

# Chapter XLVIII

## Software Process Asset Libraries Using Knowledge Repositories

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### ABSTRACT

*This paper establishes the incorporation of knowledge management techniques as a means to improve actual software process asset libraries. It presents how knowledge management contributes to the creation of a new generation of process libraries as repositories of knowledge as well as the mechanisms to allow the acquisition, storage, collaborating, sharing and distribution of knowledge related to the software development processes. It exposes aspects about organization and structure of this kind of digital libraries oriented to software process engineering, defining a lifecycle of the software process assets and a set of services and functions for its effective use in small and medium software development enterprises.*

### INTRODUCTION

An underlying aspect of the software development is the process. There is a direct relation between

processes quality and developed software products (Fuggetta, 2000). During the development of software projects, the organizations need people, technology and processes for creating, acquiring

and sharing knowledge about how build software. The process-oriented approach is dedicated to study and understand the sequence of steps and activities necessary for developing the software product, establishing a technical and organizational framework for applying methods, tools and people to software development.

The personnel involved in software development accumulate knowledge. The main disadvantage is that this knowledge is not gathered, hence the knowledge is lost, past errors are repeated again, and the knowledge transference is not easy. The software process knowledge can be stored in a Software Processes Asset Library (PAL) so that in future projects the results could be reached easily and helping to achieve the Software Process Improvement (SPI). But there is little information about what kinds of processes must be captured in the PAL, what processes to ignore, and the need to consider different process representations, materials for different roles and purposes. Moreover, a PAL that achieves to standardize and reuse a software process must describe the process, store it in a suitable format, identify the desired process in a database and retrieve it and adapt it to organizational needs. There are many works about the process description and few researches about the rest of functions (storage, search, recovery, and adaptation).

The goal of this work is to define a set of functionalities of a new generation of PAL, using Knowledge Management (KM) techniques and reusing mechanisms like key elements in order to obtain an institutionalized process to gather and use the know-how in Small and Medium Software Enterprises (SME).

The remainder of this work is structured as follows. Section 2 illustrates the background and definitions. Section 3 presents a review of the literature. Section 4 shows the structure of the PAL proposed, a set of functionalities for creating a new generation of PAL, and it highlights the contributions to the Software Engineering field. Section 5 describes conclusions remarks, and finally, future trends are presented.

## **BACKGROUND AND DEFINITIONS**

This section presents concepts related to the application of knowledge repositories in software process asset libraries for helping to implement SPI strategies using KM.

### **Software Process Improvement**

The objective of SPI is to implement and institutionalize improvement practices to develop software in the organization (i.e., to create new knowledge at an organizational level, creating processes that help the organization to acquire experience of existing sources that will be applied to new projects).

For an effective deployment of SPI it is necessary to facilitate the means for the organization continually gathering pieces of information valuable to attaining improvement and to package and infuse the synthesized experience into future projects. In such a way that it can assemble sub-processes in constructive fashion (Aaen et al., 2002).

The successful SPI models like CMMI in large companies offer incentives for their adoption in new environments but they must be adapted appropriately for its effective fulfillment.

SMEs have a great interest in how to introduce and sustain a SPI initiative, minimizing the limitations of its size and maximizing the benefits inherent in its culture. For the use of SPI models, these companies need to tailor the models to address the problems related to the size and key aspects like documentation, management, reviews, resources, and training.

### **Process Asset Library**

The SPI actions are oriented to create processes that help the organization to acquire experience of existing sources that will be able to be applied to software engineering projects. Therefore, it is necessary to store the knowledge, to package it

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