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Knowledge sharing in information systems development projects: Explicating the role of dependence and trust

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Abstract

This study provides empirical evidence for the role of dependence and trust in knowledge sharing in information systems projects. As critical antecedents of dependence and trust among team members, four constructs are included in the study—environmental complexity, domain expertise, similarity of project value, and communication frequency. Partial least square analyses are conducted, using data collected from 135 project teams in two large IT firms. The results confirm that dependence and trust maintain a strong impact on knowledge sharing, leading to good team project performance. This study uses a cross-sectional survey as a research method. Longer term exploration seems necessary to further explore how trust and dependence are actually formed among team members. Findings indicate that team members share their knowledge when they trust their partners and when they feel dependent. Feelings of dependence and trust are influenced by the communication frequency, perceived similarity of the project's value, and the perceived expertise. Project managers need to pay attention to these variables in order to increase the level of knowledge sharing among team members especially in information systems development projects where primary tasks are critically knowledge-intensive.

Keywords: Systems development; Knowledge sharing; Knowledge management; Dependence; Trust; Project management; IT services; Information systems

1. Introduction

As organizations encounter the need to develop information systems (IS) for novel business applications and new problem domains, the need for knowledge sharing in IS development projects is increasingly emphasized in practice (Tiwana and McLean, 2005). IS development is comprised of different knowledge-intensive activities that require different types of knowledge (Xia and Lee, 2004). IS projects often use a combination of complex technologies that pose a high knowledge burden and that are difficult for project members to grasp. In many cases, the ability of project members to learn and use technology-related knowledge as well as domain knowledge effectively is critical for successful IS implementation.

Knowledge sharing is the most valuable activity. It is valuable because knowledge sharing encourages project participants to maintain social capital (Chiu et al., 2006; Kotlarsky and Oshri, 2005; Nelson and Cooprider, 1996; Tiwana and McLean, 2005; Yang and Farn, 2009), sustain high performance in IS projects (Hsu et al., 2012; Patnayakuni et al., 2007; Pee et al., 2010), become more innovative (Lind and Zmud, 1991) and become more creative (Tiwana and McLean, 2005). Thus, the sharing of knowledge in an IS project has become a requirement for the completion of a successful IS project.

A stream of knowledge sharing research in project management has recently focused on how to transfer and share knowledge within a project (Pee et al., 2010). Each project has internal sources of knowledge such as project

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members, project deliverables, and a project form of ecology. To maximize the use of internal knowledge, the knowledge must be shared among individuals or teams (Chang et al., 2013). Effective knowledge sharing can result in accelerating the relationship between the business clients and the IS consultants that are involved in the IS project. The time spent on problem solving can be reduced significantly because the project participants' benefit from the shared and accumulated knowledge.

According to the theory of relationship maintenance, trust and dependence between parties are central factors that motivate each party to participate or engage in successful and mutually beneficial exchange relationships (Hewett and Bearden, 2001). Knowledge sharing based on exchange relationships is fundamental to foster collaboration between members and to achieve the goals of an IS implementation (Xu and Ma, 2008). Thus, trust and dependence play a central role in building and maintaining the relationship between the participants of an IS project and in promoting knowledge-sharing activities. While both dependence and trust are important drivers of relational behaviors, the evidence is that dependence and trust must partner in the processes involved in IS projects. A successful implementation of an IS project often requires extensive customization to configure the methodology to the specific client and their marketplace (Pan et al., 2007). IS system customization involves critical decision-making activities (Vandaie, 2008). Users should be willing to trust the customization vendor because the user determines the utility that they expect from the IS system and they depend upon the vendor's knowledge of the IS system (Sarker et al., 2005).

The objective of this study is to better understand the behavioral mechanism that encourages project partners to share knowledge in IS development projects. IS projects demand creative efforts that involve in-depth exchange of expertise and insights among partners, and partners need frequent communications with each other, dealing with complex project management issues. In this regard, following two research questions are formulated for this study.

(1) *What are the critical antecedents for building trust and dependence in IS development projects that may lead to knowledge sharing and team performance?*
(2) *What are the roles of trust and dependence in this behavioral mechanism?*

Thus, critical antecedents of trust and dependence are identified from the literature on project management and knowledge sharing. Relationship among antecedent factors (environmental, partner and interaction), mediating factors (trust and dependence), and outcome factors (knowledge sharing and project team performance) are hypothesized based on research findings from related areas. In the following sections, the research model and hypotheses are presented with literature review. Subsequently, the research methods are presented with details of data collection followed by the data analysis results. At the end, implications of our findings are discussed with limitations and directions for future research.

2. Research model

The research model posits that the trust–dependence relationship influences the extent of knowledge sharing during the IS development process. The model of trust and dependence identifies the environment, partner and interaction as the basic elements of the relationship between the parties. The supplier perspective is relevant for understanding knowledge sharing because these elements are inherent in collaboration for a mutually beneficial exchange relationship (Bendapudi and Berry, 1997; Morgan and Hunt, 1994). In the context of knowledge sharing, the project environment corresponds to the complexity of the project, which affects the project participant's relationships owing to the limited resources (Xia and Lee, 2005). The project partner corresponds to the expertise and the similarity of the clients involved in the provision and acquisition of knowledge from the perspectives of IS consultants. The project interaction corresponds to the communication through which the knowledge is shared. The effect refers to the outcome of the sharing of knowledge, such as performance, creativity and outcome expectations.

The prior studies of knowledge sharing have provided insight into its antecedents. Organizing the antecedents provides us with a better understanding of the state of research on knowledge sharing and identifies different subjects in prior research. According to earlier research (Bendapudi and Berry, 1997), the antecedents of relationship exchanges are the environment factor, partner and customer factors, and interaction factors in relationship environments. Because this study focuses on the partner characteristics, we study the use of the three antecedents of the environment factor, partner factors and interaction factors, which account for trust and the dependence mechanism of sharing knowledge during IS projects.

The project environment antecedent considers IS complexity. IS development projects have more issues and problems than other business task projects when adapting to the ever-changing business environment on account of the complexity of IT tasks (Roberts et al., 2004). By collaborating and cooperating to reduce the risk of complexity when undertaking new product development tasks, the project team enhances organizational learning (Sorenson, 2003) and accumulates the project knowledge that stems from the development process (Brookes et al., 2006). The project partner antecedents include expertise and the similarity of project value. The partner's competency and expertise levels, indicating their ability to encode and decode knowledge clearly, have been identified as key characteristics of the participants in the project (Tiwana and McLean, 2005; Xu and Ma, 2008). Other influential knowledge source attributes include the participants' experience and credibility (Faraj and Sproull, 2000; Joshi et al., 2007). The project members are able to obtain ideas and concepts from outside of their knowledge domains, often drawing different implications from the same ideas. The similarity between parties leads to interaction and influences the choice of service partners (Johnson and Grayson, 2005). When the target goals are similar to existing values, the IS system is more easily implemented and more effectively operated (Wasko and Faraj, 2005). The customer will also be