

# Chapter 57

## An Objective Compliance Analysis of Project Management Process in Main Agile Methodologies with the ISO/IEC 29110 Entry Profile


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### ABSTRACT

*Software Process Improvement efforts (SPI) are pursued by organizations for improving the overall quality of their software development processes. However, very small entities (VSEs) avoid them by the lack of required financial and other organizational resources. In contrast, VSEs use agile software development methodologies (ASDMs), but these ASDMs do not foster adherence to best scholastic practices promoted by SPI. Furthermore, while a new ISO/IEC standard (29110) has been recently released for VSEs, it was not designed taking account the ASDM approaches. Thus, we investigate the extent of adherence of main ASDMs (two industrial and one academic type) with this new standard. Initial results provide evidence on the strong need to enhance the two industrial ASDMs (XP and SCRUM). In contrast, the academic ASDM (UPEDU) fits the standard very well but it is scarcely used by VSEs. Hence, it is concluded that there is a knowledge gap between the praxis with ASDMs and the recommended scholastic software processes like the ISO/IEC 29110 standard for VSEs.*

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## **INTRODUCTION**

Software process models and standards (SPMSs) (SP (like ISO/IEC 12207, ISO/IEC 15504, CMMI) have been developed by international associations for helping to software development organizations to meet the current demands for quality process and product improvements (Succi et al., 1998; Laporte et al., 2008). SPMSs are important for software development organizations because their correct implementation has generated relevant benefits (Clarke & O'Connor, 2012; SEI, 2006). However, according to Laporte et al. (2008) these software process standards “were not written for small projects, small development organizations, or companies with between 1 and 25 employees, and are consequently difficult to apply in such settings.” Thus, very small entities (business or teams) while represent a high percentage of software business in the world (OECD, 2005), are under served potential users by normal software process standards and models (O'Connor & Laporte, 2010; 2012) (Coleman & O'Connor, 2008). To address this problematic situation, the ISO/IEC 29110 software process lifecycle standard (ISO, 2012) was elaborated. This standard focuses on VSEs.

However, such standards do not prescribe a particular software development methodology (SDM) (such as RUP (Kruchten, 2001; or MSF (Microsoft, 2008)), and thus software development teams – from large, medium, small or very small organizations - face a compliance problem of what SDM to use with any particular standard or model (Mora et al, 2009). This compliance problem between process standards or models with SDMs has been studied previously (Gallagher & Brownsword, 2001; Manzoni & Price, 2003; Mora et al., 2010; Irrazabal et al., 2011; Pasini et al., 2013; Fernandez-Monteiro, 2014; Larrucea & Santamaria, 2015; Cruz et al., 2015; Garcia et al., 2016) with the aim to help to organizations in achieving a satisfactory implementation and certification of the selected software process standard or model (Larrucea et al, 2016).

Furthermore, it has been identified that small and VSEs prefer to use Agile Software Development Methodologies (ASDMs) such as: SCRUM and XP among others (Dya & Dingsoyr, 2008; West and Grant, 2010; Stavru, 2014). However, these ASDMs do not foster adherence to best scholastic practices like SPMSs. Additionally, while a new standard (ISO/IEC 29110) (ISO, 2012) has been recently released for VSEs, it was designed independently of the ASDM approach. In this research, thus, we are motivated to study the compliance problem of ASDMs with the new ISO/IEC 29110 standard given the relevance for VSEs of both approaches and the lack of such compliance results in the extant literature. We study the compliance level of two well-known industry-based ASDMs (SCRUM (Sutherland & Schwaber, 2013) and XP (Beck, 1999)), and one academic-based (UPEDU (Robillard et al., 2001)) with the ISO/IEC 29110 standard. Our scope is limited to the Process Management process in this study. A subsequent research will address the Software Implementation process compliance.

This paper continues as follows: the research goals, questions, method, tools and materials are reported in the section 2; the theoretical basis on ISO/IEC 29110 standard and the three ASDMs are reported in the section 3; the compliance analysis are reported in the section 4; a discussion of implications, limitations and recommendations are reported in section 5; and finally the conclusions of this study are reported in section 6.

## **Research Goals, Questions, Method, Tools, and Materials**

This research pursues two specific goals: 1) to assess an objective compliance level on Roles, Activities-Tasks, and Artifacts to the ISO/IEC 29110 Entry Profile Project Management process within the SCRUM,

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