Chapter 6.3
Integration of Knowledge Resources in R&D Organizations: A Human Resource Management Perspective

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ABSTRACT

This article presents the process of design and implementation of a holistic knowledge management infrastructure for R&D organizations from human resources (HR) perspective. The approach addresses HR challenges such as support for an open and flexible organizational structure, support for managing the specific assets of an R&D organization, supports for analysis and reporting, both internally and towards research funding bodies, as well as integration into the semantic web community space. Using an illustrative case study of a concrete research-intensive establishment, the Mihajlo Pupin Institute, this article shows how the latest semantic technologies (ontologies, SPARQL, Semantic Wiki) could be used on the top of the commercial SAP® Enterprise Resource Planning system and the open-source Alfresco Enterprise Content Management system in order to ensure meaningful search and retrieval of the expertise for in-house users as well as the integration in European research space and beyond.

INTRODUCTION

The business process of an R&D organization is a very complex one, heavily influenced by the relations of the R&D organization with the other actors in the society (universities, industry, government and research funding bodies). The main innovation driving forces are: science "push" factors, market "pool" factors, as well as the societal needs and expectations. In a very simplified way, the innovation process of an R&D organization can be roughly divided into three phases: research phase, development phase, and deployment phase.

The results of the research phase are either published and stored in a publication database or kept strictly confidential in paper or electronic form for later use in the patent application, technical or project documentation. The result of the development phase is a prototyped solution that is sooner or later put in practice and accompanied with different kinds of documentation e.g. marketing leaflets, technical white paper, user guide, etc. Keeping the documentation that is created in different time periods in different databases or document management systems makes difficulties in tracking the activities in the business process. Therefore, an R&D organization, like any profit-oriented organization, needs an infrastructure for the integration of the business activities. Such business integration infrastructure should: provide an uniform user-centric access to integrated knowledge resources, facilitate reusability, and automate the tasks defined by the adopted Quality Assurance standard.

The current state-of-the-art knowledge management systems (Cai, 2008; Benbya, 2008) are based on open standards (JEE, XML, XSLT), as well as on semantic technologies such as RDF/RDFS, OWL, SPARQL and others recommended by W3C[1]. Besides business automation and enterprise integration, knowledge solutions support all aspects of knowledge processing and sharing, including knowledge extraction, representation and retrieval. In addition, an R&D organization, in order to be recognized by the broader scientific community, has to follow the information technology trends e.g. Semantic Web initiatives such as SIOC and FOAF (Bojars, Breslin, Peristeras, Tummarello, & Decker, 2008). The SIOC initiative (Semantically-Interlinked Online Communities)[2] aims to enable the integration of online community information. SIOC provides a Semantic Web ontology for representing rich data from the Social Web in RDF. It has recently achieved the significant adoption through its usage in a variety of commercial and open-source software applications, and is commonly used in conjunction with the FOAF vocabulary[3] for expressing personal profile and social networking information (Auer, 2008).

Research questions that arise in this context are:

1. What are the specifics and challenges of knowledge management in research intensive organizations as compared to knowledge management in a business sector?
2. How does the KM infrastructure of R&D organization change and look like in the light of the uprising initiatives for standardization of the Semantic Web data?

In this article, we will discuss these research questions using an illustrative case study of concrete research-intensive establishment, the Mihajlo Pupin Institute (MPI), the biggest research institution in high-tech sector in South East Europe. We will reveal the process of developing an integrated knowledge management platform for R&D organizations from the human resources perspective, where the latest semantic technologies are used on the top of the commercial Enterprise Resource Planning (ERP) software (SAP®) and the open-source Enterprise Content Management (ECM) software (Alfresco). This article is structured as follows. In the following section, the challenges of knowledge management in the HR sector of R&D organization are presented, and the requirements for the human capital management solution are derived. Section 3 discusses the methodological aspects of creating the integrated knowledge management infrastructure. Herein, the overview of the activities that are part of the design, the development and the implementation of the holistic knowledge management platform are given. Next, in section 4, on the case of MPI, the process of knowledge integration in the HR sector as well as the knowledge retrieval is discussed and some results of finding expert knowledge