IDEA GROUP PUBLISHING **ITB11169**

701 E. Chocolate Avenue, Suite 200, Hershey PA 17033-1240, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com

This chapter appears in the book, *Business Systems Analysis with Ontologies*, edited by Peter Green and Michael Rosemann. © 2005, Idea Group Inc.

Chapter V

Template-Based Definition of Information Systems and Enterprise Modelling Constructs

Andreas Opdahl, University of Bergen, Norway

Brian Henderson-Sellers, University of Technology, Sydney, Australia

Abstract

The chapter reviews and augments a previously proposed template for defining enterprise and information systems (IS) modelling constructs. The purpose of the template is to provide clear and precise definitions of modelling constructs in a common format and, thereby, to facilitate intra- and inter-language integration. The template is based on the Bunge-Wand-Weber (BWW) model of information systems and has been used on several existing modelling languages and frameworks. It is defined by a meta-model expressed as a UML class diagram. The purpose of this chapter is to clarify the template further by formalising *the meta-model through semi-*

formal constraints expressed in the object constraint language (OCL) and by populating *the meta-model with definitions of example constructs from the UML version 1.4. The purpose is to make the template easier to understand, to validate it, to pave the way for stronger tool support for the template and to further our work on providing a complete template-based definition of the UML.*

Introduction

As pointed out in Opdahl and Henderson-Sellers (2004), modelling languages and ontologies for enterprises and their information systems (IS) are becoming increasingly important. New and emerging technologies, such as enterprise application integration, enterprise content management, domain-specific languages, intelligent agents and the semantic web, all rely on models of or ontologies for enterprises. The OMG's *model-driven architecture* (OMG, 2002) initiative introduces enterprise and IS modelling techniques into the software development field. As more and more enterprise knowledge is captured in models, there is a danger that the knowledge is dispersed into many small isolated islands because it is represented in a variety of different modelling languages. Language standardisation alone is not sufficient to solve this problem, because different modelling domains, modelling problems, user communities, business partners and model-based tools will require their own dedicated modelling languages in the future as they do today. To ensure that knowledge captured in enterprise models can be integrated and made available throughout the organisation, it is therefore necessary to enable organisations to integrate more closely the different modelling languages they use.

Philosophical ontology offers a common ground for integrating enterprise and IS modelling languages. According to Weber (1997), philosophical ontology is the branch of philosophy that deals with theories about the nature of things in general, as opposed to theories about particular things. In the IS field, one much used ontological model is the Bunge-Wand-Weber (BWW) model of information systems (e.g., Wand & Weber, 1988, 1993, 1995), which adapts Mario Bunge's (1977, 1979) comprehensive philosophical ontology to the IS field. Bunge's ontological model is an example of *scientific realism*, meaning that it "identifies reality with the collection of all concrete things ... postulates the autonomous existence of the external world, admits that we are largely ignorant of it, and encourages us to explore it" (Bunge, 1999, pp. 240-241). It is therefore well suited for defining and integrating modelling constructs that represent concrete problem domains, constructs that represent physical materials rather than abstract concepts.