

Gatekeepers and knowledge sharing in inter-organizational project networks

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Abstract

Sharing knowledge among multiple organizations is key to addressing adaptation challenges and unforeseen issues involved in the delivery of inter-firm projects. While much research has focused on governance and institutional factors within these projects, less attention has been paid to individual boundary spanners, who act as gatekeepers for the transfer of knowledge to other organizations. We draw on self-determination theory to examine how the mode of governance (shared versus lead) and motivational climate (mastery and performance) affects psychological needs satisfaction, and ultimately, boundary spanners' knowledge sharing motivation.

Keywords: Knowledge sharing, Project management, Self-determination theory

Introduction

Projects increasingly involve the integration of a network of multiple organizations, purposefully brought together to deliver a pre-defined set of objectives (Sydow and Braun, 2018). Inter-organizational (and intra-project) knowledge sharing and problem-solving is key to addressing the unforeseen issues and adaptation challenges which inevitably arise during this execution process (Davies et al., 2009; Eriksson et al., 2017). For instance, innovative contractual and relational agreements during Heathrow Terminal 5 project enabled greater knowledge sharing among suppliers than was typical of such projects, in turn facilitating higher levels of problem-solving (Davies et al., 2009).

While sharing knowledge may help accomplishing goals and solving joint problems (Siemsen et al., 2009; Zhang et al., 2019), it has proven to be slow, costly and uncertain (Kogut, 2000). It is slow because the transfer of knowledge (particularly tacit knowledge, e.g. know-how) between organizations occurs through individuals (Becerra et al., 2008), and often requires significant individuals' effort and motivation (Chen et al., 2016; Siemsen et al., 2008). Moreover, inter-organizational knowledge sharing is costly and uncertain due to the likelihood of knowledge spill-over to partners that may use the spill-over for their own interest (Devarakonda and Reuer, 2018).

Previous research has highlighted a range of structural, relational and contractual mechanisms designed to motivate project members to participate and openly share knowledge (Pemsel & Müller, 2012; Siemsen, Roth, Balasubramanian, & Anand, 2009; Siemsen, Roth, & Balasubramanian, 2008; Wei & Miraglia, 2017). Limited attention however has been paid to the role of individuals within each partner organization who act as gatekeepers governing the transfer of knowledge from home organizations to the project environment (Tushman and Katz, 1980). The boundary spanning role of these gatekeepers is however central to the transfer of knowledge, particularly decisions on when and what should be shared with other organizations (Jarvenpaa and Majchrzak, 2016). Utilizing self-determination theory (Ryan and Deci, 2000), we explore how project governance and motivational climate in organizational project networks influences boundary spanners' psychological needs satisfaction and knowledge sharing motivation.

Self-Determination Theory

Self-determination theory (SDT) is a theory of human motivation concerned with how individuals interact with the social environment and engage in a behavior (Deci et al., 2017; Ryan and Deci, 2000). According to the theory, engagement in behavior can vary with respect to self-determination, i.e. the extent to which individuals internalize the value of behavior.

SDT argues that the social context can facilitate value internalization through satisfaction of three basic psychological needs i.e. autonomy, competence, and relatedness (Deci et al., 1994; Weibel, 2007). Scholars have found that satisfying individuals' psychological needs results in internalization of values and engagement in activities that the organization values (Gagné and Deci, 2005). In the context of inter-organizational project networks, it is expected that psychological needs satisfaction enhances individuals' tendency to internalize the collective goals of the project as well as regulatory processes that are ambient in the environment (cf. Gagné & Deci, 2005). Consequently, they will be more likely to engage in knowledge sharing behaviors to solve joint problems. In other words, when boundary spanners' feel competent, autonomous, and related to others with whom they have opportunities to share knowledge, they will value the advantages of knowledge sharing and persist in their behavior (Gagné, 2009). Therefore, we hypothesise that:

Hypothesis 1. Higher levels of psychological needs satisfaction lead to higher intention to share knowledge within inter-organizational project networks.

Modes of Governance

The form of project governance reflects the structure of authority and collaboration, and can be categorized along two dimensions (Provan and Kenis, 2008): shared and lead. Shared governance refers to the extent to which a network is brokered, for example, where all participating organizations interact with each other to govern the network. Lead governance relates to a network governed by a key party, either an internal participant or external organizations. In this study, we examine externally governed networks, where a unique network administrative organization (NAO) is responsible for management of joint activities in the project.

We draw on SDT to argue that the mode of governance in networks influences psychological needs satisfaction through two mechanisms. First, boundary spanners tend to have varying levels of involvement in the coordination of joint activities and execution of control systems depending on the mode of governance in an inter-organizational network (Provan et al., 2015). Within a shared governance, boundary spanners are

mutually responsible for the development of plan and management of project activities. Whereas, there is often less involvement (if any) of boundary spanners in control and coordination of lead governed networks (Provan and Kenis, 2008). Weibel (2007) argues that the need for autonomy is more satisfied when individuals have an active role in the development and execution of control systems.

Second, we argue that the mode of governance may influence satisfaction of psychological needs through the structure of interaction and links between boundary spanners. Within shared governed networks, boundary spanners interact through regular meetings to jointly manage and monitor shared activities in project. In comparison, lead governed networks involve less interaction among boundary spanners. The structure of interaction in lead governed networks is centralized with few one to one interaction among boundary spanners (Provan and Kenis, 2008). Therefore, it is expected that individuals in lead (versus shared) governed networks feel less connected and related to other network members. This may dampen boundary spanners' feeling of relatedness. Overall, we expect that boundary spanners show higher satisfaction of psychological needs in shared versus lead governed networks because they have higher sense of autonomy and relatedness. Therefore, we hypothesize that:

Hypothesis 2a. Shared versus lead modes of governance within an inter-organizational project network enhances individual psychological needs satisfaction.

Motivational Climate

Motivational climate is defined as individuals' perception of contextual information in projects and how performance is evaluated (Caniëls et al., 2019). Extant research has identified two types of motivational climate: mastery and performance. In a mastery climate, the focus is on learning and evaluation of performance is based on an individuals' effort and development. In contrast, performance climates focus on achieving optimal outcomes, and criteria for success are based on demonstrating superiority to others (Černe et al., 2014).

In a mastery climate, individuals perceive an emphasis on learning and mastery of skills (Černe et al., 2014). Mastery climate value individuals' development and learning, which encourage people to set challenging but self-assigned targets (Barron and Harackiewicz, 2001; Nerstad et al., 2013). In such climate, people may be more in control of how to engage in a behavior and hence, feel more autonomous (Harackiewicz and Elliot, 1993). Moreover, within mastery climate, demonstrating effort and learning is seen as a key success criterion. Individuals are encouraged to try (and perhaps experiment with) alternative approaches to find new solutions (Černe et al., 2014). This is likely to increase the feeling of self-efficacy and confidence in performing a behavior, which enhances competence need satisfaction. Therefore, overall, we hypothesize:

Hypothesis 2b. Mastery climate within an inter-organizational project network enhances individual psychological needs satisfaction.

A performance climate, by contrast, values normative outcomes and superiority to others in problem-solving (Miron-Spektor and Beenen, 2015). Social-comparison is used as the basis of performance evaluation (Černe et al., 2014; Nerstad et al., 2013). In such a climate, people perceive external pressure from the environment to perform better than others (Černe et al., 2014; Nerstad et al., 2013). This in turn, dampens their sense of autonomy in engagement of behavior and reduces autonomy need satisfaction. Additionally, projects with a performance climate rewards behavior only when it leads to

optimal results and/or conforms to normative outcomes. Thus, performance climate may decrease people’s confidence for engagement in behavior and reduce sense of competence in project. Therefore, overall, we hypothesize:

Hypothesis 2c. Performance climate within an inter-organizational project network reduces individual psychological needs satisfaction.

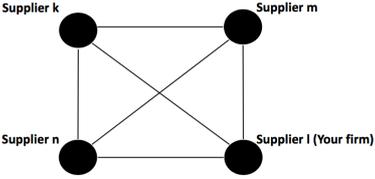
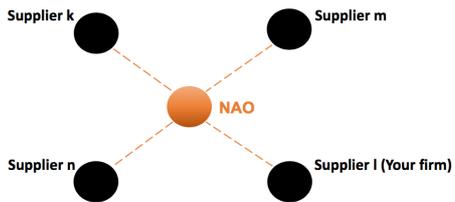
Methodology

To test our hypotheses, we used a behavioral scenario-based experiment which allowed us to use situational descriptions to assess knowledge sharing motivation (cf. Chen, Zhao, Lewis, & Squire, 2016). We examined the effect of the mode of governance (shared governance versus lead governance) and motivational climate (no climate, mastery climate, performance climate) on knowledge sharing motivation. Each participant received one version of the scenario, resulting in 2 * 3 between-subject factorial design. The scenario was built on a real-life case of an inter-organizational project network in the UK. All participants received identical introductory section of the scenario about their role, and context of the project.

We built on the conceptual definition of network governance (Phelps et al., 2012; Provan and Kenis, 2008) and existing manipulation of network characteristics (Brands et al., 2015; Brands and Mehra, 2019) to carefully manipulate two levels of the form of governance (shared governance and lead governance). In both conditions, we also use a schematic illustration of the respective network, i.e. nodes (i.e. suppliers and NAO) and lines (representing interaction between nodes for management of the network) (cf. Brands et al., 2015) to manipulate the structure of the authority. Appendix A provides an overview of the scenario. In addition, we adapted an existing manipulation of motivational climate in the literature (Černe et al., 2014) to manipulate mastery and performance climate in the scenario. In the control group, no information was provided about the project’s motivational climate. Table 1 provides an overview of the scenario. After reading the scenario, participants were asked to respond to series of questions about the dependent and control variables, as well as manipulation and realism checks.

Table 1 Scenario for Experiment

<p>Your role and company You are a senior project manager at a UK-based energy equipment supplier, which provides mechanical, electrical, heating, cooling and ventilation systems for construction projects. You are an expert in managing the delivery of energy equipment and have deep knowledge of your firm’s resources and capabilities, including manuals, methodologies, know-where, and know-how.</p> <p>A new power station in the UK Your firm is responsible for the supply and installation of mechanical systems (e.g. piping and plumbing) for a new power station in the UK. You are your firm’s representative in this project. The client is a large energy company and performing well in this project could lead to successful bidding for their future energy projects.</p>	
<p><i>[MASTERY CLIMATE]</i> The project has a climate that encourages cooperation and exchange of thoughts and ideas among project members. Each individual plays a very important role in this project. Cooperation and mutual exchange of knowledge is desired and commended. Individuals are encouraged to work together to try finding new solution methods and learn something throughout the project.</p>	<p><i>[PERFORMANCE CLIMATE]</i> The project has a climate that encourages competitive rivalry among project members to attain the best possible results. Individuals’ work accomplishments are based on comparisons with the accomplishments of others in the project. Therefore, individuals are encouraged to try as hard as they can and perform better than others.</p>

<p>The supplier network</p> <p>The supplier network for energy equipment on this project comprises of four suppliers, including your firm. The other suppliers – who also are your firm’s competitors in the broader energy equipment industry – have been contracted by the client to supply and install the remaining systems (namely, electrical, heating, ventilation and cooking systems). Each supplier (including your firm) is responsible for delivering their own tasks on-time, on budget and at high quality. Many of the tasks are however interdependent with those of the other suppliers.</p>	
<p><i>[SHARED GOVERNANCE]</i></p> <p>All suppliers of energy equipment are mutually responsible for coordinating resources, monitoring behaviors, and ensuring project goals are met. As your firm’s representative, you interact with senior members of the other suppliers to mutually manage and oversee activities in the project. Figure 1 (below) illustrates interactions among suppliers to manage the project.</p> <p>Figure 1</p>  <p>* Lines show interaction between the suppliers to mutually manage and oversee activities in the project</p>	<p><i>[LEAD GOVERNANCE]</i></p> <p>An external network administration organization (NAO) has been assigned by the client to manage suppliers’ joint activities the project. The NAO is responsible for coordinating suppliers’ resources, monitoring their behaviors, and ensuring project goals are met. As your firm’s representative, you interact with the NAO who centrally manages and oversees activities in the project. Figure 1 (below) illustrates interactions between suppliers and the NAO that manage the project.</p> <p>Figure 1</p>  <p>* Lines show interaction between the suppliers and the NAO that centrally manages and oversees activities in the project</p>
<p>The problem</p> <p>You have become aware that one of the suppliers is experiencing a quality-related issue during the installation of heating systems in the power station. It appears that the issue could result in delays to other suppliers’ tasks (including yours).</p> <p>As a senior project manager, you have expertise and knowledge about this issue. This is an opportunity to share knowledge with the supplier network, which may solve the problem and prevent delays in project. At the same time, such knowledge is of great competitive value to your company and hence sharing it with other suppliers may affect your firm’s competitiveness when bidding for future projects.</p> <p>You must now make a decision on how much knowledge you are willing to share with other suppliers in the project.</p>	

Sample and measurements

We recruited 277 professionals through the Prolific online platform (prolific.ac) (DuHadway et al., 2018). Participants were required to a) currently live in the UK; b) be full- and part-time employees; c) be self-employed/partner and/or hold middle and upper management positions. Table 2 provides a summary of the sample demographics.

Table 2 Demographic Data of Experiment Participants

	Mean (SD)	Percentage
Gender		Female (54.69%); Male (44.92%)
Age	40.80 (10.28)	
Work Experience	17.33 (10.35)	

N = 256

We used existing multi-item measurements in the literature to assess participants responses to our dependent and control variables. All our questions were measured on a 1-7 Likert scale.

Knowledge sharing motivation. To assess knowledge sharing motivation, we adopted established measures from past research (Chen et al., 2016; Siemsen et al., 2008). After reading the scenario, participants responded on a 7-point scale (1 = “strongly disagree”; 7 = “strongly agree”) to the following statements: “I have no intention to share this knowledge”; “I am motivated to share what I know”; “I really want to share this knowledge”; “I mean to share this knowledge”; “I have no intention to share this knowledge”.

Psychological needs satisfaction (PSN). Psychological needs satisfaction was assessed using an existing multi-item measurement in the literature (Chiniara and Bentein, 2016). Participants indicated on a 7-point scale how satisfied they were (1= “extremely dissatisfied”; 7 “extremely satisfied”) about “the opportunities to take personal initiatives in the project”, “the level of autonomy I have in the project”, “the opportunities to exercise my own judgment and my own actions”, and “the degree of freedom I have to do my job the way I think it can be done best” (i.e. autonomy needs); “the feeling of being competent at achieving the project goals”, “the level of mastery I can achieve in my know-how and skills”, “the level of confidence about my ability to achieve the project goals properly”, and “the sense that I can accomplish the most difficult tasks” (i.e. competence needs); “the positive social interactions I have in the project with other members”, “the feeling of being part of a group in the project”, “the close working relationship I have with other members”, and “the opportunities to talk with others about things that really matter to me” (i.e. relatedness needs). Extant studies have indicated high correlations among the measure of autonomy, competence, and relatedness need components (Deci et al., 2017). Therefore, consistent with past research (Campbell et al., 2015; Hagger et al., 2006), we created a second-order factor of psychological needs satisfaction that averages responses to autonomy, competence, and relatedness components.

Analyses

To test hypotheses 2a-c, we used ANCOVA and planned contrasts (cf. Ellinger et al., 2019). We contrast coded our experimental variables and pre-set the baseline condition as 0. For the form of governance, we set the lead condition as the baseline (shared governance =1), and the control condition as the baseline in motivational climate. Table 3 provides a summary of the results. Hypotheses 2a predicted that shared mode of governance leads to higher satisfaction of psychological needs compared to the lead mode. The ANCOVA results showed a significant main effect ($F(1, 256) = 10.91, p < .001$). Planned contrasts using estimated marginal mean (EMM) confirmed our Hypothesis 2a, revealing significant higher psychological needs satisfaction in shared versus lead modes of governance ($t = 0.41, p < .001, Cohen's d = 0.43$).

In addition, we hypothesized that mastery climate enhances (i.e. Hypothesis 2b) and performance climate dampens (i.e. Hypothesis 2c) psychological needs satisfaction. The

results of ANCOVA indicated a significant effect of motivational climate on the needs satisfaction ($F(2, 256) = 6.63, p < .01$). Subsequently, the results of a post-hoc planned contrast confirmed Hypothesis 2b, i.e. mastery climate facilitates individuals' satisfaction of psychological needs ($t = 0.40, p < .05, Cohen's d = 0.41$). However, we could not find significance differences between people in performance climate and control conditions – i.e. Hypothesis 2c ($t = 0.14, n.s., Cohen's d = 0.14$).

Table 3 ANCOVA Test Results

DV = psychological needs satisfaction			
Variable	df	Sum Square	F value
(Intercept)	1	1413.48	1501.99
Mastery orientation	1	10.93	11.59 ***
Performance orientation	1	3.31	11.61*
Motivational climates	2	6.63	3.52 **
Modes of governance	1	10.91	11.59 ***
Residuals	250	235.27	

N = 256 observations

*** $p < 0.05$, ** $p < 0.01$, * $p < 0.1$.

Moreover, we utilized ordinary least squared (OLS) regression to test Hypothesis 1 (Table 4). We controlled for the effect of our control variables (i.e. work experience, mastery and performance orientations). Consistent with our hypothesis (i.e. Hypothesis 1), we found a significant effect of psychological needs satisfaction on individuals' knowledge sharing motivation.

Table 4 Regression Test Results

Variable	DV = knowledge sharing motivation	
	Estimate	SE
Work experience	0.13	(0.077)
Education	0.16**	(0.078)
Mastery orientation	-0.01	(0.080)
Performance orientation	-0.24***	(0.080)
Psychological needs satisfaction	0.29***	(0.080)
(Intercept)	4.48***	(0.077)
R2	0.11	
Adjusted R2	0.09	
F	5.993*** (df = 5, 250)	

N = 256 observations

*** $p < 0.05$, ** $p < 0.01$, * $p < 0.1$.

Indirect mediation effects

To examine the indirect effect of modes of governance and motivational climate on knowledge sharing motivation, we utilized Hayes PROCESS Macro (Hayes, 2013). PROCESS runs a series of regression models and uses bootstrapping to calculate the path coefficients and SEs to determine the strength and statistical significance of the indirect effect through a mediator (Hayes, 2013). To produce accurate confidence intervals, we

used 5,000 bootstrapping. Using this method, results are significant if the 95% bias-corrected confidence intervals for the effects do not include zero (Hayes 2013). Bias-corrected bootstrap results based on 5,000 resamples indicate that the indirect effect of the mode of governance on knowledge sharing through psychological needs satisfaction is positive and significant (*path coefficient* = 0.0941; 95% *CI* = [0.0271, 0.1801]). Moreover, we tested the indirect effect of motivational climate on knowledge sharing and found positive and significant impact of mastery climate (*path coefficient* = 0.0988; 95% *CI* = [0.0140, 0.2089]) and non-significant effect of performance climate on knowledge sharing motivation (*path coefficient* = 0.0211; 95% *CI* = [-0.0701, 0.1092]).

Discussion

Our findings contribute to the literature and practice in several ways. First, we contribute to extant research in inter-organizational project networks by studying how knowledge sharing outcomes can be influenced. Past studies have mainly focused on the effect of project- and network-level factors on innovation (Davies et al., 2009, 2016), learning (Eriksson et al., 2017), and overall performance of projects (Brinkhoff et al., 2015; Oliveira and Lumineau, 2017). Taking a micro view, we show how the governance and motivational climate in projects can influence the transfer of knowledge from organizations to project environment. This has implications for the design of projects' mode of governance. For instance, while past studies claim the use of lead versus shared modes of governance enhance efficiency of network coordination (Provan et al., 2015), the findings of our research show that such governance may hamper knowledge sharing motivation. Project stakeholders may take this into account when making tradeoffs between costs and benefits of different modes of governance.

Moreover, we showed that mastery climate facilitates knowledge sharing motivation through satisfying boundary spanners' innate needs. Previous studies have shown the role of psychological safety and tolerance for failure climate on knowledge sharing and innovation in projects (Hutchison-Krupat and Chao, 2014; Siemsen et al., 2009). Our study extends the findings of this research by highlighting the important role of mastery climate in motivating boundary spanners' knowledge sharing. However, contrary to our expectations, we did not find a significant effect of performance climate on psychological needs satisfaction and knowledge sharing.

Second, our study contributes to the extant inter-organizational research by focusing on the effect of macro factors on boundary spanners' knowledge sharing (Jarvenpaa and Majchrzak, 2016; Salvato et al., 2017). Past studies have discussed contractual and relational antecedents of knowledge sharing but paid limited attention to the role of boundary spanners (e.g. Devarakonda & Reuer, 2018; Muthusamy & White, 2005; Paulraj, Lado, & Chen, 2008). Utilizing SDT, we argue that the effect of such factors on boundary spanners' knowledge sharing motivation is, at least, partly mediated through psychological needs satisfaction.

Third, we contribute to extant SDT studies by showing the importance of psychological needs satisfaction in influencing individuals' behavior in an inter-organizational context. SDT has been used extensively by management scholars to examine the effect of various organizational concepts (e.g. leadership, justice) on employees' behavior through psychological needs satisfaction (Chiniara and Bentein, 2016; Olafsen et al., 2015; Rosen et al., 2014). More recently scholars have shown the importance of the theory at the inter-organizational level (Robson, Schlegelmilch, & Bojkowszky, 2012; Roehrich, Hoejmoose, & Overland, 2017). Our findings offer insights into how SDT can shed lights on micro-foundations of compliance and commitment to inter-organizational regulations and practices.

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