Conflict and creativity in inter-organizational teams

The moderating role of shared leadership

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Abstract

Purpose – This paper aims to examine the effects of task and relationship conflicts on team creativity, and the moderating role of shared leadership in inter-organizational teams. An inter-organizational team normally comprises employees from collaborated organizations brought together to conduct an initiative, such as product development. Practitioners and researchers have witnessed the prevalence of conflict in inter-organizational teams. Despite significant scholarly investigation into the importance of conflict in creativity, a deep theoretical understanding of conflict framework remains elusive.

Design/methodology/approach – A questionnaire survey was conducted in China to collect data. Consequently, 54 teams, which comprised 54 team managers and 276 team members, were deemed useful for the study.

Findings – By testing our hypotheses on 54 inter-organizational teams, we found that relationship conflict has a negative relationship with team creativity, whereas task conflict has an inverted U-shaped (curvilinear) relationship with team creativity. Furthermore, when shared leadership is stronger, the negative relationship with team creativity is weaker for relationship conflict, whereas the inverted U-shaped relationship with team creativity is stronger for task conflict.

Research limitations/implications – The main limitation is cross-sectional, which cannot establish causality in relationships. Despite this potential weakness, the present research provides insights into conflict, leadership and inter-organizational collaboration literature.

Practical implications – The findings of this study offer some guidance on how managers can intervene in the conflict situations of inter-organizational teams.

Social implications – Managers are struggling to identify ways to effectively manage team conflict when a team of diverse individuals across organizational boundaries are brought together to solve a problem. The findings of this study offer some guidance on how managers can intervene in the conflict situations of inter-organizational teams.

Originality/value – This paper provides understandings about how relationship and task conflicts affect team creativity in inter-organizational teams.

Keywords Team creativity, Relationship conflict, Task conflict, Shared leadership, Inter-organizational team

Paper type Research paper

Introduction

Through business networks, firms are increasingly developing inter-organizational teams to promote collaborative innovation which respond to scarce resources, competitive pressure and dynamic market (Zuckerman and Higgins, 2002; Enz and Lambert, 2012). For example, both Apple and Samsung have established multiple collaborative R&D teams with their suppliers to develop new products. It is suggested that inter-organizational teams allow collaborated organizations to complement each other's technological resources (Nieto and Santamaría, 2007), share R&D costs (Hagedoorn, 2002) and exchange heterogeneous knowledge and insightful ideas (Faems *et al.*, 2005; Sammarra and Biggiero, 2008). However, about 50-60 per cent of inter-organizational teams in Architecture, Engineering and Construction (AEC) industries were disbanded without achieving the desired outcomes (University of Reading, 2014). Some scholars have argued that inter-organizational teams need to cope with the cognitive, social, institutional and geographical differences among the collaborated organizations, which suggest that it may not easily to achieve successful collaborative innovation (Chua, 2013; Lawson *et al.*, 2009; Polidoro *et al.*, 2011). For example, Boschma (2005) contended that too much or too little cognitive proximity among collaborated organizations may be harmful for collaborative innovation; that is, too much cognitive proximity leads to a lack of flexibility, whereas too little cognitive proximity increases the difficulties in effectively communicating and understanding new knowledge. Therefore, how to manage the diversity of membership to facilitate the development of creativity in inter-organizational teams is of great significance and interest (Drach-Zahavy, 2011).

Scholars increasingly tout conflict theory as an important perspective for studies on collaborative innovation (Li and Hambrick, 2005). They argue that because of the nature of cross-boundary, inter-organizational teams normally face the challenges of handling various organizational culture, strategic goals and work styles (Drach-Zahavy, 2011; Gelfand *et al.*, 2007). Accordingly, both relationship conflict (i.e. interpersonal emotional clashes) and task conflict (i.e. disagreement on job-related issues), which are the perceived incompatibilities or disagreements among employees from collaborated organizations, have been proposed as important factors affecting the creativity of inter-organizational teams (Lynch *et al.*, 2014; Zhang and Zhang, 2013). However, previous studies on how conflict affect team creativity generated mixed results. For example, most studies proposed that both relationship and task conflicts play the negative role in affecting team creativity (He *et al.*, 2014; Schulze *et al.*, 2014; Yong *et al.*, 2014), whereas others indicated that task conflict can promote team creativity (Lu *et al.*, 2011). In this vein, scholars are calling for more research to explore important moderators in the process of inter-organizational teams experiencing, interpreting and managing team conflict.

Investigating the moderating effect of shared leadership may help resolve the inconsistency in previous studies. On the one hand, shared leadership reflects an

inter-organizational team's situation where multiple team members engage in leadership, and is characterized by collaborative decision-making and shared responsibility for outcomes (Hoch, 2013). It is found to be a key factor influencing the conflict management because this leadership can help team members work together toward their shared goals without sacrificing their individual interests (Fisher, 2000; Hendel *et al.*, 2005). On the other hand, different to intra-organizational teams, inter-organizational team should face complicated conflicts resulting from incongruence of organizational culture and goals (Drach-Zahavy, 2011), power differentials (Panteli and Sockalingam, 2005), unfairness of outcome distribution (Barden *et al.*, 2005). According to Song *et al.* (2006, pp. 342-343):

> […] context can make substantial differences in the lessons learned, including perceptions of conflict, the types of conflict, and the outcomes engendered, and the application of behavioral strategies used to handle conflict.

Hendel *et al.* (2005, p. 138) further argued that, "leadership style and choice of conflict management strategies may strongly influence outcomes of a conflict". In this view, shared leadership may play as an effective leadership in inter-organizational teams to leverage the relationship between team conflict and team creativity. However, no research has empirically investigated the effects of team conflict on team creativity and the interaction effect of team conflict and shared leadership in the context of inter-organizational teams. Such a void leaves a significant gap between theoretical and empirical research.

In the current research, we aim to address this gap by empirically assessing the confluence of team conflict and shared leadership on the creativity of inter-organizational teams. The conflict literature has called for in-depth discussions on conflict dimensionality, the nature of contingency and the value of incorporating these factors into theoretical development (Qian *et al.*, 2013). Specifically, the current study defines team conflict as the concept that comprises relationship conflict and task conflict. We simultaneously investigate the linear relationship between relationship conflict and team creativity, and the nonlinear relationship between task conflict and team creativity. Further, we apply the integrated contingency perspective to explore the moderating effects of shared leadership on the above relationships between team conflict and team creativity in the context of inter-organizational teams. This study can help scholars extend the understandings of the conflict–creativity linkage in inter-organizational teams, as well as, aid inter-organizational team managers in tailoring their efforts to enhance team creativity.

Literature review and hypotheses

Developing inter-organizational teams cross over the boundaries of individual organizations is becoming a trend in collaborative innovation (Drach-Zahavy, 2011; Bakker *et al.*, 2011). For example, as products and services become more technologically complex, and as customers come to expect increasing levels of service, many supplier firms decide to collaborate with customer firms to establish technical standards and dominant designs (Sammarra and Biggiero, 2008). Under this condition, inter-organizational teams which are composed of representatives from both the supplier and customer firms are employed to ensure that products and services are tailored and adjusted to the growing expertise demands of their customers (Durand, 2002; Stock, 2006). Moreover, in project-based industries such as AEC industries, innovations in materials, work processes and approaches to project completion highly require inter-organizational coordination (Bakker *et al.*, 2011; Homayouni *et al.*, 2010). Work in AEC industries is typically carried out in inter-organizational teams that are expected to develop new products as well as maximize the fit with customer requirements, enhance mutual learning and reduce development time (Bstieler and Hemmert, 2010). Thus, the literature suggests that inter-organizational teams can help firms pool multiple and

specialized knowledge sources from collaborators to achieve collaborative goals (Shin and Zhou, 2007; Yong *et al.*, 2014). This is especially true in innovation projects requiring the combination of the capital, technology and firm-specific assets of collaborated organizations (Matinheikki *et al.*, 2016; Swallow *et al.*, 2015). Such combination would be helpful for the acquisition and utilization of various knowledge and resources, which increases the possibility of realizing creative outputs and generating more creative solutions at an accelerated pace (Nieto and Santamaría, 2007; Matinheikki *et al.*, 2016).

Although the diverse knowledge and resources of inter-organizational teams offer building blocks for collaborative innovation, effectively managing inter-organizational teams to reap such benefits remains a challenge for organizations (Faems *et al.*, 2005). In fact, inter-organizational teams must cope with different organizational cultures, increased heterogeneous ideas, technology jargon and working styles, the differentiation of power and outcome distribution and increased perceived personal differences. These challenges suggest that integrating diverse resources from collaborative partners to achieve successful innovation may not be an easy task (Chua, 2013; Badke-Schaub *et al.*, 2010; Gelfand *et al.*, 2007). Drach-Zahavy (2011) indicated that, despite the notable advantages, inter-organizational teams are often involved in distinct and sometimes competing objectives, values, resources and strategies of partner organizations, which might lead to more conflicts and collaborative failures. Durand (2002) also suggested that the disadvantages of inter-organizational teams relate to the danger of conflict, which may be the consequence of their exposure to cross-boundary interactions or dissimilar backgrounds. Conflict has been regarded as a reason for ineffectively collaborate resources to achieve successful innovations (Zhang and Zhang, 2013; Lynch *et al.*, 2014). Given that uncertainty and unpredictability in innovative processes can easily trigger conflict (Song *et al.*, 2006), the present study focuses on managing the influence of conflict on team creativity within inter-organizational teams.

Conflict in inter-organizational teams
Conflict is defined as the perceived incompatibilities of individuals, who hold discrepant views or interpersonal incompatibilities (Jehn, 1995). Prior studies have indicated the coexistence of two types of conflicts, namely, relationship and task conflicts (He *et al.*, 2014; Li and Hambrick, 2005). Relationship conflict, which is also called emotional or affective conflict, refers to an awareness of interpersonal incompatibilities, a reflection of interpersonal frictions and tensions and disagreements about personal values, taste and interpersonal styles (Desivilya *et al.*, 2010). This type of conflict is exemplified by friction and clashes over personal mannerisms (Yang and Mossholder, 2004). By contrast, task conflict, which is also called cognitive conflict, pertains to an awareness of differences in opinions and perspectives with respect to the work team's tasks. This type of conflict results from divergent perceptions of the distribution of resources, work procedures and policies (Desivilya *et al.*, 2010). Cognitive at its core, task conflict arises when disagreements occur among team members about how particular aspects of a task should be accomplished (Yang and Mossholder, 2004).

Barclay (1991, p. 155) argued that "context is the main source of conflict". The literature further suggested that:

> […] the dissimilarities in backgrounds, differential goals and divergent frame of reference of international partners should produce emotional conflict; cultural differences should also increase the diversity of perspectives considered and opinions expressed, producing task conflict (Rose and Shoham, 2004, p. 943).

Particularly in inter-organizational teams, team members who are involved with cross-boundary interactions might easily encounter task conflict because of different aims, different skills and capabilities, different working styles (Chua, 2013; Li and Hambrick, 2005). For example, decision-making is critical to new product development for collaborative engineering design within inter-organizational teams (Larsson, 2007). Engineers from different organizations should interact frequently to negotiate and coordinate their work more effectively. However, their different domains of expertise, task responsibility or communication difficulties may generate persistent misunderstanding about key concepts, who is in charge of what, how to collect or analyze data and even fundamental issues about the entire project (Durand, 2002). Hence, task conflict emerges in the decision-making process for collaborative engineering design.

Also, relationship conflict is particularly salient in inter-organizational teams, in which team members from partner organizations have dissimilar organizational cultures, technical beliefs and strategic goals (Gelfand et al., 2007; Shapiro et al., 2002). Prior research has indicated that team members who held diverse interpretations of organizational values were more likely to experience mistrust and tensions compared to those who have more homogenous value interpretations (McClure, 2010). In addition, representatives of different organizations, who have diverse beliefs concerning the preferences of strategic goals, would undoubtedly engage in discussions that lead to disagreements during the decision-making process. These disagreements can sow the seeds of relationship conflict between partners (Zhou et al., 2007). For example, construction project teams often include architects and contractors from different firms. Although contractors and architects enter into separate contracts with a property developer, they coordinate and negotiate frequently during construction (Lui et al., 2006). Given that collaborative partners have different knowledge, technology and financial sources, contractors may seek to save cost, whereas architects may favor technological advancement. The cognitive difference may be irreconcilable, which may increase mutual hostility.

Scholars have explored the relationship between team conflict and creativity in the context of intra-organizational teams (De Dreu, 2006; Desivilya et al., 2010; Farh et al., 2010). For example, some scholars proposed that relationship conflict plays a negative role in intra-organizational teams (He et al., 2014; Yong et al., 2014). Meanwhile, some studies reported the negative influence of task conflict on team outcomes (Schulze et al., 2014), whereas others indicated that task conflict can promote team creativity in intra-organizational teams (Lu et al., 2011). In this vein, these studies indicate that the influence of relationship conflict on team creativity is linear, whereas the effect of task conflict in the context of intra-organizational teams would be curvilinear (Farh et al., 2010; Xie et al., 2014). However, the literature did not fully address how team conflict influences team creativity in the context of inter-organizational teams (Lynch et al., 2014). Previous studies have theoretically indicated that conflict plays different roles in intra- and inter-organizational relationships (Li, 2005). Specifically, Kraut et al. (2002) argued that because of geographic proximity and cultural similarity, sharing complex information may occur more effectively for intra-organizational teams than inter-organizational teams. This argument indicates that the creativity benefits of task conflict may be weaker in inter-organizational compared with those in intra-organizational teams, because these benefits depend on the teams' ability of sharing information and recombining diverse knowledge (Hinds and Mortensen, 2005). By contrast, because monitoring and formal controls are difficult and costly to establish in inter-organizational teams, relationship conflict may escalate more easily into a destructive process in inter-organizational teams

than in intra-organizational teams (Li, 2005). Indeed, Song *et al.* (2006, pp. 342-343) have stated that:

[…] context can make substantial differences in the lessons learned, including perceptions of conflict, the types of conflict, and the outcomes engendered, and the application of behavioral strategies used to handle conflict.

Conflict and creativity in inter-organizational teams
Relationship conflict has a negative influence on team creativity in inter-organizational teams because information processing among team partners is impeded (De Clercq *et al.*, 2009). When interpersonal conflict intensifies and arousal increases, team partners spend time and energy focusing on each other rather than on task-related problems (De Dreu and Weingart, 2003). As Hülsheger *et al.* (2009, p. 1132) noted:

[…] relationship conflict undermines team functioning to the degree that anger and frustration impede effective communication within the team and reduce team members' receptiveness to each others ideas.

Therefore, animosity, miscommunication and mistrust among team partners inhibit the effective flow and exchange of information and knowledge across inter-organizational areas (De Dreu and Weingart, 2003; Menguc and Auh, 2008), which are prerequisites for nurturing team creativity.

Relationship conflict can also reduce team creativity in inter-organizational teams because it interferes with cognitive functioning of individuals. Relationship conflict narrows the range of attention, incites rigid thinking and reduces cognitive flexibility (Carnevale and Probst, 1998; Hülsheger *et al.*, 2009). De Dreu and Weingart's (2003) meta-analysis suggested that when participants anticipated a competitive, hostile negotiation (high relationship conflict), their cognitive flexibility and creative thinking decreased substantially. Hence, personal and emotional incompatibilities may decrease participants' creative thinking by undermining decision quality and understanding (Chen, 2006; Ensley *et al.*, 2002; Parayitam *et al.*, 2010).

Relationship conflict has a dysfunctional effect on team creativity by decreasing the satisfaction and commitment of team members (Jehn, 1995; Medina *et al.*, 2005). Research consistently showed that relationship incompatibility leads to dissatisfaction with the team (Puck and Pregernig, 2014; Tekleab *et al.*, 2009). For example, when team partners do not feel "recognized and understood", they tend to identify less with the team, which may constrain the team's motivation to share "creative ideas and insights" (Swann *et al.*, 2004). Therefore, relationship conflict is frustrating and dissatisfying, which impedes the willingness of members to present creative ideas, and in turn, undermines team creativity. Based on the above arguments, we propose the following hypothesis:

H1. Relationship conflict is negatively related to team creativity in inter-organizational teams.

Team creativity benefits from intermediate levels of task conflict, rather than from either low or high levels of task conflict. In other words, intermediate task conflict enhances team creativity, thereby resulting in a curvilinear, inverted U-shaped function. A low level of task conflict "leads to inactivity and avoidance, neglect of information, and low joint performance" (De Dreu, 2006, p. 86). Thus, low information exchange resulting from low levels of task conflict prohibits the creation and dissemination of insightful ideas (Leenders *et al.*, 2003).

Intermediate task conflict can facilitate team creativity in inter-organizational teams via team learning. Task conflict, particularly in inter-organizational teams, represents open exchange of ideas, objective assessment of alternatives and rigorous contrast of perspectives

among team partners (Ensley *et al.*, 2002). Intermediate task conflict increases team partners' ability to give and take, voice their views and fight for viewpoints that they believe (De Dreu and Weingart, 2003; Xie *et al.*, 2014). This evidence tends to substantiate the general claim that intermediate task conflict can increase team learning, such as learning to take different perspectives (De Dreu and Weingart, 2003). During team learning, teams bring a variety of ideas, and the members will be able to combine multifarious perspectives to obtain a greater cognitive understanding of the issue that contribute to team creativity (Parayitam *et al.*, 2010; Simons and Peterson, 2000). Indeed, intermediate task conflict can increase team partners' tendency to scrutinize task issues and to think more deeply, which can foster learning and the development of new and creative insights, leading the team to become more creative (De Dreu and West, 2001; De Dreu and Weingart, 2003). For example, inter-organizational teams for space exploration research involves task interdependence during the dynamic interaction between astronomers and engineers. The cognitive diversity resulting from engineering and astronomic knowledge can encourage improved solutions for complex problems (Bayerl and Lauche, 2010). Hence, we argue that, as task conflict initially increases, the resulting team learning such as inter-organizational interactions and joint problem solving generates more creative ideas in inter-organizational teams (Menguc and Auh, 2008).

However, some scholars argued that high level of task conflict may lead to cognitive overload or negative emotion, which is harmful to team creativity (Farh *et al.*, 2010; Xie *et al.*, 2014). The literature has indicated that excessive task conflict may lead to a decline in the quality of decision-making because of cognitive overload. Thus, the information processing and effective decision-making are constrained (Jehn *et al.*, 2008; Puck and Pregernig, 2014). Under this condition, team partners might fail to incorporate multiple lines of thoughts into a cohesive solution and subsequently lose sight of the collective goal, which may be detrimental to creative outcomes (De Dreu, 2006; Farh *et al.*, 2010). Indeed, the literature has argued that excessive task conflict hinders the ability and motivation of individuals to engage in effective communication, collaboration and coordination, thereby creating barriers to inter-organizational coordination (Menguc and Auh, 2008). Consequently, team creativity will likely suffer.

The literature also indicated that high levels of task conflict can cause team partners to become frustrated with the lack of progress (Farh *et al.*, 2010). As De Dreu (2006, p. 86) stated:

> Increasingly high compared to moderate levels of task conflict, however, produce the stress, interpersonal tension, and distrust that prohibit people from focusing on the problem and from open-mindedly generating ideas. It also reduces team members' motivation to work together in selecting and implementing adequate problem solutions.

For example, if team partners constantly challenge each other's opinions regarding their tasks, such interactions may result in anger and alienation, and subsequently lead to disaffection and departure by offended team partners (Ensley *et al.*, 2002; Jehn *et al.*, 2008). Consequently, open communications become difficult to achieve, which can create barriers to inter-organizational coordination (Menguc and Auh, 2008; De Wit *et al.*, 2012). Therefore, high levels of task conflict may lead to interpersonal negative emotions and ultimately a decrease in team creativity. To summarize, we propose the following hypotheses:

H2. Task conflict has an inverted U-shaped (curvilinear) relationship with team creativity in inter-organizational teams.

Shared leadership in inter-organizational teams
Shared leadership reflects a situation where multiple team members engage in leadership and is characterized by collaborative decision-making and shared responsibility for outcomes (Hoch, 2013). To clarify the concept further, we offer some examples of shared

leadership behavior: sharing influence with their partners in making decisions and solving problems, and shaping collective activities in identifying opportunities and challenges (Pearce and Conger, 2003; Fletcher and Käufer, 2003). Accordingly, shared leadership offers a team-level phenomenon of leadership practice, wherein behaviors are enacted by multiple individuals rather than solely by those at the top or by those in formal leadership roles (Pearce, 2004; Bligh et al., 2006; Carson et al., 2007). A prominent distinction between shared leadership and more traditional forms of leadership is the influence processes involved, which may frequently include peer or lateral influence in addition to upward and downward hierarchical influence processes (Pearce and Conger, 2003).

The literature has suggested that inter-organizational teams often have an equitable distribution of power among teammates (Ramesh and Tiwana, 1999; Huang and Wilkinson, 2006). For example, inter-organizational teams for offshore oil and gas exploration commonly include mechanical engineers, data analysts and general practitioners. Tasks on collective action regulation in oil and gas exploration teams showed that the teams were often provided with a high degree of autonomy in coordinating their internal resources and conducting detailed planning (Weber, 1997). The general design principle in oil and gas exploration teams is to delegate decision power to team members (Bayerl and Lauche, 2010). Particularly in inter-organizational teams that lack formal hierarchical authority, some scholars indicated that a collective form of leadership, such as shared leadership, may be useful in creative tasks (Al-Ani et al., 2011; Garrison et al., 2010; Thorpe et al., 2011). Given that shared leadership involves sharing power with a view toward motivating collaborative partners in joint teamwork, sharing feedback and directing activities of the team together (Ensley et al., 2006; Thorpe et al., 2011), shared leadership may be particularly relevant to creativity (Bligh et al., 2006). However, no published research has specifically examined the impact of shared leadership in the conflict–creativity relationship in inter-organizational teams.

Investigating the impact of leadership in the conflict-creativity relationship in inter–organizational teams is important. The literature emphasizing the unique nature and structure of inter-organizational teams argued that conflict resolution requires mastering special leadership skills, such as coordinating team activities, establishing effective working relationships with partner teammates and overcoming communication and cultural barriers (Al-Ani et al., 2011). For example, leadership support in inter-organizational conflict can achieve a climate of trust by eliciting collaborative behavior from partner teammates and by releasing tensions, harmonizing misunderstanding and dealing with disruptive or aggressive behavior (Hendel et al., 2005; Pittinsky and Simon, 2007). As Ayoko and Callan (2010, p. 221) stated, "the lack of attention to the role of some aspects of team leadership behaviors might further explain the consistent mixed outcomes for conflict in teams". However, empirical studies that examine the impact of leadership in the conflict–creativity relationship are limited (Ayoko and Callan, 2010). Therefore, another objective of this paper is to empirically investigate the moderating role of shared leadership in the conflict–creativity relationship by exploring appropriate conflict management strategy in the context of inter-organizational teams. We develop our hypotheses in the following subsection.

Potential moderation of shared leadership on the relationship between conflict and creativity in inter-organizational teams

We argue that when an inter-organizational team has strong shared leadership, the effect of relationship conflict on team creativity will be mitigated. Shared leadership offers a team-level phenomenon of leadership practice where behaviors are enacted by multiple individuals rather than solely by top managers or by those holding formal leadership roles (Bligh et al., 2006). Shared leadership encourages team partners to share influence with their

peers when making decisions and solving problems, identifying opportunities and challenges and giving and receiving feedback (Pearce and Conger, 2003; Fletcher and Käufer, 2003). Thus, shared leadership may also help develop a climate of social support and shared mission (Hoch, 2013). When shared leadership increases, the negative influence of relationship conflict decreases because shared leadership does not only emphasize a common purpose among functional areas, but also fosters participative and collaborative decision-making (Kuhn and Poole, 2000). Under high-level shared leadership, team partners who have interpersonal clashes may, despite their differences, anticipate one another's actions, behave similarly and coordinate effectively (Klein *et al.*, 2011), which will subsequently benefit team creativity.

Shared leadership can also lesson the negative effect of relationship conflict on team creativity because it facilitates a psychologically safe climate within the team. Such climate resolves inter-organizational tensions and frictions while restoring and maintaining working relationships (Canary and Spitzberg, 1989). The literature suggested that shared leadership can encourage team partners to exchange creative ideas without the fear of being penalized (Pearce and Conger, 2003; Fletcher and Käufer, 2003). Consequently, team partners are less likely to fear ostracism and more likely to feel comfortable in discussing and exploring their ideas with other members. With a high level of psychological safety, team partners who have interpersonal clashes may, despite their differences, feel weak constraints on their verbal and behavioral expression of their individual values (Klein *et al.*, 2011). Therefore, we propose the following hypothesis.

> *H3.* In inter-organizational teams, shared leadership moderates the relationship between relationship conflict and team creativity, such that the higher the shared leadership, the less negative the relationship.

We propose that the inverted U-shaped relationship between task conflict and team creativity is moderated by shared leadership in inter-organizational teams. A key aspect of shared leadership is that team members can share their distinct knowledge, and they can access and build on each other's ideas through knowledge sharing (Pearce, 2004; Hoch, 2013). In so doing, a high level of shared leadership can create a free situation that weakens constraints on team partners' verbal and behavioral expression of their viewpoints (Davis and Eisenhardt, 2011). Such situation can help team partners resolve modest opposing ideas by stimulating free communication, information sharing and open discussions (De Dreu and West, 2001; De Dreu and Weingart, 2003). Therefore, when shared leadership is high, team partners respond with relatively high team creativity to intermediate task conflict because that shared leadership facilitates mutual understanding and learning, and integrating new ideas (Menguc and Auh, 2008). Conversely, a low level of shared leadership may undermine team partners' motivation to share knowledge and capitalize on the ideas and perspectives from their cognitively diverse team (Van Knippenberg, 1999; Shin *et al.*, 2012), thereby impeding the translation of intermediate task conflict into team creativity.

Shared leadership might also affect the curvilinear task conflict–creativity relationship by increasing these members' identification with the team (Shin *et al.*, 2012; Nicolaides *et al.*, 2014). By providing inspirational motivation, high levels of shared leadership can increase these members' awareness of team identification (i.e. "we are a team") to ensure that individual team members are more willing to capitalize on an intermediately wide range of ideas and perspectives from their cognitively diverse team (Van Knippenberg, 1999; Shin *et al.*, 2012). Therefore, the enhanced motivation resulting from high levels of shared leadership can drive individuals to search for the different ideas provided by the task conflict of their team and to actively integrate these ideas that will enable them to perform better in

creative tasks. With the enhanced motivation of team identification, team partners are more likely to exploit the advantage of intermediate cognitive diversity (Shin *et al.*, 2012). Therefore, we propose the following hypothesis:

H4. In inter-organizational teams, shared leadership moderates the inverted U-shaped relationship between task conflict and team creativity, such that teams with high levels of shared leadership will exhibit higher team creativity in response to intermediate task conflict than those who have low levels of shared leadership.

Method
Sample
A questionnaire survey was conducted to collect data from China. We chose to conduct the survey in China for two reasons. First, China is the world's largest emerging economy and is a powerhouse in global economics (Zhou *et al.*, 2007). An increasing number of Chinese business organizations actively invest in collaborative R&D with the aim of becoming the forefront of innovation (Yip and McKern, 2014). Thus, China provides an ideal setting for conducting research on collaborative innovation. Second, almost all empirical studies on team conflicts were conducted with a Western cultural background (Desivilya *et al.*, 2010; Klein *et al.*, 2011). However, Chinese culture is considered characterized by collectivism, which is not the dominant cultural value in Western countries (Huang, 2012). Under the collectivism culture, Chinese people highly value harmony and are likely to resolve conflict (Tjoavold *et al.*, 2006; Zhang and Zhang, 2013). This traditional view means that teams in the Chinese cultural sphere may not be able to make full use of the benefits of conflict (Huang, 2012). However, researchers also argue that the harmony-seeking behavior of Chinese people may be driven by trust, relationship building and sincerity (Tjosvold *et al.*, 2005). With this motive, Chinese people discuss conflicts openly to strengthen their relationships. Thus, they may be able to discuss conflict productively (Huang, 2012; Tjosvold *et al.*, 2005). Therefore, the different perspectives about conflict in Chinese culture indicated that the effects of conflict on team outcomes in China remain unclear. As He *et al.* (2014, p. 1534) contended, "prior studies relating conflict management are mainly conducted in western countries, and more research in Asia Pacific, including China, is needed". However, empirical studies under the cultural background of China were rare, with only a few notable examples (Qian *et al.*, 2013; Zhang and Zhang, 2013; He *et al.*, 2014).

In the present study, an inter-organizational team was operationalized as a team of individuals from different companies brought together to conduct an initiative, such as product development, cost reduction or revenue generation initiatives (Enz and Lambert, 2012). The teams were created for an ongoing assignment or for a discrete project with specific goal. We collaborated with a leading Chinese university to ensure the feasibility of our survey. With the help of this university, we obtained a roster of the top management from different organizations. Our research team contacted these top management to introduce our study. Most of the top management agreed to participate in the survey on the condition that we should share our findings with them. With their support, we identified inter-organizational teams in their organizations. All the inter-organizational teams were defined as the teams established based on the assigned collaboration agreement between two organizations. Then we investigated these targeted inter-organizational teams as follows. First, our research team approached inter-organizational team managers to introduce the study. Each team manager was interviewed to ascertain that each team provided an appropriate setting for this study. In cases where a manager was supervising more than one team, we surveyed only one of the teams to avoid confusion regarding the leader (Lin *et al.*, 2012). Second, paper-based questionnaires were sent to team managers, who were asked to

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complete the questionnaire themselves and to distribute the questionnaires to their team members. This method of allowing the team manager to handle the distribution is consistent with previous research on teams (Srivastava *et al.*, 2006). Following the conflict literature, we did not compel the respondents to disclose their identities because respondent anonymity could increase response rate and allow the respondents to answer the questionnaire under less pressure (Brown and Day, 1981). When we launched the survey, the questionnaires for managers and members from the same team were provided with a generated team code. This code was entered on the first page of the survey to ensure that the responses of the manager and the members belonging to the same team could be matched afterward. To minimize potential common method biases, we collected data from two different sources. Team members reported on shared leadership, task conflict and relationship conflict, and team managers reported on team creativity.

We initially sent out survey questionnaires to 68 inter-organizational teams. A total of 55 teams were received, which is equivalent to a response rate of 80.9 per cent. A team will be included in the final sample if at least three team members completed a questionnaire, and the team manager completed a separate questionnaire (Hinds and Mortensen, 2005). Consequently, 54 teams, which comprised 54 team managers and 276 team members, were deemed useful for the study. These teams were from 19 Chinese companies in telecommunications, electronics, information technology, manufacturing, semiconductor, pharmaceutical and scientific instruments industries. Table I shows the demographic information of these inter-organizational teams. The average number of respondents per team was 5.11, which is consistent with previous literature (Janhonen and Johanson, 2011). Specifically, all teams have more than three members in the present study, and 29.6 per cent teams have more than 16 members. This meets:

> […] a need for additional theoretical and empirical investigation in teams with more than three people, particularly in regard to the impact of team size on communication, knowledge differentiation, and accuracy of expertise recognition (Palazzolo *et al.*, 2006, p. 231).

Measures
We constructed an English questionnaire, which was subsequently translated into Chinese by a team of three researchers from different majors. All the items in the questionnaire were

No. of respondents per team	No. of the teams	(%)	Team type	(%)	Gender of team leaders	(%)
Three respondents	9	16.7	Manufacturing	20.8	Male	77.4
Four respondents	6	11.1	R&D	56.6	Female	22.6
Five respondents	10	18.5	Marketing	9.4	Gender of team members	(%)
Six respondents or more	29	53.7	Others	13.2	Male	71.2
					Female	28.8
Team size	No. of the teams	(%)	Team tenure	(%)	Age of team leader/ members	(%)
4 to 5 members	4	7.4	1 to 6 months	13.2	21 to 30 years	20.7/59.5
6 to 10 members	23	42.6	7 to 12 months	20.8	31 to 40 years	45.3/34.7
11 to 15 members	11	20.4	13 to 36 months	28.3	41 to 50 years	30.2/5.1
16 members or above	16	29.6	36 months or above	37.7	50 years and above	3.8/0.7

Table I.
Sample demographic

measured using a five-point Likert scale. These items were adapted from existing literature. Given that these variables were derived from different sources (team managers versus team members), the design features exclude common method variance as viable explanations for our results.

Relationship conflict was assessed through the four-item scale of Jehn (1995). The scale asks team members to rate interpersonal incompatibility in interpersonal relationships. A sample item is, "There are much friction among members in our team" (1 = strongly disagree; 5 = strongly agree).

Task conflict was tested using the four-item scale proposed by Jehn (1995). The scale asks team members to consider the amount of task or work-based conflict he or she experiences with others in the work place. A sample item is, "Members in our team often disagree with opinions regarding the work being done" (1 = strongly disagree, 5 = strongly agree).

Shared leadership was assessed using the 10-item scale proposed by Wood and Fields (2007). Team members assessed the extent the whole team shows shared leadership behaviors. A sample item is, "Each member shares in deciding on the best course of action when a problem faces the team" (1 = strongly disagree, 5 = strongly agree). As Gockel and Werth (2010, p. 174) contended, "team members' general impression of shared leadership processes in their team might be more important for predicting team outcomes than finding out who exactly influences whom". Therefore, we used a direct consensus model (Chan, 1998), wherein the entire team was used as the referent. This approach was employed because, compared with other approaches such as the social network approach, it is more accurate and appropriate in addressing the collective nature of our construct, as well as the focus on specific leadership behaviors (Carson *et al.*, 2007). This approach has been widely used in prior empirical research (Hoch, 2013; Wood and Fields, 2007).

Team creativity was measured using the four-item scale of Shin and Zhou (2007). Given that team managers were well-informed about their own team (De Dreu, 2006; Gong *et al.*, 2013), the team managers were asked to rate team creativity. They were asked to assess the extent to which their teams generate novel and useful ideas. A sample item is, "How well does your team produce new ideas?" (1 = strongly poorly; 5 = very much).

Control variables. We included team size, team tenure, team type, company type, education level and education diversity in our analysis as control variables because they have been found to affect team conflict and team creativity (Shin and Zhou, 2007). Team size was measured by asking team managers the range to which their teams belong (1 = less than or equal to 5, 2 = between 6 and 10, 3 = between 11 and 15 and 4 = more than or equal to 16). Team tenure was assessed by asking team managers the range to which their teams belong (1 = less than or equal to 6 months, 2 = between 7 to 12 months, 3 = between 13 to 36 months and 4 = more than or equal to 36 months). Team type was measured by asking team managers the range to which their teams belong (1 = manufacturing, 2 = R&D, 3 = marketing and 4 = others). Company type was measured by asking team managers the range to which their teams belong (1 = electronics, 2 = information technology, 3 = pharmaceutical, 4 = manufacturing, 5 = others). Education level was assessed with four response options ranging from 1 (high school) to 4 (master degree and above). Individual responses were aggregated to the team-level mean. Education diversity was operationalized as the team-level standard deviation of education (Shaw *et al.*, 2011).

Analytic strategies
We performed two different analyses to validate whether the data structures were statistically adequate for aggregation. First, we used the intra-class correlation ICC(1), and reliability of the mean ICC(2) to examine between group variability. According to one-way

random-effects analysis of variance, the ICC(1) values of relationship conflict, task conflict and shared leadership were 0.47, 0.23 and 0.36, respectively, while the ICC(2) values of these variables were 0.85, 0.65 and 0.77, respectively. These results support our inferences that relationship conflict, task conflict and shared leadership differed between teams ($p < 0.01$). Second, to determine if aggregation to team level was justified for our team-level variables, we estimated within-group inter-rater reliability scores based on the formula derived by James *et al.* (1984). A mean of R_{wg} across teams of 0.80, 0.80 and 0.91 for relationship conflict, task conflict and shared leadership, respectively, suggested a high level of within-team agreement (James *et al.*, 1984). These results showed that the aggregation of relationship conflict, task conflict and shared leadership was justified.

Assessment of measures
Confirmatory-factor analysis was performed to assess the reliability and validity of the scales. Table II shows the measurement analysis results, which include loadings, Cronbach alpha (α), composite reliabilities (CR) and average variance extracted (AVE). The loadings and AVE were used as the measures for convergent validity (Fornell and Larcker, 1981; Bagozzi and Yi, 1988). All item loadings range from 0.69 to 0.97, which is higher than the 0.60 criterion (Bagozzi and Yi, 1988). Each construct's AVE score ranges from 0.63 to 0.90, which exceeded the threshold level of 0.50 suggested by Bagozzi and Yi (1988). We compared the relationship between the correlations among constructs and the square root of the AVE scores to assess the items' discriminant validity. The results in Table III indicate that the square root of the AVE scores for each construct is higher than the correlations among the constructs, which confirms discriminant validity (Fornell and Larcker, 1981).

Cronbach alpha coefficients and CR were used to assess the reliability of the multi-item scale (Huang and Li, 2009). As shown in Table II, Cronbach alpha ranges from 0.80 to 0.94,

Variables	Loading	Cronbach α	Composite reliability	AVE
Relationship conflict	0.92-0.97	0.94	0.96	0.90
Task conflict	0.69-0.91	0.87	0.91	0.72
Shared leadership	0.72-0.87	0.91	0.93	0.67
Team creativity	0.69-0.87	0.80	0.87	0.63

Table II.
Summary statistics of the measurement analysis

Variables	Mean	SD	1	2	3	4	5	6	7	8	9
1. Relationship conflict	2.80	0.73	(0.95)								
2. Task conflict	2.88	0.46	0.26*	(0.85)							
3. Shared leadership	3.81	0.40	−0.17	0.07	(0.82)						
4. Team creativity	3.92	0.57	−0.56**	−0.06	0.29*	(0.79)					
5. Team size	–	–	−0.10	−0.00	0.05	0.14	–				
6. Team tenure	–	–	0.08	0.22	0.07	0.25	0.16	–			
7. Team type	–	–	−0.10	0.00	−0.12	−0.20	−0.06	−0.10	–		
8. Company type	–	–	0.13	0.24	0.04	0.06	0.15	0.09	0.03	–	
9. Education level	–	–	0.03	−0.22	−0.14	0.00	−0.08	−0.10	−0.16	−0.10	–
10. Education diversity	–	–	−0.06	0.12	0.08	0.02	0.04	0.03	0.12	0.19	−0.28*

Notes: *$p < 0.05$; **$p < 0.01$

Table III.
Means, standard deviations, correlations and square roots of AVE in diagonals

which is above the recommended standard of 0.70 (Huang and Li, 2009). Composite reliability ranges from 0.87 to 0.96, which is higher than the 0.70 criterion (Bagozzi and Yi, 1988). Therefore, we concluded that the measures demonstrate internal consistency.

Results

Table III shows the means, standard deviations and correlations for all the variables, as well as the square roots of AVE in diagonals. As shown in Table III, the correlation between relationship conflict and team creativity is significant and negative, but the correlation between task conflict and team creativity is non-significant. Shared leadership is positively associated with team creativity.

We used hierarchical regression analysis to test our ideas because this technique allows the examination of statistical associations for evidence of nonlinearity (Lechner *et al.*, 2010). Consistent with previous research (Lechner *et al.*, 2010), we centered all independent variables before entering them into the regression models and before creating cross-product terms. Nonlinear components are represented by squared variables. Entering the independent variables in one block and the squared variables in a second block enables one to determine the significance of curvilinear relationships that goes over and above any linear relationships. In regression models, a curvilinear relationship is evident if the addition of the nonlinear predictor results in significant incremental variance after the linear relationships have been considered (Cohen *et al.*, 2003). Multiple hierarchical regressions are widely used to assess curvilinear relationships in team creativity literature (De Dreu, 2006; Farh *et al.*, 2010).

Table IV shows the results of regression analysis. The variance inflation factors for all coefficient estimates were below the cutoff of 10 (Cohen *et al.*, 2003), which indicate that multicollinearity does not contaminate the results. We included six control variables in Model 1. Among the controls, the coefficient for team tenure was significant ($\beta = 0.32$, $p < 0.05$).

We added the two independent variables in Model 2. Results show that relationship conflict was significantly and negatively related to team creativity ($\beta = -0.57$, $p < 0.01$),

Variables	Team creativity				
	Model 1	Model 2	Model 3	Model 4	Model 5
Team size	0.10	0.03	0.04	0.04	0.01
Team tenure	0.32*	0.33*	0.28*	0.28*	0.28*
Team type	−0.24	−0.22	−0.23	−0.18	−0.19
Company type	−0.16	−0.14	−0.17	−0.12	−0.16
Education level	0.01	0.03	0.03	0.14	0.11
Education diversity	0.08	0.03	0.04	0.06	0.02
Relationship conflict		−0.57**	−0.53**	−0.50**	−0.54**
Task conflict		0.02	0.09	0.10	0.13
Task conflict squared			−0.33**	−0.35**	−0.26*
Shared leadership				0.17	0.15
Relationship conflict × shared leadership					0.24*
Task conflict × shared leadership					−0.20*
Task conflict squared × shared leadership					−0.27*
R^2	0.05	0.37	0.46	0.50	0.59
ΔR^2		0.32	0.09	0.04	0.09
F value	1.42	4.82**	5.93**	6.47**	6.86**

Notes: *$p < 0.05$; **$p < 0.01$

Table IV.
Results of regression analysis for team creativity

which supports *H1*. The overall model was significant ($R^2 = 0.37$) and showed a significant change in the multiple squared correlation coefficient (R^2) compared with Model 1.

To test for curvilinear relationships, we added quadratic terms to the regression equation in Model 3. As shown in Model 3, the squared terms for task conflict was negative and significant ($\beta = -0.33$, $p < 0.01$). The change in R^2 was also significant, which supports the salience of curvilinear effects (Cohen and Cohen, 1983), as stated in *H2*.

We added shared leadership as the moderator in Model 4. Results show that shared leadership was non-significantly related to team creativity ($\beta = 0.17$, n.s.). By using the procedures proposed by Aiken and West (1991), we introduced cross-products composed of the non-squared and squared interaction terms in Model 5.

In Model 5, the linear interaction term for relationship conflict and shared leadership ($\beta = 0.24$, $p < 0.05$) and the change in R^2 is significant. This result suggests that shared leadership moderates the linear effects of relationship conflict on team creativity. To facilitate the interpretation of the interaction, we followed the recommendation of Aiken and West (1991). We plotted the simple slopes for the relationship between relationship conflict and team creativity at one standard deviation above and below the mean of shared leadership (i.e. high shared leadership and low shared leadership; see Figure 1). Figure 1 suggests that shared leadership weakened the association between relationship conflict and team creativity, which agrees with *H3*. To test this interpretation, we statistically compared the two slopes to zero. As expected, relationship conflict significantly predicted team creativity (simple slope = -0.76, $p < 0.01$) at low shared leadership, and was non-significant (simple slope = -0.10, n.s.) at high shared leadership.

Finally, the squared cross-product term for task conflict and shared leadership is significant and negative ($\beta = -0.27$, $p < 0.05$) in Model 5. To facilitate the interpretation of this effect, we plotted the relationship between task conflict and team creativity with one standard deviation above and below the mean of shared leadership (i.e. high shared leadership and low shared leadership). Figure 2 shows a very slight curvilinear relationship between task conflict and team creativity at a low level of shared leadership. However, the curvilinear relationship between task conflict and team creativity is strengthened at a high level of shared leadership, and a clear inverted U-shaped relationship is observed. Therefore, our results support *H4*.

To better understand the curvilinear relationship, we compared this relationship under low shared leadership with that under high shared leadership. We plotted the curvilinear relationship between task conflict and team creativity with one standard deviation above and below the mean of shared leadership. Table V presented the regression coefficients for the two models and the corresponding inflection points. As shown, the inflection point for
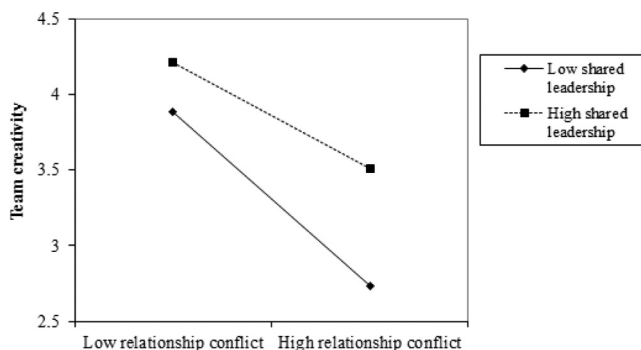

Figure 1.
Interaction effect of relationship conflict with shared leadership on team creativity
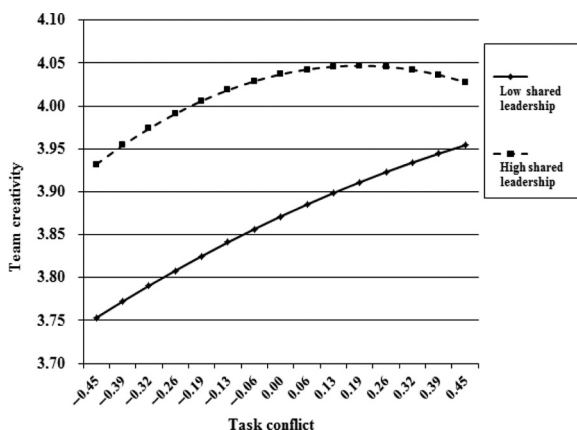
Figure 2.
Moderating effect of
shared leadership on
the curvilinear
relationship between
task conflict and team
creativity

Task conflict–team creativity	Regression coefficients (β)				**Table V.**
	Intercept (β_0)	Linear (β_1)	Quadratic (β_2)	$Z_{\text{inflection}} = -\beta_1/2\beta_2$	Inflection points computed for high shared leadership and low shared leadership
High shared leadership (+S.D.)	4.04	0.11	−0.28	0.20	
Low shared leadership (−S.D.)	3.87	0.22	−0.09	1.22	

high shared leadership is 0.20, and for low shared leadership is 1.22. This results provided further support for *H4*.

Discussion

This current research provides interesting insights into the complexity, dimensionality and context-bound nature of conflict in inter-organizational teams. In conceptualizing conflict as a multidimensional construct, we examine the relationships between two conflict types and team creativity in inter-organizational teams. Specifically, relationship conflict is negatively related to team creativity, whereas task conflict is related to team creativity in a curvilinear fashion. Compared with that at moderate level of task conflict, inter-organizational teams are less creative at low and high levels of task conflict. Therefore, this study indicates the importance of differentiating between relationship and task conflicts in inter-organizational teams. Our findings suggest that inter-organizational teams that seek high levels of team creativity should consider and resolve the challenges of exploiting the benefits of task conflict while minimizing the disadvantages of relationship conflict. According to Schulze *et al.* (2014, p. 58), "it has to be emphasized that conflicts are, in themselves, less important than the way in which they are managed". We therefore examine the contingency role of shared leadership in the conflict–creativity relationship because shared leadership is important in across-boundary innovation processes (Davis and Eisenhardt, 2011). We find that when shared leadership was stronger, the inverted U-shaped relationship with team creativity was stronger for task conflict, but the negative relationship with team creativity was weaker for relationship conflict.

Theoretical implications

First, this study provides empirical support for the antecedents of creativity of inter-organizational teams. Most inter-organizational collaboration studies focus on

investigating the relationship between partner organizations at the organization level (Stock and Tatikonda, 2008; Lengers *et al.*, 2013). However, other studies realized that implementation of inter-organizational efforts is considerably related to individual relationships (Bailey and Koney, 2000). For example, the precondition for inter-organizational collaboration is that key individuals need to connect personally and emotionally with the combined social purpose and with one another (Gajda, 2004). Thus, these studies emphasized the individual elements of the process (Bailey and Koney, 2000). As Zhang and Zhang (2013, p. 100) stated:

> […] it is logical that the inter-organizational interaction and relationships between these firms will be influenced by the attitudes of their representatives. To be more specific, the attitudes of their representatives toward conflict may influence their activities when friction occurs.

Instead of focusing on collaborative innovation at the organization level, we focus on the team level. We shift the emphasis toward the team-level perspective to gain further insights into the conflict–creativity linkages in inter-organizational teams. Our findings extend the knowledge of the differentiated effects of relationship and task conflicts on team creativity, and how different types of conflict and shared leadership interact to influence team creativity in the context of inter-organizational teams.

Second, this study provides an avenue for further exploring the relationship between conflict and team creativity in the domain of inter-organizational teams. Prior literature suggested that inter-organizational teams require more extensive coordination and intensive management than traditional intra-organizational teams, and they have their own set of unique difficulties, such as how to establish trust with a partner organization (Lawson *et al.*, 2009; Rampersad *et al.*, 2010). As such, a plethora of research has looked into the link between the benefits of collaboration, such as trust, commitment and information exchange among multiple partners (Davis and Eisenhardt, 2011; Humphreys *et al.*, 2009). Nevertheless, we know less of the role of conflict when actors seek to facilitate collaboration (Munksgaard *et al.*, 2012). As Nemeth *et al.* (2004, p. 367) stated:

> […] conflict, we suggest, may be superior to an emphasis on harmony, which is often at the expense of authentic differences. The efficacy of such an instructional focus on debate would be in direct contrast to the mainstream literature that emphasizes harmony and cohesion – and, especially, the avoidance of criticism.

Given that the inherently pressured environment in creative processes may easily trigger conflict (Song *et al.*, 2006) and inter-organizational teams face complicated conflicts (Drach-Zahavy, 2011), the present study documented the value of conflict for creativity in inter-organizational teams.

Third, our study presents different roles of relationship and task conflicts in affecting team creativity in inter-organizational teams. Previous studies argued that conflict constitutes one of the central processes associated with the internal dynamics of inter-organizational teams (Coles *et al.*, 2003). However, prior research on inter-organizational collaboration has often focused narrowly on the entire construct of conflict, and overlooked different types of conflict (Panteli and Sockalingam, 2005; Lengers *et al.*, 2013). For example, Humphreys *et al.* (2009) posited that the conflict between representatives of partner organizations can have a significant negative impact on inter-organizational relationships. Moreover, the inter-organizational relationships with low or well-managed conflicts will outperform those that have higher levels of conflicts. The current study departs from the tradition of studying conflict in a composite form. Specifically, relationship conflict has a negative relationship with team creativity, whereas task conflict has an inverted U-shaped relationship with team creativity in inter-organizational teams. These findings suggest that, relationship and task conflicts in inter-organizational teams are still critical

challenges for improving team creativity. To our knowledge, prior study did not explore the effects of task and relationship conflicts on team creativity in inter-organizational teams, thereby not presenting internal mechanism of relationship between team conflict and team creativity. Our findings, thus, augment the knowledge on the conflict–creativity relationship in inter-organizational teams. The differential effects associated with the two types of conflict can also facilitate further exploration of the inconsistent relationship between conflict and creativity across studies (De Dreu and Weingart, 2003).

Finally, our results indicate that shared leadership moderates the relationship between conflict (i.e. relationship and task conflict) and team creativity. Context-bound research on conflict in creativity has been rare (Farh *et al.*, 2010). Previous research largely neglected whether the effects of relationship and task conflicts depend on the level of shared leadership. Specifically, the present study shows that shared leadership could weaken the negative influence of relationship conflict on team creativity, thereby reinforcing the "positive influence of using shared leadership" (D'Innocenzo *et al.*, 2014) in the context of inter-organizational teams. Such a positive influence allows employees from partner organizations to work in conjunction with each other to address the challenge of relationship conflict in the inter-organizational team, thereby be more effectively to improve team creativity.

Moreover, our results present that shared leadership could strengthen the inverted U-shaped relation between task conflict and team creativity, which suggests that shared leadership has some disadvantages despite the advantages. With regards to advantages, in collectivistic and relationship-oriented cultures like Chinese culture, people tend to devote themselves to relationship building (Tjosvold *et al.*, 2005). In this vein, shared leadership can provide a venue whereby team members discuss task conflict openly and productively to achieve harmony and strengthen relationship (Huang, 2012). As such, shared leadership as a cooperating style of conflict management can facilitate integrating the opinions of the conflicting partners, thereby fostering team creative outcomes. Despite significant advantages, there are some disadvantages attached to shared leadership. When task conflict exceeds a moderate level, high shared leadership makes teams focus considerably on accommodating and compromising minority dissent (Robert, 2013; De Dreu and West, 2001), and allocating resources to adjust focal concerns (Farh *et al.*, 2010). Therefore, when excessive task conflict occurs, a high level of shared leadership may not be an effective way of managing task conflict because of high transaction and coordination costs, distraction from the task and group think, lack of overall direction and inefficient allocation of resources (Malhotra, 2012; Robert, 2013).

In sum, the present study provides an elaborate understanding of the conflict–creativity relationship by outlining an important contingency factor, that is, shared leadership in inter-organizational teams. Our findings, therefore, provide an empirical evidence of the conceptual argument that the consequences of conflict depend on the situational context of the conflict itself (De Dreu and Weingart, 2003; Farh *et al.*, 2010). Unlike in intra-organizational teams, shared leadership has both advantages and disadvantages in inter-organizational teams. Accordingly, the important contribution of the present study is to explore the various contingency role of shared leadership in the conflict–creativity relationship in inter-organizational teams, which responds to the call of Hogg *et al.* (2012) for further development in the analysis of intergroup leadership.

Practical implications
Managers are struggling to identify ways to effectively manage team conflict when a team of diverse individuals across organizational boundaries are brought together to solve a

problem (Hinds and Mortensen, 2005). The findings of this study offer some guidance on how managers can intervene in the conflict situations of inter-organizational teams. First, our finding suggests that relationship conflict is detrimental to team creativity in inter-organizational teams, particularly under low shared leadership. Hence, we suggest that managers who seek to foster the creative potential of collaborative teamwork should address the challenges of minimizing the disadvantages of relationship conflict. To this end, managers need to intervene and potentially act as conflict monitors to prevent the affective level of inter-organizational teams from escalating into a destructive process. Further, if interpersonal misunderstanding and distrust across different organizations remain unresolved, a high level of shared leadership can mitigate the effects of interpersonal emotional clashes on the generation of novel and useful ideas in inter-organizational teams. Hence, managers should promote mutual influence that allows team partners to disperse leadership activities throughout a work group. For example, managers should circumvent any suppressing effect on knowledge exchange among team partners, motivate team partners to participate in the decision-making process and encourage team partners to offer guidance to each other to achieve group goals (Pearce and Conger, 2003; Wood and Fields, 2007).

Second, our findings suggest that managers who seek to increase the creativity of inter-organizational teams should control task conflict at the moderate level. For example, to control the level of task conflict, managers should build communication channels through which partner teammates can voice and receive dissenting opinions (De Clercq et al., 2009). Yet, managers not only allow teammates to share their disagreement about task, but also prevent them from developing endless disagreements on task issues. Under this condition, managers should keep in mind that divergent and novel ideas only translate into creative outcomes when there is sufficient agreement with regard to the ultimate solution that should be implemented. Therefore, managers can intentionally find ways to integrate the ideas raised by team partners into a creative solution, rather than letting them bring forth new ideas simply for the sake of discussion (Farh et al., 2010).

Furthermore, our findings present that the relationship between task conflict and team creativity is not a static situation, which suggests that managers of collaborative innovation projects should pay attention to shared leadership. Specifically, when the level of task conflict is low or moderate, managers should encourage shared leadership to exploit the benefits of task conflict. For example, managers could encourage the representatives of partner organizations to lead each other, shape collective activities in identifying opportunities and challenges and give and receive feedback (Pearce and Conger, 2003; Fletcher and Käufer, 2003). However, managers should realize that increased shared leadership may nullify gains from increased task conflict beyond a certain degree. Therefore, they should try to control shared leadership when task conflict reaches beyond a certain degree. This finding indicates that hierarchical leadership may be better than shared leadership in inter-organizational teams.

Future research and limitations
This study has certain limitations. First, the present research is cross-sectional, which did not establish causality in relationships. Conceivably, the relationship between conflict and team creativity could be reversed. For example, high levels of team innovation may decrease conflict if such innovation was intended and may thus represent positive performance feedback (Peterson and Behfar, 2003; De Clercq et al., 2009). Future research should employ longitudinal designs that can assess the relationship between task conflicts and team

creativity at various points in time. Longitudinal studies can better analyze causal inferences.

Second, we collected data from 54 inter-organizational teams, which comprised 54 team managers and 276 team members. Although the literature has widely treated about 50 inter-organizational teams as the acceptable size (Van Der Vegt and Bunderson, 2005; Eisenbeiß and Boerner, 2010; Rapp *et al.*, 2013; Li *et al.*, 2016), the small size in the current study is still a limitation. Meanwhile, there were 29.6 per cent teams having more than 16 members in the current study. The large team size may cause potential missing values from the data set. Therefore, a larger sample and different samples would be helpful for confirming our findings and elucidating the functional meaning of these findings.

Third, in reviewing the correlation between task and relationship conflicts, Simons and Peterson (2000) found an average correlation of 0.47. However, the correlation between task and relationship conflict in the present study is 0.26. Although the literature has suggested the transformation of task conflict into relationship conflict, whether task conflict can motivate deeper discussions or trigger relationship conflict depends on team attributes (Huang, 2010; Van Knippenberg *et al.*, 2004). It is suggested that some appropriate team attributes (e.g. team composition) may unbundle the link between task and relationship conflict (Huang, 2010). For inter-organizational teams, individuals from different companies need to bring together heterogeneous resources to collaboratively achieve creative tasks (Drach-Zahavy, 2011). Such relationship atmosphere could help facilitate common understandings and rules that team partners bring to joint activities, reducing transactional uncertainty and facilitating coordination (Jones and Lichtenstein, 2008). These common understandings and rules will act in such a way that team partners are less likely to take offense due to disagreements, and thus, could be expected to be less negative in addressing task conflict (Parayitam *et al.*, 2010; Yang and Mossholder, 2004). Indeed, "conflicts may be reduced by the existence of a favorable relationship 'atmosphere', which generates mutual understanding, common rules and routines" (Welch and Wilkinson, 2005, p. 206). Following the focus of the literature on the contingency factors in the transformation of task conflict into relationship conflict (Curseu *et al.*, 2012), future research could explore other potential moderators in the linkage between task conflict and relationship conflict under inter-organizational team context.

Fourth, our study focused on inter-organizational teams that are predominantly populated by highly educated team members. Although the results showed that education level and education diversity did not play a significant role in our model, the following concern may still be raised: "Would the model work the same way in case team members are less educated?" Future research could examine whether and how these educational factors, especially education diversity, influence team conflict, shared leadership and team creativity in inter-organizational teams.

Fifth, we only explored the role of shared leadership in the conflict management under inter-organizational team context. Future research on the conflict management may examine the roles of other factors, such as the governance of inter-organizational teams or the timing of conflict. For example, past works have highlighted the importance of the governance of inter-organizational relations (Jones and Lichtenstein, 2008). When structural or control-based governance of inter-organizational relationships is high, team partners will not partake confidently because their concerns, ideas and information may be not considered by other's decisions (Muthusamy and White, 2005). As such, team partners are more apt to hide their own ideas, and choose to ignore the existence of conflict. On the contrary, when relational or trust-based governance of inter-organizational relationships is high, team partners will be more likely to discount

their emotional blips, and less likely to take offense owing to disagreements (Jones and Lichtenstein, 2008). Thus, team partners with high trust tend to make concerted efforts to resolve the conflict rather than to ignore the existence of conflict (Parayitam *et al.*, 2010). Furthermore, conflict issues associated with the stages of project are important because different stages of inter-organizational project contribute to understanding inter-organizational team change and development processes (Chen, 2006). When task conflict emerges at the later stage of the inter-organizational collaboration, teams cannot easily change their established plans, and can no longer afford resources and time to incorporate different ideas into creative outcomes (Ford and Sullivan, 2004; Farh *et al.*, 2010). As such, any potential for creativity due to task conflict may go unrealized at the end of the inter-organizational collaboration. Therefore, increased shared leadership may nullify gains from task conflict at the end of inter-organizational collaboration.

Finally, we conducted the survey in China, which may limit the generalizability of our findings. The literature has presented that China has specific cultural, economic and institutional mechanisms. Scholars should be cautious when generalizing the results of the current study in other contexts. Future studies can compare our study's findings from different settings to obtain interesting results.

Conclusion
Although the existing literature indicates that inter-organizational teams should deploy shared leadership in a manner that addresses team conflict, the existence and nature of the interaction between conflict and shared leadership and its influence on team creativity in the context of inter-organizational team lack empirical support. In the current study, we applied both conflict and leadership perspectives to identify the complicated interrelationships between shared leadership, task conflict and relationship conflict in inter-organizational teams. We obtained evidence linking the leadership–conflict interaction and team creativity. The current study presented that shared leadership moderates the linear relationship between relationship conflict and team creativity, and the inverted U-shaped (curvilinear) relationship between task conflict and team creativity. Our findings provided new empirical insights into the theoretical conceptualization of shared leadership–conflict interaction, and empirical support for theoretical propositions linking the shared leadership–conflict interaction with inter-organizational team creativity.

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