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College of Management and Economics



The Impact of Social Network Centrality on Managers' Performance: A Holistic View

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Outline

- The Impact of Social Network Centrality on Managers' Performance: A Holistic View

- [1] Introduction
- [2] Theoretical background
- [3] Model development
- [4] Methodology
- [5] Results
- [6] Discussion and conclusion



1. Introduction

1.1 Background : Mixed managerial structure

- **Functional managers**

High-tech companies should *make flexible functional management* and develop proactive strategies to cope with the turbulence (Abbasi and Altmann 2011).

- **Technical managers**

High-tech companies need to *make technical innovations routinely* to keep in pace with customers' needs so that they can survive in the market.





1. Introduction

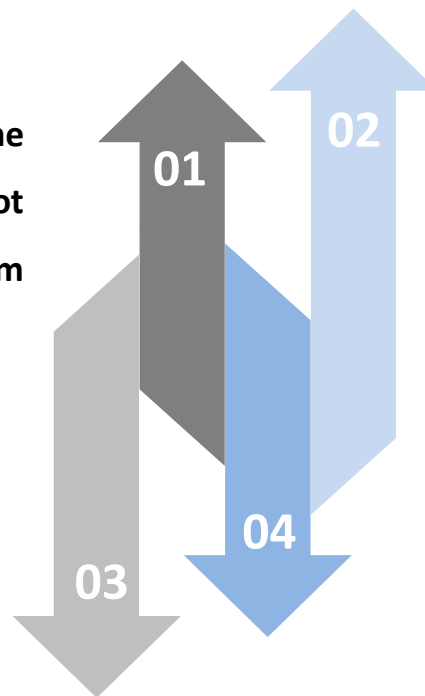
1.2 Research gap

Research subject

Previous studies mainly focused on the employees' performance or they did not specifically discriminate **managers** from **general employee**.

Social network theory

Various researches based on SNT try to study individual performance, manager performance has not been fully explained.



Managers V.S general employees

Managers' work——complicated, need to plan, organize, lead and control

General employees' work——single and simple job

Inconsistent findings

There are inconsistent findings about C-P relationship, that is **positive, negative and no influence**.

Moderating effects: the C-P relationship may be moderated by different contextual factors.

● The main starting point of this research

Sparrowe, R. T., Liden, R. C., Wayne, S. J., & Kraimer, M. L. (2001). Social networks and the performance of individuals and groups. *Academy of Management Journal*, 44(2), 316-325.

employees' positions in a network representing the flow of work was indirectly related to job performance via job characteristics. Thus, one purpose of the current study was to replicate and extend previous research on the relationship between an individual's network position within a work group and his or her job performance by examining the role of informal network position in actual work settings.

Among the fundamental explanatory tenets of the social network perspective is the idea that the structure of social interactions enhances or constrains access to valued resources (Brass, 1984; Ibarra, 1993). Resources exchanged through informal networks include work-related resources, such as task advice and strategic information, but informal networks also transmit social identity (norms) and social support (Podolny & Baron, 1997). We focus on the exchange of task advice and information, because these resources are likely to be positively related to job performance, and on hindrance relations, because of their potentially negative effects on job performance.

The results of this study offer support for the hypothesized relationships between social network centrality and individual performance. Individuals who were central in their work groups' advice networks had higher levels of in-role and extra-role performance than did individuals who were not central players in such a network. Individuals who were central in a hindrance network had lower levels of both in-role and extra-role performance. These results are important because they demonstrate that group members who are

● Inconsistent findings

- network centrality is positively related to individual performance

Roberson & Block, 2001; Garraway, 2005; Tulenko , 2011; Goldman, 2015

- network centrality is negatively related to individual performance

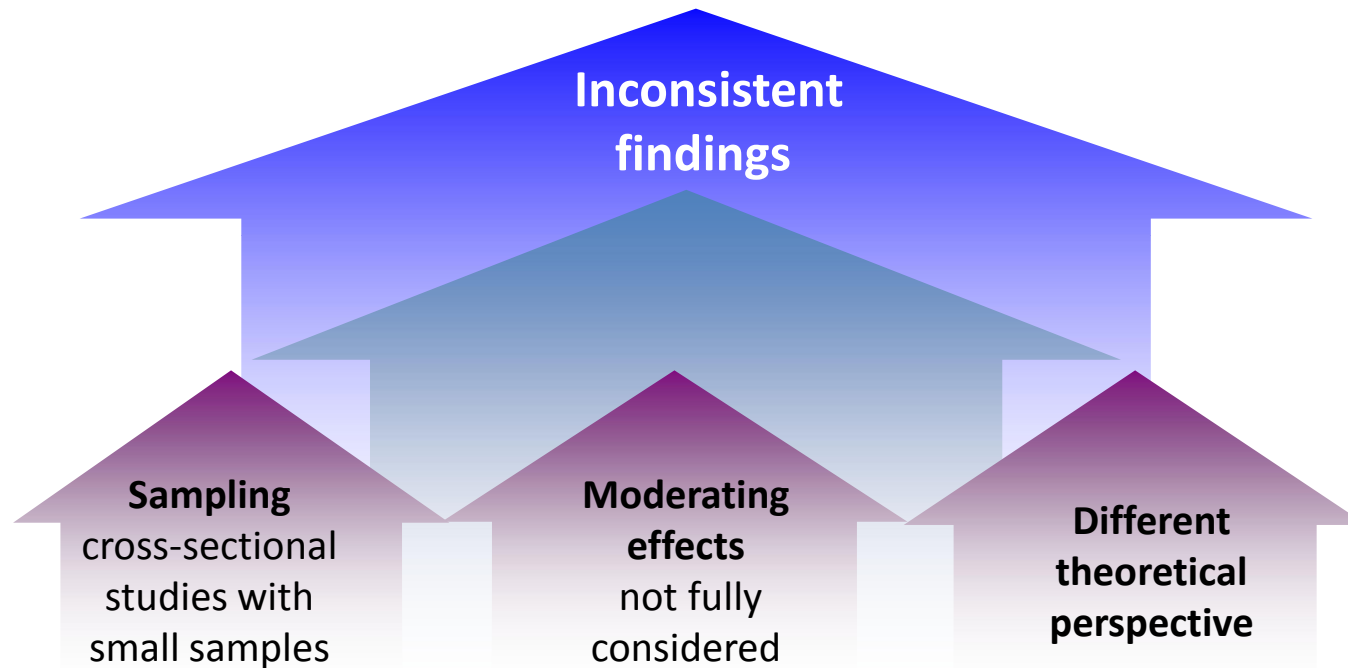
Dodds & Watts 2003; Eppler & Mengis, 2005; Ferriani & Cattani 2009

- double-edge sword

Diefendorff et al. 2002

● Possible reasons for inconsistent findings

Our research objective aims to explore network centrality and managers' performance by considering the moderating role of job function and social network





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1. Introduction

1.4 Research questions

RQ 1 Main effect

What are the influences of network centrality in email and IM network on managers' performance?

RQ 2 Two-way effect

What effect does the overlap between email and IM networks have on managers' job performance?

RQ 3 Three-way effect

Whether the moderating role of network overlap is contingent upon managers' job function?



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2. Theoretical background

2.1 Managers' job performance

- Internal factors

- ✓ characteristics and capabilities (Mumford et al., 2000)
- ✓ self-confidence (Hollenbeck and Hall, 2004)
- ✓ interpersonal effectiveness, willingness to handle difficult situations, teamwork and personal adjustment, adaptability, and leadership and development (Conway, 2000)

- External factors

- ✓ environmental influences (Connelly et al., 2000)
- ✓ social network benefits (Lu et al., 2015)



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3. Model development

3.2 Hypothesis 1 – one way main effect (degree centrality)

- In the email network, they have *more access to the detailed information* about current work condition and next step work assignment, which can help them better manage the whole group work process.
- In the IM network, it can be *more convenient and timelier* for them to receive timely and supplement resources and integrate these resources to finish their own work (McFadyen & Cannella, 2004).



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3. Model development

3.3 Hypothesis 2 – one way main effect (betweenness centrality)

- Betweenness centrality is defined as which can ‘capture the extent to which a relationship manager is node, providing both information access and influence or power (Brass, 1984).
- Individuals have to spend a lot of time and effort to maintain the structural holes position (Gilsing et al., 2008).
- Managers with structural holes mean that they play the role of information hub (Shi et al., 2009).
- Too much communication will distract managers’ attention and reduce their work efficiency, resulting in lower performance.



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3. Model development

3.4 Hypothesis 3 – two way interaction effect (network overlap)

- Network overlap refers to the strength of the binary relationship between actors is enhanced through a variety of connections (Van, Christophe & Stefan Wuyts, 2007).
- Network overlap enhances the *mutual trust* between members and facilitates *information sharing and collaboration* (Palmatier, Lisa, & Jan-Benedict, 2007).
- Network overlap enables email and IM supplement for each other, strengthening the *richness of communications* between members in the network.
- Greater network overlap also burdens managers with the role of information hub.



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3. Model development

3.5 Hypothesis 4 –three way interaction effect (job function)

- Technical manager
 - ✓ Need for technology-related information, which is widely used in different organizational environments with low timeliness.
 - ✓ Explicit information is suitable to be transmitted through email.
- Functional manager
 - ✓ Need for management-related information, which is difficult to be coded, and only applicable to specific environments with high timeliness
 - ✓ Implicit information is suitable to be transmitted through instant messaging.



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4. Methodology

4.1 Data

- The annual work performance data were collected from annual work evaluation reports of managers at the end of each year(2015, 2016, 2017).
- For each manager, we obtained her/his 5-level work performance score.
- Our data set only included managers who have work performance scores and participate HI and email activities in one year.
- We finally got 4617 observations of 2301 managers, including 2912 observations of functional managers and 1705 observations of technical managers.



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4. Methodology

4.2 Measurement

- Degree centrality: the number of direct ties in the social network without accounting for the tie's strength (Freeman, 1979) .
- Betweenness centrality: $BC_i = 2(\sum_j^n \sum_{k>j}^n (g_{jk}(i)/g_{jk}))/ (n^2 - 3n + 2)$
 g_{jk} is shortest paths between nodes j and k , and $g_{jk}(i)$ is the number of shortest paths between j and k passing through manager i (Abbasi & Altmann, 2011).
- Network overlap: the number of concurrent ties a manager has in his or her email and IM networks (Gonzalez et al. 2014).
- Job function: binary variable (0: technical manager , 1:functional manager)



4. Methodology

4.3 Model estimation - a panel ordered logit model

- Ordered logit models are used to estimate relationships between an ordinal dependent variable and a set of independent variables.
- The panel ordered logit model is as follows:

$$y_{it}^* = X_{it}\beta + c_i + e_{it}, t = 1, \dots, T,$$

$$e_{it}|X_i, c_i \sim \text{Normal}(0,1), t = 1, \dots, T$$

y_{it}^* is an unobservable variable that indicates the performance of employees

X_{it} is a matrix of explanatory variables

vector β are the coefficients we attempt to estimate,

e_{it} is a random error term for each observation

c_i is Chamberlain-Mundlak device which expresses the unobserved effects



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6. Discussion and conclusion

6.1 Findings – one way effect

- Betweenness centrality in email and IM networks both threat managers' performance.
 - ✓ It is time and effort consuming to maintain the structural position (Ronald S. Burt, 2002).
 - ✓ Managers should be encouraged to decrease roles of information hub and build cultures of information exchange among employees (Cross et al., 2013; Hauschild et al., 2001).



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6. Discussion and conclusion

6.1 Findings – one way effect

- Degree centrality in email and IM networks both benefit managers' performance.
- In email network, degree centrality has weaker influence on functional managers than on technical managers, while it has stronger influence on functional managers than on technical managers in IM network.



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6. Discussion and conclusion

6.1 Findings – two way interaction effect

- For network overlap effect, we found that network overlap only enhances the positive relationship between degree centrality in two networks and managers' performance.
 - ✓ Overlapped ties more relationally motivate information sharing and fully cooperation, so that the positive effect of degree centrality on managers performance is improved.



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6. Discussion and conclusion

6.1 Findings – three way interaction effect

- The moderating effect of network overlap is not consistent for two types of managers.
- For technical managers, the strengthen effect of network overlap on the positive relationship between degree centrality in email network and managers' performance is greater, compared with functional managers.



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6. Discussion and conclusion

6.2 Theoretical contribution

- First, we advance social network as a theoretical lens to identify the drivers and threats of managers performance, focused on the underlying mechanisms of information and control dis/advantages from email and IM social networks.
- Second, our results support the premise of network synergy (network overlap), demonstrating that social capital from multiply informal networks combined to enhance or weaken managers' performance.
- Third, with the consideration of job function and social media, we suggested a unified understanding about the interaction effect of network centrality, network overlap and job function on managers' performance.



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THANKS

