

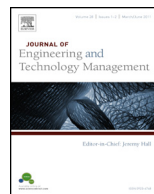


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Contents lists available at ScienceDirect

Journal of Engineering and Technology Management

journal homepage: www.elsevier.com/locate/jengtecman



The antecedents of collective creative efficacy for information system development teams



Hsiu-Hua Cheng^{a,1}, Heng-Li Yang^{b,*}

^a Department of IM, Chaoyang University of Technology, 168, Jifeng E. Rd., Wufeng District, Taichung 41349, Taiwan, ROC

^b Department of MIS, National Chengchi University, 64, Sec. 2, Zhinan Rd., Wenshan District, Taipei 11605, Taiwan, ROC

ARTICLE INFO

JEL classification:

M15
D83

Keywords:

Information system development
Collective creative efficacy
Knowledge integration capability
Achievement motivation

ABSTRACT

Improvement processes for information system development, such as creativity, have seldom been addressed. Based on social cognitive theory, this study explores the influence and moderating effect of collective creative efficacy (CCE) on software process improvement. The partial least square method is applied to analyze data from 61 development teams. Analytical results indicate: (1) team knowledge, achievement motivation, and knowledge integration capability positively influence CCE. (2) Interpersonal interaction enhances the relationship between team knowledge and CCE. (3) Project complexity weakens the relationship between team knowledge and CCE, but strengthens that between achievement motivation and CCE. Theoretical and practical implications are discussed.

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Introduction

Although software projects are typically well founded, they have had a high failure rate. According to the Standish Group International (Jiang et al., 2004), about 15% of projects never delivered a final product, costing US\$67 billion per year. Failure to meet deadlines is endemic in the information technology industry (Parolia et al., 2007).

Software process improvement can reduce the likelihood of software project failure. Many software companies rely on continuous improvements to their processes to increase project

* Corresponding author. Tel.: +886 2 29399091x81005; fax: +886 2 29393754.

E-mail addresses: hhcheng@cyut.edu.tw (H.-H. Cheng), yanh@nccu.edu.tw (H.-L. Yang).

¹ Tel.: +886 4 23323000x7834; fax: +886 4 23742337.

performance (Allison and Merali, 2007; Galinac, 2009; Sun and Liu, 2010). During software development, an information system development (ISD) team generally proposes new ideas for software processes or for improving existing software processes. However, software process improvement has seldom been discussed from the perspective of creativity. This study assumes software process improvement is creativity for an ISD team.

Research has identified creative self-efficacy as a key influence on creativity (Tierney and Farmer, 2002). Previous studies also indicated the relationship between efficacy and creativity at the individual level. However, although teams are central to organizations, previous researchers only indicated that collective efficacy is positively related to team performance (Akgün et al., 2007); they seldom discussed the relationship between self-efficacy and creativity at the team level (i.e., collective efficacy and collective creativity). Cheng and Yang (2011) combined literature on collective efficacy and creativity to propose collective creative efficacy (CCE) at the team level. In the ISD context, software process improvement may require that team members develop and share ideas, and may require team creativity. This study (1) explores the antecedents of CCE from the perspective of information accumulation, and (2) investigates the moderating effects of team and environmental variables on the relationships between antecedents and CCE.

Literature and hypotheses

Creativity

Oldham and Cummings (1996) defined creative outcomes as new, original, suitable and useful ideas or processes. Guilford (1984) argues that team creativity as an outcome of divergent team thinking. Divergent and convergent thinking can help teams to be creative; that is divergent thinking can help teams develop new ideas, while convergent thinking can enable teams to integrate ideas as team outcomes. According to Kurtzberg and Amabile (2001), information and interpersonal interaction contribute to team creativity. Oldham and Cummings (1996) defined team creativity as creative synthesis, meaning that teams develop and share ideas and provide encouragement to produce creative results. In ISD teams, members cooperate on various project-related matters and integrate individual outcomes or ideas into systems. Thus, this study also defines team creativity as a creative synthesis, in which ISD team members propose new and useful ideas for improving software development procedures, suggest novel software processes, or integrate useful modules into information systems.

Collective efficacy

Collective efficacy is the belief of a team in the abilities of its members to successfully complete tasks (Bandura, 1997; Gibson, 1999, 2001); that is, it is a shared belief in the ability of a group to achieve specific goals (Bandura, 1997). Gibson and Earley (2007) indicated that collective efficacy is a cognitive phenomenon, a belief in a general context. To discuss team creativity in depth, Cheng and Yang (2011) developed *collective creative efficacy* (CCE), a new construct, and defined it as the shared belief that combining the abilities of team members will result in creative ideas.

Gibson (2001) asserted that collective efficacy is the product of group-level cognitive processes. Gibson and Earley (2007) indicated that collective efficacy is a cognitive phenomenon. A group developed collective efficacy through four collective cognitive processes (Gibson, 2001): (1) accumulation is the process through which teams acquire information and knowledge for developing collective beliefs; (2) interaction allows team members exchange information and knowledge via interactions; (3) examination is the process of team members cooperating to negotiate, interpret, and evaluate knowledge and information to form a collective efficacy; and (4) accommodation occurs when team members select behaviors according to information processed during previous phases.

Based on the collective cognitive processes proposed by Gibson (2001), Gibson and Earley (2007) indicated that team members can combine their information and experiences to form collective efficacy by internal communication. This study integrates the collective cognitive processes of Gibson (2001), and Gibson and Earley (2007) and creativity theory by Amabile (1983) to generate the

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