Chapter 7

THE BUSINESS VIEW: ONTOLOGY ENGINEERING COSTS

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Abstract: A core requirement for the take-up of ontology-driven technologies at industry level is the availability of proved and tested methods which allow an efficient engineering of high-quality ontologies, be that by reuse, manual building or automatic knowledge acquisition methods. This includes in equal measure feasible technological support, which is provided by the methodologies, methods and tools emerged in the last decades in the field of ontology management, and the economics of ontology engineering projects, in particular issues of cost effectiveness and profitability. This chapter presents and discusses approaches for reliably assessing the costs of building ontologies and the usage of cost-related information to quantifiably support a wide range of decisions arising during the lifecycle of an ontology. We account for the similarities and differences between software and ontology engineering in order to establish the appropriateness of applying methods, which have a long-standing tradition in this adjacent engineering field, to ontologies. Building upon the results of this analysis we introduce ONTOCOM as the first parametric cost model for ontologies and discuss means to improve its accuracy and extend its applicability for a wide range of ontology engineering projects at public and corporate level.

Keywords: business view; cost estimation; ontology costs; ontology engineering; parametric method

1. INTRODUCTION

Though ontologies and associated ontology management tools have become increasingly popular in the last decades, the dissemination of ontologies and ontology-based applications as envisioned by the Semantic
Web community requires fine-grained methodologies which are able to deal with both technical and economic challenges of ontology engineering. In order for ontologies to be built and deployed at a large scale and with sufficient efficiency and effectiveness one needs not only technologies and tools to assist the development process, but also proved and tested means to control the overall engineering process. A wide range of ontology engineering methodologies have emerged in the Semantic Web community. Apart from minor differences in the level of detail adopted for the description of the process stages they define ontology engineering as an iterative process, which shows major similarities to the neighbored research field of software engineering. However existing methodologies do not cover a crucial aspect of the engineering process, which has gained significant attention in adjacent engineering areas because of its importance in real-world business contexts: the costs estimation using pre-defined cost models (Hepp, 2007).

In order to precisely estimate the costs related to the ontology engineering process, there is a need for empirically tested cost models which exploit the results already achieved with respect to this issue in related engineering fields. At the same time a cost model for ontologies should take into account the critical factors and particularities of the ontology engineering process. With ONTOCOM we present the first existing approach in this new emerging field of ontology engineering. Estimating costs for ontology engineering is similar to estimating costs for software engineering as it requires the consideration of economic aspects for generic products and the processes they result of. Therefore, our approach largely benefits from the experiences made in estimating costs for software engineering. By using expert interviews we identified the most relevant cost drivers for a wide class of ontology engineering projects. In a large user study we acquired relevant data from a large number of already existing ontology engineering projects and calibrated the model with promising results. Combing the two we were able to identify dimensions for further research and development in order to create a methodology for the creation of any kind of cost estimation model for ontologies, independently of the ontology lifecycle or the organizational setting it might be employed.

The outline of this chapter is as follows. We start by motivating the need for cost-related information in ontology engineering and elaborating on the most relevant methods for cost estimation which are likely to be suited for this purpose in Section 2. In Section 3 we present the ONTOCOM model based on the previously identified most promising methods for cost estimation. We show the various parts of ONTOCOM such as a parametric formula to estimate costs and relevant cost drivers. We show how the generic ONTOCOM model can be broken down for concrete industrial