Effects of task complexity on individual creativity through knowledge interaction: A comparison of temporary and permanent teams

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A B S T R A C T

Using the interactionist's perspective of creativity, this paper proposes a new research model of creativity manifestation to explore how factors affecting individual creativity depend on team characteristics. We investigated the antecedents of creativity in the literature—task complexity, team member exchange, and knowledge sharing—and then examined the relationships and differences between temporary and permanent teams. To maximize practical implications, we studied two team types like project task force (PTF) and research and development (R&D) teams in the Information and Communication Technology (ICT) industry in Korea, where strong creativity is required for team performance. PTF teams operate with a clear mission to be completed on a deadline, while R&D teams create scientific enhancements for existing products. The proposed structural model was tested empirically with cross-sectional data from 289 professionals from the two team types. Results indicated that, in the case of PTF teams, task complexity had an indirect relationship with individual complexity through knowledge interaction among team members, while for R&D teams, task complexity was directly associated with individual creativity, and indirectly associated with the creativity through team member exchange. Thus, team characteristics must be considered together with task complexity and knowledge interactions in order to achieve team goals more effectively by maximizing each member's creativity.

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1. Introduction

In the face with intense competition, increasing creativity and innovation emerge as important strategies for an organization's performance and survival (Lopez-Cabrales, Pérez-Luño, & Cabrera, 2009). Creativity has received considerable attention from both researchers and practitioners as a method by which firms' competitiveness can be enhanced dramatically (Shalley, Zhou, & Oldham, 2004; Zhou & George, 2001). Creativity indicates that employees use a broad range of their knowledge and experience to develop novel ideas to solve problems and complete tasks in efficient ways. Further, according to the interactionist's perspective, creativity is considered to be a function of interactions among employees and characteristics of the context in which they work (Amabile, 1996; Woodman, Sawyer, & Griffin, 1993). Woodman and Schoenfeldt (1990) suggested that individual creativity will be affected by factors such as past reinforcement history, social facilitation, and physical environment, as well as task and time constraints. In this sense, when we consider factors affecting individual creativity in actual working environments, we must address the effectiveness of the working relationships, interactions among other employees, the characteristics of the tasks that need to be performed, and their constraints.

With regard to the work environment, many firms have turned to team-based systems to cope with hyper-competition by increasing their responsiveness and ability to enhance innovation (Mesmer-Magnus & DeChurch, 2009). In using teams as an organization's primary work unit, companies must understand the influence of team characteristics on employee creativity in order to foster creativity and innovation efficiently. Specifically, in the context of the organizational environment, most firms have employees who work on one of two types of teams: temporary or permanent, in terms of the team's life span (Cummings & Worley, 2001). Although there are many differences between these types of teams, one typical distinguishing feature is the deadlines under which temporary teams work. Previous research has shown that deadlines have an effect on the working mechanisms and performance of these teams (Amabile, Hadley, & Kramer, 2002; Van Eerde, 2000) and are important regulators with respect to how work is planned and practiced. It has also been argued that temporal features of a team's task environment should be considered as a crucial factor affecting performance (Harrison, Mohammed, McGrath, Florey, & Vanderstoep, 2003).

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Research purpose of this paper is to investigate how the difference of team types affect the creativity which individuals working in the teams show. To explore this objective, a relevant research model was proposed relying on the interactionist's perspective which assumes that those interactions among team members affect creativity of individuals working in the team. To add more rigor to the proposed research model, constructs related to both task complexity and knowledge interaction among team members were considered. For the purpose of empirical analyses, we adopted two team types like PTF (project task force) teams and R&D teams, which are considered as two typical types of teams in the ICT industry where prevailing technologies change fast, and new projects are launched very often. A number of relevant and valid survey questionnaires were collected through the meticulously designed methodological process, and applied to the proposed research model. Detailed statistical results were obtained to prove the validity of our proposed research model. Implications, practical and academic, were derived from the empirical results. Limitations and future study needs were discussed before concluding this paper.

2. Literature review

2.1. Creativity from the interactionist's perspective

Creativity is a complex, multifaceted concept defined by researchers from various approaches (Shalley, Gilson, & Blum, 2000). Creativity can be defined as processes that produce innovative results (Amabile, 1988; Drazin, Glynn, & Kazanjian, 1999), or as an ability to produce work that is useful and original (Barron, 1988). It is also referred to as the product of a new and useful idea and a solution to a problem (Amabile, Barsade, Mueller, & Staw, 2005). In an organizational context, it is referred to as the creation of a new product, service, idea, procedure, or process by individuals working together in a complex social system (Woodman et al., 1993, p. 293). Creative products are the outcome of processes engaged in by creative individuals in a relationship with their environment (Kim, Cramond, & VanTassel-Baska, 2010). Creativity may be viewed as a systemic rather than individual phenomenon (Csikszentmihályi, 1990), as it does not occur in an individual, but in the interaction between his/her thoughts and a socio-cultural context. According to the interactionist model of creative behavior (Woodman & Schoenfeldt, 1990), creativity refers to the complex product of a person's behavior in a given situation, which is characterized by contextual and social influences that either facilitate or inhibit creative accomplishment. Therefore, to better understand creativity in the organizational context, it is essential to understand the creative process, product, person, situation, and the way in which each of these components interacts with the others (Woodman et al., 1993). Following prior research based on the interactionist model of creativity, we defined individual creativity as the generation of novel and useful ideas through an individual's interaction with the work environment. With regard to that environment, characteristics of the task, relationships with members, and work setting are all good examples of contextual factors (Shalley et al., 2004). Thus, we emphasized contextual settings in organizations and selected: (1) team member exchange (TMX); (2) knowledge sharing; (3) task complexity; and (4) team characteristics as social and contextual factors that are believed to be in association with individual creativity.

2.2. Temporary and permanent teams

Teams are essential management tools. Organizations use teams in order to create novel combinations of employees to solve novel problems. A team can be defined as a small number of employees with complementary abilities who are committed to common goals and working relationships for which they hold themselves mutually accountable (LaFasto & Larson, 2001). Teams generally pass through a predictable sequence in their evolution—the five-stage model of development. This model characterizes a team as proceeding through distinct stages: forming; storming; norming; performing, and adjourning (Tuckman & Jensen, 1977). Team behaviors that may be observed differ from stage to stage. Although what makes a team effective is actually more complex (George & Jessup, 1997), it is accepted that a team becomes more effective as it progresses through the first four stages.

From the perspective of the five-stage development model, while performing (fourth stage) is the last stage in development for permanent teams, adjourning (fifth stage) is the final stage among temporary teams that have a limited task to perform. Some researchers, however, have argued that temporary teams do not seem to follow the usual five-stage development model. Some studies have shown that these teams have their own unique sequence of actions, referred to as the punctuated-equilibrium model of organizational transformation (Gersick, 1988; Romanelli & Tushman, 1994). This describes organizations as evolving through relatively long periods of stability in their basic activities (equilibrium periods) that are punctuated by relatively short bursts of fundamental change (revolutionary periods; Romanelli & Tushman, 1994). According to the punctuated-equilibrium model, a team's progress is triggered more by members' awareness of time and deadlines than by completion of an absolute amount of work during a specific developmental stage (Gersick, 1988).

Deadlines make temporary teams unique. Deadlines regulate and structure the work through the division of a team's final goals into interim goals, different courses of action, and time anchoring. Previous studies have reported mixed results with respect to these features (Seers & Woodruff, 1997; Van Eerde, 2000). On the one hand, the existence of a deadline motivates the team to begin work (McGrath & O'Connor, 1996; Seers & Woodruff, 1997). As a deadline approaches, teams feel increased time pressure (Gersick, 1988; Seers & Woodruff, 1997) that motivates them to pay more attention to time and increase their task performance, whereas the absence of time pressure can lead either to members' attention straying to activities outside the team's work, or to indifference (Gevers, Van Eerde, & Rutte, 2001). However, deadlines have often been mentioned as a possible constraint on creativity (Amabile, 1996). When individuals feel pressured to meet tight deadlines, the result may be lowered intrinsic motivation, creativity (Amabile et al., 2002) and an inability to act (Van Eerde, 2000); deadlines also cause stress, which can in turn lead to passivity and avoidance and have a negative effect on members' health and performance. Examples of temporary teams—such as PTF and cross-functional teams—abound in modern organizations. Lee, Chae, and Seo (2010) examined the crucial factors influencing individual creativity in PTF and R&D teams. They found that the organizational learning culture and degree of centrality were important for a PTF team, while intrinsic motivation and structural holes were important for R&D teams.

2.3. Team member exchange and knowledge sharing

It is natural that team working relationships and group dynamics have a major effect on the behavior of rank-and-file employees. The effectiveness of a member's working relationship with the peer group can be defined by examining the concept of team member exchange (TMX; Seers, 1989). This is referred to as "the reciprocity between a member and his or her team with respect to the member's contribution of ideas, feedback, and assistance to other members and, in turn, the member's receipt of information, help,