Available online at www.sciencedirect.com
SCIENCE DIRECT®
Information & Management 42 (2005) 1105–1120
INFORMATION & MANAGEMENT
www.elsevier.com/locate/dsw

Knowledge networks in new product development projects: A transactive memory perspective

Ali E. Akgün [a,*], John Byrne [b], Halit Keskin [a], Gary S. Lynn [c], Salih Z. Imamoglu [a]

[a] *Science and Technology Studies, Gebze Institute of Technology, Istanbul Cad. No. 101, 41400 Gebze, Kocaeli, Turkey*
[b] *Lubin School of Business, Pace University, New York, NY 10038, USA*
[c] *Wesly J. Howe School of Technology Management, Stevens Institute of Technology, Hoboken, NJ 07030, USA*

Received 27 August 2004; received in revised form 26 November 2004; accepted 9 January 2005
Available online 23 February 2005

Abstract

Even though an individual's knowledge network is known to contribute to the effectiveness and efficiency of his or her work in groups, the way that network building occurs has not been carefully investigated. In our study, activities of new product development teams were analyzed to determine the antecedents and consequences on the transactive memory systems, the moderating affect of task complexity was also considered. We examined 69 new product development projects and found that team stability, team member familiarity, and interpersonal trust had a positive impact on the transactive memory system and also had a positive influence on team learning, speed-to-market, and new product success. Further, we found that the impact of the transactive memory system on team learning, speed-to-market, and new product success was higher when there was a higher task complexity. Theoretical and managerial implications of the study findings are discussed.

Keywords: Transactive memory system; Knowledge network; Team learning; New product development

1. Introduction

Knowledge management in the group dynamics and behavior literature has been receiving great deal of interest recently and scholars have been investigating the ways of managing group knowledge, such as generating, capturing, storing, sharing, and implementing it [6,63,68,77,83]. Within such practice, *knowledge networking* (the webs of personal relationships) is imperative to perform group activities effectively [30,84]. Alavi and Tiwana [2] pointed out that knowledge networking in groups or teams is effective if its members know who has the required knowledge and expertise, where the knowledge and expertise are located, and where and when they are needed: the knowledge needed to complete group tasks is distributed among group members and no individual needs to know all the detailed knowledge or to be fully cognizant of every aspect of the project [13]. Thus interpersonal awareness of others' knowledge is essential.

* Corresponding author. Tel.: +90 262 653 8497; fax: +90 262 6538521.
E-mail addresses: aakgun@gyte.edu.tr, alieakgun@yahoo.com (A.E. Akgün).

0378-7206/$ – see front matter © 2005 Elsevier B.V. All rights reserved.
doi:10.1016/j.im.2005.01.001

The idea of knowledge networking in general and interpersonal awareness of other's knowledge in particular have been investigated as the transactive memory system (TMS) in small group management research [33,51]. A TMS requires that individuals, in continuing relationships, utilize each other as memory sources or aids to supplement their own limited and unreliable memories and knowledge [79]. A TMS provides a knowledge network among individuals allowing the interchange of data, information, and knowledge. However, empirical investigations were mostly conducted in laboratory conditions, on relationships among intimate couples and small groups, and ignoring multi-functional work groups, such as new product development (NPD) teams.

Such project teams are specific forms of organizational work-groups. NPD projects generally involve [14,20,23]:

- people with different views, perspectives, functional backgrounds, and knowledge, and concurrently, their interaction with other units in the organization;
- team processes (e.g., conflict management, motivation, teamwork); and
- project related task work.

This complex nature of NPD projects requires effective team knowledge of who has and needs particular information. For instance, Lewis [42] argued that they benefit when team members utilize their unique expertise and integrate the differentiated expertise of other members. She further stated that such a TMS was "an especially appropriate concept for understanding how knowledge-worker teams can optimize the value of members' knowledge." Thus, investigating TMS theory in NPD project teams could be valuable by helping recognize networking task-specific expertise and knowledge for project related tasks. Accordingly, the goal of our study was to investigate the factors effecting TMS and the consequences of it in an NPD project team context.

2. Background

2.1. TMS and new product development

Transactive memory, in the mind of an individual, is influenced by other people. Scholars (e.g., [72]) have showed that transactive memory forms beliefs about the knowledge possessed by others and affected accessibility to that knowledge. For instance, Wegner [78] noted that it began when individuals learnt something about someone else's domains of expertise.

A TMS occurs when two or more people cooperatively store, retrieve, and communicate information and knowledge [29]. It is formed by individuals playing the role of external memory for others who, in turn, encode memories about the memories of others. Thus, a TMS consists of the memory stores of particular individuals and any social interactions in which they participate [81]. As Wegner [80] said, "One person has access to information in another's memory by virtue of knowing that the other person is a location for an item with a certain label. This allows both people to depend on communication with each other for the enhancement of their personal memory storage." Thus a TMS tacitly coordinates who will learn what from whom, and then aids the dissemination of that knowledge [32]: people rely on others to process and encode knowledge related to their area of expertise within a TMS [34].

Early studies on TMS were based on dyadic relations and were empirically tested in laboratory settings [7]. In order to enhance the individual level theory of TMS, group level studies proposed that TMSs had three major components:

- *Specialization*: The differentiated structure of member knowledge.
- *Credibility*: Members' beliefs about the accuracy and reliability of other members' knowledge.
- *Coordination*: Effective and orchestrated knowledge processing.

Moreland [55], using a radio assembling experiment, found: that *specialization* showed that one person remembered where components should be inserted in a circuit board while another knew how the circuit boards should be wired together, *coordination* explained how group members worked together efficiently on the radio, and *credibility* showed the degree of trust among group members of other members' radio knowledge. Studies on TMS in real-world workgroups were underestimated, with the exception of a few studies such as Faraj and Sproull's [22] investigation of the impact of expertise coordination.