1.8. Ease of changing partner

Organizations are also seen as vulnerable entities often affected by the uncertainty of its environments (Pfeffer 1977). Bensaou and Venkatraman (1995) emphasize the uncertainty of a member of a dyad about his/her relationship with another member as being an environmental uncertainty. Concretely, when there are several possible partners on the market, the company tries not to invest in specific assets with a single partner to control its independence and to be

able to change partners, to guard against transaction cost rising. Following Cho and al. (2017), we adopt the measurement scale proposed by Gulati and Sytch (2007) which considers the ease of changing partner. The factor analysis of this model is constituted of 2 items (CR = .468).

3. Configurational approach

Fuzzy Set Qualitative Data Analysis (FsQCA) helps to find complex causal (equifinal) configurations compatible with an outcome. According to Fiss (2011), fuzzy set is uniquely suitable for testing a typological and configurational theory. This method thereby differs from conventional, variable-based approaches, as they don't disaggregate cases into independent analytically separated aspects. It treats configurations as different types of cases. Thus, the methodological approach used here sheds new light on numerous causal relationships between the individual perception of some governance mode (contractual, relational and transparency) and an outcome of interest. Hence, outcome variable is operationalized by the individual perception of dyadic operational performance (see Appendix A). It identifies the combinations of attributes associated with the outcome of interest to explain which configurations of governance modes lead to high (vs. low) level of perceived dyadic operational performance. FsQCA uses Boolean algebra algorithms, allowing a logical reduction of numerous and complex causal conditions into a reduced set of configurations that lead to the outcome. Since inter-organizational governance mode calls for complex situations, this method is particularly suited in identifying several combinations (equifinal) of governance mode on perceived dyadic operational performance. According to the causal asymmetry principle for complex system, this method allowed us to compare configurations that explain a growth in perceived dyadic operational performance to those that explain negative performance, which could be different.

3.1. Data calibration

The calibration procedure allows to establish the fuzzy variable. It consists of setting membership scores assigned to a specific case (Schneider and Wagemann 2012). The process of transforming variables used in the FsQCA method requires the specification of full membership in a set of interest (near 1), full non-membership (near 0) and the most important, a crossover point regarding membership (near 0.5). The latter describes the point of indifference where it is impossible to say whether the case is more a member or a non-member of a set. As we highlight in the variable measurement part, all the Likert scale variables have been factorized in their consistent hypothesized construct. According to this type of variable, we

follow Pappas and Woodside (2021) calibration procedure. Table 1 sum up calibration data used for this study.

Table 1 Fuzzy set calibration

		Trust	CPXT*	CONTCTRL*	CONTCOORD*	EPC*	IT*	INDT*	DP*
N		204	204	204	204	204	204	204	204
Mean		-,00003	-,00003	,00000	,00000	,00002	,00000	,00005	,00002
Median		,13800	,12400	,24100	,12500	-,16350	,0696	,14900	,16700
Min		-3,072	-2,137	-3,258	-4,579	-2,728	-3,3125	-3,096	-2,338
Max		1,482	2,581	1,363	1,888	2,269	1,1870	2,221	1,838
Calibration set at:									
Percentiles	25	-,62900	-,90900	-,50725	-,66475	-,64050	-,44228	-,68600	-,66800
	50	,13800	,12400	,24100	,12500	-,16350	,06960	,14900	,16700
	75	,66000	,75300	,58750	,59500	,77275	,31527	,88025	,91900

*: CPXT: Task complexity; CONTCTRL: contractual control; CONTCOORD: contractual coordination; EPC: ease of changing partner; IT: Informational transparency; INDT: task interdependency; DP: dyadic performance

3.2. Fuzzy-set analyses

Our FsQCA exploratory analysis proceeds in three main steps. First, from the conditions and outcome variables transformed into sets, FsQCA algorithm creates a "truth table" with 2^k rows, where k is the number of causal conditions (7 in this study). According to Schneider and Wagemann (2012), the number of causal conditions needs to be limited by the sample size. The authors recommended a sample size greater than three times the number of causal conditions. Second, two conditions help in reducing the number of rows in the truth table algorithm: (1) the minimum number of cases required for a solution to be considered and (2) the minimum raw consistency level for the solution which indicates how closely a perfect subset relation is approximated (Ragin 2008). In the current study, the lowest acceptable raw consistency for the solution follows the recommended threshold of .80 (Greckhamer and al. 2013). Given the size of the sample, the minimum acceptable solution frequency was set at minimum to 4 (Ragin 2008). The estimates of empirical coverage provide information about the relevance of each condition. A coverage index measures the proportion of memberships in the outcome explained by the complete solution. Overall consistency and coverage indices are reported hereafter in sufficient solutions (Table 3).

Third, we report in this table the intermediate solution produced by the FsQCA software in configuration tables and note the presence and absence of governance mechanisms within each configuration. Most of the solutions, especially those of an intermediate size, do not contain instances of all logically possible causal configurations. The truth table (see Appendix B) algorithm uses counterfactual analysis to speculate about the most plausible outcomes of the

combinations that do not exist in the data set. The logically simplest solution is the parsimonious, which contains only those conditions considered as central and takes advantage of all possible simplifying assumptions. This parsimonious "core" solution is contained within an intermediate solution. Thus, the intermediate solution is used to identify the "peripheral" (Fiss 2011) explanatory conditions that could be removed from the solution but only by applying "difficult" counterfactuals.

Parsimonious solutions require to specify the assumptions on which the easy counterfactual analysis will be based (Ragin 2008). Given the nature of our study and type of conditions in the model, no specific assumption was required. In the following results, core conditions are denoted by ● (present) and ⊗ (absent), while contributing conditions are represented by • (present), ⊗ (absent) and blank (don't care).

Our analyses proceeded as follows. We first analyzed the simple and combined necessary conditions of the model. Then, we analyze sufficiency of the governance mechanisms for high dyadic performance. We then further compare these initial findings to the low dyadic performance.

FINDINGS

Configurational approaches based in fuzzy set give rise to two key dimensions of constitutive conditions to explain the outcome: the necessary condition we uncover in the first part of the results, and the sufficient conditions presented in the second part.

4.1. Necessary causal condition

The first step of the result reveals the necessary condition for the set of managers who reported high perceived dyadic performance. In the fuzzy set theory, in a same way that an egg is necessary for cooking an omelet, a condition is necessary if it is required in all high dyadic performance configurations. However, a necessary condition is usually insufficient to produce alone the outcome, excepting when all occurrences of the outcome exhibit the configuration, thus indicates a situation consistent with necessity. One or more conditions (or a combination of them) can be identified as necessary. FsQCA evaluates necessity and sufficiency relations through set-theoretic measures of consistency and coverage (Ragin 2008). For necessity analysis, a consistency of at least .9 is recommended, as is a high coverage measure to indicate that the potential necessary condition is empirically relevant (Ragin 2008). Table 2 exhibit the

consistency and coverage scores to uncover the necessary conditions for high dyadic performance.

Table 2 Consistency and coverage scores of necessary conditions for high dyadic performance

Conditions*	**Consistency**	**Coverage**
CPXT	0.492229	0.284793
~CPXT	0.612893	0.346047
INDT	0.575600	0.337994
~INDT	0.526607	0.293127
EPC	0.542148	0.308229
~EPC	0.563042	0.323478
CONTCTRL	0.765499	0.428402
~CONTCTRL	0.341030	0.199127
CONTCOORD	0.774591	0.425845
~CONTCOORD	0.337359	0.200743
TRUST	0.784369	0.448301
~TRUST	0.324184	0.185264
IT	0.775277	0.426423
~IT	0.334374	0.198865
TRUST+CONTCTRL	0.847501	0.623511
TRUST+TI	0.826208	0.610578
TRUST+EPC	0.868085	0.559189
TRUST+CONTCOORD	0.845676	0.624497
CONTCNRL+IT	0.857641	0.603207
CONTCTRL+CONTCOORD	0.866665	0.604895
TRUST+CONTCTRL+CONTCOORD+IT	**0.945246**	**0.575266**

*: CPXT: Task complexity; CONTCTRL: contractual control; CONTCOORD: contractual coordination; EPC: ease of changing partner; IT: Informational transparency; INDT: task interdependency; DP: dyadic performance.
By convention, " ~ " means the absence of the condition

Consistency and coverage scores reveal no unique necessary condition is require for high dyadic performance. However, according to the suggested role of the three governance mechanisms (contractual, relational, transparency) we test the combination of its four related conditions (Trust; contractual control, contractual coordination, and informational transparency). Table 2 shows that the combination of contractual, relational and IT is necessary for high dyadic performance. Even though this first finding is key to highlight the complementary role of the three governance mechanisms, this combination of necessary conditions is not sufficient alone, other equifinal conditions must be added to produce the result. Therefore, the next part analyses the sufficient causal condition of high (vs. low) dyadic performance (Table 3).

*Table 3 Sufficiency analysis results: configurations for high and low dyadic performance**

Causal conditions	High dyadic performance		Low dyadic performance	
	1	**2**	**1a**	**1b**
Task complexity	□	●	●	●
Task interdependency		●		□
Ease of changing partner	□			□
Contractual control	●	●	□	
Contractual coordination	●	●	□	□
Trust	●	●	□	□
Informational transparency (IT)	●	●	□	□
Raw coverage	0.188	0.139	0.278	0.174
Unique coverage	0.123	0.073	0.130	0.026
Consistency	0.840	0.872	0.881	0.863
Solution coverage	0.262		0.305	
Solution consistency	0.829		0.864	
Number of cases	16	11	20	18

* Note: Black circles indicate the presence of a causal condition, and circles with "⊗" indicate its absence. Large circles indicate core conditions, small ones, illustrate peripheral conditions. Empty, indicate "don't care.".

4.2. Sufficiency *causal condition*

FsQCA assumes that the occurrence of an outcome and its absence may be caused by different conditions (i.e., potential causal asymmetry). Greckhamer and al. (2018) recommend separating explanations for the presence and the absence of the outcome as they potentially require different causal models. Hence, we present first the sufficient configuration for high dyadic performance and the sufficient configuration for low dyadic performance in a second part.

High *dyadic performance sufficient configurations*

In line with Fiss (2011), Table 3 provides a schematic representation of the minimization algorithm of the truth table. Two configurations found to be sufficient for high dyadic performance. As we pointed out in the previous part, the four common conditions of these configurations are the four necessary governance conditions (contractual control, contractual coordination, trust and IT). The presence of three remaining conditions (task complexity and interdependency, and ease of changing partner) depict inter-organizational dyadic context. We present in the next parts these two distinctive configurations, suggesting that combining

contractual, relational and transparency governance modes is conditional to task or partner lock-in.

Configuration 1: partner lock-in

This first configuration is characterized by two core (parsimonious) conditions of firms set with high dyadic performance: the presence of a high level of informational transparency and the difficulty of changing partner (absence of "ease of changing partner"). This suggests that informational transparency request partner lock-in to reach high dyadic performance. Even though, combination of core conditions is considered as central and takes advantage of all possible simplifying assumptions (Fiss 2011), peripheral conditions are also useful to define the configuration, in particular when the core solution generates only one configuration. Considering the three governance mechanisms, the core conditions show that IT is central, even though it may be combined with contractual (controlled and coordinated) and relational (trust) peripheral governance modes. The absence of "task complexity" suggests a context in which shared tasks are somehow simple and probably routinized. Difficulties of changing partners, illustrate a lock-in position of one of the partners of the dyad who probably depends on a single source of business. The inter-organizational context depicted by theses restricted peripheral conditions (partner lock-in based on simple shared tasks) is conducive to informational transparency and trust, but also circumscribed by contract.

Configuration 2: task lock-in

A second equifinal configuration also supports high dyadic performance. Once again, informational transparency is a core condition, associated to task complexity. Hence, this second high-performance configuration is different from the previous one on that point. Peripheral condition like "task interdependency" combined with "task complexity", suggest a task constrained context (Crowston 1997). Following resource dependency theory (Pfeffer and Salancik 1978), Furlotti and Soda (2018) stated that the task that determines collaboration with an organization's hold complementary resources, the task also determines a firm's level of resource dependence and the power of one of the partners. By contrast to the partner lock-in exhibited in the first configuration, this second configuration is constituted by the combination of the three necessary governance mechanisms conditioned by task-resources lock-in.

4.3. Low dyadic performance sufficient configuration

Low dyadic performance configuration give rise to one core solution composed of two peripheral solutions (1a and 1b). Consistent with the causal asymmetry principle of fuzzy set, these two configurations are not exactly the opposite of high-performance configurations, especially regarding contextual conditions (task complexity and difficulties of changing partner). However, one of the core conditions is the absence of informational transparency, combined with almost all the other governance mechanisms (trust and coordination contract, but partially the controlled contract). Ultimately, poor dyadic performance firms exhibit no inter-organizational governance mechanisms (mainly no transparency) combined with task complexity. Considering peripheral conditions in configuration 1b, task complexity is associated with the absence of task interdependency, suggesting no resource dependency, but potential partner lock-in (absence of ease of changing partner). While no specific context clearly differentiate high and low dyadic performance firms sets, presence of governance mechanisms appears to be the main distinctive aspects of high-performance firms.

DISCUSSION AND CONCLUSION

In this study, we advance the interorganizational governance and IT literature with three important contributions. First, in line with IT literature (Lamming and al. 2004; Albu and Flyverbom 2019) we show empirically that IT in interorganizational dyadic relations is a situated and paradoxical phenomenon. Second, according to its paradoxical nature, IT can be considered as an effective governance mechanism, not just for its own observational control properties, but rather for the widespread use of complementary control mechanisms contingent to the interorganizational context. Third, combined with previous complementary governance mechanisms (contractual and relational), we demonstrate that the IT is necessary but not sufficient for high dyadic performance in interorganizational relations. Hence, we extend previous interorganizational governance research, showing that informational transparency needs to be combined with additional control mechanisms, not only derived from governance modes but also from situational constrained interorganizational conditions.

Albu and Flyverbom (2019) stated that IT is sometimes paradoxical phenomenon. According to the principal-agent game theory, absence of information asymmetry between the principal and his/her subordinate should provide better behaviors. This observational control

(Flyverbom and al. 2015) devoted to transparency is also highlighted by Berglund (2014). The latter suggests that in organizational situation with high or complete transparency no corporate governance mechanisms would be required (Berglund 2014). To our knowledge, our study is the first to test empirically this previous assertion. Thus, our results reveal that high-level observational property of IT is insufficient to provide alone dyadic performance. In a same way, IT is not a necessary condition of this efficiency either. Paradoxically, configurations show that high level of information disclosure is a core condition of dyadic performance only if it is associated with additional strong control mechanism, depending on partner lock-in (configuration 1) or task lock-in (configuration 2). This "*disclosure under control phenomenon*" is consistent with transparency-power nexus suggested by Flyverbom and al. (2015: 392) who define transparency as "a social process of managing what is visible and present—as well as invisible and absent—a process that produces multiple and extensive kinds of control and ordering".

In line with these authors, the two high performance configurations highlight, not only the key role of observational control of the IT, but also the presence of peripheral extensive control mechanism, suggesting clearly that transparency is a conditional interorganizational governance mechanism, just like formal contract and trust.

The necessary complementarity of contractual and relational governance mechanisms confirms the previous results of interorganizational literature (Poppo and Zenger 2002; Lumineau 2017; Roehrich and al. 2020; Aben and al. 2021). However, our results go a step further showing that observational property of IT is also necessary to complement the previous governance mechanisms. As IT is a core condition of all high-performance configurations, its complementarity with the two others necessary conventional governance mechanisms suggests that it would probably be key dimensions of governance missing to the previous research. The ultimate contribution to this stream of research stems from the identification of specific dependance context linked to the necessary presence of contractual, relational and transparency governance mechanisms. Configurations 1 and 2 clearly reveal presence of respectively partners and task dependency. In the configuration 1, stability of task and partner dependency suggest a long lasting inter-organizational relationship in which the combination of the three necessary governance modes take place. The task or resource dependency highlighted in the configuration 2 also demonstrate the prevalence of the power of one of the partners in the dyadic relation. In line with Albu and Flyverbom (2019) transparency is not restricted to its visible face, operationalized by observational control in the IT variable, but is also associated with less visible power mechanisms and probably resulted from multiple negotiations cycles inherent to

transparency practices.

This study provides a clear understanding of the area in which the managers should focus on, to implement IT in their dyadic relationships. By specifying the two high dyadic performance configurations, manager could apply these options to cope with their changing environments by balancing the relationship between different governance mechanisms. However, the low dyadic performance configuration invites mangers to avoid development of IT in absence of other governance mechanism. Since, IT is interdependent to other dyadic conditions, our study suggests to managers that IT is going beyond providing simply an amount of information to a partner. In other words, decision of producing more/less IT in interorganizational relationship can also change the existing form of power in dyad which should be controlled.

Previous literature has shown that certain modes of governance had to predate others to be combined. For example, the presence of a contract can form a basis for the development of trust in the second stage (Cao and Lumineau 2015; Roehrich and al. 2020; Akkermans and al. 2004). However, FsQCA is a static approach which does not capture the respective influence of each mode of governance. We encourage future research using dynamic configurational tools such as temporal QCA, to investigate whether the contractual or relational mechanisms are prerequisites for transparency governance, or vice-versa.

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Appendix A

To what extent do you agree with the following statements **(**Strongly disagree/ Disagree/ More or less disagree/ More or less agree/ Agree/ Strongly agree)

Informational transparency (Aghhavani-Shajari and Brion 2021)

Information precision

- The information exchanged is complete.
- The information exchanged is accurate.
- The information exchanged is reliable.
- The information exchanged is adequate.
- The information exchanged is appropriate.

Information accessibility

- It is expected that a party will provide proprietary information if it can help the other party.
- It is expected that we keep each other informed about events or changes that may affect the other party.
- It is expected that any information that might help the other party will be provided to them.

Information understandability

- The information is presented in a language I understand.
- The information is easy to read or to be listened to.
- The information is clear.
- The information is comprehendible.
  The information is understandable.

Trust (Cho 2006)

- This partner will promote our company's benefits as well as its own.
- This partner will operate its business in a highly dependable and reliable manner.
- This partner will be responsible and reliable in conducting its business with us.
- This partner will not engage in any kinds of exploitive and damaging behavior to our company.

Task interdependency and complexity (Bensaou and Venkatraman, 1995)

- To perform a task with the partner, the different sequences and steps to follow are known and specified in advance.
- To carry out our activity, we depend on the tasks of our partner.
- The number of exceptions or the frequency of unanticipated events force us to constantly change the methods or procedures to perform our common task.

Contractual control (Srivastava and Teo, 2012)

- The contract is a comprehensive document in which key exigencies had already been taken care of. - The contract details the tasks, obligations and rewards of each part. - The contract specifies the penalties to which the partner firm is liable in the event of non-performance. - The contract clearly specifies the key service-level agreements. - The contract meticulously covers the important aspects of our business relationship with the partner.
Contractual coordination (Wang, Tai and Grover, 2013) - We attempt to achieve compromises when conflicts arise. - We respond flexibly to each other's requests. - We resolve together properly and satisfactorily unexpected problems. - We adjust mutually the contract in response to environmental changes. - We find alternative ways instead of sticking to original agreements to deal with unexpected problems. - We deal flexibly with problems which are hard to attribute a unique responsibility.
Ease of changing partner (Gulati and Sytch, 2007) - It would require much trouble and expense for our company to switch to a new partner. - Our company is capable of switching to a new partner and can discontinue the relationship with the existing partner, without any delay in work process.
Dyadic operational performance (Subramani 2004) To what extent do you agree with the following statements **(**Very low level or none of this benefit/ Low level of this benefit/ Rather low level of this benefit/ Rather high level of this benefit/ High level of this benefit/ Very high level of this benefit) - Cost efficiencies from higher sales volumes - Improvements to current processes or creation of new processes - Increased profitability

Appendix B

Truth table

Trust	FLXT	INDT	CONTCTRL	CONTCOORD	EPC	IT	number	DP	raw consist.	PRI consist.	SYM consist
1	0	0	1	1	0	1	9	1	0.916513	0.863382	0.876392
1	1	1	1	1	0	1	6	1	0.901066	0.836322	0.848343
1	1	1	1	1	1	1	5	1	0.897024	0.819933	0.828981
1	0	1	1	1	0	1	7	1	0.815203	0.702903	0.710096
1	0	1	1	1	1	0	4	0	0.793229	0.624586	0.624586
0	1	0	1	0	0	0	5	0	0.70668	0.328234	0.34503
1	0	1	1	1	1	1	7	0	0.684773	0.543935	0.551443
0	1	1	0	0	0	0	6	0	0.624282	0.122511	0.125499
0	1	0	0	0	0	0	13	0	0.607053	0.143036	0.156011
0	1	1	0	0	1	0	4	0	0.501931	0.142641	0.142641
0	1	0	0	0	1	0	9	0	0.479242	0.0639913	0.0639913