Ontological Evaluation of Scheer's Reference Model for Production Planning and Control Systems – Outline

Peter Fettke, Peter Loos

Johannes Gutenberg-University Mainz
Information Systems & Management
D-55099 Mainz, Germany
E-Mail: {fettke|loos}@isym.bwl.uni-mainz.de

1 Introduction

Within the information systems field, modeling is a vital instrument to develop information systems. However, the modeling process is often resource consuming and faulty. As a way to overcome this failures and to improve and accelerate the development of enterprise-specific models, the concept of reference modeling has been introduced.

Various authors use the Bunge-Wand-Weber-model (BWW-model) [We97] for evaluating grammars [Sh03]. In this presentation, we apply the BWW-Model to ontological evaluate Scheer's reference model for production planning and control systems (PPC) [Sc94]. This study follows the approach of [FL03a] in – at first – identifying ontological deficiencies of the grammar which is used to represent a reference model and in – afterwards – identifying ontological deficiencies of the reference model itself.

2 Ontological evaluation of reference models

The main idea of an ontological evaluation is to map the constructs of a reference model onto constructs of the BWW-model [FL03a]. First, it is necessary to develop a transformation mapping for the grammar used for representing the reference model. This transformation mapping allows to convert the constructs of the used grammar to the constructs of the BWW-model. The transformation mapping introduces an ontological meaning for each construct of the grammar used by the reference model. The explicitly ontological definition of the transformation mapping have a beneficial effect on the objectivity of the evaluation. Without this definition it would be hard to criticize a conducted evaluation of a reference model.

3 Conclusions, limitations and future research

We ontological analyze some parts of Scheer's reference model for PPC. The results demonstrate that the modeling grammar used to represent the reference models has ontological deficiencies. These deficiencies lead to several problems in the reference model,

e. g. the meaning of some modeling constructs is not definite, but vague and some aspects of a reference model are redundant. On the other hand, it can be argued that some of the problems noted are intended by the model's developer and desirable because reference models do not represent one specific enterprise but a class of enterprises. So, these aspects which we identified as ontological unclear constitute a kind of genericity of the reference model. However, we admit to these arguments but believe that such implicit genericity may be confusing and can cause problems if the user of the model is not aware of it. Hence, we demand that reference models should explicitly represent genericity. Otherwise the meaning of the reference model is ambiguous and its adaptation is not straight forward. Furthermore, we explicate some implicit implications of Scheer's reference model. For example, it assumes implicitly an industrial company producing large quantities of specific product types, where each product is made in discrete quantities.

An ontological evaluation can be criticized in several ways, e. g. it is not an objective procedure, it is influenced by the Fregean theory of language, and it relies on specific ontological and epistemological assumptions. However, the basic steps of an ontological analysis can be performed using other assumptions. Furthermore, we point out that an ontological evaluation is not inherently superior to other evaluation approaches. So, we believe that reference models should be analyzed and evaluated from different perspectives [FL03b].

We see several areas for further research: First, ontological evaluations should be applied to analyze and evaluate further reference models. By doing so, model's quality can be studied and guaranteed. Second, our approach is based on the BWW-model. Further investigations should examine the usefulness of other ontological assumptions. Third, ontological evaluations of reference models should be complemented with evaluations from other perspectives. To conclude, we believe that the results of further research provide a better understanding of reference model quality and insights that lead, in the long-term, to a theory of enterprise-modeling.

References

[FL03a] Fettke, P.; Loos, P.: Ontological evaluation of reference models using the Bunge-Wand-Weber Model. Ninth Americas Conference on Information Systems 2003. Tampa, FL, USA 2003, pp. 2944-2955.

[FL03b] Fettke, P.; Loos, P.: Multiperspective Evaluation of Reference Models - Towards a Framework. In: M. A. Jeusfeld; Ó. Pastor (Eds.): Conceptual Modeling for Novel Application Domains - ER 2003 Workshops ECOMO, IWCMQ, AOIS, and XSDM, Chicago, IL, USA, October 13, 2003. Berlin et al. 2003, pp. 80-91.

[Sc94] Scheer, A.-W.: Business Process Engineering - Reference Models for Industrial Enterprises. 2. ed., Berlin et al. 1994.

[Sh03] Shanks, G.; Tansley, E.; Weber, R.: Using ontology to validate conceptual models. In: Communications of the ACM 46 (2003) 10, pp. 85-89.

[We97] Weber, R.: Ontological Foundations of Information Systems. Melbourne 1997.