Chapter 52
An Innovative Approach to the Development of an International Software Process Lifecycle Standard for Very Small Entities

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ABSTRACT

For very small software development companies, the quality of their software products is a key to competitive advantage. However, the usage of Software Engineering standards is extremely low amongst such very small software companies. A primary reason cited by many such companies for this lack of quality standards adoption is the perception that they have been developed for large multi-national software companies and not with small and very small organizations in mind and are therefore not suitable for their specific needs. This paper describes an innovative systematic approach to the development of the software process lifecycle standard for very small entities ISO/IEC 29110, following the Rogers model of the Innovation-Development process. The ISO/IEC 29110 standard is unique amongst software and systems engineering standards, in that the working group mandated to develop a new standard approached industry to conduct a needs assessment and gather actual requirements for a new standard as part of the standards development process. This paper presents a unique insight from the perspective of some of the standards authors on the development of the ISO/IEC 29110 standard, including the rationale behind its development and the innovative design of implementation guides to assist very small companies in adopting the standards, as well outlining a pilot project scheme for usage in early trials of this standard.

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1. INTRODUCTION

For many small and very small software companies, implementing controls and structures to properly manage their software development activity is a major challenge. Administering software development in this way is usually achieved through the introduction of a software process. All software companies are not the same and vary according to factors including size, market sector, time in business, management style, product range and geographical location. For example, a software company operating in India may have a completely different set of operational problems when compared to a software company in Canada, Mexico or Ireland. Even within a single geographical area such as Ireland, the range of operational issues faced by a small local Irish-owned firm 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. 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 (Coleman & O'Connor, 2008a).

In a time when software quality is a key to competitive advantage, the use of ISO/IEC systems and software engineering standards remains limited to a few of the most popular ones. Research shows that small and very small companies can find it difficult to relate ISO/IEC standards to their business needs and to justify the application of the standards to their business practices (Laporte et al., 2008; O'Connor & Coleman, 2009). Most of these companies don't have the expertise or can't afford the resources - in number of employees, cost, and time - or see a net benefit in establishing software life-cycle processes. There is sometimes a disconnect between the short-term vision of the company, looking at what will keep it in business for another six months or so, and the long-term or mid-term benefits of gradually improving the ways the company can manage its software development and maintenance. A primary reason cited by many small software companies for this lack of adoption of software engineering standards, is the perception that they have been developed for large software companies and not with the small organization in mind (Coleman & O'Connor 2008b). To date the industrial reality is that Very Small Entities (VSEs) have limited ways to be recognized, by large organizations, as enterprises that produce quality software systems within budget and calendar in their domain and may therefore be cut off from some economic activities.

Accordingly there is a need to help such organizations understand and use the concepts, processes and practices proposed in the ISO/IEC JTC1/SC7's international software engineering standards. The recently published ISO/IEC 29110 standard "Lifecycle profiles for Very Small Entities" (ISO, 2011a) is aimed at addressing the issues identified above and addresses the specific needs of VSEs.

The purpose of this paper is to chart the design and development of this new ISO/IEC standard by harnessing the expressive power of the 6-stage model of the innovation-development process model, developed by Rogers (2003). In addition it presents a unique insight from the perspective of two of the standards authors, as well as the initial results of some early pilot trials of ISO/IEC 29110.

The structure of this paper is as follows: Section 2 introduces background concepts and definitions such as the concept of Very Small Entities, Standards and their usage in small companies. Section 3 provides a high level summary of the approach used in this paper and a detailed description of the application of this approach and its outcomes. Section 4 will discuss the impact of this work, its limitations and planned future work.