

Examining the influence of team knowledge on effectiveness of service management teams

Priyanko Guchait¹
The Pennsylvania State University
University Park, PA, USA

Karthik Namasivayam
The Pennsylvania State University
University Park, PA, USA

Abstract

The influence of team knowledge on team learning behavior, team performance, and team viability was tested using service management teams in a restaurant setting. Teammates' taskwork knowledge and teamwork knowledge was both conceptually and empirically distinguished and their convergence or 'sharedness' was assessed. Preliminary results showed that both shared taskwork and teamwork knowledge were positively related to performance, viability, and team learning behavior.

Keywords: Team knowledge, team cognition, shared mental models, performance, and viability.

1. Introduction

Service organizations are increasingly using self-managing teams (SMTs) at all hierarchical levels to improve productivity and service quality, and enhance organizational competitiveness (De Jong, Wetzels, & Ruyter, 2008). Organizational success depends on the ability of teams to collaborate effectively and work efficiently (DeChurch & Mesmer-Magnus, 2010). SMT refers to groups of interdependent employees who are collectively responsible for decision-making and developing work routines, planning, and monitoring team performance (De Jong et al., 2008). Organizations including Taco Bell, Prudential, Welch Foods, and Cigna have successfully utilized SMTs in their customer service operations (Cohen, Chang, & Ledford, 1997). Prior research lists several benefits to organizations from using front-line SMTs including an efficient use of the knowledge and experience of front-line employees who are closest to the customer (Batt, 1999), increased learning and adaptability (Wageman, 1997), enhanced employee motivation, and higher productivity (Cohen et al., 1997). With increased adoption of front-line SMTs in service operations, it is important to investigate the determinants and underlying mechanisms that impact team effectiveness and organizational productivity. (Henceforth, SMTs will be referred to as teams in this paper).

The goal of this study is to develop and empirically test a conceptual model explaining the determinants, processes, and conditions that affect team effectiveness. An abundance of

¹ Corresponding Author

research has been conducted to examine factors that contribute to high team performance (e.g., Salas, Dickinson, Converse, & Tannenbaum, 1992). Among these factors, team knowledge has received much research attention because it is considered to be a central driver of team-related processes and behaviors (Cohen, Ledford, & Spreitzer, 1996; Chou, Wang, Wang, Huang, & Cheng, 2008, Cannon-Bowers & Salas, 2001; (DeChurch & Mesmer-Magnus, 2010). The knowledge possessed by effective teams has been frequently referred to as team knowledge or shared knowledge, and in similar contexts, as shared mental models, team cognition, and shared understanding (Cooke et al., 2000). Team cognition has been referred to as an emergent state, in which knowledge important for team functioning is mentally organized, represented, and distributed within the team (Kozlowski & Ilgen, 2006), and has been used as a mechanism to explain both how successful teams accurately predict and execute actions and how failures in team cognition leads to disasters (Mohammad & Hamilton, 2010). Shared mental models refer to team members' shared, organized understanding and mental representation about the key elements of the team's relevant environment (Mohammed et al., 2010; Klimoski & Mohammed, 1994).

Research has identified numerous factors that affect teams and has presented several models of team functioning (Guzzo & Dickson, 1996). Although these models vary in details, they share an input-process-outcome (I-P-O) framework (Mathieu et al., 2000). *Inputs* refer to the conditions that exist prior to a performance episode and may consist of member, team and organizational characteristics. Inputs in the I-P-O model in the current study include team knowledge (shared cognition or shared mental models). *Processes* are interdependent activities among team members, and describe how team inputs are transformed into outputs. While the impact of team knowledge on team performance is well established, there is little research explaining why and how (i.e., processes) team knowledge affects team performance. Extant research has focused on processes including communication, coordination, and cooperation (Mathieu et al., 2000). This study makes a contribution to the literature by examining the mediating effects of team learning behavior on the relationship between team knowledge and team outcomes. Team learning behavior, which refers to an ongoing process of reflection and action (Edmondson, 1999), will have an important effect on the relationship between team knowledge and performance. *Outcomes* are results and by-products of team activity that are valued by one or more constituencies. Extant research in team cognition has focused on team performance as a measure of team outcome (e.g., Mathieu et al., 2000; Cannon-Bowers et al., 1993; Austin, 2003). Hackman (1990) identified three dimensions of team outcomes: (a) performance, (b) team longevity, and (c) members' affective reactions. Responding to recent calls from scholars (Mohammed et al., 2010) the current study investigates multiple measures of team effectiveness: (a) team performance; (b) team satisfaction (affective outcome); and team viability (longevity outcome).

The concept of team knowledge or shared mental model was developed based on observations of teams engaging in dynamic and time stressed environments (e.g., cockpit crews; Cannon-Bowers, Salas, & Converse, 1990; 1993). Existing research in team knowledge is dominated by laboratory studies (e.g., Mathieu et al., 2000). Even the few field studies that have been done (e.g., Lim & Klein, 2006; Smith-Jentsch, Campbell, Milanovich, & Reynolds, 2005) used samples which still were composed of action teams (Mohammed, Ferzandi, & Hamilton, 2010). Recent research has called for investigation of team knowledge construct with samples of teams focusing on project, management, decision-making, and service (i.e., non-action teams) (Chou et al., 2008) to extend generalizability of findings in team knowledge (Chou et al., 2008;

Badke-Schaub, Neumann, Lauche, & Mohammed, 2007; Mohammed & Dumville, 2001). Responding to the call in the literature, this study investigates the role of team knowledge in service management teams in a field setting.

To sum up, first, the study examines the impact of team knowledge on team outcomes. Second, the mediating role of team learning behavior on the relationship between team knowledge and team outcomes is investigated. Finally, the study also explores the influence of time, and individual level factors (e.g., personality) that may influence development of team knowledge and consequently affect team processes and outcomes.

This project will add to the theoretical understanding in this area by modeling and testing the impact of team knowledge on team learning and team effectiveness. An understanding of these relationships will lead to the development of more directed and effective training programs. The study will also provide managers information about ideal team member characteristics which can help managerial understanding of team composition. Finally, the project will inform managers if team knowledge develops overtime, consequently improving team processes and team outcomes.

The rest of this paper is arranged as follows. In the next section, the independent variables, dependent variables, and the mediating variables of interest in this project are discussed, and hypotheses are proposed. Further, the methodology to test the proposed hypotheses is discussed, followed by the presentation of the preliminary results from the pilot test. Finally, the results, implications of the findings and directions for future research are discussed.

2. Literature Review

Team knowledge

Team knowledge was defined as team members' shared, organized understanding and mental representation about the key elements of the team's relevant environment (Klimoski & Mohammed, 1994). In similar contexts, team knowledge been frequently referred to as shared knowledge, shared mental models, shared cognition, shared understanding, and schema agreement, (Cooke et al., 2000; Ensley & Pearce, 2001; Johnson & O'Connor, 2008; Rentsch & Klimoski, 2001). The concept of team or shared knowledge (or shared mental models) was developed based on observations of expert teams – high performance teams often coordinate behavior without the need to communicate. Such knowledge sharing allows team members to select actions that are consistent and coordinated with those of their teammates (Mathieu et al., 2000). Scholars argued that expert teams develop compatibility in members' cognitive understanding of key elements of their performance environment which helps them operate efficiently, without the need for explicit coordination, resulting in high performance (Cannon-Bowers et al., 1993; Cooke, Gorman, Duran, & Taylor, 2007).

Shared knowledge organization is at the core of team knowledge construct (Cannon-Bowers et al., 1993). 'Sharedness' refers to 'having in common' (Mohammed et al., 2010), that is, the degree to which team members' knowledge are consistent with one another (Cannon-Bowers et al., 1993). Terms such as similarity, convergence, agreement, commonality, overlap, compatibility, and consensus have been used to capture sharedness (Mohammed et al., 2010). Therefore, the crucial implication of team knowledge (or shared knowledge or shared mental model) concept is that team members hold compatible or common knowledge that leads to common expectations for the task and team (Cannon-Bowers et al., 1993; Kozlowski & Ilgen,

2006); these mutual expectations allow teams to coordinate and make predictions about the behavior and needs of their teammates (Cooke et al., 2000).

Team knowledge fulfill multiple *functions* – they allow team members to interpret information in a similar manner (description), share expectations concerning future events (prediction), and develop similar causal accounts for a situation (explanation) (Rouse, Cannon-Bowers, & Salas, 1992). Essentially, teams with shared knowledge have a common/shared view of what is happening, what is likely to happen next, and why it is happening (Mohammed et al., 2010).

Many previous studies have argued that team knowledge do not refer to a unitary concept; multiple knowledge domains coexist among team members at a given point in time (Cannon-Bowers & Salas, 2001; Cannon-Bowers et al., 1993; Mathieu et al., 2000; Klimoski & Mohammed, 1994). Team knowledge is conceptualized to represent various *types* of knowledge (Mohammed et al., 2010). Cooke et al. (2000) argued that the knowledge associated with ‘team knowledge’ can be declarative (knowledge of what - i.e., facts, rules, regulations, and concepts in task domain), procedural (knowledge of how - i.e., the steps, procedures, sequences and actions), and strategic (knowledge of the context and application – i.e., the overriding task strategies and knowledge of when they apply). Team members hold multiple knowledge or content domains simultaneously (Rouse et al., 1992). Cannon-Bowers et al. (1993) originally proposed four non-independent knowledge or content domains – knowledge about tools and technology, knowledge about task (understanding of work procedures, strategies, and contingency plans), knowledge of teamwork interaction (awareness of member responsibilities, role interdependencies, and communication patters), and knowledge of team members (understanding of teammates’ preferences, skills, and habits).

While early work has focused on knowledge structures (Cannon-Bowers et al., 1993), scholars note that the team knowledge construct is incomplete without a treatment of the notion of shared, evaluative belief structures (Mohammed, Klimoski & Rentsch, 2000). That is, knowledge structures refer to descriptive states of nature believed to be true while belief structures refer to desired states of nature that are preferred or expected (Mohammed et al., 2000). Accordingly, Cannon-Bowers and Salas (2001), proposed four types of content domains including ‘shared beliefs’: (1) task-specific knowledge (knowledge about specific procedures, sequences, actions, and strategies that are necessary to perform a task), (2) task-related knowledge (knowledge of information about member roles, responsibilities, role interdependencies, and interaction patterns), (3) knowledge of teammates (knowledge of each other – preferences, strengths, weaknesses, and tendencies to maximize team performance), and (4) knowledge of attitudes or beliefs (knowledge of teammates’ general attitudes, values or beliefs toward work tasks, working environments, or the work itself).

More recent research has collapsed team knowledge content into teamwork and taskwork categories (Cooke, Kiekel, & Helm, 2001; Mathieu et al., 2000). Researchers suggest that task-focused knowledge include work goals and performance requirements, and team-focused knowledge include the interpersonal interaction requirements and skills of team members (Mohammed et al., 2010).

Scholars suggest that both components of team knowledge, namely task- and team-work help a team ‘to be on the same page’ in knowing what to expect, anticipating what team members need, and explaining what is observed which enables the team to coordinate actions and adapt behavior to task demands, leading to enhanced decision-making and higher performance (Cannon-Bowers et al., 1993). Therefore, the general thesis of this emerging

literature is that when team members are mentally congruent and have an adequate understanding of the taskwork and teamwork, the result is higher team effectiveness (Mohammed & Hamilton, 2010).

Empirical work supporting this conceptualization shows that team knowledge influence team effectiveness (Lim & Klein, 2006; Marks et al., 2000; Mathieu et al., 2000) including team performance measured as scores from computer simulations (Mathieu et al., 2000), in field research as client satisfaction (Rentsch & Klimoski, 2001), decision quality (Kellermanns et al., 2008), military assessments (Lim & Klein, 2006), and safety and efficiency (Smith-Jentsch et al., 2005). Recent studies have associated team knowledge with engagement (Miles & Kivlighan, 2008), collective efficacy (Mathieu et al., 2010), and individual-level outcomes (such as member trustworthiness, performance, and satisfaction) (Chou et al., 2008; Rentsch & Klimoski, 2001). Apart from outcomes, team knowledge is also positively related to team processes (e.g., strategy formation, cooperation, back-up behavior, coordination, and communication) (Marks et al., 2002; Mathieu et al., 2000; Marks et al., 2002). The next section more closely discusses the relationship of team knowledge with outcomes of interest in this study, namely, performance and viability.

Team knowledge and team performance

Each component of team knowledge namely task- and team shared knowledge have been associated with team performance. More sharedness/similarity of knowledge and understanding among team members in these two domains promotes higher levels of performance (Cannon-Bowers et al., 1993; Cooke et al., 2000; Mathieu et al., 2000; Cannon-Bowers & Salas, 2001; Mohammed et al., 2010; Lim & Klein, 2006; Smith-Jentsch et al., 2005).

Few studies have examined the influence of multiple knowledge domains on team performance (e.g., Lim & Klein, 2006). Previously scholars have collapsed multiple knowledge domains into two content areas – taskwork and teamwork (Mathieu et al., 2000). In the current study the taskwork category includes the first knowledge domain suggested by Cannon-Bowers and Salas (2001): task-specific knowledge. The teamwork category includes the last three knowledge domains suggested by Cannon-Bowers and Salas (2001): task related knowledge, knowledge of teammates, and knowledge of attitudes or beliefs.

Research has shown that team knowledge improve timeliness of work, quality of outcomes, work efficiency, customer satisfaction, and decision-quality (Mohammed et al., 2010; Chou et al., 2008). In the current study, team performance measure includes quality of team's deliverables, time management, meeting deadlines, providing customer service and paying attention to detail.

This study examines the relationship between team knowledge and team performance. Moreover, the influence of both task- and team shared team knowledge on team performance is examined. Finally, the current study incorporates the 'shared beliefs' component in the team knowledge construct as suggested by Cannon-Bowers and Salas (2001; Chou et al., 2008). The following hypothesis is proposed:

Hypothesis 1a: Team knowledge will be positively related to team performance.

Team outcomes or team effectiveness are results and by-products of team activity that are valued by one or more constituencies (Mathieu et al., 2000). Hackman (1990) identified three types of team outcomes: (1) performance, (2) team longevity (viability), and (3) members' affective reactions (satisfaction). Scholars have suggested that team satisfaction and team