

A Benefit Estimation Model for Ontologies

Tobias Bürger

Semantic Technology Institute (STI), Innsbruck, Austria
tobias.buerger@sti2.at

Abstract. Predicting the economic value of ontologies is important for their use in productive environments. The measurement of the economic value of information systems usually consists of an assessment of its costs and benefits. While methods for cost estimation for ontology engineering have already been proposed, no method to quantify the benefits of the use of ontologies exists. We thus propose a method for benefit estimation that can be applied to ontologies based on a multiple gap model for user information satisfaction analysis. Together with cost estimation methods this model can be used to predict the economic value of ontologies.

1 Introduction

Nowadays ontologies are a popular tool to represent common knowledge about a domain and are amongst others used for information integration, in knowledge management or to support semantic search. Without a means to predict the benefits and the costs of its development and utilization however it is not feasible to introduce ontologies in productive environments. Methods for cost estimation for ontology engineering have been proposed which include amongst others the ONTOCOM model [3]. But, in order to determine the economic value of ontologies, a method for analysing benefits has to be developed that can be used to compare the estimated costs to quantitative or financial figures. Thus we propose a method for estimating the benefits of ontologies and ontology based applications which is based on user information satisfaction (UIS) analysis as proposed in [2]. This approach was selected based on an analysis of the most common purpose(s) of the use of ontologies from a huge range of available methods used in the field of information systems which are presented in [1] and [4].

2 User Information Satisfaction Analysis for Ontologies

User information satisfaction (UIS) can be measured through a comparison of user expectations of an information system with the perceived performance of the system on a number of different facets. We propose a multiple-gap model which typically assumes that the UIS is influenced by the post-implementation expectations and by the pre-implementation expectations. Multiple-gap models are particularly useful for assessing how systems are viewed at various stages of their production, implementation and use and how these impact UIS. We propose

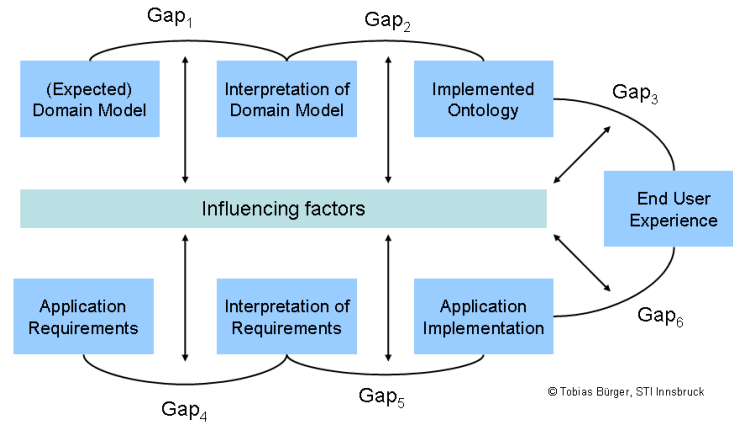


Fig. 1. A multiple-gap model for UIS for ontology based applications

to approach the measurement of benefits of ontologies by the use of the multiple-gap model which is visualized in figure 1. In this model the gaps between the different user groups (i.e. domain experts, ontology engineers, application end user) are explicitly taken into account: Gaps 1-3 consider the ontology perspective of an ontology based application and gaps 4-5 the application perspective. UIS will be measured using a questionnaire which includes questions to measure the perceived importance of facets to assess the effectiveness of the system, questions to measure the performance of the system, and questions to assess the overall user satisfaction in the system. The first parts of the questionnaire are based on a taxonomy of ontology based applications which we developed¹. To further operationalize this model, it will be necessary to develop tools to measure the gaps. Here factor analysis, correlation and regression analysis is suggested to measure the influential factors but also the extent of the gaps.

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References

1. J. Andresen. How to select an it evaluation method – in the context of construction. In *Proceedings of the CIB w78 conference, Aarhus School of Architecture*, 2002.
2. K.K. Kim. User information satisfaction: toward conceptual clarity. In *Proceedings of the International Conference on Information Systems*, pages 183–191, 1990.
3. E. Paslaru-Bontas-Simperl, C. Tempich, and Y. Sure. Ontocom: A cost estimation model for ontology engineering. In *Proceedings of ISWC 2006*, 2006.
4. D. Remenyi, A. Money, and A. Twite. *The effective measurement and management of IT costs and benefits*. Butterworth-Heinemann, 1995.

¹ An exemplary questionnaire and the taxonomy can be found at: <http://www.tobiasbuerger.com/mmsurvey/uis/>