

Learning process in new product development teams and effects on product success: A socio-cognitive perspective

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Abstract

The study purports to develop and empirically test a model of team learning process and its effects on team performance in new product development teams. Using the socio-cognitive theory of learning in groups and organizations, several hypotheses were tested to show that the primer components of social cognition (that is, information acquisition, information dissemination, information implementation, unlearning, thinking, intelligence, improvisation, sense-making, and memory) form an interactive process model of the team learning phenomenon. By studying 165 new product development projects, it was shown: (i) that the eight primer socio-cognitive factors of information acquisition, information dissemination, information implementation, memory, thinking, improvisation, unlearning, and sense-making constitute interrelated sub-components of a higher-order team *information-processing* construct; (ii) that *team intelligence* is positively related to components of team information-processing; and (iii) that information-processing facilitates *new product success* primarily through the positive effects of superior information implementation. Theoretical and managerial implications of the study findings are discussed.

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1. Introduction

A majority of successful innovations is developed through the collective efforts of individuals in new product development teams (hereafter, NPD teams). NPD teams are organizational workgroups where individuals from diverse personal and organizational backgrounds come together for a limited (and usually, predetermined) time period and work in close collaboration towards creating, designing, developing, and marketing a new product (Pinto, 2002). The ultimate objective of all NPD teams is superior marketplace success of the new product. And, as widely noted in the relevant academic and popular literature (e.g., Grant, 1996; Leonard-Barton, 1992; Moorman & Miner, 1997; Nonaka &

Takeuchi, 1995), one of the major success factors in NPD teams is that the knowledge acquired by individuals within the team transcends beyond the individual mind and becomes a collective entity that facilitates the mission of the team (Madhavan & Grover, 1998; Moorman, 1995). Understanding and explaining the processes and procedures through which knowledge is generated, shared, disseminated, and utilized (that is, *learned*) in NPD teams is therefore critical for understanding *new product success*. While considerable research has focused on the learning phenomenon in NPD teams (Meyers & Wilemon, 1989; Purser, Pasmore, & Tenkasi, 1992), particularly on the dynamics of team information-processing (Lynn, Reilly, & Akgün, 2000; Moorman, 1995; Moorman & Miner, 1997, 1998), the current state of knowledge about the learning phenomenon in NPD teams needs to be expanded to include a greater understanding of the *process* of learning and its effects on project *outcomes*.

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One way to expand the scholarship on NPD team learning is by cross-fertilization with different streams of research in this area (Akgün, Lynn, & Byrne, 2003; Easterby-Smith, 1997). The *organizational learning* literature, for instance, offers a rich basis for identifying and understanding the key factors and mechanisms through which learning occurs in groups (Dixon, 1992; Huber, 1991). Similarly, studies on group psychology, small group researches, and social psychology emphasize the importance of *social cognition* for group and organizational learning process (Akgün et al., 2003; Gruenfeld & Hollingshead, 1993; Higgins, 2000). Because the NPD process in most organizations is in essence a group activity that involves people throughout the organization and their reciprocal interactions, knowledge, behaviors, cognitions, and functional cultures (Madhavan & Grover, 1998), the integration of the social cognition literature into the theoretical articulations of learning in NPD teams might provide a better elucidation of the learning processes and practices as indicated by the future research suggestions of Akgün et al. (2003) and Akgün, Lynn, and Reilly (2002). Accordingly, the present study (i) incorporates the organizational learning theory and the socio-cognitive framework to develop a model of the *NPD team learning process* and (ii) operationalizes and empirically tests, in a nomological network, the effects of factors from both streams of research on new product success. In doing so, this article aims to provide managers with applicable guidance on how to facilitate the learning process and new product success in NPD teams.

2. Background

2.1. Social cognition and learning in teams

Most of the literature on group and organizational learning has addressed concepts associated with cognition (Cook & Yanow, 1993). As a generic term, cognition is defined as the mechanism of information-processing (Reed, 1982) or data processing and storing in the human nervous system (Anderson & Ausubel, 1965). At the individual level, many sub-processes are required to explain the cognitive perspective of human information-processing, including the acquiring, forming, storing, manipulating, discarding, and implementing of information (Manis, 1966). Nonetheless, while a similar view of cognition has been discussed in higher-level social groups such as teams and organizations (Hedberg, 1981; Popper & Lipshitz, 1998), the insights and applications of individually oriented cognition are generally deemed less useful in understanding group and organizational learning due to differences in underlying assumptions and ontology (Cook & Yanow, 1993). Accordingly, scholars (e.g., Allard-Poesi, 1998; Gioia & Sims, 1986) have suggested that the socio-cognitive perspective be used to explain the *collective*

cognitive representation of organizations and groups in general and *organizational learning process* in particular (see, Akgün et al., 2003).

Social cognition is an approach to the understanding of human social behavior, involving the investigation of the mental processes of people interacting with one another (Martin & Clark, 1990). Specifically, social cognition examines aspects of human information-processing; what it influences, and what it is influenced by, within the complex social interactions of groups (Gioia & Sims, 1986).¹ As such, social cognition transcends beyond the cognitive approach (which emphasizes individual cognitive processes) and the structural approach (which, as in the organizational learning literature, emphasizes organizational and group routines; Gherardi, 1998; Schwarz, 1995), and amalgamates different views on the process of learning (such as behaviorism, cognition, and social construction; Akgün et al., 2003). In this vein, as indicated by Akgün et al. (2003), the socio-cognitive perspective of organizational learning removes the learning-level dichotomy and constitutes a more grounded approach for understanding the learning process via reciprocal relations of both cognitive processes and social constructs. According to Akgün et al. (2003), the socio-cognitive view of organizational learning can be conceptualized as a higher-order construct (process), construed of cognitive processes and social constructs which are (1) distributed through the organization, (2) unfold overtime, (3) involve people in diverse functions and mind-sets, and (4) embedded in routines and institutional structures by means of organizational culture. Exemplars for such *distinct but correlated* features (sub-processes) include:

- information/knowledge acquisition—gathering of data from various sources, including customers, competitors, economic assessments, financial statements, social reports, consultants, new members, acquisitions and mergers, and so on;
- information/knowledge implementation—uncovering and correcting product-related problems by collective utilization of relevant information;
- information/knowledge dissemination—distributing and sharing information/knowledge in groups and organizations through a variety of means, including formal communication means (e.g. memos, reports, bulletin boards, and face-to-face meetings) as well as informal communication means (e.g., coffee-breaks, water-cooler discussions, hallway meetings, and so on);
- memory—storage of skills and experiences of team members;
- unlearning—eliminating or changing how memory is manifested in organizations/teams—such as changing team beliefs, norms, and values;
- thinking—a process of decision-making, judgment, and

¹ Different definitions of social-cognition can be seen in Ostrom (1984), and Akgün et al. (2003).

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