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For a contingent approach of conflict resolution mechanisms: the case of innovation networks

ST-AIMS 3: Coopetition, Ecosystems, Networks and Alliances

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Abstract: Previous researches on interorganizational relations show contradictory findings on the link between conflict and members satisfaction. While recent literature sketches some insight to refine the influence of different type of conflicts, resolution mechanisms that overcome these conflicts remains less studied. Our research proposes that conflict resolution mechanisms moderate hub firm satisfaction, depending on the type of conflict. Study of 173 innovation networks hub’s firms demonstrate contingent relationships between type of conflict and resolution mechanisms on hub firm satisfaction. The expected negative effect of task conflict on hub firm satisfaction is positively moderate by soft resolution mechanisms (discussion and soft pressure), and the degradation caused by the relational conflicts on the hub firm satisfaction is compensate by the hard conflict resolution mechanism (mediation and court). These results shed new light on how to mitigate conflicts in the context of innovation, prone to discordances. Theoretically, this research paves the way for a joint consideration of literature on conflict types and literature on resolution mechanisms that are typically treated separately.

Keywords: innovation networks, interorganizational conflicts, resolution mechanisms
INTRODUCTION

Conflict is an inherent and important part of interorganizational relations, as evidenced by the important body of research that has examined it (Frechet et al., 2011; Lumineau et al., 2015). Much of this attention is due to the potentially destructive effects of conflicts on the interorganizational relations (Oliveira and Lumineau, 2018). These conflicts can induce cooperation costs that are related to communicating with the partner, monitoring the contract fulfillment, and enforcing sanctions on the partner if the contractual obligations are not fulfilled (White and Siu-Yun Lui, 2005). To minimize this negative effect on conflict, partners implement conflict resolution mechanisms.

Many scholars and managers consider a focus on innovation to be a critical strategy in order for firms to stay competitive (Ahuja, 2000). For SMEs, it can be quite difficult to control all parts of the innovation process because of a need for many different types of resources and competencies (Dhanaraj and Parkhe, 2006). For this reason, many SMEs rely on networks to improve their ability to innovate. According to this perspective, SMEs form linkages to obtain access to needed assets, learn new skills, and manage their dependence upon other firms. In general, SMEs face many challenges (Gardet and Mothe, 2011). We chose to focus on SMEs hub firm in innovation network for two main reasons. First, the centrality of a hub firm is often associated with power and influence in a network (Krackhardt, 1990), and at the same time, SMEs are often considered in a situation of dependence so it can be a source of conflict. Thus, it would be interesting to see which conflict resolution mechanisms the SME implement and their impact on the project bearer’s satisfaction. Second, the growing importance of innovation for competitive success makes this concept an important research topic. Innovation networks typically involve high levels of transactional uncertainty and exchanges of tacit knowledge. Those issues demand coordination between the different actors and there is more pressure on the hub firm to develop the project and extract value from it (Ahuja, 2000; Dhanaraj and Parkhe, 2006). By developing innovation networks in order to create maximum profit and success, hub firms are often confronted with conflict. This conflict is derived from inconsistencies and disagreements from different partners who have contrasting or opposing objectives. The relevant literature can be broken down into two principal parts. The first line of research is concerned with the origins and corresponding foundations of conflict (Alter, 1990; Jehn and Mannix, 2001; Frechet, 2002). By implementing contractual theories, Fréchet (2002) aimed to identify the factors that influence initial beginnings of conflict within innovation networks.
From the cognitive point of view, conflict is found worldwide due to a lack of harmony within a relationship (Alter, 1990). Similarly, it seems that conflict arrives as soon as the involved parties demonstrate incompatible desires (Jehn and Mannix, 2001). The second line of research is concerned with the impact conflict and its corresponding resolution mechanisms have on an organisation’s success (Mohr and Spekman, 1994; Iniesta, 1999; Tuten and Urban, 2001). Inestia (1999) considers conflict to be harmful towards alliance networks as it leads to profit diminution and in the worst-case scenario, the discontinuation of the partnership.

Our study serves as conceptual augmentation of previous existing literature on interorganizational relationships and conflicts (type and mechanisms to resolve them). First, the focal point of our study is to propose that the two main types of interorganizational conflicts (task and relationship) and mechanisms to resolve them play a role on hub firm satisfaction. Despite the extensive attention that has been devoted to the use of coordination mechanisms in interorganizational networks, literature remains unclear on the way to resolve conflict in the network. The two main coordination mechanisms studied in the literature are trust and contracts (Lumineau et al., 2015). Moreover, existing research has typically studied the roles of task conflicts and relationship conflicts in group (Breugst and Shepherd, 2017; De Dreu and Weingart, 2003; De Wit, Greer, and Jehn, 2012), whereas our model suggests to integrate the role of conflict resolution mechanism to explain the impact on satisfaction.

A major gap addressed in this paper concerns the study of conflicts and conflict resolution mechanisms implemented by SME’s hub firm. Because of interdependency, incentive misalignment, and dynamic business environments, conflicts are frequent in interorganizational relationship. However, if an expansive body of research studies conflicts between individuals and within teams, little research has been done on interorganizational conflict (IOC) (Lumineau et al., 2015). Furthermore, the management of IOC needs to speak to the types of repair actions undertaken to resolve a conflict. Few organization studies have focused on conflict resolution mechanism, which is a specific coordination mechanism. In particular, the literature in organization studies has not directly considered the influence of the type of conflict and the mechanisms used on the hub firm satisfaction. Some authors show the influence of conflict resolution mechanisms on partnership success (Mohr and Spekman, 1994). This literature partially demonstrates that hard resolution mechanisms, like coercion, domination or third part arbitration have a negative impact on alliance satisfaction while soft resolution mechanisms produce high level of satisfaction. However, this research does not take into account which conflict types are behind these resolution mechanisms. Our aim is to help bridge this gap.
The remainder of the paper is organized as follows. The first part consists of a literature review regarding conflict resolution mechanisms, primarily reviewing interorganisational relations. The second part describes the adopted methodology. The results are presented in the third part with a discussion of the impact of type of conflict on hub firm satisfaction according to the conflict resolution mechanisms.

THEORY AND HYPOTHESES

For instance, most research on conflict and resolution mechanisms are based on interpersonal or on team level but rarely on interorganizational level. However, conflict resolution mechanisms used differ according to the level of analysis. An individual conflict can be directly resolved by the people involved. While in case of interorganizational relationships, conflict resolution often involves multiple decision makers within each organization due to multi-point relationships. Thereby, multiple decision makers lead to more complex conflict management (Lumineau et al., 2015). In innovation networks, partners have their own individual interests that are not necessarily congruent with their partners’ (Das and Teng, 2002). Conflicts often arise in interorganizational relations due to the inherent uncertainty and interdependencies between parts (Mohr and Spekman, 1994). Conflicts erode trust and reduce employee satisfaction, preventing the latter from carrying out the innovation project on time and undermining their level of commitment to the relationship (Cullen et al., 1995). These phenomena are often emotionally charged and their complexity is difficult to grasp by contractual theories which propose two main conflict resolution methods: revocation (exit) or court (Conlon and Sullivan, 1999). Prior researches on TCE, study conflict resolution mechanisms through contractual clauses. According to this approach, contract defined what is allowed and what is not in the exchange and imposing penalties in cases of non-compliance (Lumineau and Malhotra, 2011).

Moreover, legal scholars have showed that uncertainty about legal standards in contracts increases the number of cases filed with the court. However, they do not explain the link between litigation and features of interorganizational relationship, which is the issue of most interest to organizational scholars (Lumineau and Oxley, 2012).

We define conflict as “the process which begins when one party perceives that another has frustrated, or is about to frustrate, some concern of his” (Thomas, 1992: 265). Conflict refers to the degree of divergence in partners' preferences, interests, and practices. Das and Teng (2002) underlined the importance of taking this dimension into account when analysing how cooperation agreements work and how they are coordinated. Moreover, the literature on
interorganizational governance (contractual and relational governance) is lacking a broad and systematic assessment of conflict type as it applies to interorganizational relationship and a better understanding of how to resolve these different types of conflict (Lumineau et al., 2015).

**Heterogeneous types of conflicts in interorganizational relations**

Conflicts may arise for several reasons, and this will affect the cooperation in different ways. In this context, Jehn and Mannix (2001) distinguish three types of conflicts: (1) task conflict: disagreements over which activities and tasks should be performed; (2) process conflict: who should perform given tasks; and (3) relationship conflict: tension and emotional conflict between partners. The conflict process deals with different steps that help alleviate disagreement and problems within interorganizational networks. To study this type of conflict, it is necessary to adopt a processual approach. Our research analyzes the influence of conflict types and resolution mechanisms on satisfaction *ex post*. That is why we do not consider the conflict process on our research. Moreover, Das and Teng (2002) identify three principal categories of inter-partner conflicts: (1) conflicts related to very different routines, technologies, decision-making styles; (2) conflicts related to opportunist behaviour and incompatible private interest; (3) exogenous conflicts link to a fierce competitor. The last type is not taken into account in this research, which focuses on conflicts and their mechanisms within innovation networks.

Some others authors (Breugst and Shepherd, 2017; De Dreu and Weingart, 2003; De Wit et al. 2012) examine team conflict and distinguish two types of conflict: (1) relationship conflict: disagreements among group members about interpersonal issues, such as personality differences or differences in norms and values. It is similar to affective conflict (Amason, 1996) and represent an awareness of interpersonal incompatibilities and disagreement about interpersonal issues among partners; (2) task conflict: disagreements among group members about the content and outcomes of the task being performed. It is also called cognitive conflict (Amason, 1996) and represents differences in ideas, viewpoints and opinions with partners and disagreement about the content and outcomes of the innovation project. Table 1 summarizes the main types of conflicts identified in the literature.
<table>
<thead>
<tr>
<th>Authors</th>
<th>Types of conflict</th>
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| Breugst and Shepherd (2017)                  | ▪ **relationship conflict:** disagreements among group members about interpersonal issues, such as personality differences or differences in norms and values  
▪ **task conflict:** disagreements among group members about the content and outcomes of the task being performed                                                                                       |
| De Dreu and Weingart (2003)                  | ▪ conflicts related to very different routines, technologies, decision-making styles  
▪ conflicts related to opportunistic behavior and incompatible private interest  
▪ Exogenous conflicts link to a fierce competitor.                                                                                                                                                       |
| De Wit, Greer, and Jehn (2012)               | ▪ **task conflict:** disagreements over which activities and tasks should be performed  
▪ **process conflict:** an awareness of disagreement among group members about aspects of how task accomplishment will proceed  
▪ **relationship conflict:** tension and emotional conflict between partners                                                                                                                                  |
| Das and Teng (2002)                          | ▪ **task conflict:** disagreements over which activities and tasks should be performed  
▪ **process conflict:** an awareness of disagreement among group members about aspects of how task accomplishment will proceed  
▪ **relationship conflict:** tension and emotional conflict between partners                                                                                                                                 |
| Jehn and Mannix (2001)                       | ▪ **task conflict:** disagreements over which activities and tasks should be performed  
▪ **process conflict:** an awareness of disagreement among group members about aspects of how task accomplishment will proceed  
▪ **relationship conflict:** tension and emotional conflict between partners                                                                                                                                 |

Table 1. Main types of conflict in the literature

Previous research on the consequences of these types of conflict has focused on team and venture outcomes (Breugst and Shepherd, 2017), but organizational consequences and the impact of conflict resolution mechanisms used have not been sufficiently addressed. Few studies distinguish explicitly between these different conflicts types (Christoffersen, 2013: 74). Researcher implicitly refer to task and process conflicts by referring to disagreements over functional areas (Ding, 1997). The measures used to reflect these conflicts include the frequency of disagreement in various functional areas and goals attainment. For relationship conflict researchers referring to negative effect on trust and the items used are related to cultural misunderstandings, inter-partner distrust and personality conflicts (Steensma and Lyles, 2000; Christoffersen, 2013).

Since, in this research we try to focus on the effect of the two main conflict types for the innovation context, where risks and uncertainty is potentially high, thus call for specific types of conflict. In this context, two types of conflict have been identified task performance conflict and relational appropriation conflict. This distinction refers to the risk typology proposed by Das and Teng (1996). Here, the conflict is a consequence of the risk. These two conflict types are conceptually independent of each other because they arise from two different kinds of sources. While relational appropriation conflict finds its foundation in conscious intentions of the innovation partner, task performance conflict arises either in the environment or in the capabilities of the partner (Das and Teng, 1996). Task performance conflict (or realisation conflict) is considered as the probability and consequences of not achieving the goals in a relationship, given good intentions and efforts of the partner. In this case, the essence of conflict doesn’t necessarily depend on the efforts of the partners. In innovation project, the results are unpredictable because the development and commercialization of new products belong to an
exploration process. In this conflict type, all partners cooperate fully but conflict appears due to the impossibility for the partner to respect his initial commitment. As to relational appropriation conflict, it addresses the fact that the partners do not fully commit themselves to the innovation project. This conflict type arises when private interests and opportunistic behavior are at stake. Partners may have incompatible goals that encourage them to maximize their private benefits without furthering common benefits. Moreover, they may adopt opportunistic behaviors in order to appropriate others’ tacit knowledge (Das and Teng, 2002). According to Williamson (1985: 6) opportunism is defined as “self-interest seeking with guile. This includes but is scarcely limited to more blatant forms, such as lying, stealing, and cheating [...] More generally, opportunism refers to the incomplete or distorted disclosure of information, especially to calculated efforts to mislead, distort, disguise, obfuscate, or otherwise confuse”. Even though a formal contract exists, firms often fail to seek legal penalties when conflicts of affective nature arise (Lee and Cavusgil, 2006). Moreover, interorganizational trust will decrease when one of the partners displays dysfunctional behavior (Lusch and Brown, 1996).

**Effect of conflicts on satisfaction**

In the literature, conflict can have negative or positive impact on the performance and satisfaction. Indeed, in an innovation network, the conflict can make better decisions than those that do not, knowing that conflicts can encourage greater cognitive understanding of the issue being discussed. The effect of task conflict has been found at both the individual level (e.g. Amason, 1996) and the group level (e.g. Schweiger et al., 1986; Simons and Peterson, 2000). Some studies show that conflict may increase creativity and job quality in a group (e.g., Amason, 1996), and improve organizational effectiveness and development (Guerra, Martinez, Munduate and Medina, 2005), while others research pointed out a negative effect on satisfaction (De Dreu and Weingart, 2003).

In line with this stream of research, time to market is key in innovation projects and conflicts slow down the process. In innovation networks the output is uncertain and it is very difficult to define *ex ante* the way to share the potential results (which can be new patent, tacit knowledge and so on). It can also be difficult to be sure that the partner we selected has the competences to do the job. So, the emergence of performance conflict can appear and will slow the progress of the project.

This can be stated more formally by the following hypothesis:
Hypothesis 1a: The occurrence of task conflicts will decrease the hub firm satisfaction.

Firms committed in innovation network are motivated to engage in joint problem solving and integrative outcomes satisfy more fully the needs and concerns of both parties (Thomas, 1992). When parties engage in joint problem solving, a mutually satisfactory solution may be reached, thereby enhancing partnership success. Partners often attempt to persuade each other to adopt particular solutions when several alternatives solutions are at stake. Conflict can also arise when a partner tries to impose is solution or decides to adopt an opportunist behavior. In this situation, the conflict will probably have a negative impact on the satisfaction and performance of the project. Conflict can contribute to interorganizational failure (Steensma and Lyles, 2000). It reduces the level of trust between partners and eventually impedes knowledge transfer (e.g. Tsang et al. 2004). Tsang et al. (2004) verify empirically that intensity of conflict reduces knowledge transfer (Meier, 2011: 13). Indeed, in this situation the partner will limit information exchange and group members will spend their time and energy focusing on each other rather than on the innovation project. Thus,

Hypothesis 1b: The occurrence of relational conflicts will decrease the hub firm satisfaction.

Interplay between resolution mechanisms and conflict

Conflict often exists in inter organizational relationships due to the inherent interdependencies between parties. Given that a certain amount of conflict is expected, an understanding of how such conflict is resolved is important (Borys and Jemison, 1989). How partners manage conflict in the relationship is a central question (Meier, 2011: 13). Kale et al. (2000) analyze joint conflict management processes and find evidence for a positive effect on both the level of trust between alliance partners and the transfer of knowledge. As such, joint conflict management seems to work as a trust-building mechanism and as a knowledge transfer practice in its own right. Berdrav and Lane (2003) and Collins and Hitt (2006) confirm these findings: firms that frequently engage in partner interaction, which in turn is characterized by a high level of communication quality and perceived fairness in the resolution of conflicts, are found to transfer more knowledge within alliances (Meier, 2011: 13). However, the impact of conflict resolution on the relationship can be productive or destructive (Deutsch, 1969; Mohr and Spekman, 1994; Kale et al., 2000). The use of destructive conflict resolution techniques (e.g., domination, confrontation) are seen as counter-productive and are not considering in this paper. The way in which conflicts are resolved has implications for partnership success and the outcome of the innovation project and we try to understand how. When parties engage in joint problem solving, a mutually satisfactory solution may be reached, thereby enhancing partnership success. We
distinguish three main categories of conflict resolution: discussion, pressure and harder mechanisms like exit of the partner or recourse to a third party (referee or court) (Mohr and Spekman, 1994).

Discussion can enable the parties to resolve conflicts based on open communication and a preference for non-opportunistic, win-win solutions (Kale et al., 2000; Hoetker and Mellewigt, 2009: 1028). Cooperative efforts are associated with effective conflict resolution, harmonious relationships, and better performance in dynamic organizational environments, such as that of innovation, and environments in which conflict is discussed face-to-face (Norton, Parry, and Song 1994). Strong communication between partners appears as a key element of successful conflict resolution (Cummings, 1984). Previous research (Kale et al. 2000) also acknowledge the importance of honest and open lines of communication to the continued growth of close ties and resolution of conflict situations. “Besides communication, readiness to engage in joint problem solving and a mutual concern for ‘win–win’ outcomes will often produce mutually satisfactory solutions. Joint problem-solving fosters closer collaboration between the alliance partners, thereby creating a more conducive environment for future cooperation” (Kale et al., 2000: 223). In the same vein, De Dreu and Weingart (2003) point out that task conflicts can be overcome when the conflict is managed with high levels of openness, psychological safety, and within-team trust. The literature also shows that partners can also persuade each other to adopt particular solutions to the conflict situation. (Mohr and Spekman, 1994). These persuasive attempts will generally be more constructive than the use of coercion or domination (Deutsch, 1969). In this situation, one of the parties tries to persuade the other members that solution A or B represents the best way to emerge from a conflict situation. However, persuasion does not 'fit' with the more proactive tone of a partnership in which problems of one party become problems affecting both parties. As a result, smoothing or avoiding fails to go to the root cause of the conflict and tends to undermine the partnership's goal of mutual gain (Mohr et Spekman, 1994: 139). Thus, we posit:

Hypothesis 2a: In case of task conflict, “soft conflict” resolution mechanisms based on discussion and/or persuasion, increase the hub firm relationship satisfaction.

On the other hand, the partner can adopt “hard” conflict resolution mechanisms (exit of the partner or recourse to a third party: referee or court). The literature often views as destructive conflict resolution techniques (Deutsch, 1969; Morh and Spekman, 1994), and portraying a ‘win–lose’ perspective are seen as counterproductive and are likely to strain the fabric of the partnership (Kale et al., 2000). In innovation networks, discussion and pressure can harm the project by creating delays and frustration if there are several conflicts. In this case, the partner
displays minimal commitment and acts opportunistically, the hub firm generally prefers exit by the member, because it can select another partner (Dhanaraj and Parkhe, 2006). This sanction is faster than engaging in lengthy discussions, which could affect the project’s progress. Replacing a member also is no more expensive than rebuilding a relation destroyed by treachery. Use third parties to interorganizational innovation project can help partner firms to achieve the success of their project (Zhang and Li, 2012). As relational conflict tends to be interpersonal and emotional, thus more likely to elicit a negative affective response than task conflict, third parties are well-positioned to play a mediation role that may positively affect relations in interorganisational network (Bocquet et al., 2016; Zhang and Li, 2012). Third parties lie on restricting potential free-riding behaviors or intellectual property misappropriation, as so, mitigate opportunism (Duplat and Lumineau, 2015). Thus, we propose the following:

**Hypothesis 2b: In case of relational conflict, “hard” conflict resolution techniques based on pressure increase, exit of a partner or court, increase the hub firm satisfaction.**

With figure 1 (below) we summarise the theoretical model. It serves as an organizing framework the subsequent testing of hypotheses.

![Figure 1. Conceptual model](image)

**DATA AND METHODS**

**Sampling and data collection procedures.** We focus on small and medium-sized enterprises (SMEs) for several reasons. SMEs often form links to obtain access to required assets and learn new skills (Powell et al., 1996). By taking a central role, the hub firm gains power and influence in the network (Dhanaraj and Parkhe, 2006), so the study of its dependence relationships becomes particularly interesting, especially for SMEs. Moreover, innovation networks typically involve high levels of transactional uncertainty and exchanges of tacit knowledge, such that
coordination among actors is necessary and difficult. Finally, size asymmetry (e.g. small hub firm and large partners) tends to affect the management of alliance relations and the coordination mechanisms implemented (Gardet and Mothe, 2011). To help the data collection, we signed a partnership with BPI France and EUREKA\(^1\) and they gave an access to their database of innovative project bearer, which has finished their project. We collected data from all sector and we focused on the project bearer (we did not interview their partners). In the first stage, the variables from the model have been operationalized through scales that have been validated in previous research and applied of the context of our research. Moreover, we have pre-tested the questionnaire by 25 hub firms. The initial sample consisted of 967 innovation project bearers of project developed with at least two partners. We have chosen to administrate it by phone for several reasons. On the one hand, we could control respondents selected and asked systematically to address ourselves to the person who was most involved in the project. On the other hand, we received a budget from a business club and so we were able to paid assistants for each questionnaire fully completed (that explain why we do not have nonresponse bias). After four months, we obtained 173 valid responses. This high response rate (near 18\%) can be explained by the institutional credibility of our partnership.

**Dependent and independent variables**

Tentative measures were either developed or adopted from the literature. Then we have tested for content validity with 25 project bearers. Through an iterative process of linking the theory with empirically derived concepts, the measures were enriched and refined (see Appendix 1: table of measures).

*Dependent variables*

**Hub’s firm satisfaction.** According to Brock and Barclay (1997) and Mohr and Spekman (1994), hub’s firm satisfaction is measured through time items based on five point scales. It is asked to the project bearer to what extend did he agree with the following propositions: 1. Overall, members are both quite satisfied with our working relationship; 2. Compared to other working relationships I've known or heard about, the one I have experienced here is quite good; 3. If tomorrow you were asked to participate in a project with the same members, you would agree to collaborate.

*Independent variables*

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\(^1\) BPI France is a public investment bank whose mission is to support the competitiveness of French companies. An important part of its activities is support for innovation.
Conflict types. We adapted the conceptual framework of Das and Teng (1996; 2002) used for the risky context of innovation. Task performance conflict and relational appropriation conflict are each operationalized with two binary items. It is asked if project bearer encountered task performance conflict during the project, as follow: “Minimum involvement of one of the project members considering their initial commitments”; and, “Work and results produced are minimized compared to initial commitments”. In the same way, relational appropriation conflict is measured by the two following items: “Results appropriation problem” and “Problem of capturing know-how or strategic information”.

Conflict resolution mechanisms. We followed Mohr and Spekman (1994) to select mechanisms that likely describe multilateral relations in innovation networks. The authors highlight two main type of resolution mechanisms: constructive and destructive resolution mechanisms. Like the authors, we built a soft resolution mechanism reflective construct (ie. Constructive resolution mechanism) with two five points scale variables, as following: joint resolution of a problem, such that the parties agree to work together to find a mutual solution; parties ignore conflict. Hard resolution mechanisms, that is to say destructive resolution mechanisms, have been formalized by a reflective construct composed by the following two items: parties either used power or threats to resolve conflict; parties went to a court to resolve the disagreement

Control variables. We carefully selected control variables that are relevant for theory-based reasons. First, as hub firm size tends to intensify the bargaining-power differential (Dhanaraj and Parkhe, 2006), we included hub firm size difference. This variable is measured by the number of full time employees.

Second, we controlled for the network size by the number of partners. The networks can be rather large in size (there are networks that comprise up to 30 member firms) or small (at least 3 partners). For Thorgren et al. (2009) size of the network can predict the level of innovative performance and number of conflicts may be higher.

Since type of innovation impacts the team’s environment and also the networks structure interaction, consistent with previous research (Lamming et al., 2000), we differentiated between services-based innovation (coded as 1) and product-based innovation (coded as 2) and process-based innovation (coded 3).

Common Method Bias. Following Podsakoff et al. (2003), we conduct several procedural remedies to address potential method bias. First, we protected the respondents’ identities to avoid socially desirable responses. Second, the format and wording of the questions used for
the dependent and independent variables differed. Third, the questions related to conflicts and hub firm satisfaction were not asked in the same phases of the questionnaire. Finally, structural equation modelling allowed us to proceed to multiple-method-common-factors approach (cf. the results below).

**RESULTS**

To analyse the results, we used partial least squares structural equation modelling. This method is particularly suitable for phenomena that are rarely studied (Hair et al., 2011). The PLS method is based on the prediction of the explained variables and aims to maximize the explained variance (Chin and Dibbern, 2010).

**Reliability and validity of measures**

The external structural model enables to test the validity of the measures. This test led to the suppression of reflective indicators that are not sufficiently correlated with their reference variable. Every indicator should have a standardized loading that exceeds the minimum threshold of .5. In addition, we tested the significance of these correlations with the bootstrap resampling method. We then checked the internal consistency using the composite reliability index. Composite reliability index prevails over Cronbach’s alpha in PLS models (Chin and Dibbern, 2010). The value of these indices is satisfactory when it is greater than .6 (Esposito Vinzi and Russolillo, 2010). We assessed convergent validity in terms of the average latent variable variance extracted, which must be at least 50 percent (Table 2). We used the factor loadings and cross-loadings to examine discriminant validity, which requires the items to load strongly on their theoretically assigned factors, not on other factors in the model. Appendix 2 shows that all the constructs had loadings above .6. In support of discriminant validity, table 3 reveals that the square root of the AVE for any given construct was greater than the correlation between that construct and any other constructs in the analysis. Thus, we have evidence of adequate construct validity and reliability. Average full collinearity variance inflated factor (1.419) is far from the maximum acceptable value (3) then indicate lack of pathological collinearity, and the model can be considered free of common method bias (Kock and Lynn, 2012).

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Composite Reliability</th>
<th>AVE</th>
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<tbody>
<tr>
<td>Task conflict</td>
<td>.884</td>
<td>.791</td>
</tr>
</tbody>
</table>
To test the effects and statistical significance of the structural model, we used a bootstrapping 999 resamples procedure. Table 4 and figure 2 show the results. The $R^2$ value of hub firm alliance satisfaction is relatively high (.459), showing the high weight of the conflict in interorganization satisfaction.

In addition, the $Q^2$ indices attest to the reliability of the structural model. We note that the $Q^2$ index for hub firm satisfaction ($Q^2 = .465$) is different from zero. Associated with a large GoF (.458), the model offers good predictive reliability.
<table>
<thead>
<tr>
<th>Type of conflict</th>
<th>β</th>
<th>p</th>
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<tbody>
<tr>
<td>Task conflict</td>
<td>-.235***</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Relational conflict</td>
<td>-.369***</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
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<tr>
<td>Innovation type</td>
<td>-.107 ns.</td>
<td></td>
</tr>
<tr>
<td>Project bearer size</td>
<td>.076</td>
<td></td>
</tr>
<tr>
<td>Network size</td>
<td>.074</td>
<td></td>
</tr>
</tbody>
</table>

Notes: In line with Cohen (1988), all the effect sizes ($f^2$) of the significant paths in our model indicate a score higher than the minimum threshold ($f^2 > .02$).

**Table 4. PLS results**

**Direct effects**

As it was hypothesized, task conflict affects negatively the hub firm satisfaction in the sample ($\beta = -.235, p < .001$) and give some support to H1a. In the same way, relational conflict decreases hub firm satisfaction ($\beta = -.369, p < .001$) thus, supporting H1b. Soft conflicts resolution mechanisms does not affect the hub firm satisfaction ($\beta = .026, n.s$) while hard conflicts resolution mechanisms exert strong negative effect on satisfaction ($\beta = -.338, p < .001$). None of the control variables exerts an effect on the hub firm satisfaction of the relations.

**Indirect moderating effects**

Regarding the moderating role of soft resolution mechanisms, when the level of task conflict increases, the hub firm satisfaction increase ($\beta = 0.120, p < .05$), thus supporting H2a. Symmetrically, as it is hypothesized in H2b, hard conflict resolution mechanism influences positively the relationship between the relational conflicts and the hub firm satisfaction ($\beta = .342, p < .001$).

**Figure 2. Results of the model**
DISCUSSION

The picture that emerges from our results can be summarized as follows: the type of conflict negatively influences the hub firm satisfaction and conflict resolution mechanisms moderate their effect. Our result specifies the findings of Kozan et al. (2006) which show that problem solving and compromise were the most often used styles. We show that “soft conflict” resolution mechanisms based on discussion and/or persuasion, increase the hub firm relationship satisfaction. in case of performance conflict. However, it is not the case when a relational conflict emerges. Kozan et al. (2006) show that the way to manage conflict depends to the level of specific investment made by the buyer and the supplier but they do not take into account the type of conflict.

However, we observe that the type of conflict have a major impact on them. Tuten and Urban (2001) proposed to extend Mohr and Spekman’s model (1994) to include the existence of previous relations as a moderating variable. Resolution methods are "softer" (joint resolution and persuasion) when partners have been in a long-term relationship, and "harder" (exit or court) when the firms have had only casual relationships. Our results may partially agree with these previous results. Indeed, we can think that partners who have prior relationships know each other well and therefore it is less likely to emerge relational conflicts than performance conflicts. When a hub firm has already cooperated with a member, shared values emerge, and transaction costs are reduced (Dhanaraj and Parkhe, 2006). Prior satisfactory business relations diminish relational risk (Das and Teng, 2002). The literature indicates a standardization of exchange formalization (Argyris and Porter Liebeskind, 1999). By establishing the role of the parties, contracts introduce a sense of commitment. They also force partners to introduce clauses related to cooperation commitment (van Marrewijk, 2005) and reduce the parties’ freedom of action. Even though contracts represent a sign of involvement in the project, they entail significant costs (especially for small firms). This explains that, in certain situations, SME hub firms prefers informal exchanges that are facilitated when repeated interactions have led to the development of personal relationships (which probably limits relational conflict). A low degree of formalization developed through frequent interactions between organizations increases flexibility and reduces the risk of conflict. However, such arrangements take a long time to be implemented (Das and Teng, 2002). They do not always facilitate cooperation as they cause delays that can render the innovative product obsolete. Rational call for a clearer distinction between task and relational conflict construct that are sometime be confounded (De Dreu and Weingard, 2003). The distinctive effect of two types of resolution mechanisms on the
conflict types gives some support to consider task conflict and relational conflict as separate empirical concept, even though they both exhibit a same negative effect on satisfaction.

In addition, this study claims that soft mechanisms combined with performance conflict increase hub firm satisfaction. However, this effect is valid only up to a certain level of conflict. After this point, soft mechanisms are no longer operative (cf. 3D interaction graphs – Appendix 3). So, there is probably a mixed relationship, both negative and positive relationships between task performance conflict and hub firm satisfaction consequences and therefore it is not safe to conclude as some previous studies did, that performance conflict should be encouraged while relationship conflict is restrained in risky interorganizational relationships. For Breugst and Shepherd (2017) relationship conflict was related to an increase in negative affect, whereas the pattern for performance conflict was less clear. For these authors, performance conflict was connected to an increase or a decrease in negative affect depending on the setting. Their findings also revealed positive consequences of uncertainty (i.e., attenuating negative consequences of conflict) and this dimension is always present in innovation network. Thus, as it’s showed by our results, the inverted U-shape effect of conflict performance on hub firm satisfaction, somehow helps to reconcile the divergent results in the literature.

It should also be noted that in certain types of innovation networks, hub firms lack the authority to issue commands (Dhanaraj and Parkhe, 2006) and it is difficult for them to formalize their relations by a contract and therefore to foresee the conflict resolution mechanisms. However, guarantees are important in innovation networks as they reduce uncertainty and opportunistic behaviour (Dhanaraj and Parkhe, 2006). Indeed, these organizational forms are particularly conducive to the exchange of information and foster the transfer of know-how, which, unfortunately, encourage opportunistic behaviour (Goerzen, 2007). In addition, these organizational forms suffer from uncertainty caused by the often-tacit knowledge of members and the low level of predictability of results. In the case where it is too long (in an innovation network, any delay may lead to a product becoming obsolete) or when it is not possible to implement direct guarantee, indirect guarantee can be an alternative. Using its central position within the network, the hub firm can affect the members’ reputation and their future business opportunities. If a partner brought some key resources to the project, the hub firm will probably prefer to take indirect guarantees (possibility to damage future business opportunities) rather than no guarantee. Thereby, the hub firm’s main objective is to minimize the risk of seeing the partner leave the project because it can reduce the advancement of the project and partners satisfaction.
Regarding conflict resolution, the literature on interorganizational cooperation considers that discussion favours cooperation. In innovation networks, this solution is interesting only if all involved members are satisfied (when there is a performance conflict and not a relational conflict); otherwise, it can harm the project as it can entail delays and may lead to members’ frustration. The literature on conflict identifies neglect (Turnley and Feldman, 1999) as one solution for solving conflicts. Innovation networks are often subjected to time constraints and this type of practice (frequent in franchise relations for instance) was not been observed.

CONCLUSION

There is no doubt that research enhancing the coordination mechanisms “black box”, especially over the past couple of decades. However, most research focus on one of two principal coordination mechanisms, formal (and more specifically on contracts) and informal (and more specifically trust). Despite its importance, conflicts are not at the heart of the debate. Lumineau and Malhotra (2011: 533) explain: “it is important to understand whether and when contracts are likely to be effective in preventing conflict, it is also crucial to understand how a reliance on contracts will impact the dispute resolution process and its outcomes”. In the effort to exploring the impact of conflict resolution mechanisms on satisfaction, this study has theoretically examined the complex link among types of conflict, mechanisms to resolve them and satisfaction under the enlightenment of existing research. The findings indicate that different types of conflict will directly associate with the level of hub firm satisfaction. In addition, this study showed that effectiveness of conflict resolution mechanism is contingent to the type of conflict. Even though this contingency occurs in the specific context of interorganizational innovation network in SME, results bring some new avenues for research that need to be investigate in less constrained interorganizational contexts.

From a practical point of view, such research offers insight into how to proactively manage innovation networks in order to reap the hub firm satisfaction, and to resolve conflict according to their type. Our results are also important for SME hub firms. Contrary to what is usually advanced for large firm, the SME may find themselves at the head of important innovation networks by the number of members and the nature of these members (see controls variables), some of which are multinational leaders in their field. So, this research has important managerial implications concerning how SME hub firms, through their managers, select the type of conflict resolution mechanisms they will implement. The framework provides guidance
for more effective management in innovation networks. Managers should take into consideration the fact that conflict resolution mechanism are complex and are related to the type of conflict. More generally, this study calls for future work on this important topic in an innovation-based economy.

Finally, our study carried several limitations, which are associated to several avenues for further research. First, we analysed a specific context where the hub firm was also the organization that had registered the patent(s). Our study concerned hub firms and it may not be possible to generalise the results to all hub firms, especially in other countries, as intellectual property laws may differ and so have impact on conflict resolution mechanism used. Secondly, our research has distinguished between relational and task performance conflict. However, the distinction between these types of conflict is not clear-cut, because they can coexist (de Wit et al., 2012) and can transform into each other (Simons and Peterson, 2000). Thirdly, the focal point of our research is to study the impact of the type of conflict and their resolution mechanisms on satisfaction however, we adopt a static point of view. It could be interesting to adopt a dynamic approach in order to study how the types of conflicts interact and affect group outcomes through the two types of conflict. Many authors (Das and Teng 2002; Lumineau and Malhotra, 2011) argued that studies of interfirm governance must understand interfirm processes. Finally, innovation networks conflict may be dyadic or network-based, involving three or more parties. In our study we did not restrict our analysis to bilateral relationships. It could be interesting to distinguish this level of interaction in order to maintain parsimonious results.

REFERENCES


van Marrewijk A. (2005), Strategies of Cooperation: Control and Commitment in Mega-Projects, *M@n@gement*, 8(4), 89-104.
### Appendix 1

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent variables</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Type of conflict</strong></td>
<td></td>
</tr>
<tr>
<td>(Das and Teng, 1996; 2000)</td>
<td>What problems have you encountered during the project?</td>
</tr>
<tr>
<td><strong>Relational appropriation conflict</strong></td>
<td><em>(RelConf)</em></td>
</tr>
<tr>
<td>1. Results appropriation problem</td>
<td></td>
</tr>
<tr>
<td>2. Problem of capturing know-how or strategic information</td>
<td></td>
</tr>
<tr>
<td><strong>Task performance conflict</strong></td>
<td></td>
</tr>
<tr>
<td><em>(PerfConf)</em></td>
<td></td>
</tr>
<tr>
<td>1. Minimum involvement of one of the project members considering their initial commitments</td>
<td></td>
</tr>
<tr>
<td>2. Work and results produced are minimized compared to initial commitments</td>
<td></td>
</tr>
<tr>
<td><strong>Resolution mechanisms</strong></td>
<td>Assuming that some conflict exists over network, how frequently are the following methods used to resolve such conflict?</td>
</tr>
<tr>
<td><em>(Mohr and Spekman, 1994; 1996)</em></td>
<td></td>
</tr>
<tr>
<td><strong>Soft resolution mechanism</strong></td>
<td><em>(SoftReso)</em></td>
</tr>
<tr>
<td>1. Parties ignore conflict</td>
<td></td>
</tr>
<tr>
<td>2. Parties started discussions and looked for a way to solve the problem</td>
<td></td>
</tr>
<tr>
<td><strong>Hard resolution mechanism</strong></td>
<td><em>(HardReso)</em></td>
</tr>
<tr>
<td>1. Parties either used power or threats to resolve conflict</td>
<td></td>
</tr>
<tr>
<td>2. Parties went to a court to resolve the disagreement</td>
<td></td>
</tr>
<tr>
<td><strong>Dependent Variable</strong></td>
<td>In what extend did you agree with the following propositions?</td>
</tr>
<tr>
<td><strong>Hub’s firm satisfaction</strong></td>
<td></td>
</tr>
<tr>
<td><em>(Satisfact)</em></td>
<td></td>
</tr>
<tr>
<td><em>(Brock and Barclay, 1997; Mohr et Spekman, 1994)</em></td>
<td></td>
</tr>
<tr>
<td>1. Overall, we are both quite satisfied with our working relationship.</td>
<td></td>
</tr>
<tr>
<td>2. Compared to other working relationships I’ve known or heard about, the one I have experienced here is quite good.</td>
<td></td>
</tr>
<tr>
<td>3. If tomorrow you were asked to participate in a project with the same members, you would agree to collaborate</td>
<td></td>
</tr>
<tr>
<td><strong>Control Variable</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Innovation type</strong></td>
<td>The value is 1. if innovation is related to a product, 2. for service innovation and 3. for process innovation</td>
</tr>
<tr>
<td><em>(InnoTyp)</em></td>
<td></td>
</tr>
<tr>
<td><strong>Number of members of the network</strong></td>
<td><em>(NbrMemb)</em></td>
</tr>
<tr>
<td><strong>Project bearer size</strong></td>
<td>How many members are there in your innovation network?</td>
</tr>
<tr>
<td><em>(LeadSiz)</em></td>
<td></td>
</tr>
<tr>
<td><strong>What is the size of your firm (full-time equivalent employees)?</strong></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2

Normalized loadings and crossloadings

<table>
<thead>
<tr>
<th></th>
<th>Satisac</th>
<th>RelConf</th>
<th>PerfCon</th>
<th>SoftRes</th>
<th>HardRes</th>
<th>InnoTyp</th>
<th>NbrMemb</th>
<th>LeadSiz</th>
<th>SE</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SATIS-m</td>
<td>0.791</td>
<td>-0.342</td>
<td>-0.191</td>
<td>-0.176</td>
<td>-0.334</td>
<td>-0.035</td>
<td>0.115</td>
<td>0.013</td>
<td>0.035</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SATIS-a</td>
<td>0.769</td>
<td>-0.360</td>
<td>-0.170</td>
<td>-0.183</td>
<td>-0.359</td>
<td>-0.006</td>
<td>0.109</td>
<td>0.009</td>
<td>0.034</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SATIS-n</td>
<td>0.791</td>
<td>-0.292</td>
<td>-0.212</td>
<td>-0.178</td>
<td>-0.328</td>
<td>-0.060</td>
<td>0.069</td>
<td>0.091</td>
<td>0.037</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>TYP-Re1</td>
<td>-0.369</td>
<td>0.808</td>
<td>-0.062</td>
<td>0.024</td>
<td>0.325</td>
<td>-0.123</td>
<td>-0.103</td>
<td>-0.034</td>
<td>0.037</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>TYP-Re2</td>
<td>-0.316</td>
<td>0.809</td>
<td>-0.132</td>
<td>0.098</td>
<td>0.357</td>
<td>-0.015</td>
<td>-0.028</td>
<td>0.036</td>
<td>0.036</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>TYP-Pe1</td>
<td>-0.248</td>
<td>-0.062</td>
<td>0.825</td>
<td>0.328</td>
<td>0.279</td>
<td>-0.060</td>
<td>-0.142</td>
<td>-0.026</td>
<td>0.024</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>TYP-Pe2</td>
<td>-0.165</td>
<td>-0.147</td>
<td>0.893</td>
<td>0.300</td>
<td>0.103</td>
<td>-0.124</td>
<td>0.002</td>
<td>-0.014</td>
<td>0.024</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>RES-So1</td>
<td>-0.199</td>
<td>0.074</td>
<td>0.380</td>
<td>0.795</td>
<td>0.299</td>
<td>0.057</td>
<td>-0.074</td>
<td>0.022</td>
<td>0.068</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>RES-So2</td>
<td>-0.184</td>
<td>0.051</td>
<td>0.228</td>
<td>0.888</td>
<td>0.225</td>
<td>-0.169</td>
<td>-0.133</td>
<td>-0.092</td>
<td>0.127</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>RES-Ha1</td>
<td>-0.252</td>
<td>0.213</td>
<td>0.242</td>
<td>0.253</td>
<td>0.753</td>
<td>-0.073</td>
<td>-0.067</td>
<td>-0.062</td>
<td>0.103</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>RES-Ha2</td>
<td>-0.397</td>
<td>0.415</td>
<td>0.097</td>
<td>0.217</td>
<td>0.741</td>
<td>0.024</td>
<td>0.057</td>
<td>0.065</td>
<td>0.062</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CTRL-ty</td>
<td>-0.041</td>
<td>-0.082</td>
<td>-0.102</td>
<td>-0.057</td>
<td>-0.031</td>
<td>1</td>
<td>-0.189</td>
<td>0.119</td>
<td>0.054</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CTRL_Nb</td>
<td>0.119</td>
<td>-0.077</td>
<td>-0.081</td>
<td>-0.116</td>
<td>-0.006</td>
<td>-0.187</td>
<td>1</td>
<td>-0.039</td>
<td>0.194</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CTRL-sy</td>
<td>0.046</td>
<td>0.001</td>
<td>-0.023</td>
<td>-0.037</td>
<td>0.003</td>
<td>0.121</td>
<td>-0.041</td>
<td>1</td>
<td>0.161</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Appendix 3

Slope test for two-way interactions

Comment of performance conflict graph:

Figures show that when task performance conflict (PerfConf) is high, hub firm satisfaction is low when soft mechanisms resolution (SoftReso) is low. In contrast, when task conflict grows up, satisfaction increase only if soft resolution mechanisms also increase (red and yellow colors on the 3D graph) or high (dashed black line in 2D graph). Finally, 3D graph exhibits effect that is not perceived by simple linear slope test (2D graph): when task performance conflict become too high, soft resolution mechanism were not strong enough to overcome conflict (even though soft resolution is high), at this point hub firm satisfaction decrease, exhibits an inverted U-shape effect.
Comment of relational conflict graph:

In the 3D graph, when relational conflict (RelConf) is low between members of an innovation network, whatever the level of hard resolution mechanism (HardReso), the satisfaction to the hub firm (Satisfact) is high (red color on the right of the graph). In the 3D and 2D graphs, when relational conflict is high in the network, low level of hard resolution mechanism drops dramatically the level of satisfaction while high level of this resolution mechanism helps maintain hub’s firm satisfaction (yellow color on the left of the 3D graph, black dashed lines in the 2D graph).