Chapter 12
Identification of Patterns for the Formation of Software Development Projects Teams

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ABSTRACT

The formation of software development project teams is carried out, conventionally, in an empiric manner; however, in this process, multiple factors should be considered. In literature, the works where this process is modeled are scarce, and most do not consider aspects linked to the formation of the team as a whole. In this paper, a group of patterns that contribute to the formation of software development projects teams are identified through the use of the Delphi method, psychological tests, and data mining tools. The paper identifies patterns that are validated experimentally, while psychological characteristics in the process of software team formations are exemplified.

1. INTRODUCTION

Many investigations recognize that human resources play a critical role in the success or failure of software projects (Acuña, Gómez, & Juristo, 2008a; De Carvalho, 2003; De Marco & Lister, 1999; Gorla & Wah, 2004; IEEE, 2004; Pressman, 2004; Pyster & Thayer, 2005). However, people continue to be the least formalized factor in process modeling, which tends to focus more on the technical aspect (Acuña, Juristo, & Moreno, 2006; André, Baldoquín, Acuña, & Rosete, 2008; Karn, 2006). The inadequate assignment of personnel and problems among project team members are identified as two of the main human factor related difficulties affecting software project success (Charette, 2005; Ryan, 2007). Generally, though, people are assigned to project roles, and teams are
formed empirically, with the resulting impact on project quality which is harder in medium-sized and large organizations. The experience of the project leader is useful in the assignment process. However, if this process occurs in an intuitive way and without an objective base, it results in poor use of the resources, not being able to satisfy the chronograms (Ngo-The & Ruhe, 2008) and it can cause dissatisfaction of personnel.

Nevertheless, although the assignment problem has been an object of study for several decades, the works where the assignment of personnel to software project teams is modeled are scarce.

In Acuña, Juristo, and Moreno (2006), De Carvalho (2003), and Ngo-The and Ruhe (2008), models are described that tackle the assignment of personal to software projects. These proposals are centered in the individual assignment of people to tasks or roles of the project and they do not consider factors associated to the formation of the team as a whole.

In this paper the main results of the process of knowledge management are shown. These are carried out to obtain patterns that contribute to formation of software development project teams, making use of Delphi, as an expert method, and of the application of psychological tests and tools for data mining. The identified patterns are validated by means of analysis of successful and unsuccessful projects teams.

This paper is structured as followed. Section 2 describes related work on models of processes for the assignment of personal to software projects and studies that consider psychological aspects in the formation of software teams. Section 3 details the main results of the process of knowledge management carried out to obtain the patterns that contribute to formation of software development project teams through the use of the Delphi method, and of the application of psychological tests and tools for data mining. Section 4 describes the validation of the identified patterns.

2. RELATED WORKS

The assignment of persons to software projects has been a topic hardly approached in software engineering literature. The models of software processes are generally centered in the technical aspects. Such that, recognized models of processes like: People-CMM (Curtis, Hefley & Miller, 2001), Personal Software Process (Humphrey, 1995), Team Software Process (Humphrey, 1998) and the Rational Unified Process (Jacobson, Booch, & Rumbaugh, 2000), although they incorporate the human factor, they do not model the assignment process of personnel to project, neither do they formalize the necessary competences for the execution of roles.

Although many authors have devoted studies to identify competences of IT professionals (e.g., Trigo et al., 2010) or software engineers (e.g., Colomo-Palacios et al., 2010), none of these studies have analyzed in deep psychological factors for the assignment of people to software development teams.

In the next subsection, works where models of processes for the assignment of personal to software projects are proposed and studies that consider psychological aspects in the formation of software teams are analyzed.

2.1. Models for the Assignment of Personal to Software Projects

In De Carvalho (2003), a management process of human resources in software development projects based in the reuse of organizational knowledge of the competences and previous assignments of personnel is proposed. According to the process, the project leaders assign people to each task of the project, taking into account the defined profile which includes competences, experiences and academic formation.

In Ngo-The and Ruhe (2008), a method of planning of releases to develop software incrementally is proposed. The method assigns functionalities