Chapter 66
Software Process Improvement for Small and Very Small Enterprises

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ABSTRACT

Software organizations have been struggling for decades to improve the quality of their products by improving their software development processes. Designing an improvement program for a software development process is a demanding and complex task. This task consists of two main processes: the assessment process and the improvement process. A successful improvement process requires first a successful assessment; failing to assess the organization's software development process could create unsatisfactory results. Although very small enterprises (VSEs) have several interesting characteristics such as flexibility and ease of communications, initiating an assessment and improvement process based on well-known Software Process Improvement (SPI) models such as Capability Maturity Model Integration (CMMI) and ISO 15504 is more challenging in such VSEs. Accordingly, researchers and practitioners have designed a few assessment methods to meet the needs of VSEs organizations to initiate an SPI process. This chapter discusses the assessment and improvement process in VSEs; we first examine VSEs characteristics and problems. Next, we discuss the different assessment methods and standards designed to fit the needs of such organizations and how to compare them. Finally, we present future research work perceived in this context.

INTRODUCTION

The software industry has become an important economic activity in industrialized countries. Investments in this industry are in billions of dollars. In parallel, the number of software organizations has increased, varying in size, types of products produced and development processes used.

One of the important players in the software industry and world economy is organization with few employees. The majority of positions in the IT sector in industrialized countries are provided by small and very small organizations. Until the end of 1990s, it is mostly large organizations that have shown interest in improving their software processes using well-known SPI models. Unfortunately, models such as CMMI, ISO 15504 and others have not been adopted by small and very small organizations since their level of detail and comprehensiveness is more suitable for large organizations than small and very small organizations. Applying these models in such organizations leads to a number of challenges within a set of constraints; small and very small organizations which are fighting to survive and provide their customers with a working version of their products, must address daily challenges. These challenges leave organizations with little flexibility with respect to long-term planning. Small and very small organizations must be highly agile and reactive, and they have little control over longer lead times. Therefore, any process assessment conducted by such organizations and any improvement process they implement must also be agile, quick and inexpensive. Other challenges and problems will be discussed later on in the issues, controversies, and problems section; open issues will be also discussed in Future research directions.

BACKGROUND

Designing an improvement program for a software development process is a demanding and complex task. This task consists of two main processes: the assessment process and the improvement process. A successful improvement process requires first a successful assessment which identifies the exact weaknesses in the organization's software development process; failing to assess the organization's software development process could create unsatisfactory results.

Software processes assessment (SPA) can be used either to determine the capability of another organization, for subcontracting purposes, or to determine and understand the status of the organization's current processes to initiate an improvement process. Currently, several methods are available to assess the maturity and capability of a software development process based on well-known software process assessment and improvement frameworks such as CMMI and ISO-15504. The success of these assessment methods and improvement frameworks is supported by post-development studies on the validity, reliability and effectiveness of these methods. Unfortunately, many researchers consider that such methods are too large to implement in small and very small organizations. As a result, some researchers have studied process assessment and improvement in small and very small organizations and proposed assessment methods suitable to such organizations' needs, usually called lightweight SPA methods such as MARES, TOPS and FAME. These methods and others will be discussed in the solutions and suggestions section

There is no standard definition for small organizations size. The size is something relative, i.e. an organization having 100 employees considers another organization having 1000 employee as very large, while the organization having 1000 employee considers the organization having 100 employees as a small one, and perhaps will consider the organizations having 10 employees as "micro-organizations." So when discussing SPI in small and very small organizations we have, firstly, to define "what small and very small" mean to us.

In the Software Engineering Process Group conference (SEPG'98) on the Capability Maturity Model (CMM) and small projects held in 1998,

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