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DOCTORAL THESIS

Ties, Leaders, and Teams: A Social Network Approach

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To my Father

apoyo y por hacer más agradable el día a día, haciendo de nuestro lugar de trabajo un espacio más acogedor y entretenido para investigar.

A mis amigos por entender y respetar el esfuerzo que suponía la realización de esta Tesis Doctoral. A Nico por su amistad, paciencia y generosidad. A Ana por su mezcla de inteligencia, comprensión y cariño. Gracias por creer en mí y darme la fuerza necesaria para terminar la última fase de esta Tesis. A mis amigos de Moixent, Eugeni, María José, Juanan, Anna, Iván y Dani por estar siempre a mi lado. Y digo siempre, porque desde los 4 años llevamos compartiendo vivencias. A Salva, Jorge, Álvaro, Carlos y Lucas por recordarme la suerte que tengo de tener unos amigos como ellos. A Jero, por su ejemplo de lucha y honestidad. A María por su espontaneidad y su saber escuchar. A Pedro, Roberta y Cristina, por apoyarme desde la distancia. A Iván y Duga por ayudarme a desconectar y hacerme reír constantemente. De mi etapa en Londres, me gustaría agradecer a Fernando, Mathias y Dani por acogerme, cuidarme y quererme como si fuera de su propia familia. Por último, a mi amigo Jordi y sus padres, que me han enseñado a creer que todo es posible con esfuerzo.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1:

General Introduction

1.1 INTRODUCTION, JUSTIFICATION AND GENERAL OBJECTIVES OF THE THESIS.

A great extent of management theory and research considers that individuals are embedded in social networks which provide opportunities to organizations. These organizations are increasingly using teams rather than individuals to perform key tasks because they contribute to greater access and exchange of information, being more flexible and autonomous (Mohrman, Cohen, & Mohrman, 1995). McGrath (1997, p. 16) suggested that "researchers need to borrow and invent new ways of thinking about teams and new tools for doing research on them—conceptions and tools that allow us to seriously (not just rhetorically) conceptualize and study teams as complex, adaptive, dynamic systems."

A network perspective can be related to team research because it centers on the patterns of interactions between individuals, in contrast with the actions of an isolated individual. Social Network researchers have long accepted that team structure is the basis for many team processes and outcomes. Early studies take us back to the 1950s when social psychologists conducted laboratory experiments demonstrating that actors in a central position in communication networks were related to group performance when solving problems, with perception of leadership and member satisfaction (Bavelas, 1950; Leavitt 1951). Until the 1990s, the literature on social networks and teams followed different independent

paths (Friedkin, 1999). Recent findings suggest that social network structure can play a critical role in team performance (Sparrowe, Liden, Wayne and Kraimer 2001; Hansen, 1999; Reagans, Zuckerman, & McEvily, 2004; Oh, Chung, & Labianca, 2004; Cummings and Cross, 2003; Balkundi & Harrison, 2006), team conflict (Labianca, Brass, & Gray, 1998; Baldwin, Bedell, & Johnson, 1997), or team leadership (Mehra, Dixon, Brass, & Robertson, 2006; Oh, Labianca, & Chung, 2006).

The purpose of this thesis is to examine the social underpinnings of employee outcomes in team-based organizations at the individual, team, and interteam levels of analysis by which Social network analysis and team research can be integrated. A social network is a social structure that consists of individuals called *nodes*, which are connected by one or more *types* such as friendship, dislike, knowledge or prestige. The benefits of social networks are their capacity to create, distribute, screen and enrich information (Campbell, Marsden, & Hurlbert, 1986; Coleman, 1990; Granovetter, 1973). Burt (1997) elaborates on this benefit by affirming that a network allows a team member access to valuable information which could not be handled alone.

The literature on the effects of position and structure on network outcomes at different levels of analysis has increased considerably over the last decades. For instance at individual level, Sparrowe et al. (2001) found that individual job performance was related to centrality in the group's advice network. Also, Burt (2004) analyzing an American electronic organization found that managers whose networks have many structural holes were more likely to generate ideas. At group level, using a sample of 38 teams in five different organizations with 190 employees, Sparrowe et al. (2001) found that group performance was negatively related to density in the hindrance network. Nevertheless, the density in the advice network did not reflect significant results related to group performance. Some of these studies have also investigated cross-level

network effects. In a study of 182 project teams of a multinational corporation, Cummings and Cross (2003) showed that leaders who occupied structural holes in their teams negatively influenced group performance. Based on a meta-analysis of teams in organizations, Balkundi and Harrison (2006) suggest that leaders performed better when they were centrally located in their team network. Additionally, both studies demonstrated greater team performance when there was dense interaction between members (Balkundi & Harrison, 2006) which was distributed equally and at the same time non-hierarchical (Cummings & Cross, 2003).

The fundamental premise of social network research is that individuals are "embedded in networks of interconnected social relationships that offer opportunities for and constraints on behavior" (Brass, Galaskiewicz, Greve, & Tsai, 2004: 795). An actor in a central position is highly involved with others (Wasserman & Faust, 1994), and these ties turn him/her into a prominent figure for other members of the network (Knoke & Burt, 1983). Central positions are much more prone to having social influence, positive performance ratings as well as a greater possibility of being promoted (e.g., Baldwin et al., 1997; Brass, 1984; Ibarra, 1993). This is probably one of the reasons why centrality has become one of the most popular individual network dimensions studied by researchers which at the same time has allowed them to advance the investigation of a variety of areas such as power (Brass, 1984), the capacity to influence decision making (Friedkin, 1993), innovation (Ibarra, 1993) and job performance (Sparrowe, et al., 2001). For instance, examining friendship ties among 88 sales group leaders in a financial services firm, Mehra et al. (2006) discovered that centrality of these leaders positively influenced objective performance measures such as sales revenue and customer loyalty.

The main objective of this thesis is to adopt a social network perspective in order to advance our understanding of employee performance outcomes

at the individual, team, and interteam levels. With this purpose, this thesis has been divided into three different studies. First, contributing to literature on leader social network ties and team performance examining the main and interactive effects of leader multiplex ties on team performance. Second, extending literature concerning organizational intergroup relations, social network theory, and the design of team-based work. It examines the interaction of intrateam density and strong ties across teams predicting managerial intergroup effectiveness ratings differentially for low versus high levels of resource-interdependence. Third, providing a new perspective to literature in social networks, employee creativity, and leadership. It analyzes the relationship between leaders' social influence related interactions among other leaders and senior managers and their employees' development of creative ideas (see Figure 1.1).

Figure 1.1 Thesis Objectives

TIES, LEADERS, AND TEAMS: A SOCIAL NETWORK APPROACH		
Study 1	**Study 2**	**Study 3**
Leader Multiplex Ties and Team Performance	A Social Network Approach to Dyadic Team Effectiveness	Leader Ties and Employee Creativity
Can Leader Multiplex Ties Call the Difference for Team Performance?	Can Strong Ties and Team Interdependence Predict Dyadic Team Effectiveness?	Benefits from Well-Connected Leaders on Employee Creativity?

(Research Question)

1.2 BACKGROUND AND METHODOLOGY

Based on two different projects, I present three empirical studies on two technical and service organizations in Spain. The first research project, based on Study 1 and Study 2, was a joint collaboration between the University of Valencia and Instituto de Empresa whose aim was to examine the effect of team processes, intergroup relations, leadership, and social relationships, on team and interteam performance outcomes (Appendix 1). 361 employees in 93 teams, answered a questionnaire that measured variables regarding how their team worked together (e.g., group boundaries, frequency of communication, or team performance), their relationship with members of another team (e.g., information or advice obtained from a specific person, or intergroup effectiveness), and some biographical details needed to enable us to compare the views of different members of the staff (e.g., age, gender, team tenure) (Appendix 2). Besides, we contacted the line managers of each work team to obtain managerial ratings of team performance and intergroup effectiveness (Appendix 3). Six months and two years after the first questionnaire, we distributed the same questionnaire to line managers in order to allow examination of longitudinal change. To be able to analyze the data in Study 1 and 2, we first used UCINET 6, a software package for the analysis of social network data (Borgatti, Everett, & Freeman, 2002), and secondly, we ran a Multiple Linear Regression in SPSS in order to find the final results.

The second project, study 3, was a joint research project of the Universities of Cambridge, Maryland, Valencia, and Instituto de Empresa. It aimed to examine the relationship of social networks, team processes, and leadership with team members' creative performance & team innovation (Appendix 4). 218 employees in 30 teams answered a questionnaire that measured variables such as, how their social network worked together (e.g. frequency of interaction), about themselves (e.g., creative self-

efficacy), their current job (e.g., psychological empowerment), their team leader (e.g. face time with team leader), their team (e.g., team creative environment), and some biographical details necessary to compare the views of the rest of the team members (e.g., gender, educational level) (Appendix 5). The team leaders were asked to answer an evaluation sheet about their team members (e.g., team members developed ideas), views regarding how their social network worked together (e.g., nature of their personal relationship), about their views regarding themselves (e.g., political skill), about their job and their senior manager (e.g., felt accountability), and finally were asked for some biographical details (e.g., age or educational level) (Appendix 6). In the same line, senior managers were asked how their social network worked together and to answer an evaluation sheet of each one of their teams. However this information was not used in study 3 (Appendix 7). In addition, we conducted in-depth interviews with 7 senior managers in order to form a conjecture of the processes that comprise the development of creative ideas, and to better understand our quantitative results (Appendix 8). We also performed an analysis of social network data using UCINET 6 (Borgatti et al., 2002). After that, we analyzed data with Hierarchical Linear Modelling (HLM) to understand the relationship between the variables analyzed from a multi-level perspective (individual-group).

1.3 THESIS STRUCTURE

This thesis is structured into 5 chapters. Chapter 1, provides a general introduction that presents the main ideas in social network analysis in order to frame and contextualize the research questions. The following three chapters include three studies with their own introduction, theoretical framework, hypotheses, results, limitations and future research. These three independent empirical chapters form part of a general study aimed at collecting the results presented independently and provide a general overview of the possible nexus between the strategies.

Finally, in addition to the partial conclusions presented in each of the three previous chapters, Chapter 5 offers a general conclusion that summarizes the main findings.

Following the structure mentioned above, Chapter 2, Study 1 proposes a contribution to the literature on leader ties and team performance. First, it seeks to further develop the study of leader simplex ties to multiplex ties that comprise instrumental ties as well as expressive ties (Granovetter, 1985; Ingram & Roberts, 2000; Ingram & Zou, 2008; Zelizer, 2005). It shows that leaders who occupy central positions in multiplex team networks can influence team performance strongly. Secondly, it contributes to analyzing the differential moderating role of leader multiplex ties on team performance. It discusses how relevant are these ties for teams, comparing the benefits of dense hindrance networks for teams that have difficulties in their relationship with the redundancy in teams with dense friendship networks because the actors are capable of exchanging information and resources without the necessity of a leader.

Chapter 3, Study 2 presents three contributions to the prediction of dyadic team effectiveness from a social networks perspective. First, our approach on informal social networks is an extension to theoretical and empirical efforts made to find alternative predictors of effective intergroup relations. Second, it seeks to extend the study performed on single teams regards the performance implications of the structure of dyadic team ties. And thirdly, it emphasizes the importance of aligning informal social relationships within and between teams with interteam interdependence (cf. Krackhardt & Stern, 1988).

Chapter 4, Study 3 examines the positions of the leaders in three interaction networks among other leaders in the organization and how these positions may further complement the creative benefits performed by employees' own external network ties. It centers on how a leader's central position is going to influence the creation of ideas, the promotion

of those ideas among team members as well as a leaders' ability to convince senior managers in order to obtain sponsorship. It also analyses how these leader network positions further benefit team members' own external network ties.

Chapter 5 presents the overall conclusions based on main findings.

Chapter 2:

Leader Multiplex Ties and Team Performance

2.1 INTRODUCTION

Organizations often revert to team based work in order to maintain flexibility, optimal information exchange, and responsiveness to ever increasing demands (Mohrman et al., 1995). Teams that perform effectively represent important building blocks for organizational performance and survival (Kozlowski & Bell, 2003). Much research has therefore sought to identify predictors of work team effectiveness (e.g., Gladstein, 1984; Hackman, 2002; for overviews, see Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Kozlowski & Bell, 2003). In this regard, a key question that team researchers tried to answer is that of the role of team leaders' social network ties for their teams' performance (e.g., Mehra et al., 2006; Oh et al., 2006). A well-established finding that emerged from this research is that leaders' central position within their teams' informal social networks positively predicts team performance (Balkundi & Harrison, 2006).

Despite considerable progress, the study of leader networks and team effectiveness has left important questions unanswered. For instance, most of the studies on leader ties and team performance examined the effects of simplex networks only (representing a single type of relation; Hanneman & Riddle, 2005). So was Mehra et al.'s (2006) analysis based exclusively on friendship ties. However, many of the classic (e.g., Blake & Mouton, 1964; Fiedler, 1971) and contemporary (e.g., Bass & Avolio, 1994) leadership

theories suggest that effective leadership comprises aspects of both relationship and task orientation. In analogy to these theories, one could expect that the social network ties of effective leaders ideally comprise both instrumental (aimed at fostering work-role performance) and expressive (aimed at providing friendship and social support; Lincoln & Miller, 1979) ties with their followers, rather than only instrumental or affective ties. A theoretical and empirical examination of the effects of leader multiplex ties — ties that capture more than one type of relation, such as both instrumental and expressive ties (Marsden & Campbell, 1984; Verbrugge, 1979, pp. 1287; Wasserman & Faust, 1994) — is however largely missing (Beckman, Schoonhoven, Rottner, & Kim, in press). Social network researchers have included communication, friendship, and adversarial networks in the same study (Baldwin et al., 1997; Labianca et al., 1998), but up to now, no other studies at the organizational team level, have been made on the overlap in any of these network types.

Moreover, although the positive effect of leader centrality in simplex team networks on team performance is well established (e.g., Balkundi & Harrison, 2006), the facilitating role that leader centrality may also play in shaping the effects of team member ties for team performance remains largely unexplored. As Balkundi and Harrison (2006, p. 63) highlight, "Subsequent studies also need to explore whether certain network structures (e.g., centrality) moderate the effects of other network properties (e.g., network density)." Such a moderation analysis applied to team leader and member ties may allow to assess the relative importance of leader ties vis-à-vis member ties, as well as to illustrate the conditions under which leader ties are particularly important versus redundant for team performance.

We aim to address these questions in this study, and thereby to contribute to the literature on leader ties and team performance in various ways. Our first contribution is to extend the study of leader simplex ties — the focus of

most prior studies—to leader multiplex ties comprising both instrumental and expressive ties (Granovetter, 1985; Ingram & Roberts, 2000; Ingram & Zou, 2008; Zelizer, 2005). Because multiplex ties are stronger, last longer, and are more efficacious than simplex ties (Coleman, 1988; Marsden & Campbell, 1984), leaders who assume central positions in multiplex team networks may have a particularly strong influence on team performance.

Our second contribution concerns the moderating role of leader multiplex ties. We develop a contingency framework in which we propose that leader multiplex ties have differential moderating effects on team performance, depending on the content of their teams' networks. Specifically, we argue that leader multiplex ties are particularly relevant for teams that have troublesome relationships, such as teams with dense hindrance networks (Sparrowe et al., 2001), because leader centrality in team multiplex networks may provide leaders with the clout and power to bring the team back on track. Conversely, leader multiplex ties may be redundant for teams with dense friendship networks, because the emotional closeness among team members may enable such teams to exchange information and resources without help from their leader. Figure 2.1 serves as a roadmap summarizing study hypotheses.

Figura 2.1 Conceptual Model of Study 1
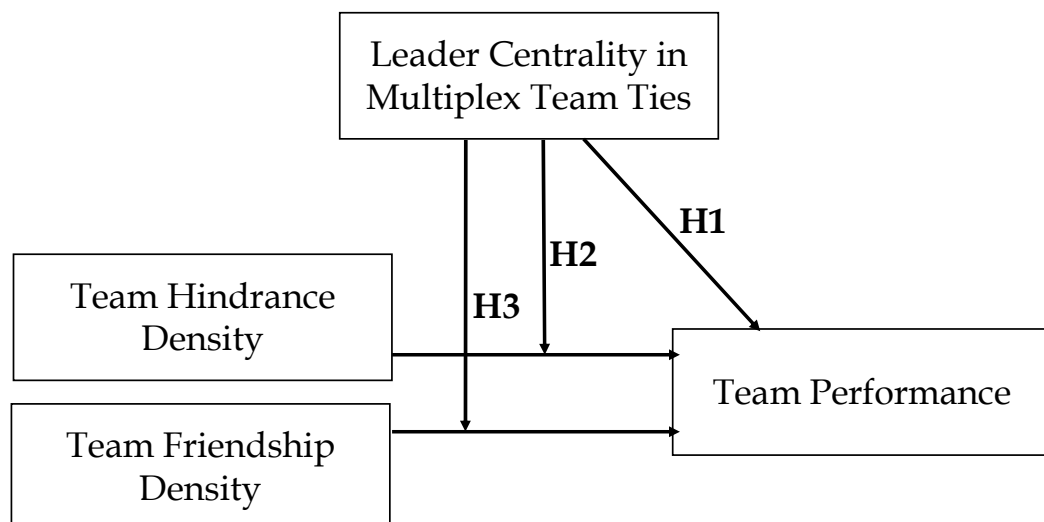
2.2 THEORY AND HYPOTHESES

2.2.1 Leader Multiplex Ties and Team Performance

Team leadership plays an important role for team performance (Hackman, 2002). The structural approach to leadership is concerned with the informal network ties that leaders develop, as well as with the positions that leaders occupy within these networks (e.g., Balkundi & Kilduff, 2006; Brass & Krackhardt, 1999; Oh et al., 2006). This approach suggests that the social relationship ties that leaders develop to others inside and outside of their teams may affect team performance in various ways.

Leaders who occupy a central position within their teams are exposed to a great amount of information on the tasks being performed by different team members (Friedkin & Slater, 1994; Knoke & Burt, 1983). Because employees often do not directly interact with each other (Oh et al., 2006), leaders who are central in the informal networks among their employees may exercise a larger amount of control over their teams (Krackhardt, 1996). Such leaders may become a critical hub for information and resource exchanges across team members, which in turn can make them indispensable for the team. As such, central leaders—via their structurally advantageous position—tend to develop comprehensive views of their team's social structures, which in turn can lead to insights that help them make better decisions (Balkundi & Harrison, 2006). In sum, central leaders can use their informal power provided in part by their network position to exert control over resources and information, provide direction to team members, and improve their decision making, resulting in enhanced team performance outcomes.

However, the extant research on leader ties and team performance has been largely limited to leader centrality in simplex networks. So did research across different types of organizations, such as in the military (Levi, Torrance, & Pletts, 1954), academia (Friedkin & Slater, 1994), or

organizational sales teams (Mehra et al., 2006), draw on instrumental or expressive ties, respectively, without considering their joint or simultaneous effects (Rock & Hay, 1953). However, simplex leader ties—although important—may fall short in capturing the complexity of effective leader networks. This is implied by classic (e.g., Blake & Mouton, 1964; Fiedler, 1971) and contemporary (e.g., Bass & Avolio, 1994) leadership theories suggesting that effective leadership comprises both relationship and task orientation towards followers.

The social network equivalent to a leadership style that integrates task and relationship orientations may best be captured by leaders' multiplex ties comprising both instrumental (e.g., advice) and expressive (e.g., friendship) ties (Lincoln & Miller, 1979) with their subordinates. Leaders who assume central positions in such multiplex team networks may positively affect their team's performance via multiple mechanisms. Multiplex ties are especially strong if socio-emotional or affective ties overlap with instrumental ties (Kuwabara, Luo, & Sheldon, 2010). Relationship ties that are both expressive and instrumental reinforce friendship and professional relationships. If leaders share multiple bases of interaction, such as instrumental and expressive ties, they are much more prone to share information or resources (Kuwabara et al., 2010). These ties may develop a basis of trust, identity, and mutual care that promote cooperation, and create a productive team environment (Beckman et al., in press; Coleman, 1988; Hardin, 2002; Marsden & Campbell, 1984). We therefore propose that multiplex leader ties positively predict team performance above and beyond team members' own multiplex ties.

Hypothesis 1: Controlling for member multiplex tie density, leader centrality in multiplex team networks positively predicts team performance.

2.2.2 Leader Multiplex Ties, Hindrance Network Density, and Team Performance

Team performance can be adversely affected by an individual team member's negativity (Phelps, Mitchell, & Byington, 2006). Negative ties are characterized by fear, anxiety and disdain. Prior research suggests that negative ties produce team conflict leading to dissatisfaction, avoidance and tension reflected in team members' performance (Brown, 1983; Hackman & Morris, 1975; Pondy, 1967). Similarly, employees with negative ties are more prone to be less satisfied with their job as well as being less committed to the organization (Labianca & Brass, 2006). Teams are more influenced by negative rather than positive ties, even if they are less frequent (Baldwin et al., 1997). In a similar vein, teams where coworkers thwart task behaviors—i.e. teams with dense 'hindrance' networks—were found to suffer performance losses (Sparrowe et al., 2001).

Teams with dense hindrance networks may have a particularly strong need for leaders to assume central positions in team multiplex ties in order to facilitate team interactions. Such positions may present leaders with the necessary clout to centralize information and resource flow and redirect team efforts, thereby bringing a conflict-laden team back on track to meet performance standards. Moreover, leaders who occupy central positions in such networks may be optimally positioned to re-infuse motivation, as well as to influence their employees to open channels for coordination and conflict resolution. Therefore, the performance of teams with dense hindrance networks may benefit from their leaders occupying central positions in multiplex ties, comprising both affective and instrumental relationships. Multiplex leader ties promote stability, more intimacy of relationships and better diffusion of information (Minor 1983), reducing uncertainty (Albrecht and Ropp, 1984).

Conversely, in teams with dense hindrance networks, low leader

centrality in team multiplex relationships comprising both expressive and instrumental ties likely results in the team lacking direction, effective information and resource exchange, as well as positivity, in turn resulting in reduced team performance.

Hypothesis 2: Leader centrality in multiplex team networks positively moderates the relationship between hindrance network density and team performance, such that the relationship between density and team performance is more positive if leaders are central.

2.2.3 Leader Multiplex Ties, Friendship Network Density, and Team Performance

Leader multiplex ties may fulfill different functions if one considers friendship rather than hindrance relationships within teams. Relationships characterized by positive affective exchanges transmit a greater dose of enthusiasm, eagerness and a feeling of happiness among team members. Friendship ties connote greater intimacy, proximity and reciprocity (Lydon, Jamieson, & Holmes, 1997) than mere acquaintance ties. Friends show a tendency towards a high degree of consensus and sharing of values, interests and attitudes. Hence, the bonding link between friends is reflected by positive and affective preoccupations which help the relationship last, even when the frequency of their interaction is lower (Adams, 1967). Teams in which many members have friendship ties with one another (i.e., high density teams) may present a form of team social capital (Oh et al., 2006) that benefits effective team work via multiple mechanisms. For instance, high levels of emotional closeness among team members may trigger more and better information sharing and collaboration that is needed for effective task completion (Coleman, 1988). In line with this rationale, Balkundi and Harrison (2006) reported similarly strong and positive effect sizes for expressive (i.e., friendship) tie density as for instrumental (i.e., advice) tie density on team performance.

In teams with high levels of friendship density, fluent information and resource exchange may result in the leader being less relevant for team performance, even if the leader assumes a central position within the multiplex team network. In such teams, a central leader may provide somewhat redundant resources and information that add little to a team's performance. When communication among team members is facilitated by good relationships and mutual recognition, decisions are taken in consensus and information and advice flow interchangeably, leaving the leader in second place. Thus, team performance may depend less on leaders' centrality in team multiplex networks if teams have high friendship density. Conversely, if leaders are less central, high levels of friendship density may make a difference to a team's performance, because team members may compensate for the lack of leadership by exchanging information and resources directly among themselves, thus bypassing the leader.

In teams with few friendship relationships, on the other hand, leader centrality in multiplex team ties may make a difference to team performance. Because in such teams information and resource exchange is likely suboptimal, leaders may use their clout and informal power provided in part by their central network position to facilitate exchange across team members, which in turn should result in enhanced team performance. Conversely, if leaders are not central and friendship density within the team is low, information and resource exchange may be seriously impaired, resulting in low levels of team performance.

Hypothesis 3: Leader centrality in multiplex team networks negatively moderates the relationship between friendship network density and team performance, such that the relationship between density and team performance is positive if leaders are not central, but insignificant if leaders are central.

2.3 METHODS

2.3.1 Sample and Procedures

We tested our hypotheses with data from 84 administrative, technical and service teams of a public university in Spain. These teams worked in a variety of areas, such as Human Resources, International Relations and Cooperation Services, Training and Educational Innovation , Technical and Maintenance Assistance, Research, Accounts and Budgeting, and provided a series of services and resources (for example, career advice and legal counseling, research support, planning, library services, accounting, etc.) to faculty members, students and the general public.

At the onset of this study, a member of the research team (a native Spanish speaker) presented the broad research objectives to the University's management in order to garner support as well as information for this research. An organizational liaison person was assigned to the research team, who supported the project throughout, as well as provided details regarding the organizational structure, the teams' objectives, tasks and daily routines.

Following Kozlowski and Bell (2003), we use the terms 'team' and 'group' interchangeably. According to these authors, a team constitutes two or more members who perform organizationally relevant tasks, share one or more common objectives, interact socially, fulfill different roles and responsibilities, perform tasks interdependently, maintain and manage boundaries, and are embedded within the organizational context. Teams who met these criteria were invited to participate. Participation was incentivized by a raffle of two iPods among participants. Out of 96 teams that were invited, 93 (97% response rate) participated. Because leader centrality calculations require at least three members in a team, we further

excluded nine two-person teams, resulting in a final sample of 84 work teams.

These 84 participating teams were managed by one leader, who was a member of the team. In addition, the teams were overseen at higher management level by 82 line managers. We met with each of the teams' line managers in order to collect rosters containing the names of team members, as well as to collect team performance ratings. On the basis of this information, we created the preliminary English questionnaire using established measures. Following established procedures (cf. Brislin, 1980), two independent bilingual translators translated the surveys and rating forms from English to Spanish and back to English, in order to ensure the accuracy of the original scales and items. Subsequent pilot testing was performed with 13 employees who did not participate in the main study in order to gauge survey completion time, as well as to ensure that instructions and items were clear and unambiguous. Feedback resulted in slight rewording of a few single items.

We assured confidentiality before handing out the questionnaires to the 259 full time employees. 255 respondents (98.5%) provided useful replies. Team response rates for each individual team exceeded 80% (cf. Oh et al., 2004). Average team size was 4.08 employees (s.d. = 1.79; range 3-16). 200 (77.2 %) participants were female, and the average employee tenure with their team was 64.45 months (s.d. = 66.88). Respondents' were on average 43.46 years old (s.d. = 8.04). 65 (77.4%) team leaders were female, and the average tenure working with their team was 114.07 months (s.d. = 85.02). Leaders were on average 44.04 years old (s.d. = 7.16).

Team members' perception of the clarity of team boundaries as well as team stability were measured with two-item scales from Wageman, Hackman and Lehman (2005); ratings ranged from 1 ("*very inaccurate*") to 5 ("*very accurate*"). On average, groups had clear boundaries (for example,

"Team membership is quite clear—everybody knows exactly who is and isn't in the team"; mean = 4.56, s.d. = .38), were stable (for example, "This team is quite stable, with few changes in membership"; mean = 4.15, s.d. = .59). Interdependence among team members was measured with a single item, "Generating the outcome or product of this team requires a great deal of communication and coordination among members"; mean = 3.96, s.d. = .67; Wageman et al., 2005).

Each of the teams' 82 line managers provided ratings of team performance at the same time when the team surveys were distributed (Time 1), as well as two years later (Time 2), resulting in a 100% response rate at both Times 1 and 2. We considered that a two-year time gap served well as a conservative test for detecting truly enduring, longitudinal change in team performance. The on-site researcher received questionnaires and managerial ratings in sealed envelopes, thereby guaranteeing the anonymity of employee responses.

2.3.2 Measures

The team member questionnaire included control variables as well as a series of social network questions to measure friendship, advice, and hindrance networks in teams. Rosters of all team members including the team leader (Marsden, 1990) in alphabetical order asked participants to answer those questions about each person of their team (excluding themselves). All network measures were calculated using UCINET (version 6.497; Borgatti et al., 2002).

2.3.2.1 Advice and Friendship Leader Centrality in Multiplex Team Ties

Following Perry-Smith (2006), friendship relations were measured with team members' responses to a single item, "How close are you with each person?" (1 = "*acquaintance*," 2 = "*distant colleague*," 3 = "*friendly colleague*," 4 = "*good friends*," 5 = "*very close friends*"), over their leaders. To assess

advice relations, team members responded over their leaders to a single item by Chua, Ingram and Morris (2008), "Please indicate the extent to which you obtain information or advice from this person to get tasks done" (from 1= "*very little extent*" to 5 ="*Very great extent*").

In line with our theoretical rationale, leaders often shared friendship and advice ties with the same team member. We therefore computed multiplex ties following Prell (2012). As a first step, we computed individual friendship and advice simplex tie matrixes. Following Perry-Smith (2006), we coded a friendship tie as "1", if members indicated to be "*good friends*" or "*very close friends*" with a leader. The categories "*friendly colleagues*", "*acquaintance*", and "*distant colleague*" were coded "0". For the advice network, we coded "*great extent*" and "*very great extent*" as "1", and "*very little extent*", "*little extent*", and "*some extent*" as "0". The resulting matrixes of simplex relations were then combined into one multiplex tie matrix. If the two simplex matrixes showed the presence of advice and friendship ties, this was coded as "1" in the multiplex matrix. If either a friendship or advice tie (or no tie) were present, this was coded as "0" in the multiplex matrix. Although the use of multi-item measures to improve reliability is desirable, it is acceptable in network studies to limit network data collection to single-item measures in order to reduce participant fatigue and resulting poor response rates (e.g., Marsden, 1990). The final measure of leader centrality was calculated as leaders' normalized in-degree centrality (Sparrowe et al., 2001) within this team multiplex matrix.

2.3.2.2 Hindrance and Friendship Density in Teams

We measured friendship density based on team members' (excluding the leader) responses over all other team members on Perry-Smith's (2006) item described earlier. We measured hindrance networks with Baldwin et al.'s (1997) measure of adversarial relationships, asking team members to what extent the relationship with other team members was difficult. The scale ranged from 1 (*very little extent*) to 5 (*very great extent*). Because we

had valued data, measures of intrateam density were computed as the sum of the values of all ties divided by the number of possible ties (Hanneman & Riddle, 2005), thereby reflecting the average strength of ties across all possible ties within teams.

2.3.2.3 Managerial Ratings of Team Performance

Line managers assessed team performance (both Times 1 and 2) as the extent to which the team met its performance standards of quality, quantity, timeliness, implementation, and had a reputation for work excellence within the organization, based on Vinokur-Kaplan's (1995) 5-item scale ranging from 1 (*not at all*) to 5 (*completely*). This theory-based measure was chosen because it is generic enough to apply to a variety of teams in the service sector, thereby enabling comparisons of the extent to which various teams meet their respective performance standards. An example item is, "To what extent do you feel that this team met the standards of quality expected by your organization?" Cronbach's alpha was .74 (Time 1) and .91 (Time 2).

2.3.2.4 Control Variables

We controlled for a number of variables that could present potential confounds or alternative explanations for our findings. We thus controlled for team size, task complexity, clarity of team boundaries, team stability, and team interdependence. In order to assess longitudinal change in team performance after two years, we controlled for team performance Time 1, using the measure described above. Because one line manager oversaw three teams, we created a dummy code for each of these teams in order to control for possible effects of non-independence (Bliese, 2000).

Clarity of team boundaries, team stability, and team interdependence were assessed with Wageman et al.'s (2005) measures described in the "sample and procedures" section above. Cronbach's alpha was .78 for clarity of team boundaries, and .82 for team stability. Task complexity was

measured with three items from Dean and Snell (1991). The first two items were measured on a scale ranging from 1 (*very little*) to 7 (*a great deal*). The third item was measured on a scale ranging from 1 (*not at all*) to 7 (*very complicated*). Cronbach's alpha was .82.

As the focus of this study is on the importance of leader multiplex ties, we wanted to demonstrate their incremental effects above and beyond member multiplex ties. Member multiplex ties were computed in analogous fashion to leader multiplex ties, using the same simplex friendship (Perry-Smith, 2006) and advice (Chua et al., 2008) network measures introduced above, this time completed by team members (excluding the leader). Following the same procedure as for leader multiplex ties, we first computed simplex tie matrixes, and then combined them into one multiplex matrix. Based on this multiplex matrix, we calculated the final measure intrateam density measure (Hanneman & Riddle, 2005), reflecting the number of multiplex ties across all possible multiplex ties within teams.

2.3.3 Analytical Approach

To test our hypotheses, we ran moderated multiple regression analyses at the team level in SPSS. We centered main effects prior to computing interaction terms in order to reduce multicollinearity (Aiken & West, 1991). Variance inflation factors (VIF) across regressions were not significant and lower than 2.79, suggesting that multicollinearity did not distort results.

In order to rule out the alternative explanation that leader simplex ties (individually or in combination) show similar main or interaction effects on team performance, we ran a series of alternative models with leader centrality in advice and friendship networks (as well as their joint and interactive effects) on team performance. None of these models showed significant main or interaction leader network effects (Models 3a and 3b in

Table 2.2). We therefore conclude that it is leader multiplex ties described in this study (and not leader simplex ties) that explain significant variance in team performance.

2.4 RESULTS

Table 2.1 summarizes descriptive statistics and Pearson's correlations among study variables. Comparable to prior research (Sparrowe et al., 2001), hindrance density coefficients were relatively low across teams (mean = .20, s.d. = .17).

2.4.1 Hypotheses Testing

2.4.1.1 Main Effects of Leader Multiplex Ties

Hypothesis 1 posits that leader centrality in multiplex team ties positively predicts longitudinal change in team performance, after controlling for member multiplex ties. As the main effect model in Table 2.2 (Model 2) illustrates, the effect of leader centrality on team performance Time 2 (controlling for team performance Time 1, as well as various controls) was significant (β = .31, p < .05). Thus, Hypothesis 1 was supported. Relative to a model including only control variables (Model 1), the main effect model explained an additional 13% of variance.

2.4.1.2 Interactions between Leader Multiplex Ties and Team Density

Hypothesis 2 predicts that leader centrality in multiplex ties moderates the relationship between team hindrance density and team performance Time 2, such that for high leader centrality this relationship is more positive than for low leader centrality. Model 3c (Table 2.2) shows that the hindrance density in teams × leader centrality interaction on team performance Time 2 is significant ($\beta_{\text{interaction}}$ = .39, p < .001). Simple slope analysis (Aiken & West, 1991; Preacher, Curran, & Bauer, 2006) further showed that the relationship between hindrance density in teams and

Table 2.1 Means, Standard Deviations and Correlations for Team-Level Variables[a]

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1. Team performance Time 1	4.10	.51												
2. Team performance Time 2	4.11	.79	.21											
3. Team size	4.08	1.79	.06	.03										
4. Team boundaries	4.56	.38	-.04	-.15	-.28*									
5. Team stability	4.15	.59	-.13	-.03	-.22*	.52**								
6. Team task interdependence	3.96	.67	-.04	.30**	-.08	-.13	.04							
7. Team task complexity	4.90	.73	.02	.04	-.18	.22*	.11	.10						
8. Density of multiplex team ties	.13	.24	.25*	.22*	-.09	.20	.21	-.05	.07					
9. Hindrance density	.20	.17	.08	-.17	-.02	-.07	-.05	.01	.08	-.18				
10. Friendship density	.61	.12	.11	.35**	-.14	.22*	.18	-.06	.13	.56**	-.39**			
11. Leader centrality in advice team ties	74.47	27.91	.27*	.39**	-.26*	.05	-.01	.28**	.13	.37**	-.06	.35**		
12. Leader centrality in friendship team ties	39.62	37.14	.22*	.31**	-.04	.01	.15	.03	.16	.56**	-.07	.50**	.24*	
13. Leader centrality in multiplex team ties	35.22	33.56	.22*	.42**	-.10	.05	.12	-.01	.18	.65**	-.15	.60**	.48**	.83**

[a] n = 84 teams. * $p < .05$. ** $p < .01$

Table 2.2 Results of Regression Analyses on Team Performance Time 2[a]

Variables	Model 1	Model 2	Model 3a	Model 3b	Model 3c	Model 4
Control variables						
Team performance Time 1	.17	.16	.14	.24*	.24**	.24**
Team size	.02	.05	.08	.04	.09	.10
Team boundaries	-.15	-.13	-.20	-.16	-.16	-.15
Team stability	.04	.02	.05	.06	.13	.12
Team task interdependence	.29**	.31**	.24*	.34**	.38***	.37***
Team task complexity	.07	.00	.04	.08	.03	.03
Density of multiplex team ties	.19	-.14			.06	.06
Dummy team	-.19	-.11	-.15	-.15	-.04	-.04
Main effects						
Hindrance density		-.06	-.05	-.03	.07	.09
Friendship density		.24	.31*	.37**	.20	.21
Leader centrality in advice team ties			.18			
Leader centrality in friendship team ties				.06		
Leader centrality in multiplex team ties		.31*			.43**	.41**
Two-way interactions						
Hindrance density × leader centrality in advice team ties			-.01			
Friendship density × leader centrality in advice team ties			-.06			
Hindrance density × leader centrality in friendship team ties				.11		
Friendship density × leader centrality in friendship team ties				-.21		
Hindrance density × leader centrality in multiplex team ties					.39***	.42**
Friendship density × leader centrality in multiplex team ties					-.26*	-.27*
Hindrance density × friendship density						-.06
Three-way interaction						
Hindrance density × friendship density × leader centrality in multiplex team ties						-.05
ΔR^2	.11	.13	.00	.06	.21	.00
ΔF	2.87**	5.09**	.15	3.40*	16.84***	.13
R^2	.23	.37	.35	.39	.57	.58
F	2.87**	3.81***	3.24**	3.75***	7.24***	6.14***

[a]Standardized coefficients are reported. *n* = 84 teams. * $p < .05$. ** $p < .01$. *** $p < .001$.

team performance is positive and significant if leader centrality is high (b = .41, t = 2.86, p < .01), but negative and significant if leader centrality is low (b = -.30, t = 3.14, p < .01). Thus, Hypothesis 2 was supported. Figure 2.2 illustrates this relationship at high (mean +1 s.d.*)* and low (mean -1 s.d.) levels of hindrance network density.

Hypothesis 3 proposes that leader centrality in multiplex ties moderates the effect of team friendship density on team performance Time 2, such that team friendship density positively predicts team performance for low levels of leader centrality, but this relationship is non-significant for high levels of leader centrality. Initial support for this hypothesis is provided by the significant negative interaction term ($\beta_{\text{interaction}}$ = -.26, p < .05). Further probing of this interaction with simple slope tests (Aiken & West, 1991; Preacher et al., 2006) suggests that the relationship between friendship density in teams and team performance is positive and significant if leader centrality is low (b = .36, t = 3.15, p < .01), but non-significant if leader centrality is high (b = -.04, t = .31, p > .05). Thus, Hypothesis 3 was supported. Figure 2.3 illustrates this compensatory interaction effect.

The size and significance of hypothesized interactions may vary depending on which other interactions are included into a model (Aiken & West, 1991). As a conservative test (as well as a robustness check) of our interaction hypotheses, we therefore conducted the omnibus test proposed by Aguinis (2004, pp. 134-135) and included all three possible two-way interaction terms among leader and employee idea network variables, as well as the resulting three-way interaction term, into one model (Table 2.2, Model 4). Our 'targeted' two-way interaction terms remained significant, further highlighting the robustness of our findings.

Figure 2.2 The Interaction of Team Hindrance Density and Leader Centrality in Multiplex Team Ties on Team Performance Time 2
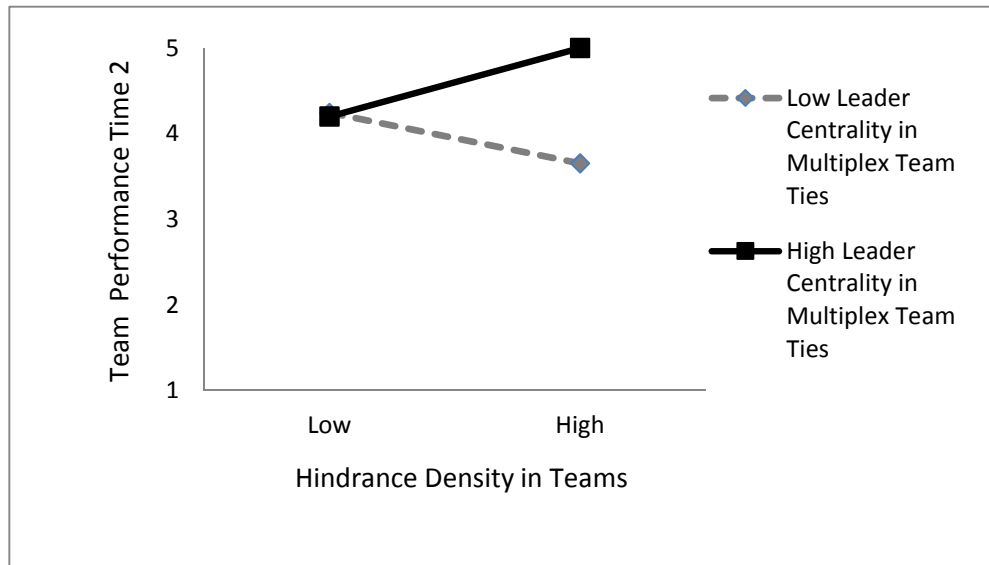
Figure 2.3 The Interaction of Team Friendship Density and Leader Centrality in Multiplex Team Ties on Team Performance Time 2
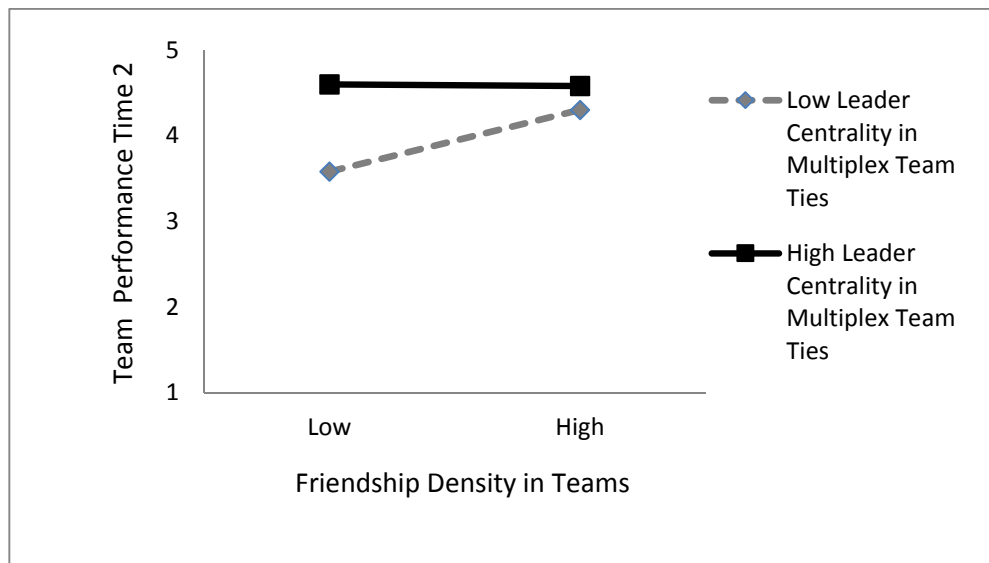
2.5 DISCUSSION

We set out to examine the main and interactive effects of leader multiplex ties on team performance. In line with our propositions, results suggest that leader multiplex ties positively predict team performance, above and beyond team member multiplex ties. Moreover, leader multiplex ties

positively moderated the relationship between hindrance network density and team performance, but negatively moderated the relationship between friendship network density and team performance. These results appear particularly strong, given that similar analyses with leader simplex ties (reported in Models 3a and 3b in Table 2.2) did not explain significant variance in team performance. These findings have implications for theory and research on leader social network ties and team performance.

2.5.1 Theoretical Contributions

Prior theory and research has examined the role of formal leaders' position in their informal social networks among team members and others across the wider organization as predictors of team performance outcomes (e.g., Balkundi & Harrison, 2006; Oh et al., 2006; Mehra et al., 2006). For instance, Balkundi and Harrison (2006) found that teams with formal leaders who also occupied central network positions within their informal team networks had higher team performance. However, this prior work has largely examined leaders' position in simplex networks (instrumental or expressive), but did not examine the effects of leaders' position in multiplex networks comprising ties that are both instrumental and expressive. Based on classic and contemporary leadership theories, we argued that this prior focus on leader simplex ties likely draws an incomplete picture of the social network ties that characterize effective leadership. This omission appears particularly severe, given that multiplex ties not only serve (in part) different purposes, but are also likely more potent than simplex ties. So may multiplex ties foster mutual trust and breed local cohesion uniting the team (Coleman, 1988; Hardin, 2002; Marsden & Campbell, 1984). Also, leaders who are central within the informal multiplex networks within their teams may share multiple bases of interactions, which may facilitate coordination and interaction within the team (Kuwabara et al., 2010). The fact that we did not replicate the same relationship with leader simplex ties suggests that leader multiplex

ties may indeed be more potent than simplex ties for team leaders seeking to propel their team's performance.

These findings call for a revision and extension of theoretical perspectives on leader ties and team performance, and for more explicit inclusion and theorizing about leader multiplex ties. Because the development of leader multiplex ties is likely more time and resource intensive than the development of simplex ties (Kuwabara et al., 2010), future research may examine the 'pay-off' that the development of multiplex ties provides relative to such costs. In addition, future research may examine for which type of team, task, or organizational context leader multiplex ties may justify such costs. Our interaction results (discussed in the following) would suggest that the efficaciousness of leader multiplex ties strongly depends on team contingencies.

The second contribution of our study is to the debate among social network researchers regarding the relative benefits of leader and member ties for team performance (cf. Balkundi & Harrison, 2006). Specifically, our findings suggest that leader centrality in multiplex ties is particularly relevant for teams that have conflict-laden relationships (Sparrowe et al., 2001), perhaps because this advantageous structural position may provide leaders with the influence and power that is needed to refocus such teams on joint performance goals. Conversely, our findings suggest that leader centrality in multiplex team ties may be of little value to teams that have dense friendship networks, because these positive social relationships among team members may enable such teams to exchange information and resources without much help from their leader. Taken as a whole, these interaction results strongly suggest that the potential of leader multiplex ties depends heavily on the expressive network configurations within teams. Specifically, when interpersonal relationships among team members appear strained or suboptimal, leaders' centrality in multiplex ties appears to make a difference to their team's performance.

At a more general level, these interaction findings suggest that an optimal understanding of the social underpinnings of effective team work requires researchers to examine member and leader ties, as well as different indicators of structural network positions (in this case centrality and density) conjointly, as suggested by Balkundi and Harrison (2006). Future research would be well-advised to examine more complex interactions among the networks of different organizational constituents, as well as among different structural positions within (the same or different) networks, in order to best explain the social network structure that underlies team performance.

2.5.2 Strengths, Limitations and Directions for Future Research

The current study has several strengths that help provide a reasonable test for our hypotheses. First, we drew upon different-source (employee, leader, and line manager) and in part longitudinal data in measuring key study variables, which helps minimize potential common source biases, as well as supports the idea that team performance outcomes are a function of social structure rather than the reverse (Shadish, Cook, & Campbell, 2002). Second, the very high response rates reported in this study and the reasonable sample size of 84 teams increases confidence in the presented results. This is because the accuracy of social network data that draw on the roster method in particular increases with the completeness of rosters (e.g., Marsden, 1990). Third, we tested our conceptual model using appropriate analytical methods, such as application of the omnibus test proposed by Aguinis (2004), supporting the robustness of our hypothesized interactions. Despite these strengths, our study bears various limitations pointing to future research avenues.

First, the entities that represented the focus in our study—teams—are further embedded within a larger organizational context. Our study model, however, has not taken into consideration the embeddedness (Uzzi, 1996, 1997) of those teams within the larger organization. Future

research may therefore test more complex models that take into consideration more explicitly team members' and leaders' relationships with employees across the wider organization (i.e., external ties).

A second limitation is concerned with this study's design, which draws on longitudinal measurement of the outcome variable, but not of the predictor variables. Although this design allows stronger causal inferences than cross-sectional designs (Shadish et al., 2002), it is inferior to complete longitudinal two-panel or experimental designs. In this respect, it is important to note that the causal claims made in this study are supported by strong theory, and that reverse causality seems very unlikely on theoretical grounds.

2.5.3 Managerial Implications

Our findings similarly have important implications for managerial practice.

Leaders who aim to maximize single team performance may be advised to properly diagnose their team's social structure (e.g., hindrance or friendship) prior to deciding whether or not to invest in the development of multiplex ties among team members. A related point concerns the need for leadership development programs to focus on leaders' social competencies, in particular to focus on leaders' development of more comprehensive, multi-functional multiplex ties.

2.5.4 Conclusion

The underlying message of this study is that leader multiplex ties have substantive direct and interactive effects on team performance. Our findings contribute to theory and research on the importance of leader ties for teams, as well as on the optimal interplay of leader and member ties for team performance outcomes**.**

Chapter 3:

Strong Ties and Team Interdependence: A Social Network Approach to Dyadic Team Effectiveness

3.1 INTRODUCTION

Teamwork requires social interactions among team members to achieve team goals. Indeed, social network research shows that "thicker" concentrations of member ties in a team are associated with superior pursuit of team goals (Balkundi & Harrison, 2006: 59). But social network research on teams has neglected the dyad (two interacting teams) as the unit of analysis. Team processes and outcomes often involve not just ties among each team's members but also cross-cutting ties with other teams (Oh et al., 2006). The effectiveness of an organization depends not just on how relentlessly each individual team pursues its goals, but also on how pairs of interdependent teams collaborate across team boundaries (cf. Krackhardt & Stern, 1988). Social network conceptualization and measurement tends to take place at the dyadic level, but little social network research takes the dyadic interacting system itself as its focus (Prell, 2012: 134-135).

A focus on pairs of organizational teams has emerged in the literature devoted to intergroup effectiveness, but this literature tends to focus on the psychology of intergroup relations rather than on network ties (e.g., Hogg, van Knippenberg, & Rast, 2012; Richter, West, van Dick, & Dawson, 2006). Bringing together social network research and intergroup effectiveness research we create, in this study, a new approach to the question of how social network ties affect the performance of the

interdependent dyadic team unit. We draw from the social network literature important ideas concerning density and tie strength, whereas we draw from the intergroup effectiveness literature an emphasis on resource interdependence (Brett & Rognes, 1986) and our dependent variable—intergroup effectiveness.

Intergroup effectiveness can be defined as the dyadic effectiveness with which a pair of teams performs joint tasks (Richter et al., 2006; cf. Brett & Rognes, 1986; Van de Ven & Ferry, 1980). For example, at the university that was the focus of our research, the two teams engaged with college careers and college professional orientation had to coordinate their activities in order to find graduating students jobs. These teams had to collaborate in the provision of job search tools, advice on strategic positioning of student profiles, and the development and implementation of job search training. Intergroup effectiveness captures the extent to which both teams performed collaboratively on these activities.

There has been exploratory research concerning the emergence of cooperation in dyads at the organizational level that shows the extent to which these dyadic relationships take on a rule-like institutionalized stability (Larson, 1992; cf. Hansen, 1999). Moving to the level of teams, there has long been recognition that teams cannot work in isolation and that the outcomes of individual teams are dependent on social relationships with members from other teams (e.g., Oh, Chung, & Labianca, 2004). But there is an absence of theory and research concerning how network relations within and between teams affect the outcomes of the interdependent team dyad. In this study we examine whether the configuration of the social network ties that serve as conduits for the flow of resources within and between teams (Oh et al., 2006) influences the joint effectiveness of teams taking into account the extent to which each pair of teams is resource interdependent.

Through adopting a social network perspective to the prediction of dyadic team effectiveness, we make three research contributions. First, our focus on informal social networks complements recent theoretical and empirical endeavors concerned with alternative predictors of effective intergroup relations, such as intergroup leadership (e.g., Hogg et al., 2012) and modes of integration (e.g., Sherman & Keller, 2011). Our examination of the social underpinnings of dyadic team effectiveness contributes to the growing body of theory (e.g., Hogg et al., 2012; cf. Mathieu, Marks, & Zaccaro, 2001) and research (Richter et al., 2006; Sherman & Keller, 2011) concerned with predictors of intergroup effectiveness.

Second, our focus on the performance implications of the structure of dyadic team ties extends prior social network research focused on single teams. Thus, theoretical (e.g., Crawford & LePine, 2013; Oh et al., 2006) and empirical accounts have linked team member (e.g., Balkundi & Harrison, 2006; Reagans et al., 2004), unit (e.g., Tsai, 2001, 2002) and leader (e.g., Mehra et al., 2006) social networks to single team processes and outcomes. But network research has neglected the interdependent team dyad.

Third, we contribute to the design of team-based work (e.g., Mohrman et al., 1995) by highlighting the importance of aligning informal social relationships within and across teams with interteam interdependence (cf. Krackhardt & Stern, 1988).

3.2 THEORY AND HYPOTHESIS

3.2.1 Dyadic Team Effectiveness

In contemporary organizations teams represent the major social entities in which work is conducted. Much research investigates the factors that foster or hamper team effectiveness (for reviews, see Ilgen, et al., 2005; Kozlowski & Bell, 2003; Mathieu, Maynard, Rapp, & Gilson, 2008). But a research focus on individual team effectiveness may leave undiscovered

factors related to the effectiveness of the overall organization. Because teams frequently compete for shared but limited resources (Kramer, 1991), or excel by hampering the efforts of other teams (Mohrman et al., 1995), team effectiveness in and of itself may be a deficient indicator for the functioning of team-based organizations (Richter, Scully, & West, 2005). Moreover, single team effectiveness may not be a suitable outcome for work on complex tasks that cannot be completed by one team alone but rather requires the concerted effort of different teams (e.g., Mathieu et al., 2001).

A more recent approach has therefore focused on the effectiveness of the dyadic team system (i.e., pairs of teams; Richter et al., 2006). Dyadic team effectiveness is grounded in the observation that organizational teams frequently need to interact with each other. First, teams need resources from other teams in order to complete their tasks (Brett & Rognes, 1986). And second, differentiation into work units such as teams requires integration across team boundaries to provide comprehensive services to customers (Sinha & van de Ven, 2005). Illustrating this with our opening example: to help students get jobs upon graduation first requires the analysis of student career profiles (by the careers team) as well as the identification of suitable job opportunities (by the professional orientation team). During this initial stage, both teams exchange resources such as information and services in order to support each other's work; at a later stage, both teams integrate their initial work by developing job search training for the students.

Building on these requirements for interteam interaction, the concept of intergroup effectiveness comprises both a) the effectiveness with which pairs of teams exchange resources, and b) the effectiveness with which teams cooperate on tasks that demand the concerted efforts of both teams (Richter et al., 2006). Intergroup effectiveness thus represents a behavioral performance outcome of intergroup relations (van Knippenberg, 2003). It

is important to note that intergroup effectiveness is not simply the performance outcome of a larger team, or of two subgroups within a larger team (Carton & Cummings, 2012). Neither does it reflect the performance outcome of an open system of sets of teams potentially spanning across organizational boundaries (Mathieu et al., 2001). Rather, intergroup effectiveness is the performance outcome of pairs of functional teams with intact team boundaries. Because a given team may work effectively together with one team, but ineffectively with another team, levels of intergroup effectiveness may vary within a given set of interacting teams. The dyadic lens adopted in this research ensures that such effectiveness differentials across pairs of teams are not averaged out. Rather, they present the explicit focus of this study.

3.2.2 A Social Network Perspective on Dyadic Team Effectiveness

Interteam efforts may be efficiently partitioned so that initial work is done within teams, and then work is integrated across team boundaries. This interplay of within- and between-team processes is likely to be reflected in the interaction of social network ties within and across teams. Social network ties have the potential to facilitate or constrain the flow of resources within and between organizational teams (Balkundi & Harrison, 2006), thereby influencing intergroup effectiveness.

The cultivation and maintenance of social network ties, however, also incurs costs in terms of time and effort (Granovetter, 1973). Team members have to weigh their engagement with colleagues both within and across teams in order to achieve optimal configurations of within- and between-team relationships (cf. Krackhardt & Stern, 1988; Oh et al., 2006). Because teams vary in the extent to which they depend on other teams' resources (cf. Ancona & Caldwell, 1988; Choi, 2002), and the transfer of complex resources across team boundaries is arduous (Hansen, 1999), the level of resource interdependence between teams is likely to affect this optimal configuration of within- and between-team ties.

In the following section, we develop these ideas into the formal hypothesis that intergroup effectiveness is jointly shaped by (1) within-team ties, (2) between-team ties, and (3) resource interdependence between teams, such that the optimal balance of within- and between-team ties for dyadic team effectiveness varies according to the extent that both teams depend on each other's resources.

3.2.3 Optimal Balance of Within- and Between-Team Ties as a Function of Resource Interdependence

Dense relationships within a team are associated with effective team performance and with increased team viability (Balkundi & Harrison, 2006), probably because such dense relationships facilitate the flow of resources and information needed for complex tasks; and because dense relationships also foster social support among employees. But whether such a dense within-team network facilitates interteam performance may depend on the presence of strong-tie connections between teams. First, specialist knowledge and resources developed within each team comprising the dyad will, optimally, be accessible by dyad members irrespective of which team they belong to. Interdependent teams need to exchange resources (such as information, knowledge, materials, or time) across team boundaries (Brett & Rognes, 1986). And, resource exchange is likely to flow through strong (rather than weak) ties given that strong ties facilitate the cross-organizational unit transfer of complex information (Hansen, 1999) and other resources (Tsai & Ghoshal, 1998).

Second and related, the transfer of resources and the integration of work across team boundaries bear severe coordination challenges (e.g., Davison, Hollenbeck, Barnes, Sleesman, & Ilgen, 2012) due to different teams working within distinctive team cultures, pursuing diverse proximal agendas, and featuring unequal modes of operation. The resulting cross-team coordination demands may be facilitated by strong ties, due to these ties providing access to more accurate, fine-grained, and timely

information (McFadyen, Semadeni, & Canella, 2009; Uzzi, 1997). Moreover, strong ties may facilitate cross-team coordination by fostering trust, effective communication, and enhanced understanding of the other team's strengths and weaknesses (Krackhardt, 1992; Levin & Cross, 2004; Nelson, 1989).

Thus, the presence of dense networks within each team in combination with many rather than few strong ties between the two teams may allow the team dyad to function as a collaborative social entity toward a shared goal. Conversely, the combination of dense intrateam networks with few rather than many strong cross-team ties may result in reduced dyadic team effectiveness, due to both inefficient resource exchange and suboptimal cross-team coordination.

Implicit in the above rationale is the assumption that each team holds resources that are needed by the other team. Because strong interteam ties serve to transfer resources across team boundaries, these ties should return performance benefits provided that both teams mutually depend on each other's resources. If both teams, however, are not mutually resource interdependent, the existence of many strong cross-team ties may well facilitate intergroup relations (cf. Labianca et al., 1998); however, these effects are likely confined to relationships, and may not materialize in intergroup performance outcomes. Because strong ties bear considerable maintenance and opportunity costs (e.g., McFadyen & Cannella, 2004), they may incur transaction costs between teams (Brett & Rognes, 1986) without returning valuable resources. Moreover, under conditions of low resource interdependence, intergroup effectiveness is mainly a function of integrating work across teams that is being completed within teams; the presence of few rather than many strong ties may therefore suffice to facilitate such integration efforts. Hence, low levels of resource interdependence are best suited to the situation of fewer strong ties between the two teams rather than many.

In sum, if teams are resource interdependent, dense networks within teams in combination with many rather than few strong ties between teams are likely to result in higher intergroup effectiveness due to improved cross-team resource exchange and coordination. But if interdependence between teams is low, dense networks within teams in combination with many rather than few strong ties across teams are likely to impair intergroup effectiveness, because the extensive maintenance and opportunity costs are unlikely to result in the exchange of valuable resources.

Hypothesis 1: Resource interdependence moderates the interaction of intrateam density and strong interteam ties on intergroup effectiveness.

a.) For low levels of resource interdependence, intrateam density more positively predicts intergroup effectiveness for few rather than many strong ties between teams.

b.) For high levels of resource interdependence, intrateam density more positively predicts intergroup effectiveness for many rather than few strong ties between teams.

3.3 METHODS

3.3.1 Sample and Procedures

The hypothesis was tested with data from 93 administration and service teams of a Spanish public university. Teams worked in various areas including human resources, international relations, technical and maintenance assistance, research, accounts and budgeting, and provided a variety of services and resources (such as accounting, legal advice, planning, library services, research support, etc.) to students, faculty, and the public. Teams had to interact with other teams on a regular basis, in order to coordinate and optimize integrated services through sharing of information, technology, materials, and financial resources.

At the onset of the project, a member of the research team, a native Spanish speaker, introduced the study and its general purpose to the organization's top management. After the organization agreed to participate, an organizational liaison person was assigned to serve as contact for the research team throughout the project, and to provide relevant information regarding the organizational structure, the teams' objectives, tasks, and daily work.

Following Kozlowski and Bell (2003), we do not distinguish between teams or workgroups. Organizational teams or workgroups are composed of two or more individuals that exist to perform organizationally relevant tasks, share one or more common goals, interact socially, exhibit task interdependence, maintain and manage boundaries, and are embedded within an organizational context (Kozlowski & Bell, 2003). Information provided by the liaison person and the teams themselves was used to ensure teams met these definitional criteria. Additionally—due to this study's particular focus on the dyadic team system—we selected teams that were established (i.e., existed for more than 6 months) and that worked interdependently with at least one other team (Brett & Rognes, 1986; Richter et al., 2006). All participating teams shared the superordinate goal to provide valuable services to students and faculty and to this end were encouraged by the organization to cooperate across team boundaries.

This process resulted in the identification of 48 focal teams who agreed to participate. Each focal team was then matched with one counterpart team by asking the teams' line managers about which other team worked closest with the focal team (cf. van de Ven & Ferry, 1980), resulting in 48 dyadic team systems. We selected focal and counterpart teams at the same hierarchical level and excluded management teams in order to avoid power or status asymmetries resulting from teams at different levels of the organizational hierarchy (Richter et al., 2006). We checked and confirmed

that the counterpart teams fulfilled the same definitional criteria of organizational teams outlined above. All 48 focal teams nominated one counterpart team. All 45 nominated counterpart teams—three counterpart teams were nominated twice and hence participated as members of two interteam pairs—agreed to participate. Questions on interteam relations within the focal team's questionnaire referred to this particular counterpart team, and vice versa.

Following this selection procedure, the same member of the research team met with each of the teams' line managers. The managers explained how the teams operated on a daily basis, the nature of their interaction with their counterpart team, and provided team rosters containing the names of team members of focal and counterpart teams. Based on this information, the initial English questionnaire was designed. In line with established procedures (cf. Brislin, 1980), two independent bilingual translators translated all survey materials from English to Spanish and back to English, thereby ensuring the integrity of the original scales and items. Subsequent pilot testing was performed with 13 employees of two pairs of teams within the organization, who were not participating in the main study, in order to gauge survey completion time, as well as to make sure that all the instructions and items were clear and unambiguous. Feedback resulted in minor amendments to the wording of individual items.

After participants were assured confidential treatment of their responses, we distributed questionnaires to the 361 full-time employees of those 93 teams, of which 357 (98.9 %) returned usable surveys. Team response rates by far exceeded 80% for each individual team (cf. Oh et al., 2004). Average team size was 3.88 employees (s.d. = 1.81; range 2-16). 276 (76.5%) respondents were female, and the average tenure of employees with their team was 76 months (s.d. = 75.12). Respondents were on average 43.46 years old (s.d. = 7.85). Because our theoretical conceptualization pictures dyadic team systems as pairs of clearly identifiable and stable

organizational teams, we assessed whether this reading was justified by assessing team members' perceptions of the clarity of team boundaries and team stability with two-item Likert scales from Wageman et al. (2005). Ratings ranged from 1 (*very inaccurate*) to 5 (*very accurate*). Teams had indeed clear boundaries (for example, "Team membership is quite clear—everybody knows exactly who is and isn't in the team"; mean = 4.57, s.d. = 0.38) and stable membership (for example, "This team is quite stable, with few changes in membership"; mean = 4.19, s.d. = 0.59).

All teams consented to the obtaining of ratings of intergroup effectiveness from line managers, who themselves were not members of the teams. Six months after team surveys were gathered from team members, the teams' 91 line managers provided 93 intergroup effectiveness ratings (100% response rate). With the exception of one line manager who oversaw three pairs of teams, each team dyad was rated by two different line managers. In line with other team studies (West & Anderson, 1996), six months was deemed a suitable time lag to tap into changes in team outcomes. Questionnaires and managerial ratings were returned to the contact researcher via sealed envelopes.

3.3.2 Measures

The team member questionnaire was divided into two sections. The team section contained demographics as well as social network questions to measure density within the team. To this end, a roster of all team members was provided, and participants were asked to answer questions about each person of their team. The interteam section contained the resource interdependence questions as well as social network questions to assess tie strength of members of the focal team with members of the counterpart team. To this end, a second roster with all team members of the counterpart team was provided, and participants were asked to answer questions about each person of this other team. All network measures were calculated using UCINET (version 6.392; Borgatti et al., 2002).

3.3.2.1 Intrateam Networks

Based on the individualized questionnaire that was distributed to each participant with a roster of all team members in alphabetical order, each participant was asked to answer social network questions with reference to team members.

We measured the frequency, closeness, and duration of relationships (Granovetter, 1973), with three items from Perry-Smith (2006). Frequency was assessed with the question, "How frequently do you communicate with this person on average?" (0 = *"less often"*, 1 = *"several times a year"*, 2 = *"once a month"*, 3 = *"several times a month"*, 4 = *"several times a week"*, 5 = *"daily"*). To assess closeness, respondents were asked, "How close are you with each person?" (1 = *"acquaintance"*, 2 = *"distant colleague"*, 3 = *"friendly colleague"*, 4 = *"good friends"*, 5 = *"very close friends"*). Duration was assessed by asking respondents, "How many years has this relationship existed?" (1 = *"less than 2 years"*, 2 = *"2 to 5 years"*, 3 = *"5 to 10 years"*, 4 = *"more than 10 years"*). Pilot testing suggested that the anchors are suitable for the organizational context we studied.

Because we have valued data, measures of intrateam density were computed as the sum of the values of all ties divided by the number of possible ties (Hanneman & Riddle, 2005), thereby reflecting the average strength of ties across all possible ties within teams. Almost all team members in our sample interacted with each other on a daily basis, resulting in extremely high density scores within teams and reduced variance for the frequency measure (mean density frequency = .95, s.d. = .09). Closer inspection revealed that 53 teams (57%) had a density score of 1. Because such distribution characteristics compromise the power of moderated multiple regression analysis to detect interaction effects (Aguinis & Stone-Romero, 1997; McClelland & Judd, 1993), and consequently the validity of its conclusions, we dropped the frequency measure from further analyses.

As analyses of intergroup effectiveness were conducted at the intergroup (rather than group) level, the final intrateam density measures for closeness and duration were averaged across focal and counterpart teams. The rationale underlying this practice is that the density of a focal team can compensate for lack of density in the counterpart team, and that therefore relative or absolute differences in the density of focal and counterpart teams should not matter. To examine whether this reading is justified, we re-ran all our analyses on intergroup effectiveness controlling additionally for algebraic and absolute difference scores of the density measures of focal and counterpart teams. In support of our rationale, controlling for these difference scores did not affect the results of our interaction hypothesis, nor did these difference scores significantly predict intergroup effectiveness.

3.3.2.2 Interteam Networks

In a subsequent section, a second matrix with a roster of all team members of the counterpart team was provided, and focal team members were asked tie strength network questions with reference to members of the counterpart team (and, vice versa, counterpart team members were asked tie strength network questions with reference to members of the focal team).

We measured strong ties between teams by assessing the closeness and duration of relationships (cf. Granovetter, 1973), using the same two items as for intrateam networks (Perry-Smith, 2006). For the closeness measure, we counted strong ties as "*good friends*" and "*very close friends*". For duration, "*5 to 10 years*", and "*more than 10 years*" were considered strong ties.

A tie exists from the respondent to the contact if the respondent reports a relationship (Reagans & McEvily, 2003: 254). Following established procedures (e.g., Seibert, Kraimer, & Liden, 2001), we counted the number

of strong ties. Because larger teams provide a greater number of potential ties than smaller teams, and we intended to compare strong ties across teams, our final measures of strong ties consisted of proportions. Therefore, we calculated strong between-team ties by dividing the number of nominated strong between-team ties that members of focal and counterpart teams provided, by the number of possible ties. Because analyses predicting intergroup effectiveness were conducted at the intergroup (rather than group) level of analysis, measures of strong ties were summed up for both focal and counterpart teams of each interteam pair.

Despite representing different facets of tie strength (Granovetter, 1973), evidence suggests that closeness and duration are independent tie strength indicators (Marsden & Campbell, 1984). In line with this rationale, the low and negative intercorrelations between closeness and duration (see Table 3.1) prevented us from computing an overall measure of strong ties. Although the use of multi-item measures is preferable in order to enhance reliability, network studies frequently face the need to limit network data collection to single-item measures. Because asking participants to answer multiple questions per measure for each member of the focal and counterpart team would be time-consuming and arduous, it may result in participant fatigue as well as poor response rates (e.g., Marsden, 1990), rendering single-item measures of strong ties advantageous in our study.

3.3.2.3 Resource Interdependence

Resource interdependence is the degree to which teams mutually depend on each other's resources for their work (van de Ven & Ferry, 1980). This concept is particularly relevant for our purposes, because the importance of cross-team relationships depends on the amount of resources that travel across team boundaries (cf. Ancona & Caldwell, 1988; Choi, 2002; Hansen, 1999). Resource interdependence thus represents an aspect of

interdependence that is similar to the notion of functional input interdependence (Mathieu et al., 2001: 295), but is conceptually different from other aspects of interdependence such as goal interdependence (e.g., Marks, DeChurch, Mathieu, Panzer & Alonso, 2005) (As mentioned earlier, teams selected for this study shared superordinate goals). We measured resource interdependence with Van de Ven and Ferry's (1980) four-item measure. Example items are, "For your team to accomplish its goals and responsibilities, how much do you need the services, resources, or support from this other team?", and "For this other team to accomplish its goals and responsibilities, how much does it need the services, resources, or support from your team?" ranging from 1 (*not at all*) to 5 (*very much*). Cronbach's alpha was .89.

Because interdependence conceptually refers to the team dyad, the level of analysis is the intergroup rather than group level. We therefore aggregated data by team dyad. To empirically justify aggregation, we produced a series of aggregation statistics. These showed that interrater agreement (James, Demaree, & Wolf, 1984) among members of pairs of teams was high (mean $r_{wg[j]}$ = .75, using a uniform null distribution; LeBreton & Senter, 2008), variance between pairs of teams was significant (F = 3.50, p < .001), and interrater reliability (Bliese, 2000) was acceptable to good (ICC[1] = .25; ICC[2] = .71). The ICC(1) coefficient compared favorably to the median .12 that is frequently reported in organizational field studies (James, 1982). By taking into consideration the information from all coefficients as well as a strong theoretical foundation for aggregation, we conclude that aggregation was justified (cf. Klein et al., 2000).

3.3.2.4 Managerial Ratings of Intergroup Effectiveness

Six months after the team member survey, intergroup effectiveness ratings were gathered from the teams' line managers. We measured the effectiveness with which each pair of teams worked together with the six-item intergroup productivity scale (Richter et al., 2006; cf. Richter et al., 2005), ranging from 1 (*to no extent*) to 5 (*to a great extent*). Four items assessed system responsiveness, the degree to which both teams worked together in a synergistic fashion in order to respond to mandates or problems within the organization (e.g., "To what extent did both teams work effectively together in order to respond to tasks or duties that emerged from working within the organization [e.g., coordinating cross-team activities, assignment of organizational duties, etc.]?"). The remaining two items measured the capacity of both teams to exchange and make use of each other's resources effectively (e.g., "To what extent did both teams effectively help each other out if resources [e.g., time to invest, people or staff, support etc.] were needed?"). Cronbach's alpha was .92. Because the line managers of each team provided intergroup effectiveness ratings for 45 pairs of teams, we averaged the evaluations of both line managers of each interteam dyad for the final measure. Interrater agreement between line managers was high (mean $r_{wg[j]}$ using a uniform null distribution was .94).

3.3.2.5 Control Variables

Because pairs of teams varied in size, we controlled for this in all analyses. Moreover, because three teams participated twice (due to being nominated as most frequent interaction partner by two other teams), we created dummy codes for each of these teams in order to control for possible effects of non-independence (Bliese, 2000). To account for the embeddedness of the team dyads within the larger organization (cf. Uzzi, 1996, 1997), we also controlled for the number of people within the organization but outside the dyadic team system with whom employees

discussed work-related matters. This measure was the count of names employees jotted down in response to a name generator question (e.g., Rodan & Galunic, 2004).

3.4 RESULTS

Table 3.1 shows means, standard deviations, and Pearson's correlations among study variables at the intergroup level. The descriptive statistics for the intergroup effectiveness scale (mean = 3.59, s.d. = .71) are comparable to those reported in a different sample (Richter et al., 2006). Notably, none of the study variables correlated significantly with intergroup effectiveness, pointing to the absence of main effects.

3.4.1 Hypothesis Testing

Hypothesis 1 states that the interactive effect of intrateam density and strong interteam ties on intergroup effectiveness is dependent on the levels of resource interdependence between teams. In particular, for low levels of resource interdependence, intrateam density should more positively predict intergroup effectiveness for few rather than many cross-team ties (Hypothesis 1a). Conversely, for high levels of resource interdependence, intrateam density should more positively predict intergroup effectiveness for many rather than few cross-team ties (Hypothesis 1b).

Table 3.2 presents results of moderated multiple regression analyses, testing the hypothesized intrateam density × strong ties between teams × interdependence interaction on intergroup effectiveness for duration and closeness networks. In all analyses, predictor variables were standardized, and interaction terms were computed as cross-products of standardized variables to reduce non-essential multicollinearity (cf. Aiken & West, 1991). To test our hypothesis, we first entered the control variables interteam size and external ties into the model. We then entered dummy

Table 3.1 Means, Standard Deviations and Correlations for Intergroup-Level Variables[a]

	Variables	Mean	s.d.	1	2	3	4	5	6	7
1.	Intergroup effectiveness Time 2	3.59	.71							
2.	Interteam size	7.71	2.75	.14						
3.	External ties	47.60	15.77	-.06	.34*					
4.	Resource interdependence	2.92	.69	.28	-.01	-.02				
5.	Density closeness within teams	.58	.08	-.01	.06	-.10	-.05			
6.	Density duration within teams	.42	.12	-.06	.05	.27	.08	-.23		
7.	Proportion of strong ties closeness between teams	.07	.15	-.18	.14	.33*	.08	-.29*	.34*	
8.	Proportion of strong ties duration between teams	.46	.24	-.15	-.15	-.27	-.29*	.04	-.52**	-.35*

[a] n = 48 pairs of teams.
 * $p < .05$
** $p < .01$

Table 3.2 Results of Regression Analyses on Intergroup Effectiveness[a]

Variables	Model 1	Model 2
Control variables		
Interteam size	.19	.19
External ties	-.10	-.10
Dummy team 1	.05	.05
Dummy team 2	.14	.14
Dummy team 3	.07	.07
ΔR^2	.05	.05
ΔF	.48	.48
Main effects		
Density closeness within teams	-.14	
Density duration within teams		-.11
Strong ties closeness between teams	-.25	
Strong ties duration between teams		-.14
Resource interdependence	.40*	.34*
ΔR^2	.18	.14
ΔF	3.01*	2.21
Two-way interactions		
Density closeness within teams × strong ties closeness between teams	.14	
Density duration within teams × strong ties duration between teams		-.01
Density closeness within teams × resource interdependence	-.05	
Density duration within teams × resource interdependence		.15
Strong ties closeness between teams × resource interdependence	.02	
Strong ties duration between teams × resource interdependence		.05
ΔR^2	.01	.01
ΔF	.13	.21
Three-way interactions		
Density closeness within teams × strong ties closeness between teams × resource interdependence	.61*	
Density duration within teams × strong ties duration between teams × resource interdependence		.61**
ΔR^2	.11	.20
ΔF	6.11*	11.93**
R^2	.35	.41
F	1.59	2.00

[a]Standardized coefficients are reported.
$n = 48$.
 * $p < .05$
** $p < .01$

codes for the three teams that participated as members of two team dyads into the regression, in order to account for non-independence of observations (cf. Bliese, 2000)[1]. We next entered the three main effects, and the three two-way interaction terms as combinations of main effects. Across models, VIF scores were non-significant and lower than 3.6, suggesting that multicollinearity did not distort regression results. A significant three-way interaction term added to the model in a final step would provide initial support for Hypothesis 1. Indeed, Table 3.2 (Models 1 and 2) shows that the three-way interaction terms for the closeness and duration measures are positive and significant (β three-way interaction closeness = .61, $p < .05$; β three-way interaction duration = .61, $p < .01$). Moreover, adding these three-way interaction terms to the models substantially increases the explained variance in intergroup effectiveness (ΔR^2 three-way interaction closeness = .11; ΔR^2 three-way interaction duration = .20).

A thorough test of Hypothesis 1a and b, however, demands further post-hoc probing of these significant three-way interaction effects, in order to examine whether the interaction of intrateam density and strong interteam ties varies according to low versus high levels of resource interdependence. Because the "pick-a-point" approach of conventional simple slopes tests (Aiken & West, 1991) only examines whether a simple slope differs from zero in predicting a dependent variable, it is not fit for tests of relational hypotheses such as ours (Dawson & Richter, 2006). We therefore tested for the significance of simple interactions (Aiken & West, 2000) of intrateam density x strong interteam ties for both low (mean - 1 s.d.) and high (mean +1 s.d.) levels of resource interdependence. Simple

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[1] Because the same three pairs of teams also received effectiveness ratings from one and the same line manager, we ran various additional models to examine whether the pattern of results reported in this study is biased due to non-independence of observations (Bliese, 2000). Neither deletion of those three pairs of teams from the analyses, nor any alternative model controlling for non-independence altered the pattern of results reported here, but led to virtually identical interpretations.

interaction tests are identical to slope difference tests (Dawson & Richter, 2006) at low or high levels of resource interdependence, respectively.

These tests revealed that for the closeness network, this simple interaction was significant and positive for high interdependence ($t = 2.45$, $p < .05$), and significant and negative for low interdependence ($t = -2.08$, $p < .05$). Similarly, for the duration network, this simple interaction was significant and positive for high interdependence ($t = 2.79$, $p < .01$), and significant and negative for low interdependence ($t = -2.85$, $p < .01$). Thus, Hypothesis 1 (a and b) was fully supported. Figures 3.1 and 3.2 display the significant three-way interactions by illustrating the positive simple interactions for high, and the negative simple interactions for low levels of resource interdependence, respectively.

Figure 3.1 The Interaction of Density of Closeness Within Teams (CWT) and Proportion of Strong Ties of Closeness Between Teams (CBT) on Intergroup Effectiveness for Low (a) and High (b) Resource Interdependence.

(a)
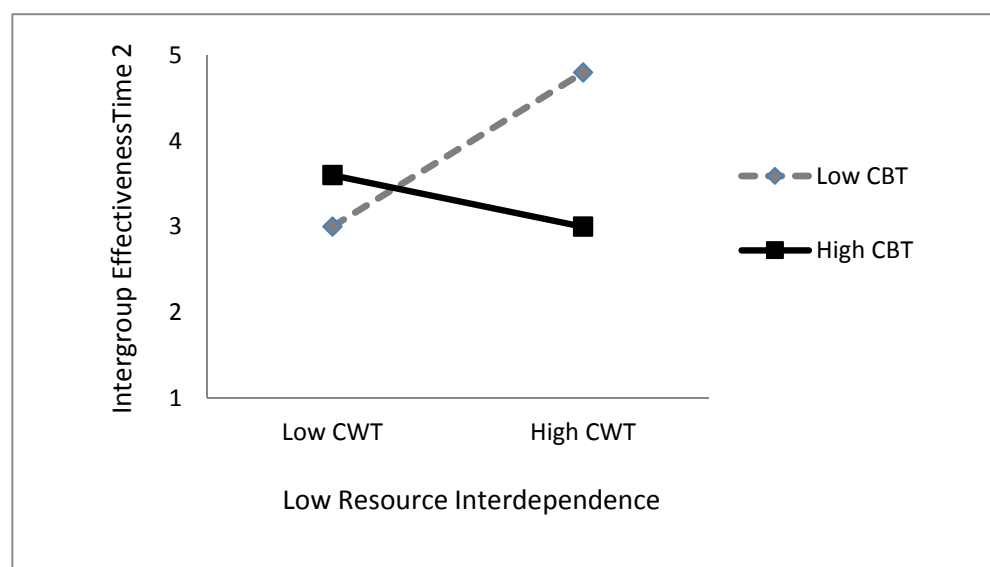
(b)
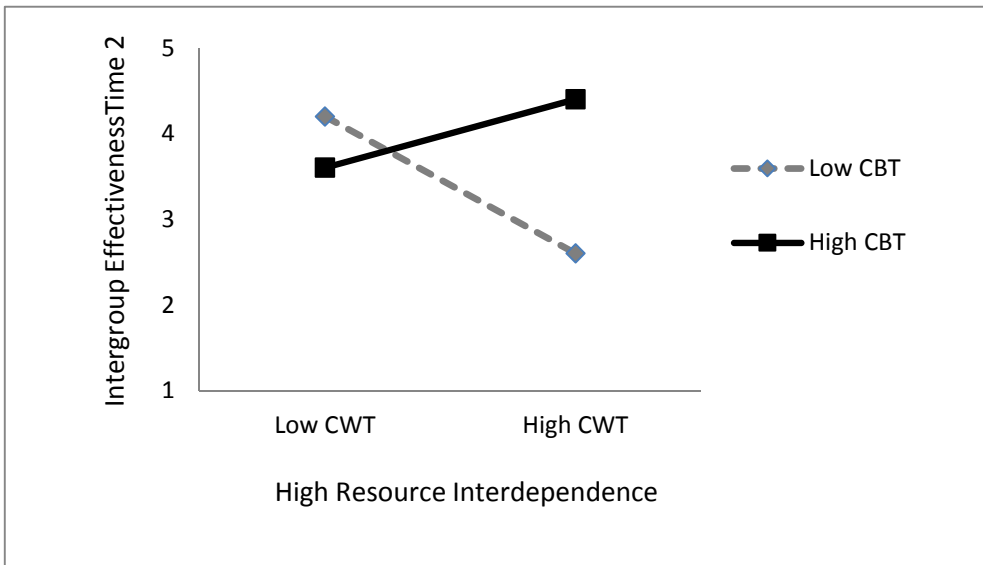
Figure 3.2 The Interaction of Density of Duration Within Teams (DWT) and Proportion of Strong Ties of Duration Between Teams (DBT) on Intergroup Effectiveness for Low (a) and High (b) Resource Interdependence

(a)
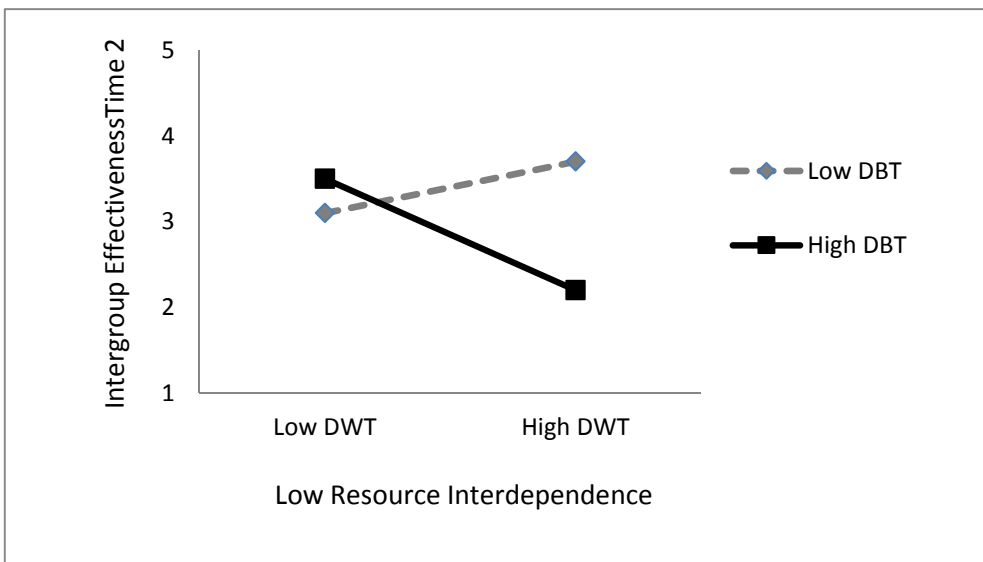
(b)
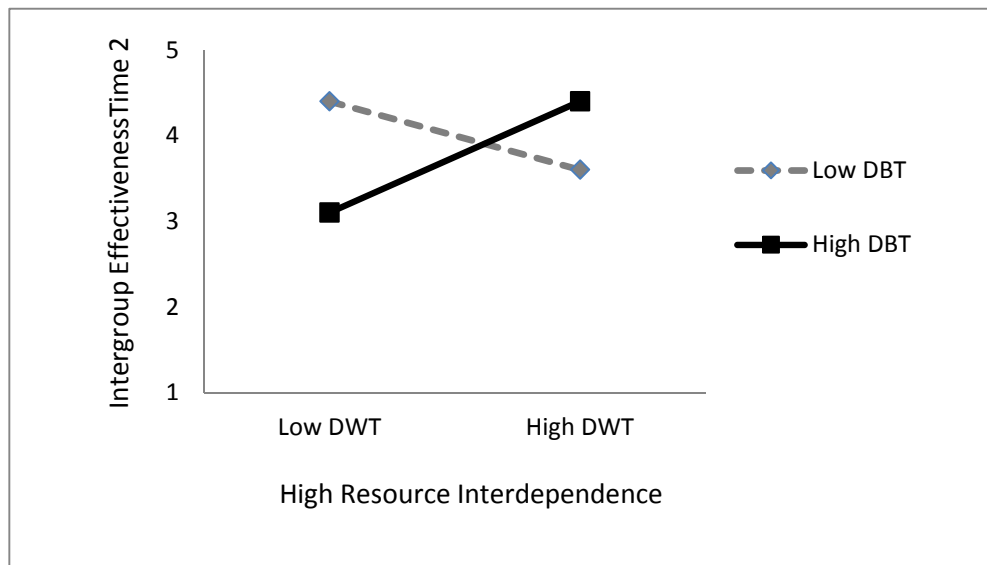
3.5 DISCUSSION

In support of the hypothesis, the results paint a picture of the optimal collaboration between two teams. Within each team, people forge many strong ties, whereas between teams people forge either few or many strong ties depending on how much the two teams have to share resources to get their work done. These findings have implications for theory and practice concerning organizational intergroup relations, social network theory, and the design of team-based work.

3.5.1 Theoretical Contributions

A core contribution of our research is to the emerging field of intergroup performance outcomes in organizations (e.g., Hogg et al., 2012; Richter et al., 2005, 2006; van de Ven & Ferry, 1980; cf. Mathieu et al., 2001) that stretch beyond intergroup attitudes such as intergroup bias (Hogg & Terry, 2000). Prior research on organizational teams—although maintaining a traditional focus on predicting single team effectiveness— has highlighted the importance of team external activities (Ancona & Caldwell, 1992). Other research has moved to the dyadic level and emphasized that misperceptions of interdependence between work units

can affect interunit performance outcomes (Sherman & Keller, 2011). Our study builds on these relational ideas to contribute a distinctive social network perspective to theory and research on intergroup effectiveness. Theoretical treatments of intergroup effectiveness (e.g., Brett & Rognes, 1986; Richter et al., 2005; 2006) may benefit from explicit incorporation of social network ties as predictors of intergroup performance outcomes. Future studies may examine whether our findings regarding the benefits of dense intrateam networks and strong interteam ties for small interteam collaborations extrapolate to effective relationships between larger business units (Martin & Eisenhardt, 2010).

Our focus on dyadic team effectiveness has also implications for research on the effectiveness of entire sets of teams. Although the effectiveness of pairs of teams is conceptually different from the effectiveness of sets of teams (van de Ven & Ferry, 1980), our study may similarly inform the growing body of experimental research on multi-team systems (MTS; e.g., Davison et al., 2012; DeChurch & Marks, 2006; Marks et al., 2005; Zaccaro, Marks, & DeChurch, 2011). MTS research is concerned with the joint effectiveness of "teams of teams" in simulated task environments. As such, MTS theory has clear and important implications for organizational intergroup relations. For instance, MTS research has similarly highlighted the importance of effective management of cross-team interdependencies for superordinate MTS goal accomplishment. Extrapolation of our findings regarding the effectiveness of pairs of teams to sets of teams points to the utility of strong social network ties within and across component teams for overall MTS effectiveness. Furthermore, our findings suggest that resource interdependence may similarly represent an important variable affecting the effectiveness of sets of teams.

Our second contribution targets more explicitly the social network arena and is concerned with the development of network theory at the dyadic level of analysis. Prior work at the dyadic level (e.g., Felmlee, 2001) has

built upon ideas concerning how relations between two people depend upon embeddedness in a larger group (Bott, 1955) or embeddedness within a clique (e.g., Krackhardt & Kilduff, 2002). By taking the team dyad as the unit of observation, we focus attention on the systemic relations of the dyad itself and the performance implications of the structure of ties. By showing that dyadic team effectiveness is contingent on the social network configurations of the dyadic team system, we call for future research to extend this work by exploring the effects of particular network configurations (such as cliques, subgroups, etc.) or specific tie contents (such as hindrance networks) on dyadic team effectiveness. In a similar vein, research may examine the influence that team leaders exert on the dyadic team system via assuming central positions within the interteam network (cf. Balkundi & Harrison, 2006).

Finally, we also contribute to theory and research on the design of team-based organizations (e.g., Mohrman et al., 1995). The finding that dyadic team effectiveness is dependent on the interplay of informal social relationships and resource interdependencies highlights the importance of alignment between formal and informal social structure (cf. Oh et al., 2006) for organizational effectiveness outcomes. Thus, the development of team-based organizations may benefit from an explicit analysis of formal and informal social structures, along with interventions that aim to create an optimal match between the two. Future research may examine optimal alignments of other aspects of formal structure (e.g., vertical rather than horizontal intergroup relations) with other aspects of social structure (e.g., instrumental versus expressive ties) for dyadic team effectiveness.

3.5.2 Strengths, Limitations and Directions for Future Research

The current study has several strengths including a research design that facilitated the collection of different-source, temporally separated data (employee surveys and performance outcome ratings from managers) for the key study variables. This research design contributes to the

minimization of potential common source biases and to the establishment of the direction of causality. Social relationships are likely contributors to performance rather than outcomes of performance (cf. Shadish et al., 2002). Further, high response rates from 93 teams increase confidence in the results, not least because the reliability and accuracy of social network findings from rosters of bounded networks rely on the completeness of data (Marsden, 1990). The study also, however, has some limitations that point to interesting avenues for future research.

First, given that the units of analysis (pairs of teams) were embedded within a larger organizational context, there may be unmeasured effects of inter-dyad ties. Although we controlled for the number of external ties of each team dyad, the focus and design of this study prevented a more explicit analysis of the embeddedness of team dyads within and beyond the larger organization (cf. Uzzi, 1996, 1997). As such, one strength of this study—the explicit focus on the bounded networks of pairs of teams—is at the same time a limitation. Future research may therefore develop and test models that more explicitly focus on the contextual embeddedness of (pairs of) organizational teams.

A second limitation concerns the absence of attention to mediating mechanisms by which within- and between-team ties affect intergroup effectiveness. Our theoretical analysis suggests that these effects are likely to be conveyed by multiple complex and intertwined mechanisms including resource exchange and improved coordination that are hard to disentangle in survey designs such as ours. Future research may more explicitly focus on identifying the complex interplay of those mechanisms by using research designs better suited for such inquiries, such as in-depth qualitative case studies.

3.5.3 Managerial Implications

One implication of the current set of results concerns the design of team-based work. Extensive interdependencies may require strong informal social networks to return desired interteam performance benefits. Managers may have to adopt a proactive approach that considers each team in terms of its likely team resource dependencies and within- and cross-team informal patterns of interaction. To treat the dyad as the unit of performance is to be mindful of the need to bring members of both teams together, when necessary, not just in formal meetings but also in informal settings. Countering organizational silo mentalities (cf. Krackhardt & Hanson, 1993) can be accomplished through intergroup gatherings, meetings, socials, and rotation of members across teams.

Moreover, our findings have implications for interteam diagnosis and interventions of established teams. Managers who aim to improve established ineffective cross-team relationships within their organizations are advised to properly diagnose not only the resource interdependencies that exist between teams, but also the informal social networks that accompany such interdependencies, in order to identify and remedy possible mismatches between more formal and informal social structure.

3.5.4 Conclusion

The key finding of our study is that dense intrateam networks and strong ties between teams interactively affect the joint performance outcomes of resource interdependent team dyads. This finding highlights the importance of social network ties within and between teams as predictors of effective intergroup relations in organizations. Interdependent teams are crucial, but often overlooked, components of organizational functioning. Dyadic team activities are facilitated by the informal relations that bind people within and between these organizational units.

Chapter 4:

Maneuvering Upper Echelon Relationships for Employee Creativity: The Role of Team Leaders' Social Network Ties

4.1 INTRODUCTION

In today's competitive business landscape, employee creativity—the development of useful ideas that are original (i.e., deviate radically from the status quo rather than incrementally; Baer, 2010, 2012; cf. Amabile, 1996; Mumford & Gustafson, 1988; Oldham & Cummings, 1996)—has become critical for organizational innovation and sustainability (Nonaka, 1991; Oldham, 2002; Shalley, Zhou, & Oldham, 2004). Managers and scholars alike have therefore sought to identify the key factors that foster the development of creative ideas (for reviews, see George, 2007; Shalley et al., 2004; Shalley & Zhou, 2008).

Despite this progress in understanding various individual and contextual predictors of creativity, one factor that has gone relatively unexplored, is the importance of managing relationships with individuals higher up in the organizational hierarchy, who can provide (or withhold) key political and creative support to foster employees' development of creative ideas (Mumford, Scott, Gaddis, & Strange, 2002; Tierney, 2008). This is particularly surprising, because creative outcomes that challenge the status quo are controversial as well as resource intensive and can be stalled by influential others at any time during their development, long before such ideas are even considered for implementation (Kanter, 1988; Mumford et al., 2002).

Consider for example the case of an employee in a nature park in the organization we studied, who developed the novel idea of opening up the park for night-time excursions. This idea implied a radical shift from existing practices and a considerable rearrangement of resources and schedules, but had the potential to substantially increase park visitorship and revenues. However, choosing to pursue this idea and remaining motivated to develop it further (i.e., refining it, running pilot experiments etc.) to a stage where it could even be considered for implementation, was not so easy. In order to avoid any idea being summarily rejected by top management (as many others had been) and to secure funds for development efforts, the idea had to be positioned strategically as being aligned with current organizational needs and strategic priorities as well as other efforts underway in the organization. However, this strategic information was not easily accessible to the employee himself. Further, even early stages of developing this idea sparked resistance from leaders of other parks whose own teams could be potentially affected, and who could withhold resources needed for idea development efforts. This required proactive promotion of the idea to these leaders, and securing their buy-in and support early on in the development process. Finally, securing sponsorship from senior managers was crucial in gaining legitimacy in the eyes of others, as well as for garnering resources for idea development. Thus, even when this employee had access to novel information that helped in spurring this idea, the successful development of this creative idea depended on effectively managing upward relationships (with senior managers) in the organization during the development process.

In comprehensively examining this issue, we propose that it is important to successfully manage upward relationships during idea development efforts via (a) liaising with leaders in senior positions and gathering strategic information regarding organizational needs and priorities, (b)

proactively promoting ideas to organizational leaders who may represent potential allies whose support is critical for idea development, and (c) persuading senior managers to sponsor idea development. This is important because employees who have access to diverse and novel information that may spur creative ideas (Amabile, 1996) may not be motivated to fully engage in the tedious idea development process if they perceive that this process may get stalled by influential others in the organization.

Managing such upward relationships may be best handled by employees' immediate leaders, who occupy "linking-pin" positions connecting their subordinates with other leaders in the organization. By virtue of their formal position in the organizational hierarchy, these leaders not only mediate the flow of intangible and tangible resources throughout the organization (Graen, Dansereau, & Minami, 1972; Likert, 1961), but also have greater legitimacy and access to influential people and resources that are beyond their employees' reach (e.g., Liden, Sparrowe, & Wayne, 1997; Mehra et al., 2006; Sparrowe & Liden, 2005) and thus may be optimally positioned to orchestrate the influence processes required to facilitate their employees' idea development efforts (Galbraith, 1982; Kanter, 1982, 1988; Maidique, 1980). Employees may also be more likely to develop creative ideas if they feel assured that their leaders can effectively manage these upward relationships and secure support for idea development.

Guided by prior research on creativity (e.g., Baer, 2010; Perry-Smith, 2006), we adopt a social network perspective to understand these issues. A network perspective offers a relevant theoretical lens to study these issues because informal networks have been shown to be important conduits for the flow of resources, information and influence (Borgatti & Foster, 2003; Podolny & Baron, 1997), which are also critical for facilitating employees' idea development efforts (Mumford et al., 2002). Prior research, using a social network lens (e.g., Perry-Smith, 2006; Zhou, Shin, Brass, Choi, &

Zhang, 2009) has found that having disparate connections to employees external to one's immediate team, can spur employees' creativity (e.g., Amabile, 1996; Perry-Smith & Shalley, 2003) because external ties provide access to a diverse knowledge base and facilitate the combination of this diverse information in various ways to come up with creative ideas (e.g., Amabile, 1996).

However, in line with our arguments earlier, we propose that in addition to employees' external ties, their leaders' network ties to other leaders, which may help in managing upward relationships, may be critical in impacting employees' creative efforts. Specifically, we examine the role of leaders' positions in three interaction networks among other leaders in the organization: (a) leaders' central position in the idea generation network among their peers, which exposes them to critical information or insights regarding organizational trends, activities, and creative opportunities; (b) leaders' central position in the idea promotion network of peer leaders, which helps them promote and sell new ideas to these potential allies; and (c) leaders' clout with senior managers in receiving sponsorship for idea development. Beyond direct associations with employee creativity, we also examine how these leader network positions may further complement the creative benefits realized by employees' own external network ties. Figure 4.1 summarizes our study hypotheses.

Figure 4.1 Conceptual Model of Study 3
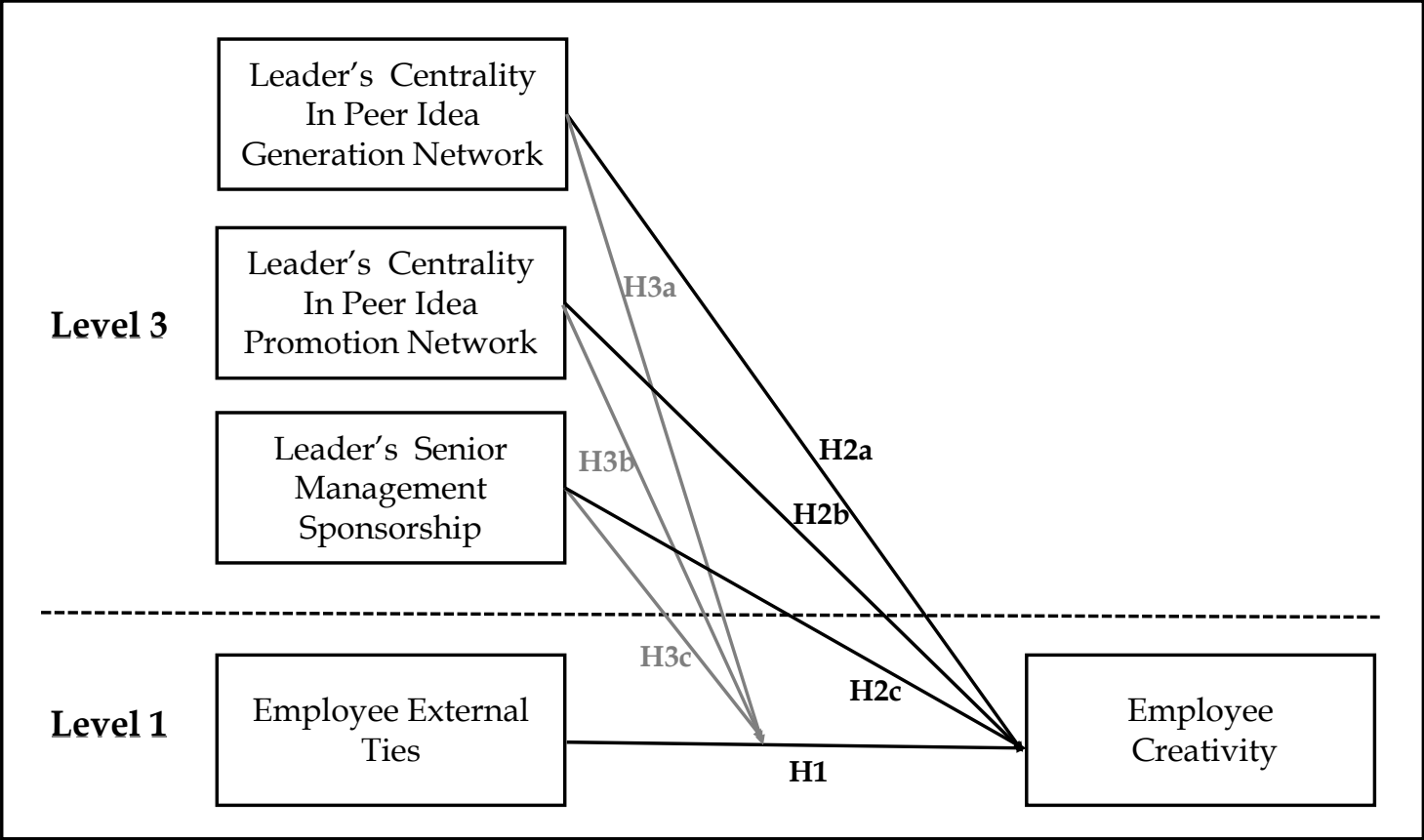
4.2 THEORETICAL BACKGROUND

4.2.1 Employee Creativity

Employee creativity, defined as the development of radically novel and useful ideas concerning organizational processes, products, or services (Baer, 2010, 2012; cf. Amabile, 1988; Mumford & Gustafson, 1988; Oldham & Cummings, 1996) is the outcome of an iterative development process comprising various stages including the identification of a problem, the generation of diverse ideas, their refinement, validation, and communication (e.g., Amabile, 1983, 1988; Amabile & Mueller, 2008; cf. Basadur, 2004). As illustrated by our example earlier, creative development often requires the effective management of relationships with higher-level managers who can provide or withhold critical support for creative development (Mumford et al., 2002).

It is important to note here that employee creativity differs from concepts such as individual innovation (e.g., Axtell, Holman, & Wall, 2006), which focus on various aspects of the implementation (such as completing the idea by turning it into a tangible product, service or process and transferring it to others, so that it can be mass-produced and commercialized/ institutionalized; Van de Ven, 1986) rather than development of new ideas. Although creativity may represent the initial phase of the innovation process (e.g., Hülsheger, Anderson, & Salgado, 2009), creativity and innovation are unrelated in those instances where innovation reflects the mere adaptation of already established procedures and practices to a new environment (Anderson, De Dreu, & Nijstad, 2004). Prior research has shown that managing upward relationships in creating buy-in and political support are important for innovation implementation (e.g., Frost & Egri, 1994; Van de Ven, 1986). The proposition we develop in this study however is that they are similarly important for the development of novel ideas.

Past creativity research has consistently found that employees' exposure to diverse perspectives and approaches to dealing with work related issues, via their ties to distant parts of the organization, is an important determinant of their creativity (Amabile, 1988, 1996; Perry-Smith & Shalley, 2003). However, in the process of developing these ideas, employees often encounter roadblocks and resistance from influential players as a result of the controversial nature of many new ideas (Kanter, 1988; Mumford et al., 2002). In such situations, employees may be more prone to develop creative ideas if they were assured of support from leaders in managing the broader expectations and political processes that typically occur at higher levels of the organization.

4.2.2 Leader Support in Managing Upward Relationships for Employee Creativity: The Role of Leader Network Ties

Because of their formal role occupying "linking-pin" positions connecting their subordinates with leaders in other parts of the organization, immediate team leaders are best positioned to garner the resources and political support from other organizational higher-ups that are needed to facilitate their employees' creativity (Graen et al., 1972; Likert, 1961). We argue that leaders will be able to garner information and support for their employees' creative efforts based on their positions in the informal social networks of peers and senior managers in their organizations. A network perspective on leadership suggests that leaders are embedded in networks of interconnected relationships among other leaders in the organization, and that these networks provide various resources and opportunities that leaders can leverage in influencing the outcomes of their employees (e.g., Mehra et al., 2006; Tierney, 2008; Venkataramani, Green, & Schleicher, 2010; cf. Sparrowe & Liden, 2005). From the perspective of employee creativity, leaders' roles in three interaction networks in particular may be of paramount importance in managing the expectations and securing support of other leaders in the organization.

First, a leader's centrality in the idea generation network (i.e., the network where new information or insights about work-related problems or issues are discussed; Baer, 2010) among other leaders may provide distinctive exposure to problems faced by other groups and their potentially novel solutions. Such exposure may in turn provide crucial strategic information regarding future plans, emerging trends and organizational priorities that are not easily accessible to employees, but that may be essential for both employees' engagement and success in the development of radical ideas because ideas in conflict with or unrelated to organizational trends and themes may otherwise become stalled by senior managers.

Second, as also illustrated in our opening example, because the development of radically creative ideas may stir resistance from other organizational groups whose own products and processes are affected by this development (e.g., Kanter, 1988; Van de Ven, 1986), the success of such development efforts may require active promotion of ideas to other leaders in the organization (Kanter, 1988; Rogers & Shoemaker, 1971). We therefore examine leaders' influential central position in the idea promotion network (i.e., the network of who interacts with whom to promote/sell new ideas) among other leaders who can be potential allies, or who alternatively may block idea development efforts[2].

And third, because important decisions about resource deployments and support are made by senior management, sponsorship from senior managers for the development of creative ideas may be essential in particular during early development stages, due to the risk of cost overruns and missed deadlines inherent to the idea development process

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[2] It is important to note that idea promotion networks differ from idea generation networks due to their distinct functions, structures and boundaries. For example, whereas individuals may seek out specific others with related experience or technical expertise to discuss their team's problems and identify potential solutions, they may promote their ideas more to those who might potentially oppose them or who can in turn, sell these ideas to others in canvassing support. Thus, based on such interactions, the same individual can hold vastly different positions in these two networks.

(Delbecq & Mills, 1985; Kanter, 1988). We therefore examine leaders' garnering of senior management sponsorship in affecting their employees' creativity. However, given the importance of employees' own external network ties in providing diverse information in order to facilitate their creativity (Baer, 2010; Perry-Smith, 2006; Zhou et al., 2009), we first develop a baseline proposition regarding the role of those ties for employees creativity.

4.3 HYPOTHESES

4.3.1 Employees' External Network Ties

Generating and developing creative ideas are often the result of employees' exposure, via their social interactions, to diverse perspectives and approaches to dealing with work related issues (Amabile, 1988, 1996; Perry-Smith & Shalley, 2003). Ties to individuals external to one's immediate workgroup tend to be weak in terms of emotional closeness or frequency of interaction (Granovetter, 1973; Perry-Smith, 2006), but are especially valuable for the generation and development of novel ideas because they provide access to diverse pockets of information that tend to be non overlapping (Mumford & Gustafson, 1988; Perry-Smith, 2006). Such diverse information broadens one's knowledge base (Amabile, 1988) and therefore, enhances the ability to combine pieces of disparate information to make unusual connections (Mumford & Gustafson, 1988). Ties within one's own workgroup, on the other hand, tend to be denser, and therefore tend to "echo" each other's ideas, thereby reducing the generation of really novel or "out of the box" ideas (Burt, 2004). As Kanter (1988) argues, the cross fertilization of ideas that is so essential for creativity is engendered by cross boundary contact and not within disciplinary boundaries. Along these lines, recent research has also found support for the role of one's external ties to other parts of the organization in influencing employees' creativity (Baer, 2010; Perry-Smith, 2006; Zhou

et al., 2009). In line with these arguments, we propose the following baseline hypothesis:

Hypothesis 1: Employees' number of external ties will be positively related to their development of creative ideas.

However, developing creative ideas also requires management of specific upward relationships with senior organizational players that employees may not be able to access on their own. Thus, leaders' positions in the three networks introduced above should also have a unique influence on employee creativity. In the following pages, we discuss the role played by these leader network ties and how they may combine interactively with employees' own external ties in impacting their development of creative ideas.

4.3.2 Leader Centrality in the Peer Leader Idea Generation Network

The successful development of creative ideas requires the identification of problems or creative opportunities that are in alignment with broader organizational needs, as well as exposure to emerging trends and ideas (Amabile & Mueller, 2008). In this regard, idea-related interactions among team leaders, which involve informal discussions about new ideas and proposals, problems faced by other teams, workable solutions or information about emerging trends and technologies, may be especially useful for their employees. Leaders' centrality in such idea networks indicates the extent to which these leaders serve as critical hubs for the transfer of ideas among other leaders, thereby providing them with significant exposure to diverse, non-redundant ideas and critical information (Burt, 2004; Brass & Burkhardt, 1993; Brass & Krackhardt, 1999; Geletkanycz & Hambrick, 1997). By virtue of their centrality in such networks, these leaders serve as critical junctions connecting unconnected leaders and their ideas (Borgatti, 2005; Freeman, 1979). As a result, central leaders acquire informational resources regarding new ideas and trends

more readily (Raven, 1965), and accumulate knowledge about task-related problems and workable solutions.

Being at the crossroads of such information exchange can trigger awareness of potential opportunities for creative development (e.g., Burt, 2004), provide exposure to pockets of local expertise that can be tapped into by one's own team for dealing with specific problems or issues, and help raise awareness of creative efforts already underway in dealing with specific issues. Such knowledge may in turn ensure that subordinates do not duplicate efforts or "reinvent the wheel", but rather concentrate their energies on the development of ideas that are topical, timely, and necessary. In addition, leaders' centrality in the idea generation network of other leaders also provides access to unique information not easily available to employees, such as information about alignment of potential ideas with broader organizational needs, current constraints and prerogatives. This information is crucial for employees' idea development in order to prevent rejection of novel ideas due to potential misalignment with organizational priorities. Thus,

Hypothesis 2a: Leaders' centrality in the idea generation network among their peer leaders will be positively related to employee creativity.

4.3.3 Leader Centrality in the Peer Leader Idea Promotion Network

The development of creative ideas that substantially deviate from the status quo also bears considerable risk of failure, eventual non-acceptance, or blockage by key organizational stakeholders (Andriopoulos & Lowe, 2000). In such situations, employees are more likely to invest time, effort and resources in developing risky and novel ideas, if they feel assured of reasonable support from critical organizational constituencies (Ford, 1996). One such group is that of leaders of other teams that might be impacted by these ideas, whose products and services need to be adjusted in light of these novel ideas, or whose work processes might change drastically if

these ideas get implemented. As a result, these leaders' acceptance of new ideas as well as their cooperation may be necessary for employees' development of creative ideas (Kanter, 1988). To this end, a focal leader's influence in effectively promoting their employees' novel ideas to leaders of other teams may be important in influencing both employees' engagement and effectiveness in the development process (Amabile, 1988; Ford, 1996; Shalley et al., 2004; Woodman, Sawyer, & Griffin, 1993).

A focal leader is said to be influential in the idea promotion network if this person occupies a central position in this network—i.e. is actively sought out by other team leaders in selling their own teams' ideas and proposals, and is relied upon to promote these ideas to others. For instance, prior research on organizational change suggests that convincing opinion leaders of the merits of impending changes represents an effective strategy, because these opinion leaders can more easily sell the intended changes to others throughout the organization (Howell & Higgins, 1988; Huy, 1999). By helping to promote the ideas of one group to another, certain leaders serve as a critical bridge between different, sometimes unconnected actors. As a result, others are likely to confer greater status on these leaders (Venkataramani et al., 2010) and to be more receptive of ideas proposed by them.

Leaders who wield a lot of influence in the idea promotion network by virtue of being central in such networks may affect employees' extent of engagement in and effectiveness of the idea development process by various means. For instance, these leaders may be better able to convince other leaders of the merits of their employees' creative ideas, garner support for the development of such ideas, and build consensus regarding their desirability for the organization. Leaders' effective promotion of their employees' ideas may also lead to other leaders granting resources and opening up opportunities, which in turn benefit employees' idea development (Amabile, 1998; Ford, 1996; Shalley et al., 2004; Woodman et

al., 1993). Beyond the creation of support and resource structures, their leaders' influence may also signal to employees that support of critical organizational constituencies during the tedious idea development process will be secured (Ford, 1996; Madjar, Greenberg, & Chen, 2011). As a result, employees may feel less constrained, more confident and motivated in developing creative ideas (Shalley et al., 2004).

Hypothesis 2b: Leaders' centrality in the idea promotion network among their peer leaders will be positively related to employee creativity.

4.3.4 Leaders' Senior Management Sponsorship

Kanter (1988) argues that the successful development of any novel idea depends on the amount and type of power behind it. Creative efforts are often derailed due to lack of support from senior management (e.g., Delbecq & Mills, 1985; Fast, 1979). Given the uncertain, "disruptive and expensive development and testing efforts" (Kanter, 1988, p. 184) that accompany novel ideas, such top-management support may be imperative for employees' engagement in and success with the development of creative ideas.

First, creative development efforts are resource intensive and require significant experimentation and tolerance for failure (Andriopoulos & Lowe, 2000; Quinn, 1989). Further, most new ideas that challenge the status quo are controversial because they involve competition with alternative courses of action over limited resources (Kanter, 1988). In such situations, top management support may serve to secure resources from various organizational groups for the development of creative ideas (Amabile & Gryskiewicz, 1989). Second, top management support may aid in validating and providing credibility to creative endeavors in the eyes of other organizational members. Sponsorship, backing and lobbying support from senior managers can significantly increase the perceived legitimacy of new ideas, thus removing organizational roadblocks and

enhancing the likelihood of garnering required resources from a limited resource pool. Third, because employees make sense of their environment in order to determine whether to continue habitual action or rather engage in non-routine, creative endeavors (Ford, 1996; Madjar et al., 2011), top management sponsorship and lobbying of their team's leader may signal backing for new ideas, in turn reducing constraints and increasing motivation to engage in creative development efforts. In line with the above arguments, past research has also found support for the critical role of supporters, backers, sponsors and friends in high places to the successful initiation of change efforts (Maidique, 1980; Quinn, 1989).

Hypothesis 2c: Leaders' sponsorship received from senior management will be positively related to employee creativity.

4.3.5 Interactive Effects of Leader Network Ties and Employee External Ties on Creativity

We have so far argued for the direct impact of employees' external ties and leaders' positions in their networks among their peers and senior managers on employees' creativity. In the following section, we examine how employees' and leaders' network ties interactively influence employees' development of creative ideas.

4.3.5.1 Employee External Ties and Leader Centrality in the Peer Idea Generation Network

We propose that employees' external ties, which provide them with access to novel information and diverse perspectives (Perry-Smith, 2006), will interact with their leader's centrality in their peer idea generation network, such that employees' external ties more strongly predict their creativity when their leaders occupy central positions in such networks.

When leaders hold strategic central positions in the idea generation network among other leaders, they provide access to unique and

important information for employees' idea development process regarding problems faced by other teams, emerging trends, technological advances, and organizational priorities and constraints. Due to their central positions, as well as by virtue of their position in the organizational hierarchy, leaders also provide more reliable and authoritative information (e.g., Liden et al., 1997) and valuable perspectives on things such as what ideas may be considered novel and useful by the broader organization, what gets rewarded and supported, and what efforts are currently underway in other workgroups, thus helping to channel employees' creative pursuits in the right direction so that their chances of being rejected are reduced. This broader perspective, in light of the more strategic information available to such leaders will serve to complement and enhance the effects of employees' own external ties that provide them access to diverse knowledge for creative development. Thus, we propose,

Hypothesis 3a: Employees' external ties will interact with their leaders' centrality in the idea generation network among their peers, such that employees' external ties will be more strongly related to employee creativity when leaders' centrality is high.

4.3.5.2 Employee External Ties and Leader Centrality in the Peer Idea Promotion Network

Leaders who assume central positions in their peers' idea promotion network may use their influence to promote their employees' creative efforts inspired by employees' own external ties. Although employees may have access to diverse and novel information to trigger creative thoughts, the development of creative ideas also requires orchestrating the politics surrounding idea development (Galbraith, 1982; Kanter, 1988), and promoting ideas to other leaders who might have a vested interest in them—parties that employees do not have easy access to. In such situations, if their leaders do not have influence (by virtue of their centrality in the idea promotion network) in persuading other leaders

regarding the merits of their employees' novel ideas, or in convincing them to support development efforts, employees may encounter roadblocks and resource shortages, and thus feel demotivated to engage in developing creative ideas despite having the necessary, diverse knowledge base provided by their external ties.

Conversely, when leaders are central in their peers' idea promotion networks, this will benefit the creativity of employees who also have more external ties of their own, for at least two reasons. First, these employees may not only feel efficacious in terms of their own ability to be creative due to their diverse knowledge base (Amabile, 1988), but will also feel motivated by the fact that their leaders have the necessary clout to promote their ideas to various organizational groups and potential allies, thus reducing any uncertainty regarding the acceptance of their ideas by the broader organization. Second, central leaders may open up resource channels and create opportunity structures that may more directly benefit their employees' realization of creative idea development inspired by their own external ties. In other words, the impact of employees' own external ties on their creative idea development should be stronger in situations where their leaders have greater influence among other leaders in promoting their ideas. Thus,

Hypothesis 3b: Employees' external ties will interact with their leaders' centrality in the idea promotion network among their peers, such that employees' external ties will be more strongly related to employee creativity when leaders' centrality is high.

4.3.5.3 Employee External Ties and Leaders' Senior Management Sponsorship

Sponsorship support from senior managers will similarly complement employees' own network ties in impacting their development of creative ideas due to various reasons. For instance, support and backing from

higher-level management increases the legitimacy of idea development efforts in the eyes of other organizational members who may have the means to support or block the development of these ideas. When employees have access to diverse information and knowledge that can facilitate the generation of creative ideas, ambivalent support and inadequate resources in particular during initial, fragile stages of the development process can significantly frustrate development efforts (Delbecq & Mills, 1985; Kanter, 1988). Thus, when leaders are able to secure sponsorship and lobbying support from more senior managers, this likely amplifies the creativity-enhancing effects of access to diverse information secured via employees' own external ties. Moreover, support from senior managers likely reduces perceptions of obstacles and constraining factors, but enhances perceptions of facilitating conditions, thereby increasing employee motivation to engage in developing creative ideas. On the other hand, when leaders lack senior management support, employees may not only lack the necessary support to turn informational resources acquired via external ties into creativity, but similarly, may lack the motivation to engage in tedious and risky idea development endeavors. Therefore,

Hypothesis 3c: Employees' external ties will interact with their leaders' sponsorship received from senior management, such that employees' ties will be more strongly related to employee creativity when leaders' senior management sponsorship is high.

4.4 METHODS

4.4.1 Data and Sample

Hypotheses were tested with data from employees in a mid-sized public technology and service organization in Spain, which develops and provides environmental protection services to the local community. Services include reforestation, environmental restoration after mining,

interventions to protect natural habitats, conservation of threatened flora and fauna, and waste management. In addition, the organization provides technical expertise regarding environmental protection to other public and private sector organizations.

We collected data from one of the company's main divisions involved in the preservation of natural habitats and conservation of threatened flora and fauna. This division operated 30 nature parks that functioned as independent teams and reported to 18 team leaders. These teams were in charge of the conservation and maintenance of parks in addition to conducting basic research and development activities related to the sustainability of each park's ecology. Employees in these teams performed a variety of tasks including research, administration and maintenance. All teams reported to a senior management team comprised of specific functional heads (i.e., administration, conservation, technical support) as well as other general managers.

Given the increasing competition faced from larger multinational corporations in this industry, limited resources, and the constant changes in the ecological environment (e.g., due to changes in weather, visitor numbers, etc.), employees are constantly encouraged to come up with radically new ways for improving new products, services, as well as important work processes such as maintenance and coordination, in ways that are substantially different from the status quo. Thus, the development of creative ideas was highly valued by the organization and represented an important and salient aspect of employees' work.

Examples of creative ideas that were developed by employees at the time of this study included the development of special services to make the parks more attractive to visitors (e.g., 'visits by night' during summer; guided theme initiatives, such as park exhibitions and tourist attractions related to the time of Roman occupation of the area; customized programs for special customer groups such as students and retired people;

'photography rallies', i.e. photo exhibitions on various themes; educational programs and adventure activities for children, etc.) and a novel internet-based advertising campaign. The development of these ideas prior to their implementation required orchestration of the wider organizational support structure involving other leaders and securing top management go ahead as well as financial support for development activities such as running simulations, experiments, purchasing equipment etc.

All 30 teams and their leaders agreed to participate in the study. We sent out separate 'employee' and 'leader' surveys to all team members and their leaders. We sent the 'employee' survey to all 218 full time employees of the division, of which 214 (98%) employees provided complete responses. All teams had response rates greater than 80% (cf. Oh et al., 2004; Sparrowe et al., 2001). The average number of employees in each team was 7.27 (s.d. = 2.20; range 3-13). 51 (24%) respondents were female, and the average tenure with their current team was 5.86 years (s.d. = 4.39). The average age of respondents was 39.77 years (s.d. = 8.68). 93 (44%) participants had a bachelor's degree or higher.

At the same time, we sent the 'leader' survey to the leaders of these teams. All leaders returned completed surveys. The average time leaders had spent in their current position was 7.64 years (s.d. = 3.16), and the average tenure with their teams was 5.59 years (s.d. = 2.92). Four leaders were female, and the average age was 46.47 years (s.d. = 8.84). All leaders had a bachelor's degree or higher.

Finally, we conducted in depth interviews with seven higher-level managers in order to cross-validate as well as facilitate interpretation of study findings. Along with the team leaders, these senior managers constituted the entire leadership team of this division. We thus collected data from all the leaders in this division.

4.4.1.1 Procedures

A member of the research team met with senior managers in the organization to broadly explain the purpose of the research. An organizational liaison person provided information on the organizational structure, the way the teams worked together, the goals they followed, and the current team rosters and list of leader names. Based on this information, we designed the initial surveys guided by our research objectives. Following standard procedures (cf. Brislin, 1980), two professionally qualified bilingual translators independent of the research team, and with several years of technical expertise, translated the original items from English to Spanish and back to English. This procedure helped to ensure that the integrity of the original scales and items was intact. We then pilot tested these surveys with a few employees in a different division of our organization who did not participate in the study, in order to gauge survey completion time as well as to ensure that all instructions and items were intelligible and unambiguous. Their feedback resulted in minor modifications to the surveys.

Following this, top management sent out a formal letter to all team leaders introducing the researchers, explaining the purpose of the survey and encouraging participation. A member of our research team, a native Spanish speaker, personally visited every team to explain the broad objectives of this research as well as to invite employees to participate. We assured employees and team leaders of the confidential nature of their responses and explained the procedures used to maintain confidentiality. Upon completion, surveys were returned to the researchers via sealed envelopes.

4.4.2 Measures

The employee survey included measures of the number of external ties as well as several control variables. The leader survey included a network

questionnaire to measure leader centrality in the idea generation and idea promotion networks among their peers, and an employee evaluation form in which they answered questions regarding the development of creative ideas by employees who reported to them. In addition, leaders were given a list of all senior managers in the organization in order to assess the support provided by them in sponsoring the team leaders' ideas and proposals.

As is common in network research (e.g., Marsden, 1990), a roster of all team leaders in the division was provided, and participants were asked to answer specific questions about each person only if they knew them currently. A roster or whole network design was used to collect data on the leaders' networks because it has been shown to improve the reliability of network data (Marsden, 1990; Scott, 2000). Further, all network questions were measured using one question each. Although it is ideal to use multi-item measures to improve reliability, it is acceptable in network studies to limit network data collection to single-item measures because asking each leader to answer multiple questions per measure about all other team leaders and supervisors would be time-consuming and arduous, potentially resulting in participant fatigue and poor response rates (e.g., Marsden, 1990). All network measures were calculated using UCINET (version 6.289; Borgatti et al., 2002).

4.4.2.1 Employee External Ties

We slightly adapted the measure used by Perry-Smith (2006) to measure external ties, using a free recall question. Specifically, we asked respondents "Thinking back over the past 6 months, please write down up to 15 names, nicknames, or initials of all people within [organization] but outside your team, with whom you have dealt with on work-related matters." Following Perry-Smith (2006), the number of names generated by each employee was used to measure external ties.

4.4.2.2 Leader Centrality in Peer Idea Generation Network

In line with our theoretical arguments, this was measured as the leader's betweenness centrality in the idea network among their peers (e.g., Burt, Kilduff & Tasselli, 2013). Betweenness centrality refers to how often a node lies along the shortest path between two other nodes in a network—i.e., how often a particular individual has to be contacted in order to reach other individuals. Thus, it is an index of liaising between two unconnected parts of the network, and thus an indication of the amount of information (ideas, in this case) that a focal individual is exposed to (Borgatti, 2005). Thus, high betweenness centrality in the peer idea network indicates a leader's exposure to non-redundant ideas and solutions for problems that flow in the team leader network (e.g., Burt, 2004; Perry-Smith, 2006).

In order to calculate this, a roster containing the names of all other team leaders in the organization was provided in the leader survey, and each leader was asked to respond to the question, "How frequently have you provided this person with new information or insights about this person's team's work-related problems or issues?" about all other team leaders in the organization (Baer, 2010). Respondents used a 5-point scale ranging from 1 (*Never*) to 5 (*Several times in the last 6 months*) to answer this question.

Responses of all team leaders to this question resulted in a network matrix wherein each cell indicated the row person's (leader's) response about a column person (leader). The matrix was provided as input for the betweenness centrality routine in the UCINET software program. Because this routine requires binary data in the cells of the matrix, we dichotomized the responses in each cell such that responses with a "1" were coded as zero and all other responses were coded as "1". The output of this routine is a vector of betweenness centrality scores. It should be noted that this measure is not based on the focal leader's responses (i.e., self reports) but on the responses of all other leaders in the network.

4.4.2.3 Leader Centrality in Peer Idea Promotion Network

Similar to the above question, this was measured as the betweenness centrality of the focal leader in the idea promotion network. This network was measured by providing a roster of all team leader names and asking each leader to answer the question, "How often have you sought out this person in order to promote your teams' ideas and proposals?" about all other leaders. Respondents used a 5-point scale ranging from 1 (*Never*) to 5 (*Several times in the last 6 months*) to answer this question. The network matrix derived from leader responses was dichotomized (similar to the procedure described above) and provided as input to the betweenness centrality routine in UCINET. In line with our arguments, high betweenness scores on this question indicate the extent to which a focal leader falls "between" others and on whom other actors must depend to conduct exchanges (in this case, to promote their teams' ideas and proposals), and thus indicates the extent of influence in the network. As discussed earlier, this measure is based on the responses of all other leaders in the network and not based on self-reports by the focal leader.

4.4.2.4 Senior Management Sponsorship

This was measured as the extent to which senior managers (supervisors higher up in the organizational hierarchy than the focal leaders) provided support in terms of sponsoring and lobbying for the ideas and proposals of the focal leader's team. Team leaders were provided with a list of all the senior managers in the organization and asked to answer the question, "How often has this person lobbied for and supported your team's ideas when you needed them to?" This question was adapted from Ancona and Caldwell (1992). Respondents used a 5-point scale ranging from 1 (*Never*) to 5 (*Several times in the last 6 months*) to answer this question. In line with our arguments, we measured this in terms of each leader's outdegree centrality by summing up the extent to which senior leaders provided such support.

4.4.2.5 Employee Creativity

This was measured with Baer's (2010, 2012) three-item scale, derived from Subramaniam and Youndt (2005). Supervisors indicated the extent to which each of the three statements was characteristic of their employees in the past 6 months, using a 7-point scale ranging from 1 (*not at all characteristic*) to 7 (*extremely characteristic*). Items were, "Developed ideas that imply substantial departures from existing product and service lines", "Developed breakthrough ideas—not minor changes to existing products/services", and "Developed ideas that make existing knowledge about current products/services obsolete." Researchers frequently measure employee creativity with supervisory ratings (Amabile & Mueller, 2008). This practice is supported by significant positive correlations between objective measures of creative performance and supervisory ratings of creativity (Scott & Bruce, 1994; Tierney, Farmer, & Graen, 1999).

4.4.2.6 Control Variables

Individual employees were nested within teams, each headed by a team leader. In some cases, due to structural reasons, a particular leader oversaw more than one team. In line with this 3-level nested structure of our sample, we controlled for several variables at the employee (level 1), team (level 2), and leader (level 3) levels that could affect our dependent variable or provide alternative explanations for our findings. At level 1, we controlled for employees' gender, age and education level, which have been shown to relate to creativity (e.g., Mumford & Gustafson, 1988; Unsworth, Wall, & Carter, 2005; Zhou & Shalley, 2008). Further, as the focus of this study is on the importance of leaders' network ties, we wanted to demonstrate the incremental effects of leader ties beyond certain employee characteristics and attitudes that have been shown to strongly predict employee creativity. Therefore, we also controlled for employees' intrinsic motivation and creative self-efficacy (e.g., Amabile,

1988; Tierney & Farmer, 2011). Intrinsic motivation was measured using a five-item scale developed by Tierney et al. (1999). Employees were asked to answer how characteristic of them each of these five statements were, using a 7-point rating scale ranging from 1 (*Not at all*) to 7 (*Exactly*). A sample item includes, "I enjoy coming up with new ideas for projects." Creative self-efficacy was measured with a 4-item scale from Gong, Huang and Farh (2009) using a 5-point rating scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). A sample item is, "I have confidence in my ability to solve problems creatively." Finally, given the focus on the leaders, we also controlled for employees' dyadic tenure with their leader and the quality of leader-member exchange (LMX) with their leader. Dyadic tenure was measured using the question, "How long have you worked with your team leader?" LMX was measured using the LMX7 scale developed by Graen and Scandura (1987). A sample item is, "I can count on my team leader to 'bail me out', even at his/her own expense when I really need it".

At level 2, we controlled for team size. At level 3, we controlled for the leaders' position in the affect based (i.e., friendship and avoidance) networks among their peers and senior managers in order to take into account that leaders' influence with peers and senior managers may be due to their affective relationships with them (e.g., Brass, 1985). Team leaders were given a list of names of all other team leaders and senior managers and were asked to answer questions on their positive and negative social ties. Following Gibbons and Olk (2003), positive social ties were measured using the question, "What is the nature of your personal relationship with this person?" Respondents used a 5-point rating scale ranging from 1 (*Do not know socially*) to 5 (*Close personal friend*). Negative ties were measured using a question adapted from Chua et al. (2008), "To what extent would you describe the relationship with this person as being difficult? Difficult relationships may be characterized by individuals that

dislike each other, and intentionally avoid contact, or hamper each other's efforts." Respondents used a 5-point rating scale ranging from 1 (*Not at all*) to 5 (*Very much*). Following suggestions from prior network research (e.g., Bono & Anderson, 2005; Mehra et al., 2006; Sparrowe & Liden, 2005), the in-degree measure of centrality was calculated for both these measures to capture the extent to which the focal leader was generally liked versus avoided by other leaders in the organization. The in-degree measure sums the "incoming" nominations of friendship or avoidance from other leaders (i.e., the extent to which other leaders nominate a focal leader as a friend or someone they find difficult to work with or prefer to avoid interacting with). Thus, this measure is not computed based on the focal member's responses.

4.4.3 Analytical Approach

Employees in our sample were clustered within teams, each headed by an external leader. Further, due to structural reasons, some leaders were responsible for supervising more than 1 team. To account for this 3-level nested nature of the data, we employed random coefficient regression modeling (Raudenbush & Bryk, 2002), following established procedures in all analyses (e.g., Hofmann, 1997). Specifically, we employed Hierarchical Linear Modeling 3 (HLM3) with HLM version 6.06 and Restricted Maximum Likelihood (RML) in running our 3-level models[3]. Our results are reported in accordance with guidelines indicated by prior studies that have employed such 3-level nested models (e.g., Liu, Chen & Yao, 2011).

In order to estimate the amount of variance in creativity predicted by variation among leaders, we first tested a null (one-way ANOVA) model on creativity as the dependent variable and calculated ICC [1]. ICC [1]

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[3] We also re-ran our model using a 2-level nested model, considering the leaders as independent leaders of the 30 teams. This analysis revealed the same pattern and significance of results as our 3-level model. We report the results of our 3-level model for the sake of correct specification of levels of analysis.

represents the proportion of variance in the outcome variable that resides between leaders. Results showed that ICC [1] = .38, indicating that 38% of the variance in creativity resided between leaders.

We next tested whether significant between-leader variance resided in the employee external ties-creativity slope (random-coefficient regression model), which would suggest consecutive modeling of this variance through examination of cross-level interactions. We first entered the controls into the model, followed by employee external ties as predictor. Results revealed significant variance in the randomly varying level-1 employee external ties slope, τ_{11} = .01, χ^2 (17) = 37.03, $p < .01$.

4.5 RESULTS

Table 4.1 provides the means, standard deviations, reliabilities and bivariate correlations among the study variables at Levels 1, 2, and 3. As this Table indicates, leaders' centralities in the three networks were not significantly related with each other, which underlines that the three networks are independent. With regard to our control variables, this Table indicates that women were more creative ($r = -.27$, $p < .01$). In line with the extant creativity literature (Zhou & Shalley, 2008), employees' college education ($r = .34$, $p < .01$) and intrinsic motivation ($r = .29$, $p < .01$) were positively related to creativity.

4.5.1 Hypotheses Testing

To test our hypotheses, we specified intercepts-as-outcome, and intercepts-and-slopes-as-outcome models (Raudenbush & Bryk, 2002; Table 4.2). In order to avoid confounding cross-level and between group interactions, we group-mean centered the level 1 predictor, employees' external ties (Enders & Tofighi, 2007; Hofmann & Gavin, 1998). Level 3 predictors were grand-mean centered to reduce multicollinearity (Raudenbush & Bryk, 2002).

Table 4.1 Means, Standard Deviations and Bivariate Correlations among Study Variables

Variables	Mean	s.d.	1	2	3	4	5	6	7	8
Level 1: Individual Level										
1. Gender[a]	.76	.43								
2. Age	39.77	8.68	.26**							
3. Education[b]	.43	.50	-.48**	-.29**						
4. Tenure with leader	5.53	3.65	.03	.13	-.19**					
5. Intrinsic motivation	5.18	1.03	-.20**	-.20**	.32**	.02	(.88)			
6. Creative self efficacy	5.61	.90	-.09	-.09	.19**	.16*	.45**	(.84)		
7. LMX	3.39	.93	.00	.10	.06	.14*	.20**	.30**	(.91)	
8. Creativity	7.75	4.48	-.27**	-.13	.34**	-.12	.29**	.11	.04	(.80)
9. External ties	7.83	4.52	-.26**	-.19**	.30**	.03	.24**	.04	.06	.23**
Level 2: Team Level										
1. Team size	7.27	2.20								
Level 3: Leader Level										
1. Centrality in friendship network	87.87	14.76								
2. Centrality in negative networks	43.77	8.83	.43*							
3. Centrality in peer idea generation network	0.20	0.61	.03	.09						
4. Centrality in peer idea promotion network	26.5	48.13	.65**	.58**	-.17					
5. Senior management sponsorship	36.13	13.18	.64**	-.24	-.22	.04				

Note: N employees = 214, N teams = 30, N leaders = 18; Cronbach's alpha in parentheses; [a] Dummy coded: 1 = Male, 0 = Female; [b] Dummy coded: 0 = no college degree, 1 = college degree. ** $p < .01$, * $p < .05$.

Table 4.2 HLM Analysis on Employee Creativity

	Model 1		Model 2	
	Coefficient	**s.e.**	**Coefficient**	**s.e.**
Intercept (γ_{000})	11.78***	1.95	11.96***	1.91
Level 1 Variables				
Gender[a] (γ_{100})	-.13	.16	-.09	.15
Age (γ_{200})	-.01	.01	-.01	.01
Education[b] (γ_{300})	.52*	.19	.70**	.18
Tenure with leader (γ_{400})	.00	.00	.00	.00
Intrinsic motivation (γ_{500})	.15	.08	.09	.07
Creative self efficacy (γ_{600})	.05	.08	.07	.08
LMX (γ_{700})	.21*	.08	.24**	.08
External ties (γ_{800})	.04* (H1)	.02	.03	.02
Level 2 Variable				
Team size (γ_{010})	-.12	.08	-.07	.08
Level 3 Variables				
Centrality in friendship network (γ_{001})	-.10**	.03	-.10**	.03
Centrality in negative affect networks (γ_{002})	-.01	.02	-.00	.02
Centrality in peer idea generation network (γ_{003})	1.17*** (H2a)	.25	1.16***	.25
Centrality in peer idea promotion Network (γ_{004})	.03** (H2b)	.01	.03***	.01
Senior management sponsorship (γ_{005})	.07* (H2c)	.03	.07*	.02
Cross-Level Interactions				
External ties X centrality in peer idea generation network (γ_{803})			-.11*** (H3a)	.02
External ties X centrality in peer idea promotion network (γ_{804})			-.00 (H3b)	.00
External ties X senior management sponsorship (γ_{805})			.01** (H3c)	.01
Model deviance	474.13		449.28	

Note: N at Level 1 = 214, Level 2 = 30, Level 3 = 18; a Dummy coded: 1 = Male, 0 = Female; b Dummy coded: 0 = no college degree, 1 = college degree. *** $p < .001$, ** $p < .01$, * $p < .05$. Model deviance is a measure of overall model goodness-of-fit in HLM analyses. The larger the model deviance, the worse is the model goodness of fit (e.g., Liu et al., 2011).

Hypothesis 1 predicted that the number of external ties that employees had would be positively related to their creativity. As the main effect model (Model 1) in Table 4.2 indicates, this was significant (γ_{800} = .04, *p* < .01)[4].

Hypothesis 2a predicted that leaders' centrality in the peer idea generation network of other team leaders will be positively related to these employees' creativity. As Model 1 indicates, this was also significant (γ_{003}= 1.17, *p* < .001). Hypothesis 2b posited that leaders' centrality in their peer idea promotion network, by virtue of being critical for the promotion of other leaders' teams' ideas and proposals, would be positively related to employee creativity. This was supported (γ_{004}= .03, *p* < .01). Hypothesis 2c predicted that leaders' garnering of senior management sponsorship for their teams' ideas and proposals will be positively related to employee creativity. This was also supported (γ_{005}= .07, *p* < .05).

Hypothesis 3a predicted that employees' external ties will interact with their leaders' centrality in their peers' idea generation network to predict their creativity such that leader centrality will enhance the effects of employee ties on their creativity. The interaction model (Model 2) indicates that this interaction term was significant (γ_{803}= -.11, *p* < .001). However, the pattern of the interaction was different from what we had hypothesized. Simple slopes tests (Aiken & West, 1991; Preacher et al., 2006) indicated that the relationship between employee external ties and creativity was stronger if leaders were less central in their peer idea generation network (γ = .10, *p* < .05) than if leaders were more central (γ = -.04, *p* > .05). Figure 4.2 illustrates this finding at low (mean – 1 s.d.) versus high (mean + 1 s.d.) leader centrality (Aiken & West, 1991). As this Figure illustrates, employees' external ties were more strongly related to their

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[4] In line with some prior findings (e.g., Baer, 2010; Zhou et al., 2009), we also examined a curvilinear relationship between employees' external ties and their creativity. However, this was not supported in our sample.

creativity when their leaders did not have access to informational resources important for creativity. Thus, while the interaction term was significant, the pattern of interaction was not in accordance with our predictions.

Figure 4.2. The Interaction of Employees' External Ties and Leaders' Betweenness Centrality in their Peer Idea Generation Network on Employee Creativity
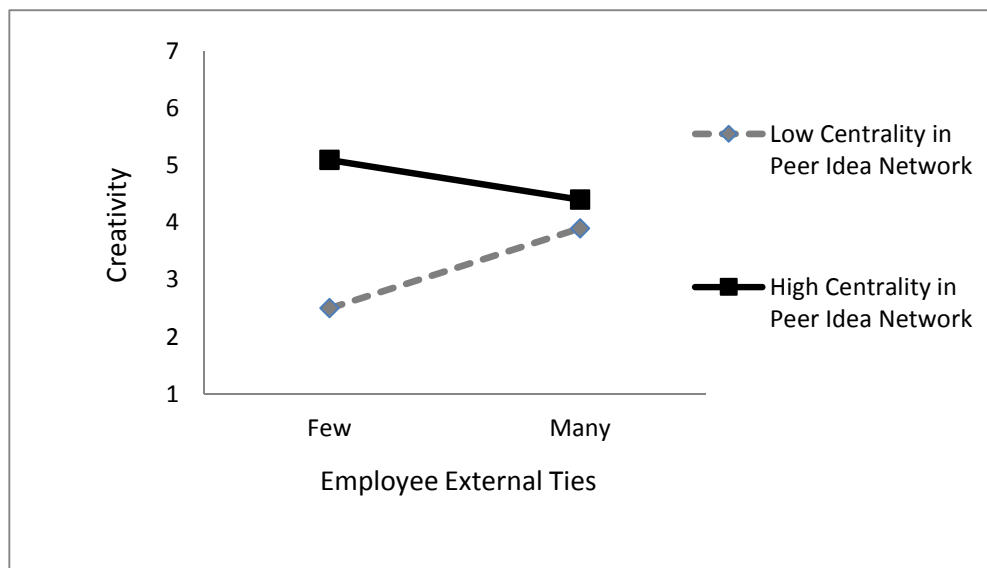
Hypothesis 3b predicted that employees' external ties will interact with their leaders' centrality in their peers' idea promotion network to predict their creativity such that they will enhance each other. This was not supported (γ_{804}= -.00, p > .05; Model 2).

Hypothesis 3c predicted that employees' external ties will interact with their leaders' ability to garner sponsorship of their teams' ideas and proposals by senior management, to predict their creativity such that they will complement each other. Model 2 shows that this interaction term was significant (γ_{805}= .01, p < .01). Simple slopes tests (Aiken & West, 1991; Preacher et al., 2006) indicated that the relationship between employee external ties and creativity was stronger for employees whose leaders had more senior management sponsorship (γ = .10, p < .01), as compared to those with less senior management sponsorship (γ = -.03, p > .05), thus

confirming our predicted pattern of interaction. Figure 4.3 illustrates this interaction.

Figure 4.3. The Interaction of Employees' External Ties and Senior Management Sponsorship on Employee Creativity
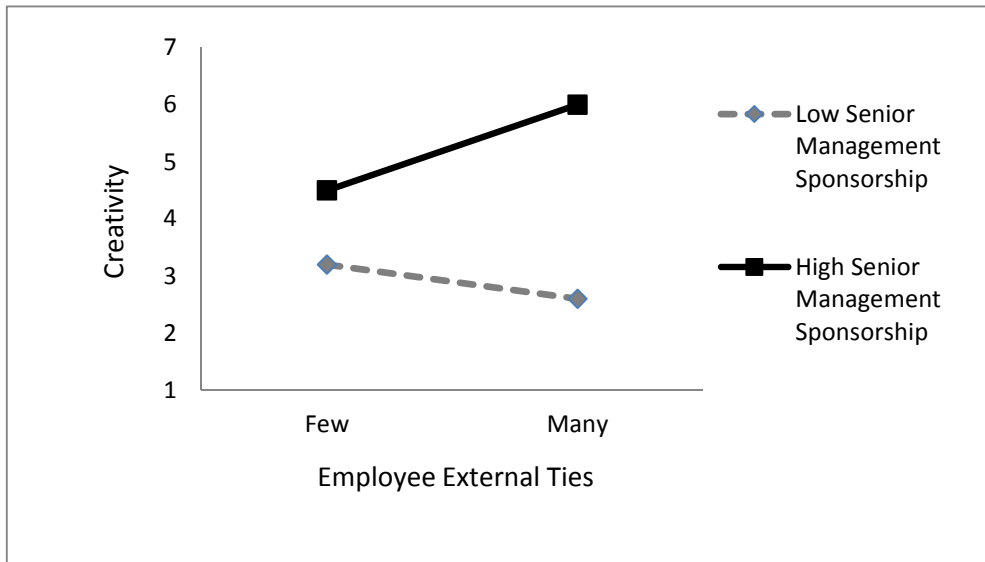
4.5.2 Summary of Findings from Interviews with Senior Managers

We further conducted in-depth interviews with 7 senior managers in the organization in order to shed light on the processes underlying the development of creative ideas, as well as to better understand our quantitative findings presented earlier. For example, the following quote from one senior manager illustrates the role played by a team leader in gathering strategic information from her peers in helping an employee identify the right problem to address (cf. Hypothesis 2a).

> "After listening to complaints from leaders of different parks (as well as members from her park), she learned that a series of parks were undergoing an invasive attack of autochthonous plants by exotic plants. She discussed this opportunity with her employees and they initiated the development of a project that completely changed how we worked—by making the park stop cultivating exotic plants but rather autochthonous plants."

Similarly, as the following quote illustrates, team leaders played a critical role in proactively seeking out other leaders in order to promote ideas that

their employees were developing, as well as to persuade them to support idea development efforts, which in turn affected employees' idea development efforts (cf. Hypothesis 2b).

> "It is essential that the leader promotes his employees' ideas among other leaders as this reduces resistance and fosters collaboration among them, leading to resource and other support, as well as better results. Having park leaders with the power to sell new ideas also makes employees motivated to try new things."

As Hypothesis 2c indicated, leaders also spent considerable time trying to convince senior managers of the merits of their employees' novel ideas in order to secure their approval and sponsorship, which in turn benefitted the idea development process.

> "A leader who has access to influential people [i.e., senior management within the organization] will have the resources (machinery, tools, etc) necessary for his park before others, as well as gets his projects through. ABC Park is a good example […] of how team members benefit from this."

Finally, the interviews also provided some explanation for our interaction findings. The following quotes illustrate the interplay between leader and member external ties as suggested by our findings for Hypothesis 3a:

> "XYZ Park's leader fits this description very well. The lady is an excellent manager and well connected with leaders of other parks. Based on these interactions, she triggers ideas in her team. Members of this team don't need external ties to get novel ideas, they receive the needed resources and information from the leader."

Conversely, employee external ties can result in creative benefits in those instances where a leader is not very well connected, as illustrated by the following quote:

> "This is the case of EFG Park. The leader doesn't do anything nor has any connections, so employees of the park look for alternatives such as […] former members of the park now located in other parks, or in other departments of Flora and Fauna."

Furthermore, various statements illustrated how leaders' garnering of senior management sponsorship can benefit members' own external ties for creativity (Hypothesis 3c):

> "PQR Park fits this perfectly and why it is important for creativity. The members of this technical team have a lot of external connections, and their leader has the best access to senior managers compared with other leaders, so the park receives a greater amount of resources (machinery, tools, etc). This enhances creativity as everyone feels more motivated to present new ideas because the chances are good that they will progress."

4.6 DISCUSSION

We set out to examine the relationship between employees' external ties and leaders' maneuvering of upper echelon relationships with other leaders and senior managers on employees' development of creative ideas. As predicted, both members' external ties and leaders' management of upper echelon relationships resulted in creative benefits for these employees. Beyond these main effects, leader ties also interacted with employees' own external ties to predict creativity, though in a somewhat more complicated manner. As expected, leaders' garnering of sponsorship from senior managers complemented the role of employees' own external ties in predicting their creativity. Contrary to our prediction, however, leaders' centrality in the idea generation network of their peers interacted with their employees' external ties in a compensatory fashion, such that employees' external ties were strongly related to their creativity only when their leaders were not central in their peers' idea generation network. Leaders who occupy critical gatekeeping positions in the idea network appear to provide sufficient informational resources to foster their employees' creativity, thereby rendering their employees' own external ties redundant. However, in the absence of well-connected leaders, employees' own external ties may serve to compensate and in part provide informational resources that benefit their creativity.

4.6.1 Theoretical Contributions

Our study makes several significant contributions to the creativity literature. At a broad level, it demonstrates the importance of maneuvering upward relationships for employee creativity, an area that

has not been explored by previous research. In doing so, it provides a fundamentally new direction for creativity research. Although prior research has examined the role of various individual and contextual factors for employee creativity (see George, 2007; Shalley et al., 2004, for reviews), this literature has remained largely silent on the importance of processes such as communicating with influential others to gather important information, promoting ideas to key allies, and securing sponsorship from top management in facilitating idea development (e.g., Kanter, 1988; Mumford et al., 2002). Whereas political support and buy-in have been shown to be important for the implementation of creative ideas (e.g., Baer, 2012), our results suggest that these factors are similarly important for employees' development of creative ideas. After all, given the controversial nature of new ideas that deviate substantially from the status quo, it is only to be expected that such ideas can get stalled by vested interests during various stages of development, and not just prior to their implementation (Kanter, 1988), thereby necessitating the management of such social influence processes during development itself. Future creativity research will be well served to attend to such processes as well as to establish their boundary conditions.

The current study further contributes to the emerging literature on a social network perspective on creativity (e.g., Perry-Smith & Shalley, 2003) in at least three distinct yet related ways. First, the current study demonstrates the benefits of upper echelon social network ties for employees' idea development efforts. Using the 'strength of weak ties' argument (Granovetter, 1973), prior research on this topic has predominantly focused on access to non-redundant and diverse pockets of information (Amabile, 1988; Mumford & Gustafson, 1988) as key creative resources that social networks provide; consequently, this research focused on employees' own external network ties that provide access to such information. However, our results suggest that informational resources

represent only one type of creative resource that social networks may provide. As our results indicate, leaders' positions in the networks of their peers and senior managers that help them understand and manage broader expectations and social influence processes surrounding idea development return independent creative benefits for employees.

Second and related, it extends prior research that has predominantly focused on employees' own external ties (e.g., Baer, 2010; Perry-Smith, 2006), by examining instead how the network ties of others (i.e., their leaders) around them may significantly influence employees' development of creative ideas. Leader network ties assume an especially central role for employee creativity, due to the controversial and resource intensive nature of the idea development process that requires the support of other leaders and managers in the organization (Mumford et al., 2002) who may not be easily accessible to employees. Along these lines, we found that leader ties had significant incremental effects above and beyond various well-established predictors of creativity. In highlighting the importance of such leader ties, these findings not only add a new and powerful group of variables to the menu of contextual influences on creativity (George, 2007; Shalley et al., 2004), but also extend recent leadership research that has found that leaders' embeddedness in broader leadership networks in the organization can have important implications for employee and team outcomes (e.g., Mehra et al., 2006; Sparrow & Liden, 2005; Venkataramani et al., 2010; cf. Balkundi & Kilduff, 2006).

Third, while replicating the well established finding that employees' creativity benefits from their own ties with others throughout the wider organization (e.g., Perry-Smith, 2006), our results further qualify this prior work by identifying enabling factors as well as boundary conditions of their effect on creativity. Particularly noteworthy in this regard is our finding that employees' external ties were not important in predicting their creativity when their leaders held central positions in the idea

generation network among their peers. One explanation is that when their leaders were well-connected, employees may be relying more on them to provide reliable and accurate strategic information regarding organizational trends, novel ideas, and current efforts underway in other parts of the organization, thereby rendering their own ties, which also provide some similar informational benefits, redundant for creativity. However, when leaders were less central in the peer idea generation network, employees had no option but to rely more on their own connections to access such information. Thus, employees' own ties may in part compensate for the absence of leader ties.

In contrast to the above pattern of interactions related to leaders' access to novel ideas and trends, leaders' ability to secure sponsorship support from senior managers who are not easily accessible to lower-level employees, acted to enhance the effect of employees' own ties on their creativity. In other words, employees who already had access to diverse information and novel perspectives by virtue of their own ties, were more engaged in developing creative ideas when their leaders were able to secure the support of senior managers, thus assuring employees of the availability of resources for their creative efforts. This suggests that employees' engagement in creativity is not a sole function of access to diverse information alone, but may be fundamentally enhanced by the availability of resources, legitimacy, and support from senior management. The different patterns of interaction with respect to leader centrality in idea generation versus promotion networks also confirms the assumptions of prior research that with regard to their creativity, employees' external ties mainly serve as sources of diverse and novel information but not as means of influencing managers in senior positions, likely because these employees do not have easy access to senior-level leaders. Future research will be well served to explore this aspect further.

Taken as a whole, these findings suggest that leaders' upper echelon ties might play an important role in addition to employees' own external ties in influencing employee creativity, and that the creative benefits of employees' external ties depend on their leaders' connectedness to potential allies and influential others. As such, the utility of employees' own ties for employee creativity should not be judged on its own, but rather in concert with their leaders' ties—a finding that calls for substantial extensions as well as refinements of current theoretical perspectives on the social network-employee creativity relationship (e.g., Baer, 2010, 2012; Perry-Smith, 2006; Zhou et al., 2009).

Finally, our study contributes to the emerging body of research concerned with contextual influences on employee creativity (e.g., Hirst, van Knippenberg, Hui-Chen, & Sacramento, 2011; Hirst, van Knippenberg, & Zhou, 2009). In particular, the cross-level approach that we adopted allows the examination of interpersonal variation in creativity within shared leadership contexts, and thereby helps to answer the question of why the creativity of some employees benefits more from the same leadership context than the creativity of others (cf. Shin, Kim, Lee, & Bian, 2012; Richter, Hirst, van Knippenberg, & Baer, 2012). Rather than averaging out individual differences, future creativity research may examine individuals' differential reactions to shared contextual influences.

4.6.2 Strengths, Limitations and Directions for Future Research

Overall, we believe that the current study has several strengths that help to provide a reasonable test for our hypotheses. First, we utilized multi-source, multi-method data—surveys and interviews from employees, coworkers, and managers—in measuring key variables, which helped to minimize potential common source biases. Second, the high response rates in our study and the use of a comprehensive set of control variables increases confidence in the results. And finally, we tested our conceptual model using appropriate analytical methods that matched the nested and

multi-level nature of our data. Despite these notable strengths, our study has some limitations that point to interesting avenues for future research.

First, its cross-sectional design prevents us from making causal inferences with respect to the direction of observed effects. Although in line with the theoretical arguments advanced in this study that leader ties affect employee creativity, a reverse effect (even though less intuitively appealing) cannot be ruled out. It would be useful for future research to replicate our findings through the application of longitudinal or experimental designs that are stronger with respect to specification of cause and effect.

A second limitation is that we have not measured the various mediating mechanisms through which the maneuvering of upper level ties may affect creativity. Our theoretical analysis as well as our interview data suggest that these effects are conveyed by multiple complex and intertwined mechanisms including employee sense making (Drazin, Glynn, & Kazanjian, 1999; Ford, 1996), the opening of diverse resource channels, and the creation of opportunity structures by other organizational leaders (Kanter, 1988; Mumford et al., 2002). Future research may explicitly focus on identifying and disentangling the complex interplay of those mechanisms by using research designs such as in-depth qualitative case studies.

An interesting extension that future research may address relates to the inclusion of network ties outside the organization (e.g., Perry-Smith, 2006). As was mentioned by one of the managers we interviewed, leaders also interacted with various constituencies external to the organization (such as government agencies, other organizations etc.) in securing information and support for facilitating their employees' creative efforts. Future research may extend our work by examining the role of network ties with constituents outside the organization (e.g., Tortoriello & Krackhardt, 2010) for employee creativity.

Another fruitful avenue for future research would be to examine the impact of other types of networks for creativity. Whereas idea generation, idea promotion, and senior management sponsorship networks appeared particularly relevant for creativity, other networks may be more important for alternative outcomes. For instance, the development of incremental (rather than radical) ideas, which requires less risk taking (Madjar et al., 2011), may to a lesser extent depend on the political support provided by influential organizational stakeholders. In a similar vein, non-creative performance may benefit more from networks that facilitate exploitation rather than exploration (Bledow, Frese, Anderson, Erez, & Farr, 2009). Of particular interest for future research may be the differential importance of upper level network ties for the implementation (rather than development) of novel ideas (Baer, 2012). A straightforward extension of our theoretical analysis would suggest that idea generation networks may be less relevant here, whereas idea promotion networks may become even more crucial in order to enable continued buy-in from relevant stakeholders who otherwise may block idea implementation.

4.6.3 Practical Implications

Our findings have important implications for managerial practice. The relevance of maneuvering upper echelon relationships throughout the wider organization for employee creativity suggests that managers should more consciously develop their informal relationships with influential others throughout the wider organization. Our findings indicate that leaders' direct interactions and supportive behavior towards subordinates may not be sufficient in motivating them to engage in developing radically creative ideas if these leaders lack the creative and political support throughout the wider organization to back their ideas. At the very least, managers may need to develop good working relationships with senior managers in order to gain approval and legitimacy for their employees' development efforts so that they can sell these ideas to potential allies or

secure resources. Organizations that aim to foster creativity may both select and train managers according to their social networking capabilities.

4.6.4 Conclusion

The underlying message of our study is that the maneuvering of social network ties with other organizational leaders and senior managers in addition to employees' own external ties is crucial for employees' development of novel and useful ideas. Beyond directly affecting employee creativity, well-connected leaders can further complement (or constrain) the creative expression of employees' external ties. These findings fundamentally challenge the current thinking about the role of social networks for employee creativity.

Chapter 5:

General Conclusion

5.1 GENERAL CONCLUSION

This chapter is an integration of the conclusions of the three studies carried out. Its purpose is to discuss the core findings, the limitations encountered in the process of the study as well as future lines of research. Each of the three studies were previously included in separate chapters in order to provide an in-depth review of the steps taken to achieve the different results. In this final chapter, I present the findings obtained by way of responding to each one of the three research questions.

Answering the first research question, the findings of study 1 indicate the necessity to revise and extend theory on leader ties and team performance, and deal more specifically with leader multiplex ties as the development of these ties is probably more common and resource intensive than those of simplex ties (Kuwabara et al., 2010). The second contribution is to the controversy among researchers on how beneficial leader and member ties are for team performance (cf. Balkundi & Harrison, 2006; Mehra et al., 2006). Our study clearly suggests that leader centrality in multiplex ties plays a particularly relevant role in teams with conflict-laden relationships (Sparrowe et al., 2001), probably because this structural position can give leaders the power and influence to reconvey such teams on joint performance outcomes. Inversely, our study indicates that leader centrality in multiplex team ties is not very relevant in teams in which there are dense friendship networks as these positive social relationships

among the members can favor information and resource exchange without leader intervention. These interaction results lead us to suggest that the potential of leader multiplex ties strongly relies on the expressive network configurations in teams. So much so that the leaders' centrality in multiplex ties really seems to make a difference on team performance, especially when interpersonal relationships of team members are tense or unsatisfactory.

In reference to the second research question, study 2 is an important contribution to the growing interest in intergroup performance outcomes in organizations (e.g., Hogg et al., 2012; Richter et al., 2005, 2006; van de Ven & Ferry, 1980; cf. Mathieu et al., 2001) that extends further than intergroup attitudes like intergroup bias (Hogg & Terry, 2000). This study develops these relational ideas in order to provide a particular social network perspective to theory and research on intergroup effectiveness. The inclusion of social network ties as predictors of intergroup performance outcomes can contribute to the improvement of the analysis of a series of theories on intergroup effectiveness (e.g., Brett & Rognes, 1986; Richter et al., 2005; 2006). Our focus on dyadic team effectiveness suggests that we are on the right track for further study of the effectiveness of entire sets of teams. Even though there is a conceptual difference between the effectiveness of pairs of teams and sets of teams (van de Ven & Ferry, 1980), our results may also enlighten the growing number of experimental researchers on multi-team systems (MTS; e.g., Davison et al., 2012; DeChurch & Marks, 2006; Marks et al., 2005; Zaccaro et al., 2011).

Our second contribution to study 2 is aimed more specifically at the social network front and deals with the evolvement of network theory at the dyadic level of analysis. Previous studies at dyadic level (e.g., Felmlee, 2001) have encouraged ideas regarding how the relationship between two actors relies on their embeddedness in a larger group (Bott, 1955) or

within a clique (e.g., Krackhardt & Kilduff, 2002). By using the team dyad as the unit of observation, we center our interest on the systemic relations of the dyad and how the structure of ties affect performance.

Lastly, this study further contributes to theory and research on the design of team-based organizations (e.g., Mohrman et al., 1995). The fact that dyadic team effectiveness relies on the interaction between informal social relationships and resource interdependencies emphasizes how important it is for formal and informal social structures to be aligned (cf. Oh et al., 2006) for organizational effectiveness outcomes. Hence, a specific analysis of formal and informal social structures, together with interventions designed to establish an optimal match between the two, can benefit the development of team-based organizations.

In the third research question, study 3 makes a series of important contributions to creativity. Broadly speaking, it demonstrates the importance of strategic social influence processes for employee creativity, an unexplored field in prior studies that provides novel channels for creativity research. Even though previous studies have analyzed the importance of several contextual factors for employee creativity (see George, 2007; Shalley et al., 2004, for reviews), they have not mentioned the importance of processes like communicating with influential actors to obtain information, promoting ideas to key allies, and assuring top management's sponsorship in facilitating idea development (e.g., Kanter, 1988; Mumford et al., 2002). While political support and buy-in prove to be positive for the implementation of creative ideas (e.g., Baer, 2012), our conclusions suggest that these two factors are just as significant for employees' development of creative ideas.

Study 3 adds to the growing literature on a social network perspective on creativity (e.g., Perry-Smith & Shalley, 2003) in three ways that are not alike yet related. First, the study shows how employees' idea development efforts can benefit from upper echelon social network ties. The results

indicate that informational resources are only one kind of creative resource provided by social networks. As we have been able to show in our study, the positions of the leaders in the networks of their peers and senior managers, who help them understand and explore new horizons and social influence processes related to idea development, yield creative benefits for employees. Second, this study develops previous research that has mostly focused on employees' own external ties (e.g., Baer, 2010; Perry-Smith, 2006), by analyzing how employees' development of creative ideas may be influenced by the network ties of other actors (i.e., their leaders) that are around them. We showed that leader ties had substantial incremental effects on predictors of creativity. Our findings have furthered recent leadership research that establishes the importance of leaders' embeddedness and their implications for employee and team outcomes in organizations (e.g., Mehra et al., 2006; Sparrow & Liden, 2005; Venkataramani et al., 2010; cf. Balkundi & Kilduff, 2006). Third, in addition to substantiating the importance of employees' own ties with others throughout the wider organization for their creativity (e.g., Perry-Smith, 2006), our results further qualify the creative expression of employees' own ties by identifying leader-related enabling factors as well as boundary conditions of this relationship. Specifically, our findings indicated that when leaders held central positions in their idea generation network, were influential and well-connected, employees' external ties were not important in predicting their creativity. However, when the scenario was the opposite, employees had no other alternative but to depend on their own relationships to acquire information. Hence, the lack of leader ties may partly be compensated by the employees' own ties.

Another finding to take into consideration is the fact that leaders who were able to achieve sponsorship support from senior managers that was not available to employees of a lower level, increased the effect of employees' own ties on creativity. That is to say, employees with access to

information were much more prone to earnestly develop creative ideas when they perceived that their leaders obtained support of senior managers which guaranteed resources and compensated them for their creative effort. This indicates that employees' commitment to creativity is not only a question of acquiring information, but also to know that resources will be available to them, that they receive recognition as well as the support of senior management.

In general terms, these findings suggest that employees' own external ties might play a subservient role to their leaders' ties in influencing employee creativity, and that the creative benefits of employees' external ties depend on their leaders' connectedness to potential allies and influential others. As such, the utility of employees' own ties for employee creativity can only be judged in the light of their leaders' ties—a finding that calls for substantial extensions as well as refinements of current theoretical perspectives on the social network-employee creativity relationship (e.g., Baer, 2010, 2012; Perry-Smith, 2006; Zhou et al., 2009).

Lastly, study 3 makes a contribution to the growing research that deals with contextual influences on employee creativity (e.g., Hirst et al., 2009; 2011). We followed a cross-level approach that allowed us to analyze interpersonal variation in creativity within shared leadership contexts. In this way, we found why some employees are more creative than others within the same leadership context (cf. Shin et al., 2012; Richter et al., 2012).

Our findings can also generate useful practical knowledge for managers. This knowledge can contribute to maintaining managers well informed in order to diagnose the informal social structure within and between their teams, and across the wider organization. For instance, in teams in which the task requires transferring simple knowledge, a great number of weak ties could prove effective because they are less costly to maintain in terms of time and energy (Hansen, 1999). But, if the task of the team involves

transmitting complex knowledge, managers should know that strong ties will prove helpful because it requires high levels of affect and coordination (Hansen, 1999). Figure 5.1 provides practical knowledge for managers as to the course of action to be taken to improve team effectiveness or enhance creativity.

Figure 5.1 Practical Advice for Managers

FUNCTIONAL NEED	NETWORK "NEED"
Complex knowledge transfer	Strong ties Accurate cognitive networks
Simple knowledge transfer	Weak ties
Coordination — simple	Centralized network
Coordination — complex	Dense, decentralized network
Public good/social loafing issues	Strong ties External embeddedness Iteration
External informational needs	Diverse external ties

Source: *Lazer and Katz, 2003*

In conclusion, this thesis has examined the theoretical and empirical implications of integrating social network and team literatures. In spite of the fact that both literatures are dedicated to relationships, there has been very little interest in promoting these two areas of study. Recently, however, a small stream of research has begun to emerge. Based on this preliminary literature, I created the framework of this thesis adopting a social network perspective in order to advance the understanding of team member performance outcomes at the individual, team, and interteam levels.

5.2 OVERVIEW OF LIMITATIONS AND FUTURE RESEARCH

The thesis also has some limitations that point to interesting avenues for future research.

Study 1 is focused on teams that form part of a larger organizational context. However, our study model has not analyzed this aspect of teams'

embeddedness (Uzzi, 1996, 1997) within the rest of the organization. Hence, a line for future research could be to test more complex models that specifically refer to team members' and leaders' relationships with employees across the rest of the organization (i.e., external ties).

This study's design also presents a certain limitation inasmuch that it determines the longitudinal measurement of the outcome variable, without getting into predictor variables. Even though this design permits stronger causal inferences than cross-sectional designs (Shadish et al., 2002), it is inferior to complete longitudinal two-panel or experimental designs. In this sense, we want to point out that the causal claims presented in this study are backed up by solid theory and a reverse causality is highly improbable from a theoretical point of view.

In Study 2, we may have unmeasured effects of inter-dyad ties due to the fact that the units of analysis (pairs of teams) were embedded in part of a larger organizational context. In spite of the fact that the number of external ties of each team dyad was controlled, the focus and design did not allow us to make a more specific study of embeddedness in team dyads within and beyond the rest of the organization (cf. Uzzi, 1996, 1997). Therefore, future lines of research could contemplate developing and testing models that centre on the contextual embeddedness of (pairs of) organizational teams.

Another limitation that needs to be taken into consideration refers to the lack of attention paid to the mediating mechanisms by which within- and between-team ties affect intergroup effectiveness. The theoretical analysis performed by us implies that these effects are transmitted by multiple complex and intertwined mechanisms that entail resource exchange and improved coordination making it very difficult to unravel them in survey designs like the one we have done. Future research could use more appropriate research designs in order to determine the complex interplay of these mechanisms, for example, in-depth qualitative case studies.

A limitation reflected in study 3 was that the nature of the cross-sectional design used did not allow us to make causal inferences regards the course of the effects observed. Considering the theoretical arguments put forward in this study that leader ties affect employee creativity, we cannot exclude the possibility of a reverse effect. As a future line of action, it would be convenient to replicate our findings applying longitudinal or experimental designs that are more robust regards specification of cause and effect.

Another limitation is that the different mediating mechanisms by which the leader network ties could affect creativity have not been measured in this study. A theoretical analysis and the interview data obtained indicate that these effects are transmitted by multiple complex and intertwined mechanisms that include employee sense making (Drazin et al., 1999; Ford, 1996; Madjar et al., 2011), as well as the creation of opportunity structures by other organizational leaders (Kanter, 1988; Mumford et al., 2002). In future, we would need to direct our attention to determining and unraveling the complex interplay of those mechanisms by means of research designs like in-depth qualitative case studies as well.

Another point worth addressing is that of the inclusion of network ties outside the organization (e.g., Perry-Smith, 2006). In our personal interviews with managers, one of them mentioned that leaders also interacted with external institutions (for example, with the Administration or other organizations) in order to obtain information and support to facilitate their employees' creative efforts. Future studies could further examine the role of network ties with constituents outside the organization (e.g., Tortoriello & Krackhardt, 2010) for employee creativity.

A challenging approach for future studies would be to analyze the impact of other types of networks for creativity. Even though idea generation, idea promotion, and senior management sponsorship networks seemed to be relevant for creativity, other networks could provide alternative outcomes that are of greater interest. Another future line could also be the

differential importance of upper level network ties for the implementation (rather than development) of novel ideas (Baer, 2012).

Finally, a further extension of study 3 that future research may address relates to the circumstances under which leaders might choose to (versus not) share their ties with subordinates. For example, leaders who may perceive certain employees to be a threat to their own position and prospects in the organization may not be forthcoming in sharing their network ties with these employees. On the other hand, leaders who perceive such employees' efforts as benefiting their own outcomes as well as that of the team or organization may actively encourage and facilitate employees' efforts through their network connections.

Summaries

SUMMARY IN ENGLISH

To examine the theoretical and empirical implications of integrating the network and team literatures, we opened three different research lines. First, we argued that leader multiplex ties with their team members fulfilled important functions for team performance. In support of our hypotheses, analysis of data from 84 teams of a Spanish public service organization suggested that leaders' centrality in their teams' multiplex networks comprising both advice and friendship ties predicted longitudinal change in team performance, above and beyond members' own multiplex ties. Beyond main effects, leader multiplex ties differentially interacted with members' own network ties. We discussed theoretical implications with respect to leader social networks and team performance.

Second, we adopted a social network perspective to examine the social underpinnings of intergroup effectiveness—the dyadic effectiveness with which pairs of teams perform collaboratively. We proposed that the interplay of social network ties within and between teams predicted intergroup effectiveness differentially depending on levels of resource interdependence between teams. In support of our hypothesis, results from temporally separated, different-source data of 48 pairs of service and administration teams suggested that the interaction of intrateam density and strong ties across teams predict managerial intergroup effectiveness ratings differentially for low versus high levels of resource-interdependence. We discussed theoretical implications with respect to dyadic team effectiveness, the performance benefits of social network ties, and the design of team-based work.

Third, we adopted a multi-level, social network perspective to examine the importance of leaders' management of upper echelon relationships in the organization for facilitating their employees' creativity. We tested this idea with a sample of 214 employees working in 30 teams of a public

technology and environmental services organization, followed by in-depth interviews with 7 senior managers. Results suggested that team leaders' centrality in the idea generation and idea promotion networks among other team leaders, as well as their garnering of sponsorship support from senior management, affected their employees' creativity in addition to employees' own external network ties. Moreover, team leaders' centrality in the peer leader idea generation and senior management sponsorship networks interacted with employees' own external ties in different ways to predict creativity. We discussed theoretical implications with respect to social networks, employee creativity, and leadership.

RESUMEN EN ESPAÑOL

Con objeto de estudiar las implicaciones teóricas y empíricas de combinar la literatura sobre redes sociales y equipos de trabajo, se abrieron tres líneas de investigación. La primera, argumentó que los múltiples vínculos del líder con su equipo cumplen un papel esencial para el rendimiento del equipo. Para respaldar nuestras hipótesis, se realizó un análisis de 84 equipos en una organización española de servicios que nos llevó a sugerir que la centralidad de los líderes en equipos con múltiples redes, que comprendían tanto vínculos de amistad como de consejo, predecían un cambio longitudinal en el rendimiento del equipo que está por encima y más allá de los propios vínculos de sus miembros. Más allá de sus propios efectos, los múltiples vínculos del líder interactuaban de forma diferenciada con los vínculos de la red de los propios miembros del equipo. En esta investigación, tratamos las implicaciones teóricas respecto a las redes sociales del líder y el rendimiento del equipo.

La segunda línea de investigación siguió un enfoque desde el punto de vista de las redes sociales para estudiar las bases sociales de la efectividad intergrupal – la efectividad con la que dos equipos colaboran entre sí. Planteamos que la interacción de los vínculos de las redes sociales, dentro y entre los equipos, predecía la efectividad intergrupal de forma diferenciada dependiendo del grado de interdependencia de recursos entre los equipos. Para apoyar nuestra hipótesis, obtuvimos los datos de fuentes distintas e independientes de 48 pares de equipos administrativos y de servicios. Estos datos sugirieron que la interacción entre la densidad dentro del equipo y los vínculos fuertes entre dichos equipos, predecían unos valores de efectividad intergrupal diferentes cuando los niveles de interdependencia de los recursos eran bajos o altos. En este estudio, se analizaron las implicaciones teóricas respecto a la efectividad entre pares de equipos, el beneficio que aportaban los vínculos de las redes sociales al rendimiento y el diseño del trabajo en equipo.

Por último, la tercera línea siguió esta vez un enfoque desde el punto de vista de las redes sociales a múltiples niveles con el objeto de estudiar la importancia de las relaciones de los líderes de equipo con directivos de mayor rango en la organización a la hora de facilitar la creatividad de sus empleados. Se analizó con una muestra de 214 empleados que formaban 30 equipos de trabajo en una organización de servicios medioambientales y tecnológicos de carácter público. Además, se realizaron entrevistas en profundidad a 7 directivos. Los resultados indicaron que la centralidad de los líderes tanto en las redes de creación y promoción de ideas entre los demás líderes, como en la capacidad de obtener el patrocinio de la dirección, influían en la creatividad de sus empleados, independientemente de sus vínculos externos. Por otra parte, observamos que la centralidad de los líderes tanto en las redes de creación y promoción de ideas entre los demás líderes, como en la capacidad de obtener el patrocinio de la dirección, interactuaban con los vínculos externos de los empleados de diferentes modos para predecir la creatividad. Analizamos las implicaciones teóricas respecto a las redes sociales, la creatividad del empleado y el liderazgo.

RESUM EN VALENCIÀ

A fi d'estudiar les implicacions teòriques i empíriques de combinar la literatura sobre xarxes socials i equips de treball, es van obrir tres línies de recerca. La primera, va argumentar que els múltiples vincles del líder amb el seu equip tenen un paper essencial per al rendiment de l'equip. Per donar suport a les nostres hipòtesis, es realitzà una anàlisi de 84 equips en una organització espanyola de serveis que ens va portar a suggerir que la centralitat dels líders en equips amb múltiples xarxes, que comprenien tant vincles d'amistat com de consell, predeien un canvi longitudinal en el rendiment de l'equip que està per damunt i més enllà dels mateixos vincles dels seus membres. Més enllà dels seus efectes, els múltiples vincles del líder interactuaven de manera diferenciada amb els vincles de la xarxa dels membres de l'equip. En aquesta recerca, tractarem les implicacions teòriques respecte a les xarxes socials del líder i el rendiment de l'equip.

La segona línia de recerca va seguir un enfocament des del punt de vista de les xarxes socials per estudiar les bases socials de l'efectivitat intergrupal −l'efectivitat amb què dos equips col•laboren entre si. Plantejàrem que la interacció dels vincles de les xarxes socials, dins i entre els equips, predeia l'efectivitat intergrupal de manera diferenciada depenent del grau d'interdependència de recursos entre els equips. Per donar suport a la nostra hipòtesi, obtinguérem les dades de fonts diferents i independents de 48 parells d'equips administratius i de serveis. Aquestes dades van suggerir que la interacció entre la densitat dins de l'equip i els vincles forts entre aquests equips, predeien uns valors d'efectivitat intergrupal diferents quan els nivells d'interdependència dels recursos eren baixos o alts. En aquest estudi, es van analitzar les implicacions teòriques respecte a l'efectivitat entre parells d'equips, el benefici que aportaven els vincles de les xarxes socials al rendiment i el disseny del treball en equip.

Finalment, la tercera línia va seguir aquesta vegada un enfocament des del punt de vista de les xarxes socials a múltiples nivells amb l'objecte d'estudiar la importància de les relacions dels líders d'equip amb directius de major rang en l'organització a l'hora de facilitar la creativitat dels seus empleats. Es va analitzar amb una mostra de 214 empleats que formaven 30 equips de treball en una organització de serveis mediambientals i tecnològics de caràcter públic. A més, es realitzaren entrevistes en profunditat a 7 directius. Els resultats van indicar que la centralitat dels líders, tant en les xarxes de creació i promoció d'idees entre els altres líders, com en la capacitat d'obtenir el patrocini de la direcció, influïen en la creativitat dels seus empleats, independentment dels seus vincles externs. D'altra banda, observàrem que la centralitat dels líders, tant en les xarxes de creació i promoció d'idees entre els altres líders, com en la capacitat d'obtenir el patrocini de la direcció, interactuava amb els vincles externs dels empleats de diferents maneres per predir la creativitat. Vam analitzar les implicacions teòriques respecte a les xarxes socials, la creativitat de l'empleat i el lideratge.

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Appendices

Appendix 1: Study 1 & 2 - Research Booklet

<u>Research Outline:</u>

<u>Promoting Collaboration in Organizational Teams</u>

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Aims of the Research:

This research project is a joint collaboration between the University of Valencia and Instituto de Empresa whose aim is to examine the effect of a variety of factors including team processes, intergroup relations, leadership, and social relationships, on **team members' and teams' performance**.

The focus will be on the following aspects:

- **Networking** within and between teams (e.g., collaboratively and open-mindedly vs. competitively).

- **Team climate factors** supporting or hindering performance & innovation (e.g., clear objectives, psychological safety, learning and social relationships).

- **Leadership behaviours** in relation to the leader's "connectedness" throughout the organization, supportive leadership and style, etc.

Benefits for the Organisation:

Based on the findings, the researcher will offer:

- **A written report of key results**, including **suggestions how to promote team performance,** to Top Management and Human Resources

- An **oral presentation** of key findings to all participants.

- **Single-team feedback reports** to participating teams on request. It provides specialist advice to help teams reflect and enhance innovative behaviours.

The findings may present a useful basis for:
- ✓ Training and coaching purposes
- ✓ Change management
- ✓ Team interventions
- ✓ Team quality improvement

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Extent of Required Participation:

- **Teams** and **team leaders** will be asked to fill in a short questionnaire at the beginning of the project.

- **The teams' line managers** would be asked to provide ratings of team effectiveness once at the beginning of the project (Effectiveness rating time 1), six months later (Effectiveness rating time 2) and two years later (Effectiveness rating time 3).

Research Instruments	Participants	Time expenditure requested by participants
Team Members and leader questionnaire	Team Members and Team Leaders	~ 25 minutes
Team effectiveness ratings (Time 1, Time 2, Time 3)	Line Managers	~ 5 minutes

- If suitable, existing team effectiveness indicators (e.g., the organisation's performance assessment systems) could be incorporated into the research as well.

These requests are flexible to a certain degree, and may be extended or reduced, to meet the particular needs, interests, and restraints of the participating organisations.

Contact:

> If you are interested in the research or would like to discuss any of the above in more detail, please contact:
>
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Participants' **confidentiality and anonymity will be guaranteed at all times** during the research process. The research pursues no financial interests per se. Findings may result in publications in academic journals with the organisations and participants involved kept anonymous.

Appendix 2: Study 1 & 2 - Team Member Questionnaire

Team ID_____
Your ID_____
These identification numbers will be kept separately from your and your team's name

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Promoting Collaboration between Teams

What is this survey?

This is a survey of your views about your work within your team and your opinions about the relationship between your team and another team in your organization during the past 6 months.

This is not a test. There are no right or wrong answers. We want to know *your* personal views on the issues raised in the questionnaire and what you think about the team you work in. The questionnaire consists of three sections:

Section 1: Asks about your views regarding how your team works together.
Section 2: Asks about your views regarding your relationship with members of another team.
Section 3: Asks some biographical details needed to enable us to compare the views of different members of staff.

Who will see my answers?

The information you give is totally confidential. No one, other than the researchers at Instituto de Empresa will see your answers. A report will be sent to the organization in aggregated form. Reports to individual teams will not identify individual responses and will simply summarise data for all team members, thus protecting your anonymity and confidentiality. These reports will not be distributed elsewhere.

How long will it take?

The questionnaire will take about 30 minutes to complete.

How do I fill in this survey?

Please read each question carefully and give your immediate response. Most statements ask you to indicate the *degree or extent of your view* by circling a number on a predetermined scale which best reflects your opinion. We are interested in *your views* about all the statements. Please answer all questions as openly and honestly as possible. *Please always circle only one number for each statement.*

As an example, a question in this survey could be whether, *in your opinion*, the team often reviews its objectives. If you believe that this is the case, most of the time, but there are occasional exceptions you would circle number 4 to indicate that you "agree", as shown below.

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1.	The team often reviews its objectives.	1	2	3	④	5

Exceptionally, you will find a different question format in the first part of Sections 1 and 2.We will explain those differences thoroughly in the foresaid sections.
Do not spend too long on any question. Try to answer according to your first reaction.
Once you've completed this questionnaire, please put the questionnaire in the envelope provided, seal it and our researcher will collect it.
In appreciation for your interest in filling in this questionnaire, we will raffle an iPod among the participants at the end of the study.

Section 1: Your Team

The following section focuses on your team members. It refers to your relationship with them, and how you feel you are working together.

1.1. Please answer the following questions for each member of your team and insert the respective number in the roster underneath.

Question 1. How frequently do you communicate with this person on average? *(0 = less often, 1 = several times a year, 2 = once a month , 3 = several times a month, 4 = several times a week, 5 = daily).*

Question 2. How close are you to each person? *(1 = acquaintance, 2 = distant colleague, 3 = friendly colleague, 4 = good friends, 5 = very close friends).*

Question 3. How many years has this relationship existed? *(1 = less than 2 years, 2 = 2 to 5 years, 3 = 5 to 10 years, 4 = more than 10 years).*

Question 4. Please indicate the extent to which you obtain information or advice from this person to get tasks done. *(1 = very little extent, 2 = little extent, 3 = some extent, 4 = great extent, 5 = very great extent).*

Question 5. Please indicate the extent to which you obtain resources from this person. *(1 = very little extent, 2 = little extent, 3 = some extent, 4 = great extent, 5 = very great extent).*

Question 6. Please indicate to what extent the relationship with this person has been difficult or not. *(1 = very little extent, 2 = little extent, 3 = some extent, 4 = great extent, 5 = very great extent).*

Question 7. To what extent did you go out with this person for social activities outside work such as going out to informal lunch, dinner or drinks? *(1 = not at all, 2 = a little bit, 3 = somewhat, 4 = quite a bit, 5 = very much).*

Please insert the respective number below for each member of your team. Do not leave any box empty!

	Q.1 Frequency communication	Q.2 Closure	Q.3 How many years	Q.4 Information or Advice	Q.5 Resources	Q.6 Difficult	Q.7 Social activities
1. Carlin, John							
2. Damon, Clint							
3. Fitzgerald, Molly							
4. Grey, Michael							
5. Hennan, Steven							
6. Johnson, Betty							
7. Miller, Samantha							

1.2.How accurate is the statement in describing your team?

		Very Inaccurate	Somewhat inaccurate	Neither accurate nor inaccurate	Somewhat accurate	Very accurate
1.	Team membership is quite clear – everybody knows exactly who is and is not in the team.	1	2	3	4	5
2.	There is so much ambiguity about who is in this team that it would be nearly impossible to generate an accurate membership list.	1	2	3	4	5
3.	Different people are constantly joining and leaving this team.	1	2	3	4	5
4.	This team is quite stable, with few changes in membership.	1	2	3	4	5
5.	Members of this team have their own individual jobs to do, with little need for them to work together.	1	2	3	4	5
6.	Generating the outcome or product of this team requires a great deal of communication and coordination among members.	1	2	3	4	5

1.3. Beyond actually carrying out the work, does your team have the authority to decide about other matters? Please tick "yes" or "no" for each of the items listed below.

Our team also has the authority…

…to monitor our own work processes and to change or adjust them if needed.	Yes ❑	No ❑
…to select new team members, or to ask an existing member to leave the team.	Yes ❑	No ❑
…to alter features of the larger organization that are affecting our team or its work (for example, the resources available to us, the information we receive, training procedures, and so on).	Yes ❑	No ❑
…to specify what our team needs to accomplish, its main purposes.	Yes ❑	No ❑

1.4. Now please indicate how you personally feel about your team (please refer to the past 6 months).

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1.	I learn a great deal from my work on this team.	1	2	3	4	5
2.	I am satisfied with my present colleagues in my team.	1	2	3	4	5
3.	I am very satisfied with working in this team.	1	2	3	4	5
4.	I am pleased with the way my colleagues and I work together.	1	2	3	4	5
5.	My own creativity and initiative are suppressed by this team.	1	2	3	4	5
6.	Working on this team stretches my personal knowledge and skills.	1	2	3	4	5

1.5.Your team's effectiveness.

During the past 6 months, to what extent do you feel that your team…

		Not at all	A little	Some what	Consi dera bly	Comple tely
1.	…met the *standards of quality* expected by your organization?	1	2	3	4	5
2.	…met the *standards of quantity* expected by your organization? (for example, workload)	1	2	3	4	5
3.	…met the *standards of timeliness* expected by your organization? (for example, finish a task on time)	1	2	3	4	5
4.	…met the *standards of implementation* expected by your organization? (for example, launching a procedure)	1	2	3	4	5
5.	…had a *reputation for work excellence* within the organization?	1	2	3	4	5

1.6.Please indicate your team's job characteristics.

		Very little	A little	Some what	A mode rate amount	A lot	Quite a lot	A great deal
1.	How much technical knowledge do the jobs in this unit require?	1	2	3	4	5	6	7
2.	To what extent do the jobs involve solving problems?	1	2	3	4	5	6	7

		Not at all	A little	Some what	Modera tely	Consi dera bly	Compli cated	Very compli cated
1.	How complicated are the jobs in this unit?	1	2	3	4	5	6	7

Section 2: Your team's relationship with the other team

The team named X was identified as the other team or work group that your team has most important interactions with to accomplish your team's goals. The following section asks about your views, relationship, objectives, and interaction with members of this other team.

2.1. Please answer the following questions for each member of the other team and insert the respective number in the roster underneath.

Question 1. How frequently do you communicate with this person on average? *(0 = less often, 1 = several times a year, 2 = once a month , 3 = several times a month, 4 = several times a week, 5 = daily).*

Question 2. How close are you to each person? *(1 = acquaintance, 2 = distant colleague, 3 = friendly colleague, 4 = good friends, 5 = very close friends).*

Question 3. How many years has this relationship existed? *(1 = less than 2 years, 2 = 2 to 5 years, 3 = 5 to 10 years, 4 = more than 10 years).*

Question 4. Please indicate the extent to which you obtain information or advice from this person to get tasks done. *(1 = very little extent, 2 = little extent, 3 = some extent, 4 = great extent, 5 = very great extent).*

Question 5. Please indicate the extent to which you obtain resources from this person. *(1 = very little extent, 2 = little extent, 3 = some extent, 4 = great extent, 5 = very great extent).*

Question 6. Please indicate to what extent the relationship with this person has been difficult or not. *(1 = very little extent, 2 = little extent, 3 = some extent, 4 = great extent, 5 = very great extent).*

Question 7. To what extent did you go out with this person for social activities outside work such as going out to informal lunch, dinner or drinks? *(1 = not at all, 2 = a little bit, 3 = somewhat, 4 = quite a bit, 5 = very much).*

Please insert the respective number below for each member of the other team. Do not leave any box empty!

	Q.1 Frequency communication	Q.2 Closure	Q.3 How many years	Q.4 Information or Advice	Q.5 Resources	Q.6 Difficult	Q.7 Social activities
1. Doyle, Angelina							
2. Franklin, Amy							
3. Lincoln, Michele							
4. Nicholson, Bridget							
5. Olsen, Steffany							
6. Perkins, Amber							
7. Pierce, William							

2.2. How effectively did your team work together with team X? (Please refer to the past 6 months).

		To no extent	Little extent	Some extent	Agree	Great extent
1.	To what extent did both teams work effectively together in order to respond to tasks or duties that emerged from *working within the organization* (e.g., coordinating cross-team activities, assignment of organizational duties, etc.)?	1	2	3	4	5
2.	To what extent did both teams effectively help *each other* out if resources (e.g., time to invest, people or staff, support etc.) were needed?	1	2	3	4	5
3.	To what extent did working with this other team result in *too many constraints* (e.g., time/staff shortage etc.) for your team's everyday activities?	1	2	3	4	5
4.	To what extent did you feel the *relationship* between your team and this other team was *productive*?	1	2	3	4	5
5.	To what extent did both teams *make effective use of each other's resources* (e.g., time to invest, people or staff, support etc.) in order to provide better results for the end-user?	1	2	3	4	5
6.	For *your team* to accomplish its goals and responsibilities, to what extent did you receive the expected services, resources, or support from this other team?	1	2	3	4	5
7.	To what extent did both teams *work effectively together* in order to provide better services to end-user?	1	2	3	4	5
8.	To what extent did both teams work effectively together in order to respond to *problems or flaws that emerged from working within the organization* (e.g., staff or time shortage, etc.)?	1	2	3	4	5
9.	For *this other team* to accomplish its goals and responsibilities, to what extent did it receive the expected services, resources, or support from your team?	1	2	3	4	5
10.	To what extent did working with this other team entail *too much loss of time and energy* on trying to reach *enduring agreements*?	1	2	3	4	5
11.	If you consider the *fairness* of the give-and-take relationship with this team, to what extent did you feel that *this other team* should have given more than it did?	1	2	3	4	5
12.	To what extent did working with your team result in *too many constraints* (e.g., time/staff shortage, etc.) for this other team's everyday activities?	1	2	3	4	5
13.	To what extent was there *too much disagreement about resource allocation* (e.g., time to invest, people or staff, allocation of tasks or duties, etc.) between your team and this other team?	1	2	3	4	5
14.	To what extent did *your team* carry out your responsibilities and commitments in regard to this other team?	1	2	3	4	5
15.	To what extent did *this other team* carry out its responsibilities and commitments in regard to your team?	1	2	3	4	5
16.	If you consider the *fairness* of the give-and-take relationship with this other team, to what extent did you feel that *your team* should have given more than it did?	1	2	3	4	5

2.3. The interdependence of your team with team X (Please refer to the past 6 months).

		Not very important	Somewhat important	Quite important	Very important	Absolutely crucial
1.	How important is *this other team* in attaining the goals of your team?	1	2	3	4	5
2.	How important is *your team* in attaining the goals of this other team?	1	2	3	4	5

		Not at all	Very little	Some	Quite a bit	Very much
1.	For *your team* to accomplish its goals and responsibilities, how much do you need the services, resources, or support from this other team?	1	2	3	4	5
2.	For *this other team* to accomplish its goals and responsibilities, how much does it need the services, resources, or support from your team?	1	2	3	4	5

2.4. Thinking back over the past year, who are the people in your organization outside of both your team and *the other team*, with whom you discuss any range of work-related matters? Please jot down up to 10 names in the list below. Please also indicate whether the respective person occupies a *lower (1)*, *same (2)*, or *higher (3)* hierarchical position relative to you in the organization.

	Name	Hierarchical Position: Lower (1) Same (2) Higher (3)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Section 3: Background information about you and your team

About your team: Please always tick only one box when multiple choices are offered

3.1. How long has the Team been set up?

Less than 6 months	❏	Between 1 and 2 years	❏
Less than 1 year	❏	2 years or more	❏

3.2. Is this the principal team with which you work?   **3.3. Is this team temporary or permanent?**

Yes ❏   No ❏   Temporary ❏   Permanent ❏

3.4. Do you consider yourself to be the principal leader or team co-ordinator of this Team?

Yes ❏   No ❏

About you: Please always tick only one box when multiple choices are offered

3.5. Are you   **3.6. How old are you?**

Female ❏   Male ❏   _____ Years

3.7. Your job title: (Please specify)_____

3.8. How long have you worked in this team?   **3.9. How long have you worked in your present position?**

_____years   _____ months   _____years   _____ months

3.10. Please mark the highest education level you have attained:

General Certificate of Secondary Education	❏
General Certificate of Education	❏
Vocational Training	❏
University (Associate Degree or Bachelor's Degree)	❏
Master's Degree	❏
Ph.D. Degree	❏

Others (please specify)_____

3.11. Do you have any additional comments you would like to make in relation to the issues covered in this survey?

3.12. Would you like to participate in the raffle of an iPod among the participants of this study?
Yes ❑   No ❑

Many thanks for completing this questionnaire. It will be a valuable contribution to our study about how to promote relationships between teams in your organization. We need to have it back within 7 days. Please place the questionnaire in the envelope provided, seal it and our researcher will collect it.

Thank you once again for your cooperation!

Appendix 3: Study 1 & 2 - Team Effectiveness Rating

Your ID_____
*Please be assured the
information you give is
totally confidential*

VNIVERSITAT
D̃ỠVALÈNCIA

ie business
school

Promoting Collaboration between Teams

Team effectiveness rating sheet

Please read each question carefully and give your immediate response. The statements ask you to indicate the degree or extent of your view by ***circling*** a number on a predetermined scale which best reflects your opinion. We are interested in your views about the statements. *Please always circle only one number for each statement.*

1. **During the past 6 months, to what extent do you feel that your team X...**

		Not at all	A little	Some what	Conside rably	Comple tely
1.	...met the *standards of quality* expected by your organization?	1	2	3	4	5
2.	...met the *standards of quantity* expected by your organization? (for example, workload)	1	2	3	4	5
3.	...met the *standards of timeliness* expected by your organization? (for example, finish a task on time)	1	2	3	4	5
4.	...met the *standards of implementation* expected by your organization? (for example, launching a procedure)	1	2	3	4	5
5.	...had a *reputation for work excellence* within the organization?	1	2	3	4	5

2. **How effectively did team X work together with team Y?** (*Please refer to the past 6 months*).

		To no extent	Little extent	Some extent	Agree	Great extent
1.	To what extent did both teams work effectively together in order to respond to tasks or duties that emerged from *working within the organization* (e.g., coordinating cross-team activities, assignment of organizational duties, etc.)?	1	2	3	4	5
2.	To what extent did both teams effectively help *each other out* if resources (e.g., time to invest, people or staff, support etc.) were needed?	1	2	3	4	5
3.	To what extent did you feel the *relationship* between your team and this other team was *productive*?	1	2	3	4	5
4.	To what extent did both teams *make effective use of each other's resources* (e.g., time to invest, people or staff, support etc.) in order to provide better results for the end-user?	1	2	3	4	5
5.	To what extent did both teams *work effectively together* in order to provide better services to end-user?	1	2	3	4	5
6.	To what extent did both teams work effectively together in order to respond to *problems or flaws that emerged from working within the organization* (e.g., staff or time shortage, etc.)?	1	2	3	4	5

Thank you for your cooperation!

Appendix 4: Study 3 - Research Booklet

Stimulating Creativity & Innovation in Teams

Project Outline

Aims of the Research:

> The research is a joint project of the Universities of Cambridge, Maryland, Valencia, and Instituto de Empresa. It aims to examine the relationships of social networks, team processes, and leadership with **team members' creative performance & team innovation.**
>
> The focus will be on the following aspects:
>
> ➢ **Networking** within and across teams (e.g., collaboratively and open-mindedly vs. competitively).
>
> ➢ **Team climate factors** supporting or hindering creative performance & innovation (e.g., clarity of team objectives, learning and social relationships in the team).
>
> ➢ **Leadership practices and leadership networking** related to creative performance & innovation (e.g., the leader's "connectedness" throughout the organization, leadership style, etc.).

Benefits for the Organisation:

> Based on the data we collect, the researchers will offer:
>
> ✓ **Single-team feedback reports** to participating teams benchmarking the team's performance and processes relative to other teams in the organization, as well as teams from other organizations; the reports represent a detailed breakdown of the strengths and developmental opportunities for teams.
>
> ✓ A **written report of key results,** including **suggestions how to facilitate creative performance and innovation,** to Top Management and Human Resources.
>
> ✓ A **presentation** of key findings to all participants.
>
> The findings may present a useful basis for:
>
> ✓ Training and coaching purposes
> ✓ Change management
> ✓ Team interventions

Extent of Required Participation:

> **Participating teams and work groups** will be asked to fill in a short questionnaire once at the beginning of the project (Questionnaire Team Member).

> **Team leaders** would be asked to fill in a short questionnaire of team members' creative performance and innovativeness at the beginning of the project (Questionnaire Team Leader).

> **The teams' next level senior managers** would be asked to complete a questionnaire at the beginning of the project (Questionnaire Senior Manager) and an in-depth interview carried out a year later.

Research Instruments	Participants	Time expenditure requested by participants
Questionnaire Team Members	Team Members	~ 30 minutes
Questionnaire Team Leaders	Team Leaders	~ 25 minutes
Questionnaire Senior Managers & Interviews	Senior Managers	~ 20 minutes each

These requests are flexible to a certain degree, and may be extended or reduced, to meet the particular needs, interests, and restraints of the participating organisations.

Contact:

If you are interested in the research or would like to discuss any of the above in more detail, please contact:

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Universidad de Valencia
Departamento de Dirección de Empresas "Juan José Renau Piqueras"
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46022 Valencia SPAIN
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E-mail: ronald.clarke@uv.es

Participants' **confidentiality and anonymity will be guaranteed at all times** during the research process. The research pursues no financial interests per se. Findings may result in publications in academic journals with the organisations and participants involved kept anonymous.

Appendix 5: Study 3 - Team Member Questionnaire

Team ID_____
Your ID_____

*These identification numbers will
be kept separately from your and
your team's name*

Innovative Team Survey

Section A: Your Social Network

The following section focuses on your social network. It refers to your relationship with them, and how you feel you are working together.

1. **Please answer the following questions for each member of your team and circle the respective number in the roster underneath**.
   You may ignore questions about yourself.

Questions	To what extent do you interact with this person as part of your required job responsibilities?					What is the nature of your personal relationship with this person?					To what extent would you describe the relationship with this person as being difficult? *Difficult relationships may be characterized by individuals that dislike each other, and intentionally avoid contact, or hamper each other's efforts.*					On average, how frequently have you provided this person with new information or insights about work-related problems or issues?				
Surname, Name	Not at all	A little	Somewhat	Considerably	All the time	Do not know socially	Acquaintance	Casual friend	Good friend	Close personal friend	Not at all	A little	Somewhat	Moderately	Very much	Never	About once every few months	About once a month	Several times a week	Several times a day
Anderson, Sarah	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Chamberlain, Emily	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Ford, Tim	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Jenkins, Herbert	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Lodge, Allison	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Martin, Benjamin	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Murray, Geoffrey	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Taylor, Adam	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

2. **Thinking back over the last 6 months, please write down up to 15 names, nicknames, or initials of all people within [organization] but outside your team, with whom you have dealt with on work-related matters.**
Please provide a circle for each statement that applies to the respective person.

Questions	Functional area/Hierarchical level of this person in your organization?			What is the nature of your personal relationship with this person?					To what extent would you describe the relationship with this person as being difficult? *Difficult relationships may be characterized by individuals that dislike each other, and intentionally avoid contact, or hamper each other's efforts.*					On average, how frequently have you provided this person with new information or insights about work-related problems or issues?				
	Lower position	Same position	Higher position	Do not know socially	Acquaintance	Casual friend	Good friend	Close personal friend	Not at all	A little	Somewhat	Moderately	Very much	Never	About once every few months	About once a month	Several times a week	Several times a day
Example: Grace Simpson	1	2	③	1	2	3	④	5	1	2	③	4	5	1	②	3	4	5
1.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
2.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
3.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
4.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
5.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
6.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
7.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
8.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
9.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
10.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
11.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
12.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
13.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
14.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
15.	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Section B: About Yourself

All statements in this section refer to who you feel you are as a person.

1. Please indicate the extent to which you agree or disagree with each statement.

		Strongly disagree	Disagree	Some what disagree	Neither agree nor disagree	Some what agree	Agree	Strongly agree
1.	I feel I am good at generating novel ideas.	1	2	3	4	5	6	7
2.	I have confidence in my ability to solve problems creatively.	1	2	3	4	5	6	7
3.	I have a knack for further developing the ideas of others.	1	2	3	4	5	6	7
4.	I am good at finding creative ways to solve problems.	1	2	3	4	5	6	7

2. Please indicate the extent to which you agree or disagree with each statement.

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1.	I am inventive.	1	2	3	4	5
2.	I am original at coming up with new ideas.	1	2	3	4	5
3.	I value artistic experiences.	1	2	3	4	5
4.	I have an active imagination.	1	2	3	4	5
5.	I like to reflect and play with ideas.	1	2	3	4	5
6.	I am sophisticated in art and music.	1	2	3	4	5
7.	I am ingenious, a deep thinker.	1	2	3	4	5
8.	I am curious about many things.	1	2	3	4	5
9.	I prefer work that is routine.	1	2	3	4	5
10.	I have few artistic interests.	1	2	3	4	5
11.	Group welfare is more important than individual rewards.	1	2	3	4	5
12.	Group success is more important than individual success.	1	2	3	4	5
13.	Being accepted by the members of your work group is very important.	1	2	3	4	5
14.	Employees should only pursue their goals after considering the welfare of the group.	1	2	3	4	5
15.	Managers should encourage group loyalty even if individual goals suffer.	1	2	3	4	5
16.	Individuals may be expected to give up their goals in order to benefit group success.	1	2	3	4	5
17.	Managers should make most decisions without consulting subordinates.	1	2	3	4	5
18.	It is frequently necessary for a manager to use authority and power when dealing with subordinates.	1	2	3	4	5
19.	Managers should seldom ask for the opinions of employees.	1	2	3	4	5
20.	Managers should avoid off-the-job social contacts with employees.	1	2	3	4	5
21.	Employees should not disagree with management decisions.	1	2	3	4	5
22.	Managers should not delegate important tasks to employees.	1	2	3	4	5

3. Please indicate the extent to which you agree or disagree with each statement

		Not at All	A little	Some what	Mode rately	A lot	Quite a lot	Exactly
1.	I often read materials related to my work to improve my ability.	1	2	3	4	5	6	7
2.	I am willing to select a challenging work assignment that I can learn a lot from.	1	2	3	4	5	6	7
3.	I often look for opportunities to develop new skills and knowledge.	1	2	3	4	5	6	7
4.	I enjoy challenging and difficult tasks at work where I will learn new skills.	1	2	3	4	5	6	7
5.	For me, development of my work ability is important enough to take risks.	1	2	3	4	5	6	7
6.	I prefer to work in situations that require a high level of ability and talent.	1	2	3	4	5	6	7
7.	I enjoy finding solutions to complex problems.	1	2	3	4	5	6	7
8.	I enjoy coming up with new ideas for products.	1	2	3	4	5	6	7
9.	I enjoy engaging in analytical thinking.	1	2	3	4	5	6	7
10.	I enjoy creating new procedures for work tasks.	1	2	3	4	5	6	7
11.	I enjoy improving existing processes or products.	1	2	3	4	5	6	7

4. Thinking about yourself and how you normally feel, to what extent do you generally feel:

		Never	Rarely	Some times	Often	Always
1.	Upset	1	2	3	4	5
2.	Hostile	1	2	3	4	5
3.	Alert	1	2	3	4	5
4.	Ashamed	1	2	3	4	5
5.	Inspired	1	2	3	4	5
6.	Nervous	1	2	3	4	5
7.	Determined	1	2	3	4	5
8.	Attentive	1	2	3	4	5
9	Afraid	1	2	3	4	5
10.	Active	1	2	3	4	5

Section C: Your Job

All statements in this section refer to your current job.

1. **Please indicate the extent to which you agree or disagree with the following statements.**

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1.	I have significant autonomy in determining how I do my job.	1	2	3	4	5
2.	I can decide on my own how to go about doing my work.	1	2	3	4	5
3.	I have considerable opportunity for independence and freedom in how I do my job.	1	2	3	4	5
4.	My impact on what happens in my department is large	1	2	3	4	5
5.	I have a great deal of control over what happens in my department.	1	2	3	4	5
6.	I have significant influence over what happens in my department.	1	2	3	4	5
7.	I am held very accountable for my actions at work.	1	2	3	4	5
8.	I often have to explain why I do certain things at work.	1	2	3	4	5
9.	My team leader holds me accountable for all of my decisions.	1	2	3	4	5
10.	If things at work do not go the way that they should, I will hear about it from my team leader.	1	2	3	4	5
11.	To a great extent, the success of my immediate work group rests on my shoulders.	1	2	3	4	5
12.	The jobs of many people at work depend on my success or failures.	1	2	3	4	5
13.	Co-workers, subordinates, and bosses closely scrutinize my efforts at work.	1	2	3	4	5

Section D: About your team leader *Ralph Gerrard*

The following statements refer to your team leader (i.e., the person to whom you report). Please think of this person while answering the following questions.

1. **Please indicate the extent to which you agree or disagree with each statement.**

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1.	The nature of my job is such that my immediate team leader is seldom around me when I am working.	1	2	3	4	5
2.	On my job my most important tasks take place away from where my immediate team leader is located.	1	2	3	4	5
3.	My immediate team leader and I are seldom in actual contact or direct sight of one another.	1	2	3	4	5

4.	My team leader and I seldom work in the same area.	**1**	**2**	**3**	**4**	**5**
5.	My team leader understands my problems and needs.	**1**	**2**	**3**	**4**	**5**
6.	My team leader would be personally inclined to use his/her power to help me solve problems in my work.	**1**	**2**	**3**	**4**	**5**
7.	I can count on my team leader to 'bail me out', even at his/her own expense, when I really need it.	**1**	**2**	**3**	**4**	**5**
8.	I would view my working relationship with my team leader as extremely effective.	**1**	**2**	**3**	**4**	**5**
9.	I have enough confidence in my team leader that I would defend and justify his/her decisions if he/she were not present to do so.	**1**	**2**	**3**	**4**	**5**
10.	I usually know where I stand with my team leader.	**1**	**2**	**3**	**4**	**5**
11.	I usually know how satisfied my team leader is with me.	**1**	**2**	**3**	**4**	**5**
12.	My team leader is very supportive of creative work.	**1**	**2**	**3**	**4**	**5**
13.	I feel creativity is supported and encouraged by my team leader.	**1**	**2**	**3**	**4**	**5**
14.	New ideas or concepts are fostered by my team leader.	**1**	**2**	**3**	**4**	**5**
15.	My team leader values creative work.	**1**	**2**	**3**	**4**	**5**
16.	I can obtain the resources required to support new ideas from my team leader.	**1**	**2**	**3**	**4**	**5**
17.	When I need additional resources to do my job, my team leader can usually get them for me.	**1**	**2**	**3**	**4**	**5**
18.	My team leader provides access to the resources I need to do my job well.	**1**	**2**	**3**	**4**	**5**
19.	My organization holds my team leader in high regard.	**1**	**2**	**3**	**4**	**5**
20.	My organization gives my team leader the chance to make important decisions.	**1**	**2**	**3**	**4**	**5**
21.	My organization supports decisions made by my team leader.	**1**	**2**	**3**	**4**	**5**
22.	My team leader strongly influences decisions made by the upper management of my organization.	**1**	**2**	**3**	**4**	**5**
23.	My team leader is highly visible in my organization.	**1**	**2**	**3**	**4**	**5**
24.	My team leader participates in decisions that affect the entire organization.	**1**	**2**	**3**	**4**	**5**

2. **Please indicate how frequently your team leader engages in the following behaviors.**
(*Note! You will be responding by using a different 5-point scale*).

		Not at all	Once in a while	Some times	Fairly often	Frequently if not always
1.	My team leader spends time teaching and coaching.	**0**	**1**	**2**	**3**	**4**
2.	My team leader treats me as an individual rather than as a member of a group.	**0**	**1**	**2**	**3**	**4**
3.	My team leader considers me as having different needs, abilities, and aspirations from others.	**0**	**1**	**2**	**3**	**4**
4.	My team leader helps me to develop my strengths.	**0**	**1**	**2**	**3**	**4**
5.	My team leader talks about his/her most important values and beliefs.	**0**	**1**	**2**	**3**	**4**
6.	My team leader specifies the importance of having a strong sense of purpose.	**0**	**1**	**2**	**3**	**4**

7.	My team leader considers the moral and ethical consequences of decisions.	0	1	2	3	4
8.	My team leader emphasizes the importance of having a collective sense of mission.	0	1	2	3	4
9	My team leader talks optimistically about the future.	0	1	2	3	4
10.	My team leader talks enthusiastically about what needs to be accomplished.	0	1	2	3	4
11.	My team leader articulates a compelling vision of the future.	0	1	2	3	4
12.	My team leader expresses confidence that goals will be achieved.	0	1	2	3	4
13.	My team leader seeks differing perspectives when solving problems.	0	1	2	3	4
14.	My team leader re-examines critical assumptions to question whether they are appropriate.	0	1	2	3	4
15.	My team leader gets me to look at problems from many different angles.	0	1	2	3	4
16.	My team leader suggests new ways of looking at how to complete assignments.	0	1	2	3	4

3. **How characteristic is each of the following statements related to your team leader's work over the last 6 months?**

		Not at All Characteristic	Little Characteristic	Slightly Characteristic	Somewhat Characteristic	Moderately Characteristic	Very Characteristic	Extremely Characteristic
1.	Developed ideas that imply substantial departures from existing product and service lines.	1	2	3	4	5	6	7
2.	Developed breakthrough ideas—not minor changes to existing products/services.	1	2	3	4	5	6	7
3.	Developed ideas that make existing knowledge about current products/services obsolete.	1	2	3	4	5	6	7
4.	Developed ideas that reinforce existing product and service lines.	1	2	3	4	5	6	7
5.	Developed incremental ideas—not major changes to existing products/services.	1	2	3	4	5	6	7
6.	Developed ideas that reinforce existing knowledge about current products/services.	1	2	3	4	5	6	7

Section E: About Your Team

The following section focuses on your team members. It refers to your relationship with them, and how you feel you are working together.

1. Please indicate the extent to which you agree or disagree with each statement.

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1.	The team often reviews its objectives.	1	2	3	4	5
2.	The methods used by the team to get the job done are often discussed.	1	2	3	4	5
3.	We regularly discuss whether the team is working effectively.	1	2	3	4	5
4.	The team often reviews whether it is getting the job done.	1	2	3	4	5
5.	If I need to get expertise on a certain issue, I know exactly who to turn to in this team.	1	2	3	4	5
6.	I know which team members have expertise in specific areas.	1	2	3	4	5
7.	I have a good understanding of "who knows what" in this team.	1	2	3	4	5
8.	Team members welcome change.	1	2	3	4	5
9.	Team members encourage each other to try new things, even though they might not work.	1	2	3	4	5
10.	Team members are willing to try creative solutions to solve difficult problems.	1	2	3	4	5

Section F: Background information about you and your team

About your team: Please always tick only one box when multiple choices are offered

1. How long has the Team been set up?

Less than 6 months	❑	Between 1 and 2 years	❑
Less than 1 year	❑	2 years or more	❑

2. Is this the principal team with which you work?

Yes ❑   No ❑

3. Is this team temporary or permanent?

Temporary ❑   Permanent ❑

About you: Please always tick only one box when multiple choices are offered

4. Are you

Female ❑   Male ❑

5. How old are you?

_____ Years

6. Your job title:	7. How long have you worked in your present position? (e.g.how long have you been a Manager)
(Please specify)_____	_____years _____ months

8. How long have you worked in this team?	9. How long have you worked with your team leader?
_____years _____ months	_____years _____ months

10. Please mark the highest education level you have attained:

General Certificate of Secondary Education ❏

General Certificate of Education ❏

Vocational Training ❏

University (Associate Degree or Bachelor's Degree) ❏

Master's Degree ❏

Ph.D. Degree ❏

Others (please specify)_____

11. Do you have any additional comments you would like to make in relation to the issues covered in this survey?

Many thanks for completing this questionnaire. It will be a valuable contribution to our study about how innovative are your teams in your organization. Please give the questionnaire to the researcher once you have finished it.

Thank you again for your cooperation!

Appendix 6: Study 3 – Team Leader Questionnaire

Your ID_____   CAMBRIDGE   UNIVERSITY OF MARYLAND   VNIVERSITAT   ie business
                            Judge Business School   ROBERT H. SMITH   D·ġ·VALÈNCIA   school
                                                    SCHOOL OF BUSINESS

Innovative Team Survey

What is this survey?

This is a survey of your views about your work within your team and your opinions about your team, your relationship with other team leaders and senior managers in your organization.

This is not a test. There are no right or wrong answers. We want to know your personal views on the issues raised in the questionnaire. The questionnaire consists of five sections:

Section A: Asks for your evaluation of your team members.
Section B: Asks about your views regarding how your social network works together.
Section C: Asks about your views regarding yourself.
Section D: Asks about your job and your senior manager.
Section E: Asks some biographical details needed to enable us to compare the views of different members of staff.

Who will see my answers?

Please be assured the information you give is totally confidential. No one, other than the researchers involved will see your answers. A report will be sent to the organization in aggregated form. Reports to individual teams will not identify individual responses and will simply summarise data for all team members, thus protecting your anonymity and confidentiality. These reports will not be distributed elsewhere.

How long will it take?

The questionnaire will take about 25 minutes to complete.

How do I fill in this survey?

Please read each question carefully and give your immediate response. Most statements ask you to indicate the *degree or extent of your view* by circling a number on a predetermined scale which best reflects your opinion. We are interested in *your views* about all the statements. Please answer all questions as openly and honestly as possible. *Please always circle only one number for each statement.*

As an example, a question in this survey could be whether, *in your opinion*, the team keeps in regular contact with each other. If you believe that this is the case, most of the time, but there are occasional exceptions you would circle number 4 to indicate that you "agree", as shown below.

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1.	We keep in touch with each other as a team.	1	2	3	④	5

Do not spend too long on any question. Try to answer according to your **first reaction**.

Once you've completed this questionnaire your researcher who will be accompanying you, will collect it.

Section A: Employee Evaluation Form

The following section focuses on your team members. It refers to your assessment of them, and how you feel they are working together.

1. **How characteristic is each of the following statements of each team member's work over the last 6 months?**

Questions	Developed ideas that imply substantial departures from existing product and service lines.							Developed breakthrough ideas—not minor changes to existing products/services.							Developed ideas that make existing knowledge about current products/services obsolete.							Developed ideas that reinforce existing product and service lines.							Developed incremental ideas—not major changes to existing products/services.							Developed ideas that reinforce existing knowledge about current products/services.						
Surname, Name	Not at All Characteristic	Little Characteristic	Slightly Characteristic	Somewhat Characteristic	Moderately Characteristic	Very Characteristic	Extremely Characteristic	Not at All Characteristic	Little Characteristic	Slightly Characteristic	Somewhat Characteristic	Moderately Characteristic	Very Characteristic	Extremely Characteristic	Not at All Characteristic	Little Characteristic	Slightly Characteristic	Somewhat Characteristic	Moderately Characteristic	Very Characteristic	Extremely Characteristic	Not at All Characteristic	Little Characteristic	Slightly Characteristic	Somewhat Characteristic	Moderately Characteristic	Very Characteristic	Extremely Characteristic	Not at All Characteristic	Little Characteristic	Slightly Characteristic	Somewhat Characteristic	Moderately Characteristic	Very Characteristic	Extremely Characteristic	Not at All Characteristic	Little Characteristic	Slightly Characteristic	Somewhat Characteristic	Moderately Characteristic	Very Characteristic	Extremely Characteristic
Blair, Alice	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Cahill, Renee	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Cole, Randall	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Cox, Paul	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Morris, John	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Smith, Jane	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Williams, Sue	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Young, Ann	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7

2. Please rate the frequency with which, over the last 6 months, each of your team member's ideas...

Questions	have been approved for further development.							have received financial or other resources (e.g., material, staff).							have been transformed into usable products, processes, or procedures.							have been successfully brought to market or have been successfully implemented at this Company.						
Surname, Name	Never	Rarely	Occasionally	Somctimes	Frequenlly	Usually	Always	Never	Rarely	Occasionally	Somctimes	Frequenlly	Usually	Always	Never	Rarely	Occasionally	Somctimes	Frequenlly	Usually	Always	Never	Rarely	Occasionally	Somctimes	Frequenlly	Usually	Always
Blair, Alice	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Cahill, Renee	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Cole, Randall	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Cox, Paul	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Morris, John	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Smith, Jane	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Williams, Sue	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Young, Ann	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7

3. Over the last 6 months, to what extent has this employee …

Questions	spoken up with ideas for new projects and changes in work procedures in your team?					made recommendations for improving work procedures in your team?					encouraged others to speak up about work-related issues in your team?					expressed his/her opinions on work-related issues to others in your team even when they disagreed with him/her?				
Surname, Name	Not at all	A little	Somewhat	Considerably	All the time	Not at all	A little	Somewhat	Considerably	All the time	Not at all	A little	Somewhat	Considerably	All the time	Not at all	A little	Somewhat	Considerably	All the time
Blair, Alice	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Cahill, Renee	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Cole, Randall	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Cox, Paul	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Morris, John	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Smith, Jane	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Williams, Sue	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Young, Ann	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Section B: Your Social Network

The following section focuses on your social network (your team, other team leaders and senior managers). It refers to your relationship with them, and how you feel you are working together.

1. **Please answer the following questions for each member of your *team* and circle the respective number in the roster underneath**.

Questions	What is the nature of your personal relationship with this person?					To what extent would you describe the relationship with this person as being difficult? *Difficult relationships may be characterized by individuals that dislike each other, and intentionally avoid contact, or hamper each other's efforts.*					On average, how frequently have you provided this person with new information or insights about work-related problems or issues?				
Surname, Name	Do not know socially	Acquaintance	Casual friend	Good friend	Close personal friend	Not at all	A little	Somewhat	Moderately	Very much	Never	About once every few months	About once a month	Several times a week	Several times a day
Blair, Alice	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Cahill, Renee	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Cole, Randall	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Cox, Paul	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Morris, John	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Smith, Jane	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Williams, Sue	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Young, Ann	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

2. Please think of your relationships and interaction with other team leaders and senior managers in your organization while answering the following questions. *Please mark with an X each one of the individuals that you know. You may ignore questions about yourself.*

Questions	How frequently do you interact with this person as part of your job?					What is the nature of your personal relationship with this person?					To what extent would you describe the relationship with this person as being difficult? *Difficult relationships may be characterized by individuals that dislike each other, and intentionally avoid contact, or hamper each other's efforts.*					How frequently have you provided this person with new information or insights about *this person's team(s)'* work-related problems or issues?					How often have you sought out this person in order to promote your *team(s)'* ideas and proposals?					How often has this person lobbied for and supported *your team(s)'* ideas when you needed them to?				
Surname, Name	Never	About once every few months	About once a month	Several times a week	Several times a day	Do not know socially	Acquaintance	Casual friend	Good friend	Close personal friend	Not at all	A little	Somewhat	Moderately	Very much	Never	About once every few months	About once a month	Several times a week	Several times a day	Never	Rarely	Sometimes	Often	Several times in last 6months	Never	Rarely	Sometimes	Often	Several times in last 6months
✗ *Example*: Betty	1	2	3	④	5	1	2	③	4	5	1	②	3	4	5	①	2	3	4	5	1	2	③	4	5	1	2	3	④	5
Allen, Heather	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Appleby, Henry	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Black, Andrew	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Crawford, Alice	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Dempsey, Annie	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Hawkins, Engelbert	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

3. **Thinking back over the last 6 months, please write down up to 15 names, nicknames, or initials of all people within [organization] but outside your team, with whom you have dealt with on work-related matters.** *Please also indicate whether the respective person occupies a lower (1), same (2), or higher (3) hierarchical position relative to you within the organization, and jot down to which organizational function/department this person belongs (e.g., Department Manager, Coordination of Administration and Public Use, Conservation and Maintenance coordinators, etc.).*

	Name	**Hierarchical Position: Lower (1) Same (2) Higher (3) than my position**	**Organizational Function/Department (e.g., accounting, HR, production etc.):**
Example	Steven Hennan	(2) Same	Department Manager
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Section C: About Yourself

All statements in this section refer to who you feel you are as a person.

1. **Please indicate the extent to which you agree or disagree with each statement.**

		Strongly disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
1.	I find it easy to envision myself in the position of others.	1	2	3	4	5
2.	I am able to make most people feel comfortable and at ease around me.	1	2	3	4	5
3.	It is easy for me to develop good rapport with most people.	1	2	3	4	5
4.	I understand people well.	1	2	3	4	5
5.	I am good at getting others to respond positively to me.	1	2	3	4	5
6.	I usually try to find common ground with others.	1	2	3	4	5
7.	I use politicking at work as a way to ensure that things get done.	1	2	3	4	5

8.	I use my interpersonal skills to influence people at work.	1	2	3	4	5
9.	I let others at work know of my accomplishments.	1	2	3	4	5
10.	I work behind the scenes to see that my work group is taken care of.	1	2	3	4	5

Section D: Your Job and Your Senior manager *Alexander Jones*

All statements in this section refer to your current job.

1. Please indicate the extent to which you agree or disagree with each statement.

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1.	The work I do is very important to me.	1	2	3	4	5
2.	My job activities are personally meaningful to me.	1	2	3	4	5
3.	The work I do is meaningful to me.	1	2	3	4	5
4.	I am confident in my ability to do my job.	1	2	3	4	5
5.	I am self assured about my capabilities to perform my work activities.	1	2	3	4	5
6.	I have mastered the skills necessary for my job.	1	2	3	4	5
7.	I have significant autonomy in determining how I do my job.	1	2	3	4	5
8.	I can decide on my own how to go about doing my work.	1	2	3	4	5
9.	I have considerable opportunity for independence and freedom in how I do my job.	1	2	3	4	5
10.	My impact on what happens in my department is large.	1	2	3	4	5
11.	I have a great deal of control over what happens in my department.	1	2	3	4	5
12.	I have significant influence over what happens in my department.	1	2	3	4	5
13.	I am held very accountable for my actions at work.	1	2	3	4	5
14.	I often have to explain why I do certain things at work.	1	2	3	4	5
15.	My senior manager holds me accountable for all of my decisions.	1	2	3	4	5
16.	If things at work do not go the way that they should, I will hear about it from my senior manager.	1	2	3	4	5
17.	To a great extent, the success of my immediate work group rests on my shoulders.	1	2	3	4	5
18.	The jobs of many people at work depend on my success or failures.	1	2	3	4	5
19.	Co-workers, subordinates, and bosses closely scrutinize my efforts at work.	1	2	3	4	5
20.	My senior manager understands my problems and needs.	1	2	3	4	5
21.	My senior manager would be personally inclined to use his/her power to help me solve problems in my work.	1	2	3	4	5

22.	I can count on my senior manager to 'bail me out', even at his/her own expense, when I really need it.	1	2	3	4	5
23.	I would view my working relationship with my senior manager as extremely effective.	1	2	3	4	5
24.	I have enough confidence in my senior manager that I would defend and justify his/her decisions if he/she were not present to do so.	1	2	3	4	5
25.	I usually know where I stand with my senior manager.	1	2	3	4	5
26.	I usually know how satisfied my senior manager is with me.	1	2	3	4	5

2. Please rate the extent to which you perceive each of the following behaviors as an expected part of your responsibilities.

		Not at all	A Little	To Some extent	Conside rable extent	Very great extent
1.	Persuading outsiders (e.g., other team leaders, government officials, visitors to parks) to support your team decisions.	1	2	3	4	5
2.	Preventing outsiders from 'overloading' the team with too many requests.	1	2	3	4	5
3.	Reaching out to individuals outside of your team that can provide project-related expertise or ideas.	1	2	3	4	5
4.	Proactively seeking the advice and support of your senior managers and /or colleagues.	1	2	3	4	5

Section E: Background information about you and your team

About your team: Please always tick only one box when multiple choices are offered

1. How long has the Team been set up?

Less than 6 months ❏	Between 1 and 2 years ❏
Less than 1 year ❏	2 years or more ❏

2. Is this the principal team with which you work?	**3. Is this team temporary or permanent?**
Yes ❏ No ❏	Temporary ❏ Permanent ❏

About you: Please always tick only one box when multiple choices are offered

4. Are you	**5. How old are you?**
Female ❏ Male ❏	_____ Years

189

8. How long have you worked in this team?	9. How long have you worked with your team leader?
_____years _____ months	_____years _____ months

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10. Please mark the highest education level you have attained:

General Certificate of Secondary Education ❑

General Certificate of Education ❑

Vocational Training ❑

University (Associate Degree or Bachelor's Degree) ❑

Master's Degree ❑

Ph.D. Degree ❑

Others (please specify)_____

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11. Do you have any additional comments you would like to make in relation to the issues covered in this survey?

Many thanks for completing this questionnaire. It will be a valuable contribution to our study about how innovative are your teams in your organization. Please give the questionnaire to the researcher once you have finished it.

Thank you again for your cooperation!

Appendix 7: Study 3 – Senior Manager Questionnaire

CAMBRIDGE
Judge Business School

UNIVERSITY OF
MARYLAND
ROBERT H. SMITH
SCHOOL OF BUSINESS

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D̃ӦVALÈNCIA

ie business
school

Your ID_____

<u>Innovative Team Survey</u>

<u>**What is this survey?**</u>

This is a survey of your views about your work with your teams and your relationship with team leaders and other senior managers in your organization.

This is not a test. There are no right or wrong answers. We want to know your personal views on the issues raised in the questionnaire. The questionnaire consists of two sections:

Section A: Asks about your views regarding how your social network works together.
Section B: Asks for your evaluation of each one of your teams.

<u>**Who will see my answers?**</u>

Please be assured the information you give is totally confidential. No one, other than the researchers involved will see your answers. A report will be sent to the organization in aggregated form. Reports to individual teams will **<u>not</u>** identify individual responses and will simply summarise data for all team members, thus protecting your anonymity and confidentiality. These reports will not be distributed elsewhere.

<u>**How long will it take?**</u>

The questionnaire will take about 20 minutes to complete.

<u>**How do I fill in this survey?**</u>

Please read each question carefully and give your immediate response. Please answer all questions as openly and honestly as possible. *Please always circle only one number for each statement.*

Do not spend too long on any question. Try to answer according to your **<u>first reaction</u>**. Once you've completed this questionnaire your researcher who will be accompanying you, will collect it.

Section A: Your Social Network

The following section focuses on team leaders and other senior managers. It refers to your relationship with them, and how you feel you are working together

1. Please think of your relationships and interaction with team leaders and other senior managers in your organization while answering the following questions. *Please mark with an X each one of the individuals that you know. You may ignore questions about yourself.*

Questions	How frequently do you interact with this person as part of your job?					What is the nature of your personal relationship with this person?					To what extent would you describe the relationship with this person as being difficult? *Difficult relationships may characterized by individuals that dislike each other, and intentionally avoid contact, hamper each other's efforts.*					How frequently have you provided this person with new information or insights about *this person's team(s)'* work-related problems or issues?					How often have you sought out this person in order to promote your *team(s)'* ideas and proposals?					How often has this person lobbied for and supported *your team(s)'* ideas when you needed them to?				
Surname, Name	Never	About once every few months	About once a month	Several times a week	Several times a day	Do not know socially	Acquaintance	Casual friend	Good friend	Close personal friend	Not at all	A little	Somewhat	Moderately	Very much	Never	About once every few months	About once a month	Several times a week	Several times a day	Never	Rarely	Sometimes	Often	Several times in last 6months	Never	Rarely	Sometimes	Often	Several times in last 6months
✗ *Example*: Betty	1	2	3	④	5	1	2	③	4	5	1	②	3	4	5	①	2	3	4	5	1	2	③	4	5	1	2	3	④	5
Allen, Heather	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Appleby, Henry	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Black, Andrew	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Crawford, Alice	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Dempsey, Annie	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Hawkins, Engelbert	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Section B: Team Evaluation Form

The following section focuses on your teams. Please answer the following questions for each team and circle the respective number in the roster underneath.

1. **Please rate the frequency with which, over the last 6 months, each team's ideas…**

Questions	Have been approved for further development.							Have received financial or other resources (e.g., material, staff).							Have been transformed into usable products, processes, or procedures.							Have been successfully brought to market or have been successfully implemented at the Company.						
	Never	Rarely	Occasionally	Sometimes	Frequently	Usually	Always	Never	Rarely	Occasionally	Sometimes	Frequently	Usually	Always	Never	Rarely	Occasionally	Sometimes	Frequently	Usually	Always	Never	Rarely	Occasionally	Sometimes	Frequently	Usually	Always
Alpha Team	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Beta Team	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Gamma Team	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Delta Team	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Epsilon Team	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Kappa Team	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7

Many thanks for completing this questionnaire. It will be a valuable contribution to our study about how innovative are your teams in your organization. Please give the questionnaire to the researcher once you have finished it. *Thank you again for your cooperation!*

Appendix 8: Study 3 – Interview Guide

CAMBRIDGE
Judge Business School

UNIVERSITY OF MARYLAND
ROBERT H. SMITH
SCHOOL OF BUSINESS

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IĐỖVALÈNCIA

ie business school

Your ID_____

Interview Guide

- Make participants feel comfortable; explain time commitment – it will take 25 minutes.
- Explain reason and purpose of this interview; to gain participant's view about their work (keep it general; avoid hypothesis guessing).
- Disposal of data:
    1. Explain interview will be tape-recorded to facilitate transcription.
    2. Transcripts will be coded anonymously & treated confidential.
    3. Only researchers will see the interview.
    4. Data will be destroyed once study is concluded.
    5. If participant has no time, jump straight to Section D – The clarification of study results.

Section A: Demographics

Gender:

Position in company (Team member/leader/senior manager):

Team name:

Leader name:

Tenure in organization:

Tenure in team:

Section B: Critical Incident

1. **Radical Creativity Incident.**

   In every job, employees sometimes identify a need to do things differently, change an existing procedure or way of doing things or come up with new ideas for developing a product or service. Sometimes these ideas are small and incremental, but in other cases, some of these ideas may be radical, completely new, which can change the face of work and make current products and services obsolete.

   1.1. In your daily work, have you introduced new ideas to existing products/services? Can you provide examples?

   1.2. Which of these examples represented the most significant change?

   1.3. Did this idea result in substantial departures from existing product/service lines? Or did this idea rather reinforce existing product and service lines?

   1.4. Can you describe this idea in detail? What were the consequences of this idea? How did it affect the way you work? How did it affect product/service lines?

   1.5. Was your idea implemented?

   1.6. What were some of the problems/obstacles you faced in getting this idea accepted and implementing it?

   1.7. In general, what do you think it takes for employees to be radically creative? For example, specific skills, resources, etc.?

2. **Leadership.**

   Could you describe the role that your leader played in the example of the idea that you've just described?

2.1. Was your leader aware of this idea? What was his/her involvement?

2.2. How did your leader react once he/she became aware of this idea/ your intention to implement this idea?

2.3. Did your leader talk about the idea to others outside your team, within the wider organization?

    2.3.1.   Who did he/she talk to?

    2.3.2.   To which end? What was his/her intention?

    2.3.3.   Was this helpful or not? Why/Why not?

    2.3.4.   What could he/she have done better?

3. Role of team & others in supporting ideas.

Could you describe the role that colleagues within your team, as well as in the wider organization, played in the example of the idea that you've just described.

3.1. Did you talk to others about this idea? What was their reaction?

3.2. Were these colleagues inside your work team, or colleagues in the wider organization (i.e. other teams)?

Section C: Radical Creativity General

1. Radical Creativity In Organization

If you think of some of the more radical ideas – those that are completely new, which can change the face of work and make current products and services obsolete-that have been suggested at (insert name of organization) by other team members of other employees that you may know outside your team:

1.1. Could you describe these ideas?

1.2. Were these ideas implemented?

1.3. What were some of the problems/obstacles faced in implementing these ideas?

1.4. Did these ideas result in substantial departures from existing product/service lines? Or did they rather reinforce existing product and service lines?

1.5. Can you describe them in detail? What were the consequences of these ideas? How did they affect work? How did they affect product/service lines?

2. Leadership

Could you describe the role that leadership played in the examples of the ideas that you've just described.

2.1. Were leaders aware of these ideas? What was their involvement?

2.2. How did these leaders react once they became aware of these ideas?

2.3. Did leaders talk about the idea to others within the wider organization?

    2.3.1. Who did they talk to?

    2.3.2. To which end? What was their intention?

2.4. In general, how do you think leaders /senior managers play a role in how creative their employees are? What different roles can a leader play in facilitating their employees' development of radically new ideas and projects?

2.5. Can you think of ways in which your own leader (or other leaders that you may be aware of) has helped you or your colleagues to be more creative? Can you think of a particular idea that you came up with and how your leader played a role in helping you?

2.6. All employees and leaders have some informal networks with others at work. How do you think employees' and their leaders' connections with others at work play a role in impacting their creativity? In what different ways do you think their social networks are crucial?

2.7. Has your leader's social connections outside your immediate work group helped you in any way? Can you explain?

2.8. Does your leader use his connections to help team members in general? How? Does he/she reserve these for certain team members and not everyone?

2.9. Now that you have the experience of being involved in some radical new ideas and products in your organization, what help and/or resources do you think are necessary for employees to be successful in their creative endeavors?

2.10. Are there any differences in terms of the resources and facilities needed based on whether employees come up

with radically new ideas versus more incremental, smaller ideas? What would you think they are?

Section D: Clarification of Results

Based on the analysis of the responses to the survey that employees here filled out, we found some interesting findings. We would like to share them with you and get your opinion on them.

1. We find that the extent of communication/interactions that employees have with people outside their immediate work group is significantly related to their radical creativity. Why do you think that is? Please tell me as many reasons you can think of.

2. We also find that employees' leaders play an important role in affecting how radically creative they are in 3 ways – (1) by providing exposure to new ideas, perspectives and organizational imperatives, (2) by having greater influence in their peer networks in terms of being an important go-between for other leaders to promote their teams' ideas and proposals and (3) getting crucial support from higher ups to lobby for and support your team's ideas and proposals and pushing things through. Do you agree with these findings? Can you explain why this is so? (Get rich description from participant to each of the 3 sub-questions).

3. Our results also suggest that both employees' own social network interactions outside their immediate work group and the leaders' position and interactions in the social networks, especially when it comes to idea generation, are complementary in influencing creativity. For example, for knowing about potentially novel ideas, if an employee has connections to members outside his/her own team to discuss ideas for work and work problems, then leader's access to novel ideas and information is not important. But leaders' connections become important for idea generation when employees don't have access to external parties that they can discuss their ideas with. Can you explain why this may be so?

4. On the other hand, unlike access to ideas, the leader's access to resources, lobbying, and support from higher authorities is very

important in addition to employees' own external connections. Can you explain why this may be so?

5. Also, why do you think this pattern is different for access to novel ideas versus lobbying, promotion, etc.?

Thank you for your cooperation!