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New structured knowledge network for strategic decision-making in IT innovative and implementable projects☆

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ABSTRACT

This study investigates the development of a structured knowledge network model in information technology (IT) innovative and implementable projects to facilitate knowledge sharing and transfer in a multi-organization context. The study employs a practice-based perspective by using an exploratory case study approach and a combination of thematic analysis and comparative analysis to analyze the data across public organizations, private organizations, and international companies. The results identify organizational factors and their influence on knowledge channels and knowledge networks. The study contributes to organizational, administrative and knowledge management theories regarding organizational strategy, organizational culture, organizational capacity, knowledge network externalities, knowledge network intermediaries, and knowledge network infrastructures.

1. Introduction

In recent years, knowledge management is experiencing a paradigm shift regarding the source of competitive advantage: from economies of scale to economies of "know-how" (Sambamurthy & Subramani, 2005). Organizations are facing new challenges, including collaborative learning, organizational learning, knowledge sharing and transfer across strategic alliances, and operation of network structures, including intra and inter firm's strategic coupling within dynamic relationships (Andersson, Hohn, & Johanson, 2007; Gupta & Polonsky, 2014). Knowledge networks emerge to help meeting the above challenges. The meaning of networks in such context relates to connections, linkages, action, brokering, and intermediaries that require systematic action to build strategic knowledge networks for knowledge mobilization (Hislop, Newell, Scarbrough, & Swan, 2000; Jashapara, 2011).

A formal knowledge network usually consists of expert institutions sharing the group's common interests and concerns. This knowledge network attempts to increase the understanding of a particular knowledge topic and enhances the capacity of grasping such knowledge to deliver solutions for particular decision problems (Alkhuraiji, Liu, Oderanti, Annansingh, & Pan, 2014). Following the SECI model (Nonaka & Takeuchi, 1995), four types of knowledge networks exist: knowledge networks of interaction, knowledge networks of interpretation and translation, knowledge networks of influence, and institutional knowledge networks (Gourlay, 2003). This classification is vital to connect different parties of multi-organizational corporations such as knowledge brokers, intermediaries, boundary spanners, stakeholders, vendors, resources, key product/service creators/providers, and key value-adding activities. Creating a comprehensive knowledge network between industries is a motivating force to mobilize knowledge and to deliver effective knowledge that organizations can use as a commodity. Thus, establishing a knowledge network in IT innovative projects is a key approach to capacity development that seeks not only to enhance organizational readiness capacity but also to draw upon a large amount of expertise to support strategic decisions (Alkhuraiji et al., 2014). A strategic knowledge network can help to maintain the integration of knowledge into business operations. For instance, some knowledge providers may justify the reason for isolating knowledge as a commercial secret, whereas isolating knowledge from a receiver's perspective is time-consuming and increases cost. However, knowledge networks facilitate cost reduction by recruiting expertise and searching for isolated knowledge and non-codified knowledge (Villasalero, 2014).

Structured knowledge networks can have a significant effect on knowledge sharing and transfer, hence delivering a more effective solution for a knowledge-exchange process (Liu, Moizer, Megicks, Kasturiratne, & Jayawickrama, 2014; Reagans & McEvily, 2003). Less time and effort in understanding knowledge sources equals less cost of knowledge transfer. A key point of structured networks is knowledge traceability, which can greatly facilitate knowledge integration across alliances (Etemad & Lee, 2003). Knowledge networks usually occur in response to a unique set of circumstances but addressing the

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effectiveness of such networks, their structure and governance, efficiency, the availability of resources, and sustainability is vitally significant.

This study focuses on exploring new structured knowledge network models that can support knowledge sharing and transfer in IT projects across three types of organizations: public organizations, private organizations, and international companies. The article follows this structure: after presenting the theoretical framework for the study, Section 3 offers the method; Section 4 presents the findings of this study. Section 5 discusses the study's conclusions and limitations.

2. Theoretical framework

Recent work in knowledge management provides four main theories regarding the conceptualization of inter-organizational issues. These theories are process theory, system theory, network theory, and actor-network theory (ANT) (Olsen, Prenkert, Hoholm, & Harrison, 2014). Process theory provides conceptual frameworks on knowledge creation processes that align with ANT, whereas system theory focuses on the interrelationships among divisions and units in their business environment. Network theory tends to focus on the structures and dynamics of such interrelationships (Alexander & Silvis, 2014).

Although this research seeks to clarify how knowledge networks initiate and how they benefit organizations, the research employs the ANT to examine the network interactions between different parties in product/service value chains. ANT explains the interactions among actors within a network and how such actors unite by using non-human actors (i.e., artifacts) to increase the potential for more alliances so as to achieve common interests (Mahring, Holmstrom, Keil, & Montealegre, 2004; Nielsen, 2005). ANT perceives an actor as the central point of an action irrespective of being a human or non-human. ANT views technology as an emergent concept from social interest that can have the potential to shape social interaction (Doolin & Lowe, 2002). ANT's epistemological and ontological stance perceives the world as a network of nodes that include people, objects, concepts, and ideas. This theory focuses on network structure, how networks originate, how such networks can relate to other networks, and how actors enroll into a network (Alexander & Silvis, 2014). Many information system (IS) studies argue that the key benefit of using ANT is facilitating the understanding of the complex socio-technical issues (Alexander & Silvis, 2014; Olsen et al., 2014; Underwood, 2008). For example, scholars use ANT to examine the introduction into an organization technology that may affect the whole network.

ANT also defines the difference between intermediaries and mediators in terms of their outputs. The intermediaries' outputs are easy to predict based on their inputs, whereas mediators' outputs are unpredictable. This differentiation is beneficial to social issues in which outcomes are most frequently unpredictable (Underwood, 2008). IS studies also use ANT to facilitate the interpretation of the political processes of IT innovation and implementation (Cresswell, Worth, & Sheikh, 2010). However, scholars rarely use ANT to explore knowledge sharing and transfer issues, especially knowledge networking and mobilization in a multiorganization context to facilitate the smooth flow, tracing, and integration of knowledge (Erden, Klang, Sydler, & Von Krogh, 2014).

This study fills a gap in current research by using ANT to explain how to construct and structure knowledge networks, the consequences from building such networks, and the key factors influencing their construction.

3. Method

This study adopts an exploratory approach. A case study method is appropriate due to its inherent flexibility as well as its efficacy in addressing complex issues and embedded relationships for certain markets (Dubois & Araujo, 2004; Woodside, 2013). The data-collection process took place over one year and a half in two stages. The setting of this research is Saudi Arabia. The sample comprised thirty-four participants from seven large organizations including leading international companies and local companies (software and hardware) and public organizations in IT project practice, plus experts from consultancy services. The study used two sampling techniques: the purposive sampling technique at the early stage to identify initial participants who were in charge of IT projects in terms of planning, evaluation, execution, implementation, and post-implementation; a snowball sampling technique in the second stage to identify further informants (Dubois & Araujo, 2004). The main criteria for selecting the samples were: (a) companies should have more than five years of involvement in IT projects, consultancy, business evaluation, and restructuring; (b) companies should have ongoing interactions between the decision makers (i.e., providers and users) to investigate issues regarding their collaborative practice. The study carried out thirty-four in-depth, face-to-face, semi-structured interviews, each lasting between 45 min and two-and-half hours, with the pertinent recording and transcription. Participants included directors, chief executives, and general managers from public, private local and international organizations conducting IT projects. Table 1 provides an overview of the participants and their organizations.

This research used a combination of thematic and comparative analysis for data analysis. The authors used thematic analysis method to analyze the qualitative empirical data, including the initial code generation, identification of meaningful themes, revising such themes, and defining and naming the categories (Braun & Clarke, 2006). The data analysis through NVivo software (Bazeley & Jackson, 2013) enabled the production of a thematic map.

The comparative analysis method is useful for cross-case analysis to examine new themes across all cases and to detect the strength of evidence from empirical data (Tharenou, Donohue, & Cooper, 2007). This research used comparative analysis to confirm the empirical findings across the eight cases where there was less support from the literature. In addition, the comparative analysis enabled the identification of the point of data saturation, thus establishing that further interviews were not necessary.

4. The research findings

4.1. Organizational factors

Three organizational factors emerge from the empirical study: organizational strategy, organizational culture, and organizational capacity.

4.1.1. Organizational strategy

The authors identify different practices from the three sets of samples (i.e., public organizations, private local organizations, and international organizations). These organizations have different roles in managing IT projects: hardware and software vendors (e.g., international private companies); knowledge brokering and knowledge mediators (e.g., local private companies specialized in software implementation and local E-service programs); IT solution-seekers (e.g., governmental or public organizations); and full IT project management, which includes initiation, consultation, execution, implementation, evaluation, and postimplementation. Fig. 1 illustrates a structured knowledge network model that includes the roles of the companies and main knowledge channels within the knowledge network. The model comprises two parts. The first part explains how governmental organizations seek IT solutions; the second part shows how international and local companies provide IT solutions to public or governmental organizations.

The model identifies the function of PYR in trying to play the role of knowledge brokering on one hand, and raising the awareness of public organizations on the other hand. The interviewees explain some communication channels issues regarding the alignment of IT projects

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