The ISO/IEC 29110 Software Lifecycle Standard for Very Small Companies

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INTRODUCTION

Software development is a complex socio-technical activity and in earlier work we have examined the complex interaction between a software development process and its situational context (Clarke et al, 2015) Part of the challenge of organising the software development process involves deciding upon the specific roles involved in the process and the responsibilities of individuals fulfilling these roles. Therefore, just as the process itself is subject to regular change (Clarke et al, 2017) so too are the roles subject to change. We have therefore examined the role of the software engineer and how this has changed over time, including how it might change into the future.

Quality orientated software process approaches and standards have gained mainstream acceptance in in the software development community over the year. There are many potential benefits of using standards due to the emphasizes on communication and having a shared common understanding of software lifecycle tasks.

For many small and start-up software companies, implementing controls and structures to properly manage their software development activity is a major challenge (Coleman & O'Connor, 2008c). It is commonly agreed that very small software companies, implementing management procedures, and controls to appropriately administer their software development activity is a significant challenge (Laporte et al, 2015). For example, a software company operating in Mexico may have a completely different set of operational problems when compared to a software company in the USA or Ireland. Even within a single geographical area such the range of operational issues faced by a small local firms can be radically different to those affecting a multinational subsidiary. The fact that all companies are not the same raises important questions for those who develop software process and process improvement models (Larrucea et al, 2016). To be widely adopted by the software industry, any process or process improvement model should be capable of handling the differences in the operational contexts of the companies making up that industry. But process improvement models, though highly publicized and marketed, are far from being extensively deployed and their influence in the software industry therefore remains more at a theoretical than practical level.

To help meet the need for VSE-specific systems and software lifecycle profiles and guidelines, the International Organization for Standardization and the International Electrotechnical Commission jointly published ISO/IEC 29110 "Lifecycle profiles for Very Small Entities" series of standards and guides, with the overall objective being to assist and encourage very small software organization in assessing and improving their software. These publications target VSEs, ranging from start-ups to grownups, with little or no experience or expertise in selecting the appropriate processes from systems or software engineering lifecycle standards (such as ISO/IEC/IEEE 12207) and tailoring them to a project's needs (Laporte et. al, 2017).

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The purpose of this chapter is to provide a primer on the ISO/IEC 29110 standard focusing on two main process areas of Project Management and Software Implementation. This chapter will start with an explanation of the rationale and justification for the development of this new standard, followed by an overview of its structure and explain how to deploy ISO/IEC 29110 in a typical very small software company.

BACKGROUND

This section will introduce the problem with standards and explain the specific case of very small entities, before presenting the ISO/IEC 29110 standard as a solution specifically designed to address these problems for very small companies.

Very Small Companies (VSE)

Due to the rich variety of software development settings (for example: the nature of the application being developed, team size, requirements volatility), the implementation of a set of practices for software development may be quite different from one setting to another (Jeners et al., 2013a). Small and very small companies are the fundamental growth of many national economies. It is important to notice that the contribution from the small companies should be seen as important and significant as compare to the large one (Jeners et al., 2013b).

The context for the development of the ISO/IEC 29110 series of standard was specifically that of Very Small Companies and it is therefore necessary to examine such terms. The definition of "Small" and "Very Small" Entities is challengingly ambiguous, as there is no commonly accepted definition of the terms. The term "Very Small Entity" (VSE) had been defined by the ISO/IEC JTC1/SC7 Working Group 24 and subsequently adopted for use in the new ISO/IEC 29110 software process lifecycle standard as being "an entity (enterprise, organization, department or project) having up to 25 people" (Laporte et al, 2008).

A large majority of enterprises worldwide are VSEs. In Europe, for instance, as illustrated in Table 1, over 92% of enterprises are micro-enterprises. They have fewer than nine employees. Micro enterprises account for 70% to 90% of enterprises in OECD countries and about 57% in USA.

Table 1. Size of enterprises in Europe (Moll 2013).

Type	Number of Employees	Annual turnover	No. of enterprises (% of overall)
Micro	1-9	≤2M	92.2
Small	10-49	≤10M	6.5
Medium	50-249	≤50M	1.1

Typically, VSEs are economically vulnerable as they are driven by cash flow and depend on project profits, so they need to perform the projects within budget. They tend to have low budgets which have many impacts, such as: lack of funds to perform corrective post-delivery maintenance; few resources allocated for training; little or no budget to perform quality assurance activities; no budget for software