Chapter 14
An Approach for Recovering the Connections between Business Process and Software System

Lerina Aversano
University of Sannio, Italy

Fiammetta Marulli
University of Sannio, Italy

Maria Tortorella
University of Sannio, Italy

ABSTRACT

The relationship existing between a business process and the supporting software system is a critical concern for organizations, as it directly affects their performance. The knowledge regarding this relationship plays an important role in the software evolution process, as it helps to identify the software components involved by a software change request. The research described in this chapter concerns the use of information retrieval techniques in the software maintenance activities. In particular, the chapter addresses the problem of recovering traceability links between the entities of the business process model and components of the supporting software system. Therefore, an information retrieval approach is proposed based on two processing phases including syntactic and semantic analysis. The usefulness of the approach is discussed through a case study.

INTRODUCTION

Fast change in business requirements forces enterprises to a continue evolution of their software systems in order to effectively use them. The change emerging from the business environment immediately affects the business processes that need to be customized to support organizational change (Basili et al., 1994). This scenario offers an important challenge. It regards the software maintenance tasks relatively to the adaptation of software systems to business process changes.

The relationships among organizational and process aspects and software components have
already been considered with reference to the development of new software systems (Henderson & Venkatraman, 1993). In particular, a business process consists of the set of activities performed by an enterprise to achieve a goal. Its specification includes the description of the activities and control and data flow among them. The supporting software system is generally an application that provides support to the user while performing the process activities. Then, it is clear that a change in the process may immediately affect the software components by software change request. However, locating the appropriate components impacted by the change requirements is not always obvious to software maintainers. This is particularly true if the change requirements are expressed in terms of business activities and maintainers have not an evidence of what this means in terms of software components. This immediately suggests the need of adequately managing the links existing between business process activities and software system components. The knowledge regarding these connections is very important for software maintainers while they have to deal with change requirements. Unfortunately, this information is not adequately documented and the impact of a change on the process is often difficult to map to the software components. In the best of the authors’ knowledge, there is a lack of studies regarding the definition of methods and tools for recovering and managing the relationships existing between business processes and software systems.

To prove the relevance of the knowledge cited above, an exploratory study was performed with the aim of analyzing the relationship existing between a business process and the supporting software systems and of understanding the contribution of this relation in the software evolution process (Aversano & Tortorella, 2009). The empirical study involved a group of students from the courses of Informative Systems and Project management, in their last year of the master degree in computer science at the University of Sannio, in Italy. They were asked to analyse code and software documentation of two software systems and identify the software components to be modified on the basis of a set of change requests. In addition, a group of experimental subjects could use the knowledge regarding the business process. The aim of the analysis was evaluating whether the knowledge of the business process using the software systems and the ability of using such a kind of knowledge leads to an improved identification of the impact of a requirement change request on the software system. The results suggested the strong correlation existing between business activities and process components and, according to the initial hypothesis, indicated that the business information effectively provides a significant help to software maintainers.

Learning from this experience, this chapter proposes an approach, based on Information Retrieval, aiming at supporting software maintainers with the business process knowledge that is useful for clarifying change requirements concerning the software systems.

The chapter is organized as follows: Section 2 provides a description of the related work; Section 3 presents the Information Retrieval approach for recovering traceability links between business process activities and software system components; the software tool supporting the approach is presented in Section 4; Section 5 presents the application of the approach in two case studies; finally concluding remarks and future works are discussed in Section 6.

RELATED WORK

The issue of alignment was mentioned for the first time in the late 1970s and since then several studies and researches were conducted highlighting the alignment concerns.

A view of business and technological alignment defines at which degree the information technology mission, objectives, and plans, support and are supported by the business mission, objectives,