Chapter 82
Getting the Best out of People in Small Software Companies: ISO/IEC 29110 and ISO 10018 Standards

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ABSTRACT

Managers of software small companies struggle to manage their software process. Therefore, for them realizing and understanding the impact of human factors on software process is even more challenging. Although human factors have been proved to have impact on software process, unfortunately they have been overlooked altogether. This paper proposes a holistic view of human factors on software process in VSE, focusing on the concerns and perceived shortcomings present. In order to identify and compare the human factors, the author carried out a systematic comparison of human factors. As a result, this study identifies the connection between software process defined in ISO/IEC 29110 and human factors given in ISO 10018 and its pertinence. In light of that, the author outlines first steps towards enhanced implementation of ISO/IEC 29110 standard based on ISO 10018.

INTRODUCTION

Software is created by people for people working in a range of environments and under various conditions (Prikladnicki et al., 2013). Dyba (2005) found in a survey of 120 software organizations that organizational factors are at least as important as technology for SPI success. Thus, people are fundamental in the software process and in its assessment and improvement (Sampaio, Sampaio, & Gray, 2013). And, understanding the cooperative and human aspects of software development is crucial in order to comprehend how methods and tools are used, and thereby improve the creation and maintenance of software (Prikladnicki et al., 2013). Indeed, the software development process has been considered a "socio-technical system," where organizational and human aspects have a key role and have to be supported by technology in a way that is human and organization-driven (Fuggetta & Di Nitto, 2014).

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Therefore, a small software company such as an enterprise, organization, department or project with up to 25 people (International Organization for Standardization (ISO), 2011), Very Small Entity (VSE), requires not only a way to assess and improve their software process, but also address people involvement and competence. Software process improvement (SPI) offers VSEs many opportunities, challenges and barriers such as financial, culture, reference models and skills (Larrucea, O'Connor, Colomo-Palacios, & Laporte, 2016). In general, if the people within an organization are not managed effectively, they could potentially cause disruptions to the implementation process. Furthermore, the implementation of ISO/IEC 29110 implies change to the organization (Pries-Heje & Johansen, 2010), and as a consequence, people are crucial to ensure successful implementation. In fact, the human factors are important in order to achieve outcomes which are consistent and aligned with organizational strategies and values but there are few previous studies in this area focused specifically on small companies (Clarke & O'Connor, 2012). Moreover, in spite of the importance of the ISO 10018 standard that provides guidelines on people involvement and competence, it had not been fully explored. In light of that, the aim of this study is twofold: first, to identify evidence presented in previous studies to support the human factors in ISO 10018; and second, to outline initial steps to enhance implementation of the ISO/IEC 29110 standard while ensuring not only proper implementation but also boots the results of the implementation effort.

BACKGROUND CONTEXT

ISO/IEC 29110

In 2011, a new software process standard for VSEs, ISO/IEC 29110 (freely available at http://standards.iso.org/ittf/PubliclyAvailableStandards/index.html) was released (O'Connor & Laporte, 2014). This standard defines the minimum activities and work products that require VSEs to perform (Takeuchi, Kohtake, Shirasaka, Koishi, & Shioya, 2014). ISO/IEC 29110 provides a standard according to VSEs characteristics and needs (ISO, 2011) and it is considered an emerging SPI initiative (Moreno-Campos, Sanchez-Gordon, Colomo-Palacios, & Amescua Seco, 2014). Although, other initiatives are devoted to small entities such as Competisoft from Latin America and ITmark from Europe (Oktaba et al., 2007), ISO/IEC 29110 is becoming the widely adopted standard (Laporte, Alexandre, & O'Connor, 2008; Moreno-Campos et al., 2014).

The overall objective of this standard is to assist and encourage VSEs in assessing and improving their software process. To date, a series of pilot project for the software engineering profile standard have been completed in several countries (O'Connor & Sanders, 2013) (Laporte, O'Connor, & Paucar, 2015) (Laporte & O'Connor 2016b). However, there are many settings of VSEs and therefore have been proposed four profiles: entry, basic, intermediate and advanced, but only the first two have been released. Moreover, the authors of this standard state that it is intended to be used by the VSE to establish processes to implement any development approach or methodology – e.g. agile, evolutionary, incremental, test driven development - based on the VSE organization or project needs. The ISO/IEC 29110 provides two main categories of processes: Project Management (PM) and Software Implementation (SI) (see Figure 1).

PM process aims to establish and carry out in a systematic way the Tasks of the software implementation project, which allows complying with the objectives of the project in the expected quality, time and cost (O'Connor, 2014). SI process aims to systematically analyze, design, construction, integration and testing of the new or modified software products according to the specified requirements.