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## Climate and Problem Solving in software Development Teams

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### Abstract

The popularity of new product development has been increasing in knowledge-intensive organizations as a means to manage aggressive competition. Given the criticality of product development to the performance of many organizations, it is important to unveil the mechanisms that support problem solving. In line with the relevant literature, this study examined the influence of team climate on team problem solving. By using 139 questionnaires from different projects, structural equation modeling was employed as a statistical analysis tool to investigate the given hypotheses. The findings showed that team climate was positively related to team problem solving. The implications for both theory and practice are discussed.

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### 1. Introduction

The traditional approaches for the achievement of business objectives have dramatically changed, especially those adopted by industries that operate in knowledge-intensive environments, such as the software industry. In these days, firms have increasingly preferred to use teams for the development of new products, services, processes and/or business models to achieve their vision instead of requiring individuals to adopt mere patents following trends established by competitors (Drach-Zahavy, 2004). Recent studies indicate that 82 percent of firms with 100 or

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more employees prefer to assign employees to various team tasks and activities instead of assigning them to individual projects. In fact, approximately 70-75 percent of these teams are assigned to product development projects (Edmondson & Nembhard, 2009). The literature of technology innovation management (TIM) reveals that firms which launch high technology products are quite often driven by rapid technological changes (Günsel & Açıkgöz, 2013). In this regard, traditional models and production methods should be updated in order to facilitate firms to be competitive and meet the increased demands of ongoing changing customer preferences.

When this is the case, teams involved in product development projects must invest in a continuous learning process, as their responsibilities often span a number of unfamiliar boundaries (Allred, Snow, & Miles, 1996). In doing so, team members should collectively acquire and apply new knowledge and understandings to address team tasks and issues for which solutions have not yet been provided (Sole & Edmondson, 2002). In this way, teams detect technical and market-related product problems and find alternative solutions for the problems, thereby producing new products with superior quality (Akgün, Lynn & Yılmaz, 2006).

In this regard, knowledge-intensive firms should excel in problem-solving processes aiming at the improvement of traditional product development methods so as to gain first-mover advantage in the industry in which they operate. However, the way that teams of such firms should develop and retain problem-solving capabilities appears to be one of the main concerns of such teams which are involved in product development projects. The characteristics of a context (such as climate or culture), at either an organizational or team level, could equally facilitate or restrain the efforts made by teams to develop problem-solving capabilities (Zellmer-Bruhn & Gibson, 2006). For the purposes of this study, we assumed that team climate as an organizational context in which members' perceptions, experiences, and beliefs regarding contingencies, conditions, and relations among its members (Schneider & Reichers, 1983) might have a significant effect on the development of problem-solving capabilities within a team.

Therefore, the aim of this study is to empirically investigate the role of climate and product quality on problem solving and learning in software development teams. The section which follows provides a literature review to establish the theoretical background of the study whilst the research hypothesis and the methodology are presented in the third section. Finally, at the conclusion part, results of hypothesis testing are discussed and the general implications of the study are reviewed.

## **2. Literature Review**

### *2.1. Team Problem Solving*

In the knowledge management literature, organizations are defined as bundles of valuable, rare, inimitable, and non-substitutable capabilities and resources (Barney, 1991). Day (1994) considers capabilities to be a combination of both skills and tacit knowledge which are operationalized throughout various processes of product development. In other words, capabilities are built upon knowledge and skills which are embedded in teams' behaviours, technical systems, and managerial functions (Atuahene-Gima & Wei, 2011; Li Yang, Klein, & Chen, 2011). According to Sheremata (2002), product development teams should develop several capabilities, i.e., dynamic capabilities such as problem solving capability in order to evaluate, assimilate, and absorb large amounts of precise knowledge which are derived, either externally from or internally to organizational boundaries. Problem solving has been considered as "the engine of knowledge creation" (Iansiti, 1998, p: 99) and its importance at a team level has been widely studied in the field of product development (e.g., Aladwani, 2002; Atuahene-Gima & Wei, 2011; Thomke & Fujimoto, 2000).

Both scholars and practitioners consider problem solving to be a dynamic capability enabling product development teams to develop original solutions to solve problems, thus rendering them competitive in the environment in which they interact (Morgeson & Humphrey, 2006). Product development, by its nature, consists of a set of routinized problem-solving processes and those who are involved in these processes are constantly dealing with unpredictable situations and crucial problems (Thomke & Fujimoto 2000). Based on Huber's (1980) work, the problem-solving process entails different phases which are related to understanding the problem, planning an appropriate solution, and also proposing various alternatives, implementing the chosen solution and periodically

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