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The Effect of External and Internal Social Capital of IS project team on Project Success: Multilevel Approach

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Abstract

Knowledge sharing (KS) and organizational citizenship behavior (OCB) among project team members are crucial for project success. The IS project team is a temporary organization and has to produce outcomes in a limited time. We investigate how internal and external social capital (SoC) influence KS and OCB within a team and how OCB and KS affect project success. We also analyze the relationships between the three SoC dimensions through multi-level approach. A statistical testing has not been complete. We will explore both HLM6 and MPLUS for multiple structural equation modeling and introduce a comparative analysis of each set of results. We expect the results of the research can provide project managers with insights on how to encourage project team members to share their knowledge and build teamwork more efficiently.

Keywords

Project success, OCB, knowledge sharing, social capital, multilevel

1. Introduction

As organizations increasingly rely on information systems (IS) for strategic and operational reasons, the role of IS has become essential in the business environmental. Despite the importance of IS, IS project teams have experienced cost and time overrun. The dissatisfaction with the performance of IS projects is widespread (The_Standish_Group 2009). Differencing from construction or engineering projects, IS projects produce intangible outcomes and are knowledge-intensive work requiring diverse expertise such as business knowledge, processes, emerging IT techniques or skills (Pee et al. 2010). Prior research has suggested positive relationships between KS and project performance (van den Hooff et al. 2004; Yu et al. 2010). However, encouraging KS is still problematic as professionals are reluctant to share their knowledge and expertise. Social, culture, and technical attributes of organizational settings, which can encourage knowledge transfer, have been one of the major research topics since the introduction of knowledge management in an organization (Alavi et al. 2001). However, few studies have examined the social antecedents of knowledge sharing in the context of IS project success.

KS is equated with knowledge transferring (e.g. Huber 1991). Knowledge transferring is defined as communication of knowledge and transmission of knowledge (Ko et al. 2005). KS depends on the attributes of the sender, receiver, and channel (Pee et al. 2010) such as sender's expertise (Joshi et al. 2007), receiver's absorptive capacity (Ko et al. 2005), and channel's richness (Lind et al. 1991). Prior research on the three elements showed mixed results (e.g. Joshi & Sarker 2007; Ko, et al. 2005). Previous research also shows the effects of intrinsic motivations (Ko et al. 2005;

Wasko et al. 2005) and social relationships (Ko et al. 2005) on knowledge transmission. Individual expertise cannot transform to a group's or an organizational knowledge without socialization (Bock et al. 2005). Arduous relationship is negatively related to communication and interaction, while interaction is positively affected by mutual trust and shared understanding (Ko et al. 2005). Factors such as trust, shared understanding and socializing are part of the informal structure of an organization and are often described as the dimensions of social capital (SoC). The concept of "SoC" has been examined as an increasingly essential factor of group formations (Huysman et al. 2004; Oh et al. 2004; Reagans et al. 2004). Research studies have noted that high levels of SoC are related to group cohesiveness, eventually supporting collective behavior (Adler et al. 2002; Yli-Renko et al. 2001). SoC highlights the informal relationships between team members and their willingness to share knowledge based on relationships with others rather than on formal organizational structure. Using SoC lens, this study sheds light on the underlying process affecting individual and group KS, and subsequently team performance.

While KS is affected by intrinsic motivation (Ko et al. 2005; Wasko et al. 2005), extrinsic motivation failed to show significant impact on knowledge transfer (Ko et al. 2005). Team members are intrinsically motivated when their satisfaction lies in the content of the activity itself (e.g., enjoying helping) (Ko et al. 2005; Wasko et al. 2005). In this study we use OCB as a manifestation of a team member's innate behavior.

Several researchers studied the antecedents of KS in IS project context (Joshi et al. 2007; Ko et al. 2005; Pee et al. 2010). These studies focused on the relationship between IT and business professionals (Joshi et al. 2007; Pee et al. 2010). These relationships are contractual in nature (Joshi et al. 2007; Pee et al. 2010). However, IS projects involve various stakeholders such as business analysts, system designers, hardware designers, programmers, and IT consultants. IS projects also require substantial teamwork and collaboration among team members, which often depend on social relations. Therefore, while prior research dealt with contractual associations, this research extends social relationship boundaries to include formal and informal connections.

SoC has been studied at various levels from individual to country (Zaheer et al. 2010). Aggregating SoC of individuals may affect higher level's performance such as a team's performance (Oh et al. 2006). The combination of SoC at different levels may affect individual behavior or higher level's performance (Yu et al. 2010). However, few SoC related studies have conducted multi-level analysis. Our goal is to understand the effect of SoC on KS and OCB among team members, and relationships between sharing knowledge, OCB, and project success. We explore the relationships among the three dimensions of SoC empirically using multi-level analysis. Thus, we extend social capital theory by examining the facilitation of KS in the organization through informal interaction and citizenship behavior at individual and group levels.

2. Theoretical foundation

2.1 Social capital theory

SoC is defined as the set of social resources embedded in the network of relationships and composed of three dimensions underlying internal and external ties (Nahapiet and Ghoshal 1998): Structural dimension refers to information channels that connect individuals and units. Relational dimension refers to resources embedded in relationships, such as trust and reciprocity, between members. Cognitive dimension is defined as the shared meaning and understanding that develops among members of the network. Several types of relationships exist within a project

group and intergroup. According to typology of conduits for group SoC (Oh et al. 2006), We classify the relationships as depicted in Figure 1.

	Intragroup relationships	Intergroup relationships
Vertical differentiation	<ul style="list-style-type: none"> ▪Team Leader – Team member 	<ul style="list-style-type: none"> ▪Team leader in other teams – Team members
Horizontal differentiation	<ul style="list-style-type: none"> ▪Team member– Team member 	<ul style="list-style-type: none"> ▪Team leader– Team leader in other teams ▪Team member – Team member in other teams

Figure 1: Social relationship in a project

At the beginning of a project, team members may not know each other. As time passes, they become familiar with other members. They might share the project’s context and task-related knowledge using common language. Additionally, they can trust their team members or other teams through internal and external interaction.

2.2 Organizational citizenship behavior

The term “organizational citizenship behavior” (OCB) was proposed by Bateman and Organ (1983) and was denoted organizationally beneficial behavior and gestures, which cannot be enforced on the basis of formal role obligations (Bateman et al. 1983). Graham (1991) separates citizen behavior into in-role job and extra-role job performance. For example, when a system designer participates in additional un-required upkeep activities, behavior can be considered as citizenship behavior. OCB is conceptually a broader concept which includes all positive behavior of organizational members (Graham 1991; Van Dyne et al. 1994).

2.3 Level of analysis

SoC assumes social relationships or networks among individuals. The levels of network analysis are classified as dyad, ego, and entire (Zaheer et al. 2010). The dyadic level refers to a dyadic tie, which focuses on the nature of the relationship between two linked actors. Ego level studies have concentrated on the position of an ego as a focal actor, and the effects of the ego’s connections such as actor’s performance or carrier success. Recent studies at the network level have examined the effects of whole network characteristics of the entire network or individual firms (Zaheer et al. 2010).

In organizational research, the level of measurement and level of analysis (Rousseau 1985) exists. The level of measurement means the unit to which the data are directly assigned and the latter means the unit to which the data are assigned for hypothesis testing and analysis (Rousseau 1985). According to this explanation, the levels of analysis of SoC studies vary from individual to society and might include multi- or mixed-level (Ali-Hassan et al. 2010) (see Table 1). A typology of mixed-level models include composition, cross-level, and multi-level (Rousseau 1985). Composition models specify the relationships among nondependent variables at different levels. Cross-level models specify the causal relationships among independent and dependent variables at different levels. The third, multi-level model, identifies relationships among

variables applying at two or more levels. Studies using multi-level approach are relatively new although the need for examining mixed-level organizational phenomena has been recognized¹.

Level of analysis	Levels of network analysis	
	Dyad	Ego
Individual	(Hatzakis et al., 2005; Moran, 2005; Seibert et al., 2001; Sherif et al., 2006)	(Ali-Hassan et al., 2010; Seibert et al., 2001; Sherif et al., 2006; Yang et al., 2007)
Group or Team	(Hatzakis et al., 2005; Newell et al., 2004; Tsai et al., 1998)	(Balkundi et al., 2006; Chang et al., 2008; Kang et al., 2009; Newell et al., 2004; Robert et al., 2008; Wang et al., 2006)
Organization	(Chou et al., 2006; Tiwana, 2008)	(Honig et al., 2006; Hsieh et al., 2007; Ingram et al., 2000; Lin et al., 2006; Nahapiet et al., 1998)
Multi or Cross level	(Arling and Subramani 2005; Patnayakuni et al. 2006; Ali-Hassan, et al. 2010)	(Yu et al., 2010)

Table 1: Two types of level of analysis

In this research, the levels of network analysis are dyad and ego since the study is structural and relational dimensions of SoC. The multi-level model is used in terms of the level of analysis. The constructs, which are three dimensions of SoC, are at the individual level. Organizational citizenship behavior is also at the individual level in the causal relationship between internal SoC and organizational citizenship behavior within a team. Conversely, the relationship between external SoC and organizational citizenship behavior is cross-level as external SoC is at the team level and OCB at the individual level. The relationship between perceived and real project success is also cross-level (i.e., individual versus team). Thus, the proposed research model is mixed-level.

3. Research Model and hypotheses

Figure 2 depicts the proposed research model, while Table 2 lists the relevant hypotheses.

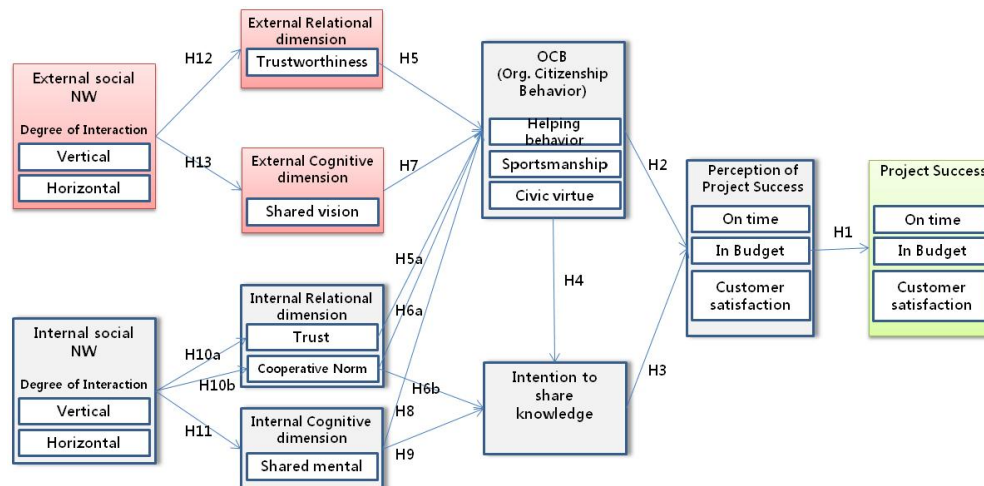


Figure 2: Research Model

¹ <http://aisel.aisnet.org/amcis2010/22/>

	Hypothesis	level
H1	The perception of project success has a positive effect on the project success	Cross level
H2	OCB of a team member has a positive effect on the perception of project success	Individual level
H3	The intention to share knowledge has a positive effect on the perception of project success	Individual level
H4	The OCB of a team member is positively associated with the member's intention to share knowledge within the same team	Individual level
H5	H5: The level of a project team's perceived trustworthiness is positively associated with the OCB of a team member	Cross level
	H5a: The extent to which a project team member trusts other members is positively associated with the member's OCB	Individual level
H6	H6a: The extent to which a project team member believes that other members share cooperative norm is positively associated with the member's OCB	individual level
	H6b: The extent to which a project team member believes that other members share cooperative norm is positively associated with the member's intention to share knowledge	
H7	The extent to which a project team shares a vision with other teams is positively associated with the OCB of the team member	cross level
H8	The extent to which a project team member shares a mental model with his team members is positively associated with the member's OCB	Individual level

Table 2: Hypotheses

H9	The extent to which a project team member shares a mental model with his team members is positively associated with the member's intention to share knowledge within the team	Individual level
H10	H10a: The degree of interaction with other members within the same team is positively associated with the extent to which the member trusts other members within the same team	Individual level
	H10b: The degree of interaction with other members within the same team is positively associated with the extent to which a project team member believes that other members share cooperative norm	
H11	The degree of interaction with other members within the same team is positively associated with the extent to which the member shares mental model with other members within the same team	Individual level
H12	The degree of interaction with other teams is positively associated with the level of the project team's perceived trustworthiness	Team level
H13	The degree of interaction with other teams is positively associated with the extent to which the project team shares a vision with other teams	Team level

Table 2: Hypotheses (continue)

4. Proposed methodology

4.1 Measurement

Each construct will be measured using and adapting existing instruments as depicted in table 3. A pilot test for the instrument will be performed on a representative sample of the target population using conditions similar to those anticipated during actual data collection. Due to the research context, members of IS project teams will be targeted as the respondents.

4.2 Analysis

We will adopt a multilevel modeling technique, which has several advantages compared to single-level analysis: (1) the research model can be specified at its correct hierarchical levels, (2) the variability in an outcome can be estimated better, and (3) the analysis can provide flexibility of the model's range (Heck et al. 2009). We will use the Hierarchical Linear Modeling (HLM6) or MPLUS to conduct multiple structural equation model approach. Due to the novelty of multi-dimension analysis in MIS research, we will explore both tools and introduce a comparative analysis for each set of results.

Construct	Measurement	Level
External social network (Degree of interaction)	Adopted ego-centric approach (Hansen, et al. 2005; Yu, et al. 2010)	Team
Internal social network (Degree of interaction)	Adopted ego-centric approach (Hansen, et al. 2005; Yu, et al. 2010)	Individual
Trustworthiness	The degree centrality of the inter-team trusting networks (Tsai & Ghoshal 1998)	Team
Shared vision	The level of shared vision in the different teams (Tsai & Ghoshal 1998)	Team
Trust	The level of trusting other members in the same team (Jarvenpaa, et al. 2004)	Individual
Cooperative Norm	Individuals' willingness to value diversity, the openness to critical thought, and teamwork spirits (Kankanhalli, et al. 2005)	Individual
Shared mental	Rated each attribute of the mental model in team process and expertise and measured mental model centrality and convergence (Mathieu, et al. 2000)	Individual
OCB	A second order construct with three dimensions which are helping behavior, sportsmanship, and civic virtue (Yen, et al. 2008)	Individual
Intention to share knowledge	Individuals' willingness to share knowledge (Bock, et al. 2005)	Individual
Perception of project success	Individuals' perception of the project's status against team's targeted schedule, man-hour and customer satisfaction	Individual
Project success	Measured in terms of "on time", "within man-hours", and customer satisfaction based on formal documents (e.g. closure reports or survey of user's satisfaction)	Team

Table 3: Operationalization of construct

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