

# 팀 혁신성과 성과에 대한 팀 내, 팀 간 사회적 연결의 영향: IT 지원에 기반하여

## The Impact of Intra-Team and Inter-Team Social Ties on Team Innovativeness and Performance: On the Basis of IT Support

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### 요 약

사회적 연결은 현재 경쟁적인 사회에서 중요한 역할을 한다고 알려져 왔다. 본 연구의 주요 목적은 팀 혁신성과 성과에 팀 내, 팀 간 사회적 연결의 영향을 파악하는 것이다. 6개 회사의 97개 팀 데이터를 통해, 본 연구는 (i) 어떻게 팀 내, 팀 간 사회적 연결이 팀 혁신성과 팀 성과에 영향을 미치는지, (ii) 어떻게 IT 지원이 두 사회적 연결을 촉진시키는지 보려고 한다. 팀 기반 분석으로, 팀 구성원간(팀 내) 강한 사회적 연결이 팀 혁신성을 증진시킴과 같이 성과에도 영향을 주는 것을 확인하였다. 하지만 팀 간 사회적 연결의 경우, 강한 연결이 팀 혁신성을 통하여 팀 성과에 영향을 주는 것을 밝혔다. 그리고, IT 지원이 이 두 사회적 연결 모두를 상당히 강하게 만들어 주는 것을 보였다.

**키워드 :** 사회적 연결, 팀 혁신성, 팀 성과, IT 지원

## I. Introduction

In a contemporary organization, individuals organize social networks in various organizational structures (Putnam, 1993). Given the increase in the importance of networks and their functionality, social capital-originally introduced in community studies-has become an actively studied topic in the field of information

management. Social capital generated by the relations among the social actors resides within or external to the organizational structures (Adler, 2001) and is closely related to social network concepts, which refer to embedded social capital in social actors' relations (Lin, 1999). Because social capital attracted significant attention, many studies have developed associated concepts and dimensions. Among various definitions, this study

adopts a bonding and bridging view that focuses on the relations formed by social actors (Gittell and Vidal, 1998). A bonding view focuses on the inner linkages among social actors in a social structure while a bridging view is related to exterior linkages among social structures (Putnam, 2001). Prior studies tend to ignore the distinction and adopt a unified concept of social capital (Putnam, 2001), or separately measure bonding (Granovetter, 1973; Portes, 2000) or bridging (Inglehart, 1999). Because the distinction between bonding and bridging has been theoretically well established (Patulny and Svendsen, 2007), the classification of a social network according to the bonding and bridging perspectives is necessary.

Organizations with efficient social networks have adapted well to swiftly changing environments and gained a competitive advantage over their competitors. Given the increase in the importance of the establishment of successful social networks, many companies have striven to develop an IT infrastructure that can effectively promote social networks (Hansen and Von Oetinger, 2001). Moreover, the growth in IT investment corresponds with the need for companies to innovate continuously (Shalley and Gilson, 2004). Companies with greater innovative capacity adapt more efficiently to the environment and generate new assets for performance (Lloréns *et al.*, 2004). As innovation becomes important for survival, many studies have examined how firms' innovativeness affects performance. Although social networks are important assets for a team's operations and innovation, relatively few studies have explored the direct relationship between a social network and innovativeness. Thus, the study of the direct relationship between those two variables is of particular interest.

Given a rapidly changing and extensively competitive business environment, organizations have adopted team-based approaches (Pearce and Ensley,

2004). The role of teams in firms has been significantly enhanced for innovation and better performance (Gibson *et al.*, 2007). Team-based work provides benefits such as access to diverse knowledge, gains in accountability, satisfaction, learning, and synergistic processes (Batt, 2004; Cummings, 2004; Dahlin *et al.*, 2005; Edmondson, 1999; Laursen and Salter, 2006).

Taken together, this study explores the effects of both bonding and bridging properties of social networks on team outcomes in terms of innovativeness and performance. It further analyzes how IT support fosters intra- and inter-social ties within teams. We employ bonding and bridging social networks depending on the location of the linkages. Intra-social ties represent bonding relationships within a team, whereas inter-social ties describe external relationships among different teams, which is in line with the bridging view.

## II. Literature Review

Social networks are related to the relationships among social actors in the network structure and measure the extent of the linkages (Tichy *et al.*, 1979). A social network facilitates communication channels and strengthens linkages among actors (Nahapiet and Ghoshal, 1998). Social capital is conceptualized as a set of resources obtained through the social networks formed by personal relationships (Coleman, 1988). According to Adler and Kwon (2002), social capital has various effects on individuals and groups. For example, it facilitates career success (Burt, 2009) and assists firms in providing extensive pools of recruits (Fernandez *et al.*, 2000). The social capital of a team is the total aggregation of the social ties of members, which ties facilitate information exchange, cooperation, and innovation among members of inside and outside (Koriat and Gelbard, 2014; Reed *et al.*, 2006).

In other words, social capital is a resource available to social actors as a function of their positions and relationships with other actors (Tsai and Ghoshal, 1998). The extent of social bonds in the social structure has been an important topic in the study of social capital (Balkundi and Harrison, 2006; Koriat and Gelbard, 2014; Son *et al.*, 2013).

Several studies classified social capital according to types of linkages (Adler and Kwon, 2002; Gittell and Vidal, 1998; Lin *et al.*, 2001). These studies divided social capital into two aspects: bonding and bridging. The bridging view considers external social ties (Gittell and Vidal, 1998) and explains social capital as a resource that resides in the external linkages between the actor and the other actors (Baker, 1990). The performance of individuals might be facilitated by their ties to other actors. The external social tie is related to the resources available after a team forms external relationships with other parties. In contrast, the internal social tie is explained by the bonding view that focuses on the internal characteristics of a social actor. This definition involves a collectivity's internal ties among its social actors instead of its external ties with other collectivities (Putnam, 1995). To put it differently, an internal social tie is different from an external social tie in that it is located in the linkages among members within the collectivity.

The network-based theory recognizes these two types of social ties and relates them to two perspectives of their instrumental and expressive purposes (Lin, 1999, 2008). The instrumental purpose is to acquire new resources, whereas the expressive purpose is to maintain existing resources. The homophily (Lazarsfeld and Merton, 1954) and heterophily (Granovetter, 1973) principles state that shared resources among actors in the inner layer of the structure tend to be homogeneous and become heterogeneous as the relations extend from the inner layer to the outer layer. The princi-

ples state that the intra-social tie that resides in the internal bonds among actors in the same collectivity incorporates similar resources. In contrast, the inter-social tie embedded in the external linkages of the collectivity with others spans diverse resources.

Lin (2008) argues that, for expressive purposes, the bonding relation is efficient because strong intra ties are necessary for mobilizing and preserving similar resources. For instrumental purposes in which additional resources are required, whether or not the purpose has been satisfied depends on the amount of embedded resources in the social ties. If the inner ties are strong and have abundant resources, the bonding relation alone might be efficient in providing new assets. If the resources are not rich enough, the assessment of new resources leads to the external linkages embedded with diverse resources. Most collectivities involve both expressive and instrumental actions. Both internal and external social ties are important in the examination of their effects on performance. Social capital is positively related to actors' performances and firms' capacities (Gabbay and Zuckerman, 1998), and networks incorporating social actors and structures are strong antecedents of performance (Cross and Cummings, 2004).

In this study, we apply these two distinct types of social ties (internal-external or bonding-bridging) into the context of contemporary teams in order to investigate different effects of them on teams' performance and innovativeness. While dynamics and activities occurring inter-team relationships are rather different from that of intra-team relationships (Kuegler *et al.*, 2015; Presbitero *et al.*, 2015; Reagans *et al.*, 2004), empirical efforts to reveal their difference in terms of team performance and innovativeness is lacking (Henttonen *et al.*, 2014). Hence, this paper address the research gap of different types of team social capital with empirical analysis.

### III. Hypotheses and Research Model

IT support is defined as “the degree of IT support for collaborative work, for communication, for searching and accessing, for simulation and prediction and for systematic storing” (Lee and Choi, 2003, p. 222). The emergence of information technology brings upgrade in coordination and communication (Clemons *et al.*, 1993), knowledge flows (Alavi and Leidner, 2001), and interpersonal channels (Levina and Vaast, 2006). IT creates infrastructures that are efficient for networking, which facilitates social capital (Calabrese and Borchert, 1996). IT support facilitates the pursuit of a shared goal at the team level (Argyres, 1999) and creates effective communication channels among team members (Yoo *et al.*, 2006). IT thus plays an important role in communication mechanisms (Thompson and Nadler, 2002). Communication is a fundamental element in shaping strong social ties and actors in social entities form various networks (Sarker *et al.*, 2011). Moreover, IT enhance searching and accessing resources by increasing information availability (Clemons *et al.*, 1993). IT in this sense enhances the circulation of knowledge among team members and stimulates communication modes (Choi *et al.*, 2010). Taken together, information technology is more likely to facilitate social tie. Thus, we propose

H1: IT support is positively related to intra-team social ties.

H2: IT support is positively related to inter-team social ties.

Team performance and team innovativeness are important dimensions of team outcome influenced by social ties (Somech, 2006). These two measures are complementary since team performance is related to the tangible accomplishment of desired result (Chatman

and Flynn, 2001) while team innovativeness is related to intangible outcomes like ideas (Damanpour and Evan, 1984).

Team innovativeness is the adaptability to change of a team (Lovelace *et al.*, 2001; Wang and Ahmed, 2004) and one dimension of team creativity (Chen, 2006). Intra-team social ties are essential to provide innovative feedback with each other (Burke *et al.*, 2006). Strong intra-team ties are related to such behaviors including cohesion, reciprocity norms, trust, and shared vision of teams (Hahn *et al.*, 2008; Krackhardt, 1992; Pearce and Ensley, 2004), thus, can lead to innovative performance impacts (Hülshager *et al.*, 2009; Kuegler *et al.*, 2015). Hence, we propose

H3: Intra-team social ties are positively related to team innovativeness.

In case of inter-team social ties, the resulting interpersonal relations are found to play important roles as resource channels to enhance innovation (Perry-Smith and Shalley, 2003). Individuals with strong external ties are more likely to adapt to changing surroundings (Burt, 2009). Since external social ties are resource channels, social actors can access them through their interactions and enable an exchange and a combination of diverse resources to adapt the change (Kogut and Zander, 1992; Reagans *et al.*, 2004). Greater access of non-redundant information and knowledge resources through external communication can lead to innovation (Hülshager *et al.*, 2009; Suh *et al.*, 2011). Previous studies have echoed social ties are positively related to innovativeness through the knowledge management process (Argote *et al.*, 2003; Chen *et al.*, 2010). Hence, we propose

H4: Inter-team social ties are positively related to team innovativeness.

Team performance generally defined as “the extent

to which a team is able to meet established objectives” in terms of “predefined quality, schedule (time), and budget (cost) objectives” (Hogel *et al.*, 2004, p. 39). In case of intra-team, when teams have strong ties, these teams receive the benefit including greater accountability, greater agreement on expectations, and less tendency of opportunism and social loafing (Sparrowe *et al.*, 2001; Uzzi, 1996). Moreover, bonding networks can lead to greater mutual interdependence among members, greater cooperation, and thereby enhance team effectiveness (Kim and Lee, 2014; Molm, 1994). Thus, intra-team social ties are strong predictors of team performance. Hence, we propose

H5: Intra-team social ties are positively related to team performance.

Oh *et al.* (2004) hinted the positive relationship between social ties and performance based on the primary role of social ties as accessibility to various types of resources. Hansen (1999) noted that social ties enhance the information acquisition of an organization, which leads to better performance. Bridging role of social ties can bring heterogeneity from various boundaries, and boundary-spanning activities are critical factors of group effectiveness (Gruenfeld *et al.*, 2000). Teams with strong ties collaborate better and share more information to complete task successfully (Balkundi and Harrison, 2006). Thus, inter-team social

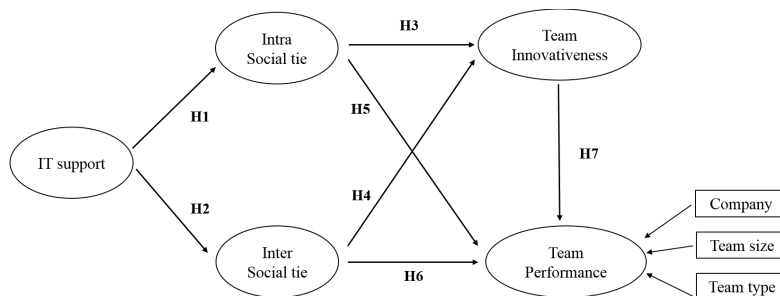
ties are strong predictors of team performance. Hence, we propose

H6: Inter-team social ties are positively related to team performance.

Firms with greater innovativeness are found to be more successful in harnessing the capacities to improve performance (Lloréns Montes *et al.*, 2004). In contemporary organizations, more teams are required to sustain innovation because innovation is essential to growth (Laursen and Salter, 2006). When teams have an ability to adapt the change, they can adjust their objective and role for meeting objective in regard of changing environment. Intangible assets including ideas can lead to tangible accomplishment of desired result in regard of established objective. Since creativity is a predictor of performance (Lee and Choi, 2003), teams with superior innovation capabilities and openness to innovation are more likely to adapt well to changing environments. We thus expect that the team innovativeness is more likely to produce better performance.

H7: Team innovativeness is positively related to team performance.

Overall, seven research hypotheses are suggested and the resulting research model is depicted as shown in <Figure 1>.



<Figure 1> Research Model

## IV. Research Method

Our research model with five team-level constructs requires a structure equation model analysis. Operational definitions for all constructs are presented in <Appendix A>. We use partial least squares (PLS), which is appropriate for exploratory research rather than the verification of existing theories (Gefen and Straub, 2005). All variables adopted are based on measurements from previous literatures and modified to fit the context of this study. All measurement items and related sources are presented in <Appendix B>. All variables are measured using a Likert seven-point scale (range from ‘strongly disagree’ to ‘strongly agree’).

Using a cross-sectional survey, we collected the data from six companies that have well-established team structures with assistance from their staffs. and Company profiles are diverse, including IT service, fine chemical, petrochemical manufacturer, govern-

ment agency, shipbuilding and construction. Teams in all six companies are known to form robust team-based social networks.

Within these six companies, the survey was distributed to 2,756 individuals working in 133 teams, and we received responses from a total of 1,646 employees in 131 teams during 3~4 weeks (59.7% of response rate). To produce team-level variables by aggregating individual responses, responses from a team with less than three responders were eliminated (Bagozzi *et al.*, 1998). We combined individual responses into team-level constructs while maintaining validity including inter-rater reliability (James *et al.*, 1984) and inter-class correlation coefficient (Shrout and Fleiss, 1979). After eliminating incomplete data and inappropriate data aggregating into team level, responses from 964 employees of 97 teams were used for further analysis. The demographic profiles of respondents and their teams are summarized in <Table 1>.

<Table 1> Demographic Profiles of the Teams

Characteristics		Frequency	Percentage
Individual (n = 964)			
Gender	Male	903	93.7%
	Female	61	6.3%
Age	20s	111	11.5%
	30s	362	37.6%
	40s	387	40.1%
	Over 50s	104	10.8%
Team (n = 97)			
Team type	Manufacturing	52	53.6%
	Non-manufacturing	45	46.4%
Team size	< 10 members	36	37.2%
	10~20 members	23	23.7%
	20~30 members	8	8.2%
	30+ members	30	30.9%
Number of teams in each company	IT service and solution	8	8.2%
	Fine chemical	18	18.6%
	Petro chemical	10	10.3%
	Guarantee funds (Government agency)	8	8.2%
	Shipbuilding & digital systems	17	17.5%
	Construction	36	37.2%

## V. Analysis Results

### 5.1 Measurement Model

We first checked the legitimacy of our samples for a team-level with an inter-rater agreement ( $r_{wg}$ ) and the inter-class correlation coefficient (ICC). All results exceeded the threshold of 0.7 for  $r_{wg}$  and 0.2 for ICC (1). Regarding construct reliability, we measured Cronbach's alpha, which indicates the extent to which constructs have internal consistency. <Table 2> shows the detailed result. The value for each construct is greater than 0.7, with the lowest being 0.921, suggesting sufficient reliability (Bagozzi *et al.*, 1998). The composite reliabilities are also greater than 0.7, which supports our analysis of Cronbach's alpha. The

factor loading of items for each construct is greater than 0.5, demonstrating the convergent validity of all constructs (Hair *et al.*, 2006). In <Table 3>, the square root of the average variance extracted (AVE) for each variable was significantly higher than its correlations with other variables. This result verifies that the discriminant validity is satisfactory (Fornell and Larcker, 1981).

In addition, we checked the possibility of multicollinearity, since some variables have high correlation according to correlation matrix. To check multicollinearity, variance inflation factor (VIF) and tolerance were calculated. The results showed that variance inflation factor is lower than 10 (2.20~3.42) and tolerance is greater than 0.1 (0.29~0.45) (Hair *et al.*, 2006); thus, the potential problem of multicollinearity can be unconcerned.

<Table 2> Internal Reliability and Convergent Validity

Construct	Measurement Item	Factor Loading	Cronbach's $\alpha$	Composite Reliability	Average Variance Extracted
IT Support	ITsup1	0.889	0.975	0.981	0.929
	ITsup2	0.866			
	ITsup3	0.886			
	ITsup4	0.880			
Intra-Social Tie	Intra1	0.783	0.942	0.963	0.896
	Intra2	0.773			
	Intra3	0.562			
Inter-Social Tie	Inter1	0.731	0.921	0.950	0.864
	Inter2	0.806			
	Inter3	0.787			
Team Innovativeness	Inno1	0.823	0.969	0.977	0.916
	Inno2	0.784			
	Inno3	0.689			
	Inno4	0.677			
Team Performance	Per1	0.812	0.968	0.977	0.913
	Per2	0.802			
	Per3	0.807			
	Per4	0.838			

<Table 3> Descriptive Statistics and Correlation Matrix

Construct	Mean	Standard Deviation	IT Support	Intra-Social Tie	Inter-Social Tie	Team Innovativeness	Team Performance
IT Support	5.048	0.705	0.964				
Intra-Social Tie	5.561	0.634	0.537	0.947			
Inter-Social Tie	5.126	0.675	0.609	0.756	0.930		
Team Innovative-ness	5.279	0.683	0.615	0.781	0.675	0.957	
Team Performance	5.524	0.668	0.597	0.713	0.595	0.787	0.956

Note: There are the square root of the average variance extracted (AVE) for each variable in diagonal.

As this study collected samples that were self-reported with individuals responding to surveys themselves, common method bias, which is generated by respondents' tendency to intentionally maintain consistency or to follow answers that are expected by social norms, might become problematic (Podsakoff *et al.*, 2003). To check for potential common method bias, we used Harman's single factor test as recommended by Podsakoff and Organ (1986). The principal factor explained 45.31% of the total variance, which is less than 50% of the threshold, indicating that common method bias is not of significant concern. We further checked this result by conducting the test recommended by (Liang *et al.*, 2007). Our analysis results show that all substantive factor loadings were significantly higher than method factor loadings (for further details, see <Appendix C>). The average of the substantively explained variance was 0.920, whereas the average of the method-based variance was only 0.014. Therefore, the potential problem from the common method variance is marginal.

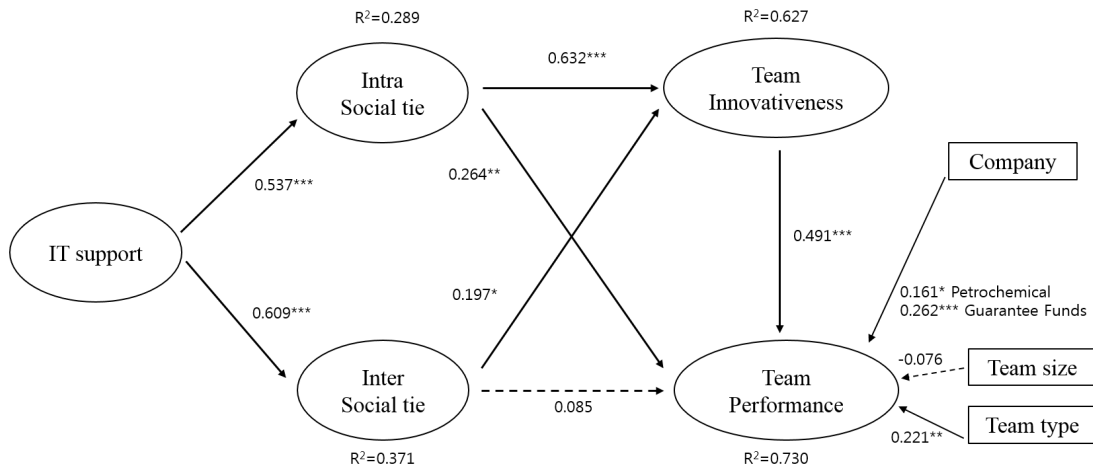
## 5.2 Structural Model

We analyzed the research model using a structural equation model. The relationships between IT support and both social ties are significant ( $\beta = 0.537$ ,  $t =$

7.569;  $\beta = 0.609$ ,  $t = 8.562$ ; intra-social tie and inter-social tie, respectively). The results indicate that IT support is a strong predictor of both intra- and inter-team social ties, supporting both hypotheses 1 and 2. The relationships between both social ties and innovativeness are all significant ( $\beta = 0.632$ ,  $t = 6.469$ ;  $\beta = 0.197$ ,  $t = 2.109$ ; intra-social tie and inter-social tie, respectively); thus, both intra-social ties and inter-social ties are positively related to team innovativeness, supporting hypotheses 3 and 4. Regarding the relationship between social ties and team performance, the effect of intra-social ties on team performance is significant ( $\beta = 0.264$ ,  $t = 2.932$ ), while the effect of inter-social ties on team performance is not significant ( $\beta = 0.085$ ,  $t = 0.778$ ). The results indicate that, although intra-social ties are strong antecedents of team performance, no significant relationship exists between inter-social ties and team performance. Thus, hypothesis 5 is supported while hypothesis 6 is not. Regarding the links between innovativeness and performance, the association between innovativeness and team performance is significant ( $\beta = 0.491$ ,  $t = 4.307$ ), indicating that innovativeness significantly enhances team performance. Hypothesis 7 is supported.

Our analysis also examined the control variables, which are company, team size, and team type, and investigated their effects on team performance. In case





\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001.

<Figure 2> Analysis Result

of company, guarantee funds and petrochemical firms exhibited significant effects on team performance, whereas others did not. The result shows that the effect of team size on performance is marginal ( $\beta = -0.076$ ,  $t = 0.839$ ), whereas the effect of team type is significant ( $\beta = 0.221$ ,  $t = 3.011$ ). <Figure 2> summarizes the result of our hypothesis testing.

## VI. Discussion

Our results show that IT support strengthens both intra- and inter-social ties. The effects of IT support on both ties are similar in magnitude, which indicates that IT support is important for both social ties in a team setting.

Our analysis also shows strong effects of both social ties on innovativeness. Intra-social ties lead to innovativeness more than inter-social ties. Drawn from the network-based theory, an intra-social tie is known to be efficient to retain internal assets. If inner ties are not adequately fluent with resources, the assessment of new assets from exterior linkages is necessary. Our finding implies that team members in intense ties are

more likely to work in pursuit of a shared goal, which results in an efficient channel that facilitates knowledge flow and creativity, thereby leading to team innovativeness.

Although strong intra-bonds among team members result in high performance, inter-linkages among teams are not directly associated with better performance. Inter-social ties do not seem to affect the extent to which a team meets its goals directly because different teams possess different goals. Each team has its specific task-related knowledge and the effect of inter ties is indirect through innovativeness.

## VII. Implication

### 7.1 Theoretical Implications

This study provides three implications for theory. First, our integrative perspective provides a firmer understanding of the nature of social ties. The categorization of the social capital of teams into two modes such as intra-team social ties from the bonding perspective and inter-team social ties from the bridging

perspective will be applicable for other team level studies.

Second, this study examines the direct effects of social ties on innovativeness and performance and shows the importance of the impact of social ties at the team level. Our result reveals a significant impact of intra-social ties on innovation and team performance. This result is critical in revealing the mechanism of inner linkages within teams and their effects on teams' outcomes.

Third, the role of information technology support is rekindled within the context of social ties. Our analysis contributes to the existing knowledge management literature by strengthening the perspective that simply improving the IT infrastructure is not enough to gain a competitive advantage (Lee and Choi, 2003). As a team utilizes its IT infrastructure, knowledge transfer can be more prevalent through developed pathways. With IT support, team members can communicate in an open and cooperative environment, resulting in enhanced bonds among them. For inter-ties, IT support enhances a team's capability to interact with others and creates a strong network structure.

## 7.2 Practical Implications

Several implications from our study provide useful insights in practice. Our findings demonstrate that both intra- and inter-social ties improve a team's innovativeness and performance. Furthermore, knowledge management practitioners should realize that forming strong relationships with other teams without the bond of inner members does not always result in the expected direct results. Without strong ties among team members, a team might not be productive regardless of the strength of the external linkages that it forms. A team's inner network should be prior to other networking initiatives. A simple and effective network might

provide better results than a vast but unidirectional network. Moreover, managers should also understand that a well-developed IT infrastructure can enrich intra- and inter-social ties that lead to better team performance. Since IT support can improve team members' internal and external social ties by providing communication channels and ground for collaborative work, managers enhance members' understanding of the role of IT and encourage their IT usage.

For example, *P Consulting*, a top-notch professional services firm in the audit, tax, and advisory industry, strived to enhance its social ties among team members with different practices. The firm realized that effectively serving large institutional clients could only be achieved through good teamwork. Therefore, the importance of social ties has not only been emphasized during the firm's hiring process but also throughout an employee's career.

Acknowledging that adding value to work comes from truly connecting its employees and clients under any circumstances, *P Consulting* internally developed a server-based file replication system using the front-end interface software. The company utilized a groupware to list all of the procedures and practices specifically used for each client and enabled its employees to upload all of the relevant work papers and files. Such an IT system not only enhanced the sharing of working knowledge within teams and different practices but also improved the overall social ties, especially in the audit field. When employees attempted to adopt a new methodology to enhance their job function or needed reference to new industry guidance, they could easily access the well-organized IT platform to acquire such knowledge or to obtain real-time feedback from their superiors. Such innovative IT tools and platforms increased work efficiency and effectiveness and helped the company secure its prestigious firm brand.

Another example could be found in the case of

*A Bank*. The bank merged with *M Investment* during the financial turmoil. When large legal entities merge, the need for social ties is stressed at every corporate level. Synergies could only be expected after simplification of the corporate structure. *A Bank* overcame such challenges with the presence of strong IT support. With the inter- and intra-social ties further strengthened by IT and database management, *A Bank* adopted a strategy to increase revenue by “cross-selling” everything from stocks to mutual funds, credit cards, and mortgages. Although cross selling has long been a touchy subject at banks and brokerage firms, such a strategy was found to strengthen their competitive advantage and can be lucrative if adopted properly.

## VIII. Further Studies and Conclusion

This study has some areas for future research. We gathered data from six companies. Although this study controlled two team-related variables such as team size and team type, the result would have exhibited different implications because each company might have distinct characteristics. Thus, a further analysis with data from more companies with industry categories ensures that these distinct characteristics can be generalized. In addition, future studies should delve into the different magnitudes of a team’s outcome, which are possibly influenced by both social ties. This extension elucidates more comprehensive team dynamics related to social ties.

On the basis of the bonding and bridging views, our study demonstrates that inter- and intra-social ties within teams play different roles. Strong inner linkages are found to be critical factors for team outcomes. Although external social ties are not directly associated with team performance, they harness performance in-

directly through team innovativeness. Importantly, information technology is found to be critical in fostering social ties in a team setting.

## References

- [1] Adler, P. S. and S.-W. Kwon, “Social capital: Prospects for a new concept”, *Academy of Management Review*, Vol.27, No.1, 2002, pp. 17-40.
- [2] Alavi, M. and D. E. Leidner, “Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues”, *MIS Quarterly*, Vol.25, No.1, 2001, pp. 107-136.
- [3] Argote, L., B. McEvily, and R. Reagans, “Managing knowledge in organizations: An integrative framework and review of emerging themes”, *Management Science*, Vol.49, No.4, 2003, pp. 571-582.
- [4] Argyres, N. S., “The impact of information technology on coordination: Evidence from the B-2 “Stealth” bomber”, *Organization Science*, Vol.10, No.2, 1999, pp. 162-180.
- [5] Bagozzi, R. P., Y. Yi, and K. D. Nassen, “Representation of measurement error in marketing variables: Review of approaches and extension to three-facet designs”, *Journal of Econometrics*, Vol.89, No.1, 1998, pp. 393-421.
- [6] Baker, W. E., “Market networks and corporate behavior”, *American Journal of Sociology*, 1990, pp. 589-625.
- [7] Balkundi, P. and D. A. Harrison, “Ties, leaders, and time in teams: Strong inference about network structure’s effects on team viability and performance”, *Academy of Management Journal*, Vol.49, No.1, 2006, pp. 49-68.
- [8] Batt, R., “Who benefits from teams? Comparing workers, supervisors, and managers”, *Industrial*

- Relations: A Journal of Economy and Society*, Vol.43, No.1, 2004, pp. 183-212.
- [9] Burke, C. S., K. C. Stagl, E. Salas, L. Pierce, and D. Kendall, "Understanding team adaptation: A conceptual analysis and model", *Journal of Applied Psychology*, Vol.91, No.6, 2006, pp. 1189-1207.
- [10] Burt, R. S., "Structural holes: The social structure of competition", Harvard University Press, 2009.
- [11] Calabrese, A. and M. Borchert, "Prospects for electronic democracy in the United states: Rethinking communication and social policy", *Media, Culture and Society*, Vol.18, No.2, 1996, pp. 249-268.
- [12] Chatman, J. A. and F. J. Flynn, "The influence of demographic heterogeneity on the emergence and consequences of cooperative norms in work teams", *Academy of Management Journal*, Vol.44, No.5, 2001, pp. 956-974.
- [13] Chen, C.-J., J.-W. Huang, and Y.-C. Hsiao, "Knowledge management and innovativeness: The role of organizational climate and structure", *International Journal of Manpower*, Vol.31, No.8, 2010, pp. 848-870.
- [14] Chen, M. H., "Understanding the benefits and detriments of conflict on team creativity process", *Creativity and Innovation Management*, Vol.15, No.1, 2006, pp. 105-116.
- [15] Choi, S. Y., H. Lee, and Y. Yoo, "The impact of information technology and transactive memory systems on knowledge sharing, application, and team performance: A field study", *MIS Quarterly*, Vol.34, No.4, 2010, pp. 855-870.
- [16] Chow, W. S. and L. S. Chan, "Social network, social trust and shared goals in organizational knowledge sharing", *Information & Management*, Vol.45, No.7, 2008, pp. 458-465.
- [17] Clemons, E. K., S. P. Reddi, and M. C. Row, "The impact of information technology on the organization of economic activity: The "move to the middle" hypothesis", *Journal of Management Information Systems*, Vol.10, No.2, 1993, pp. 9-35.
- [18] Coleman, J. S., "Social capital in the creation of human capital", *American Journal of Sociology*, Vol.94, 1988, pp. S95-S120.
- [19] Cross, R. and J. N. Cummings, "Tie and network correlates of individual performance in knowledge-intensive work", *Academy of Management Journal*, Vol.47, No.6, 2004, pp. 928-937.
- [20] Cummings, J. N., "Work groups, structural diversity, and knowledge sharing in a global organization", *Management Science*, Vol.50, No.3, 2004, pp. 352-364.
- [21] Dahlin, K. B., L. R. Weingart, and P. J. Hinds, "Team diversity and information use", *Academy of Management Journal*, Vol.48, No.6, 2005, pp. 1107-1123.
- [22] Damanpour, F. and W. M. Evan, "Organizational innovation and performance: The problem of "organizational lag"", *Administrative Science Quarterly*, Vol.29, No.3, 1984, pp. 392-409.
- [23] Edmondson, A., "Psychological safety and learning behavior in work teams", *Administrative Science Quarterly*, Vol.44, No.2, 1999, pp. 350-383.
- [24] Fernandez, R. M., E. J. Castilla, and P. Moore, "Social capital at work: Networks and employment at a phone center", *American Journal of Sociology*, Vol.105, No.5, 2000, pp. 1288-1356.
- [25] Fornell, C. and D. F. Larcker, "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol.18, No.1, 1981, pp. 39-50.
- [26] Gabbay, S. M. and E. W. Zuckerman, "Social capital and opportunity in corporate R&D: The contingent effect of contact density on mobility

- expectations”, *Social Science Research*, Vol.27, No.2, 1998, pp. 189-217.
- [27] Gefen, D. and D. Straub, “A practical guide to factorial validity using PLS-Graph: Tutorial and annotated example”, *Communications of the Association for Information Systems*, Vol.16, No.1, 2005, p. 5.
- [28] Gibson, C. B., M. J. Waller, M. A. Carpenter, and J. M. Conte, “Antecedents, consequences, and moderators of time perspective heterogeneity for knowledge management in MNO teams”, *Journal of Organizational Behavior*, Vol.28, No.8, 2007, pp. 1005-1034.
- [29] Gittel, R. and A. Vidal, *Community organizing: Building social capital as a development strategy*, Sage Publications, Thousand Oaks, CA, 1998.
- [30] Granovetter, M. S., “The strength of weak ties”, *American Journal of Sociology*, Vol.78, No.6, 1973, pp. 1360-1380.
- [31] Gruenfeld, D. H., P. V. Martorana, and E. T. Fan, “What do groups learn from their worldliest members? Direct and indirect influence in dynamic teams”, *Organizational Behavior and Human Decision Processes*, Vol.82, No.1, 2000, pp. 45-59.
- [32] Hahn, J., J. Y. Moon, and C. Zhang, “Emergence of new project teams from open source software developer networks: Impact of prior collaboration ties”, *Information Systems Research*, Vol.19, No.3, 2008, pp. 369-391.
- [33] Hair, J. F., W. C. Black, B. J. Babin, R. E. Anderson, and R. L. Tatham, *Multivariate data analysis* (Vol. 6), Pearson Prentice Hall Upper Saddle River, NJ, 2006.
- [34] Hansen, M. T. and B. Von Oetinger, “Introducing T-shaped managers. Knowledge management’s next generation”, *Harvard Business Review*, Vol.79, No.3, 2001, pp. 106-116.
- [35] Henttonen, K., J.-E. Johanson, and M. Janhonen, “Work-team bonding and bridging social networks, team identity and performance effectiveness”, *Personnel Review*, Vol.43, No.3, 2014, pp. 330-349.
- [36] Hoegl, M., K. Weinkauff, and H. G. Gemuenden, “Inter-team coordination, project commitment, and teamwork in multiteam R&D projects: A longitudinal study”, *Organization Science*, Vol.15, No.1, 2004, pp. 38-55.
- [37] Hülsheger, U. R., N. Anderson, and J. F. Salgado, “Team-level predictors of innovation at work: A comprehensive meta-analysis spanning three decades of research”, *Journal of Applied Psychology*, Vol.94, No.5, 2009, pp. 1128-1145.
- [38] Inglehart, Ronald F., *Trust, Well-Being and Democracy*, In: Mark E. Warren (ed.), *Democracy and Trust*. Cambridge, UK: Cambridge University Press, 1999, pp. 88-120.
- [39] James, L. R., R. G. Demaree, and G. Wolf, “Estimating within-group interrater reliability with and without response bias”, *Journal of Applied Psychology*, Vol.69, No.1, 1984, pp. 85-98.
- [40] Kim, H. Y. and J. H. Lee, “The influence of on-line social networking on performance of members in information system development projects”, *Information Systems Review*, Vol.16, No.1, 2014, pp. 17-35.
- [41] Kogut, B. and U. Zander, “Knowledge of the firm, combinative capabilities, and the replication of technology”, *Organization Science*, Vol.3, No.3, 1992, pp. 383-397.
- [42] Koriat, N. and R. Gelbard, “Knowledge sharing motivation among IT personnel: Integrated model and implications of employment contracts”, *International Journal of Information Management*, Vol.34, No.5, 2014, pp. 577-591.

- [43] Krackhardt, D., "The strength of strong ties: The importance of philos in organizations", In N. Nohria and B. Eccles (Eds.), *Networks and Organizations: Structure, Form, and Action* (pp. 216-239). Boston, MA: Harvard Business School Press, 1992.
- [44] Kuegler, M., S. Smolnik, and G. Kane, "What's in IT for employees? Understanding the relationship between use and performance in enterprise social software", *The Journal of Strategic Information Systems*, Vol.24, No.2, 2015, pp. 90-112.
- [45] Laursen, K. and A. Salter, "Open for innovation: The role of openness in explaining innovation performance among UK manufacturing firms", *Strategic Management Journal*, Vol.27, No.2, 2006, pp. 131-150.
- [46] Lazarsfeld, P. F. and R. K. Merton, "Friendship as a social process: A substantive and methodological analysis", *Freedom and Control in Modern Society*, Vol.18, No.1, 1954, pp. 18-66.
- [47] Lee, H. and B. Choi, "Knowledge management enablers, processes, and organizational performance: An integrative view and empirical examination", *Journal of Management Information Systems*, Vol.20, No.1, 2003, pp. 179-228.
- [48] Levina, N. and E. Vaast, "Turning a community into a market: A practice perspective on information technology use in boundary spanning", *Journal of Management Information Systems*, Vol.22, No.4, 2006, pp. 13-37.
- [49] Liang, H., N. Saraf, Q. Hu, and Y. Xue, "Assimilation of enterprise systems: The effect of institutional pressures and the mediating role of top management", *MIS Quarterly*, Vol.31, No.1, 2007, pp. 59-87.
- [50] Lin, N., "Building a network theory of social capital", *Connections*, Vol.22, No.1, 1999, pp. 28-51.
- [51] Lin, N., "A network theory of social capital", In: Castiglione dario, van Deth J.W., Wolleb G., editors, *The Handbook of Social Capital*, London: Oxford University Press, 2008, pp. 50-69.
- [52] Lin, N., K. S. Cook, and R. S. Burt, *Social capital: Theory and research*, Aldine De Gruyter, New York, 2001.
- [53] Lloréns Montes, F. J., A. Ruiz Moreno, and L. Miguel Molina Fernández, "Assessing the organizational climate and contractual relationship for perceptions of support for innovation", *International Journal of Manpower*, Vol.25, No.2, 2004, pp. 167-180.
- [54] Lovelace, K., D. L. Shapiro, and L. R. Weingart, "Maximizing cross-functional new product teams' innovativeness and constraint adherence: A conflict communications perspective", *Academy of Management Journal*, Vol.44, No.4, 2001, pp. 779-793.
- [55] Molm, L. D., "Dependence and risk: Transforming the structure of social exchange", *Social Psychology Quarterly*, Vol.57, No.3, 1994, pp. 163-189.
- [56] Nahapiet, J. and S. Ghoshal, "Social capital, intellectual capital, and the organizational advantage", *Academy of Management Review*, Vol.23, No.2, 1998, pp. 242-266.
- [57] Oh, H., M.-H. Chung, and G. Labianca, "Group social capital and group effectiveness: The role of informal socializing ties", *Academy of Management Journal*, Vol.47, No.6, 2004, pp. 860-875.
- [58] Pearce, C. L. and M. D. Ensley, "A reciprocal and longitudinal investigation of the innovation process: The central role of shared vision in product and process innovation teams (PPITs)", *Journal of Organizational Behavior*, Vol.25, No.2, 2004, pp. 259-278.
- [59] Perry-Smith, J. E. and C. E. Shalley, "The social

- side of creativity: A static and dynamic social network perspective”, *Academy of Management Review*, Vol.28, No.1, 2003, pp. 89-106.
- [60] Podsakoff, P. M. and D. W. Organ, “Self-reports in organizational research: Problems and prospects”, *Journal of Management*, Vol.12, No.4, 1986, pp. 531-544.
- [61] Podsakoff, P. M., S. B. MacKenzie, J.-Y. Lee, and N. P. Podsakoff, “Common method biases in behavioral research: A critical review of the literature and recommended remedies”, *Journal of Applied Psychology*, Vol.88, No.5, 2003, pp. 879-903.
- [62] Portes, A., “Social capital: Its origins and applications in modern sociology”, *LESSER, Eric L. Knowledge and Social Capital*, Boston: Butterworth-Heinemann, 2000, pp. 43-67.
- [63] Presbitero, A., B. Roxas, and D. Chadee, “Effects of intra-and inter-team dynamics on organisational learning: Role of knowledge-sharing capability”, *Knowledge Management Research & Practice*, 2015.
- [64] Putnam, R. D., “The prosperous community”, *The American Prospect*, Vol.4, No.13, 1993, pp. 35-42.
- [65] Putnam, R. D., “Bowling alone: America’s declining social capital”, *Journal of Democracy*, Vol.6, No.1, 1995, pp. 65-78.
- [66] Putnam, R. D., *Bowling alone: The collapse and revival of American community*, Simon and Schuster, 2001.
- [67] Reagans, R., E. Zuckerman, and B. McEvily, “How to make the team: Social networks vs. demography as criteria for designing effective teams”, *Administrative Science Quarterly*, Vol.49, No.1, 2004, pp. 101-133.
- [68] Reed, K. K., M. Lubatkin, and N. Srinivasan, “Proposing and testing an intellectual capital based view of the firm”, *Journal of Management Studies*, Vol.43, No.4, 2006, pp. 867-893.
- [69] Sarker, S., M. Ahuja, S. Sarker, and S. Kirkeby, “The role of communication and trust in global virtual teams: A social network perspective”, *Journal of Management Information Systems*, Vol.28, No.1, 2011, pp. 273-310.
- [70] Shalley, C. E. and L. L. Gilson, “What leaders need to know: A review of social and contextual factors that can foster or hinder creativity”, *The Leadership Quarterly*, Vol.15, No.1, 2004, pp. 33-53.
- [71] Shrout, P. E. and J. L. Fleiss, “Intraclass correlations: Uses in assessing rater reliability”, *Psychological Bulletin*, Vol.86, No.2, 1979, pp. 420-428.
- [72] Somech, A., “The effects of leadership style and team process on performance and innovation in functionally heterogeneous teams”, *Journal of Management*, Vol.32, No.1, 2006, pp. 132-157.
- [73] Son, J.-E., Y.-J. Jang, S.-H. Lee, and H.-W. Kim, “A systems thinking approach to the enhancement of social capital: In case of social media users”, *Information Systems Review*, Vol.15, No.2, 2013, pp. 21-40.
- [74] Sparrowe, R. T., R. C. Liden, S. J. Wayne, and M. L. Kraimer, “Social networks and the performance of individuals and groups”, *Academy of Management Journal*, Vol.44, No.2, 2001, pp. 316-325.
- [75] Suh, A., K.-S. Shin, M. Ahuja, and M. S. Kim, “The influence of virtuality on social networks within and across work groups: A multilevel approach”, *Journal of Management Information Systems*, Vol.28, No.1, 2011, pp. 351-386.
- [76] Thompson, L. and J. Nadler, “Negotiating via information technology: Theory and application”, *Journal of Social Issues*, Vol.58, No.1, 2002,

- pp. 109-124.
- [77] Tichy, N. M., M. L. Tushman, and C. Fombrun, "Social network analysis for organizations", *Academy of Management Review*, Vol.4, No.4, 1979, pp. 507-519.
- [78] Tsai, W. and S. Ghoshal, "Social capital and value creation: The role of intrafirm networks", *Academy of Management Journal*, Vol.41, No.4, 1998, pp. 464-476.
- [79] Uzzi, B., "The sources and consequences of embeddedness for the economic performance of organizations: The network effect", *American Sociological Review*, Vol.61, No.4, 1996, pp. 674-698.
- [80] Wang, C. L. and P. K. Ahmed, "The development and validation of the organizational innovative-  
ness construct using confirmatory factor analysis", *European Journal of Innovation Management*, Vol.7, No.4, 2004, pp. 303-313.
- [81] Yoo, Y., Jr, R. J. Boland, and K. Lyytinen, "From organization design to organization designing", *Organization Science*, Vol.17, No.2, 2006, pp. 215-229.
- [82] Adler, P. S., "Market, hierarchy, and trust: The knowledge economy and the future of capitalism", *Organization Science*, Vol.12, No.2, 2001, pp. 215-234.
- [83] Patulny, R. V. and G. L. H. Svendsen, "Exploring the social capital grid: Bonding, bridging, qualitative, quantitative", *International Journal of Sociology and Social Policy*, Vol.27, No.1/2, 2007, pp. 32-51.



## 〈Appendix A〉 Operational Definitions

Variables	Operational definition	Source
Intra-Social tie	The degree of contact and accessibility of between our team members	Chow and Chan (2008)
Inter-Social tie	The degree of contact and accessibility of our team members with other team members	Chow and Chan (2008)
IT Support	The degree of IT support for collative work, (or communication, for searching and accessing, for simulation and prediction, and for systematic storing)	Lee and Choi (2003)
Team Innovativeness	The degree of team's adaptability to change	Lovelace <i>et al.</i> (2001)
Team Performance	The degree of team's task performance in relation to all schedule, budget, and quality objectives	Hoegl <i>et al.</i> (2004)

## 〈Appendix B〉 Questionnaire Items

Construct	Items	Questionnaires	Source
Intra-Social Tie	Intra1	In general, our team members have a very good relationship with my team members.	Chow and Chan (2008)
	Intra2	In general, our team members am very close to my team members.	
	Intra3	Our team members hold lengthy discussions with my team members.	
Inter-Social Tie	Inter1	In general, our team has a very good relationship with other teams.	Chow and Chan (2008)
	Inter2	In general, our team is very close to other teams.	
	Inter3	Our team holds lengthy discussions with other teams.	
IT Support	ITsup1	Our team is provided with IT support for collaborative work regardless of time and place.	Lee and Choi (2003)
	ITsup2	Our team is provided with IT support for communicating among team members.	
	ITsup3	Our team is provided with IT support for searching and accessing necessary information.	
	ITsup4	Our team is provided with IT support for systematic storing.	
Team Innovativeness	Inno1	Our team continues to develop new products and services.	Lovelace <i>et al.</i> (2001), Wang and Ahmed (2004)
	Inno2	Our team collects information about new markets, products, and technologies.	
	Inno3	Our team develops capabilities to improve the current business model.	
	Inno4	Our team develops technology to create new business opportunities.	
Team Performance	Per1	On the basis of the current status, this team can be regarded as successful.	Hoegl <i>et al.</i> (2004)
	Per2	To date, all team goals have been achieved.	
	Per3	The team's output to date is of high quality.	
	Per4	The team is satisfied with its performance to this point.	

〈Appendix C〉 Common Method Bias Test

Variables	Measurement Items	Substantive Factor Loading (R1)	R1 <sup>2</sup>	Method Factor Loading (R <sup>2</sup> )	R2 <sup>2</sup>
IT Support	ITSup1	1.008 <sup>***</sup>	1.016	-0.062	0.004
	ITSup2	0.901 <sup>***</sup>	0.812	0.091	0.008
	ITSup3	0.973 <sup>***</sup>	0.947	-0.010	0.000
	ITSup4	0.977 <sup>***</sup>	0.955	-0.021	0.000
Intra-Social tie	Intra1	0.967 <sup>***</sup>	0.935	-0.008	0.000
	Intra1	1.026 <sup>***</sup>	1.053	-0.064	0.004
	Intra3	0.843 <sup>***</sup>	0.712	0.075	0.006
Inter-Social tie	Inter1	0.938 <sup>***</sup>	0.880	0.003	0.000
	Inter2	1.030 <sup>***</sup>	1.069	-0.080	0.006
	Inter3	0.815 <sup>***</sup>	0.664	0.081	0.007
Team Innovativeness	Inno1	1.183 <sup>***</sup>	1.399	-0.268	0.072
	Inno2	1.112 <sup>***</sup>	1.237	-0.174 <sup>**</sup>	0.030
	Inno3	0.789 <sup>***</sup>	0.623	0.196 <sup>**</sup>	0.038
	Inno4	0.764 <sup>***</sup>	0.584	0.225 <sup>***</sup>	0.051
Team Performance	Per1	0.945 <sup>***</sup>	0.893	0.022	0.000
	Per2	0.866 <sup>***</sup>	0.750	0.122 <sup>*</sup>	0.015
	Per3	0.966 <sup>***</sup>	0.933	-0.028	0.001
	Per4	1.051 <sup>***</sup>	1.105	-0.123 <sup>*</sup>	0.015
Average		0.953	0.920	-0.001	0.014

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001.

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## The Impact of Intra-Team and Inter-Team Social Ties on Team Innovativeness and Performance: On the Basis of IT Support

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### Abstract

Social ties play an important role in today's competitive world. The primary objective of this study is to explore the impact of intra- and inter-social ties on team innovativeness and performance. Through an empirical model of 97 teams in six companies, this study attempts to (i) examine how intra- and inter-social ties affect team innovativeness and team performance; and (ii) investigate how the support for information technology facilitates social ties. Our team-based analysis reveals that strong intra-bonds among members improve team innovativeness and enhance team performance. Inter-linkages among teams also lead to team performance through innovativeness, but they are not directly associated with performance. IT support also considerably enhances social ties.

**Keywords:** *Social Tie, Team Innovativeness, Team Performance, Information Technology Support*

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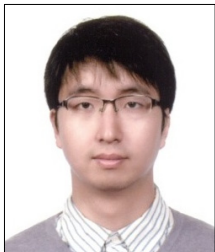
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