

Chapter 7

Semiotic Transformation from Business Domain to IT Domain in Information Systems Development

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Abstract

Semantic transaction loss exists in terms of concepts transformation from one design stage to another in information systems development. It results from different interpretations and representations of various requirements in design domains. Without an explicit structural specification of semantic linkages among design domains, the transformation cannot be efficiently identified in an appropriate way. In this chapter, a mechanism for transformation is proposed to assist with the problem through connecting different aspects of information systems with a precise and coherent representation. For the mechanism, transformation begins with the analysis of business objects in business domain, and finishes by generating corresponding structural components in IT domain. Components and their relationships in each domain are endowed with correlated semantic interpretation. The processes of transformation are illustrated through signs and their structure in an organizational semiotic perspective.

7.1 Introduction

Information systems development can be seen as a series of semiotic transformations across business and IT domains. But the transformations usually proceed separately to keep integrity in each process. However, concept divergence, which refers to the incoherence of concept structure in the processes, often exists and causes many problems. One of the serious problems is called transaction loss which happens during transformations among processes of system analysis, system design, and system implementation. When a model in business domain needs to be transformed to IT domain, semantic incoherence will be introduced during the transformation. This problem will consequently cause inconsistency between the evolution of the information system and the business change.

The semantic barrier is summarized by Martin *et al.* (2002) on information systems development from an organizational semiotics point of view. Organizational semantics, software issues, and semantic gaps are the three aspects of the semantic barrier. It is said that the capability to understand the different perceptions of others is quite important for people to share knowledge in system development from the perspective of organizational semantics. The software based tools which represent and model the business also have semantic problems in terms of integration with other systems and with people. Thus, the semantic barriers reveal a gap between the developers of systems and the real world of the organization. Defining and formalizing different levels of a shared conceptual understanding and what it represents in the changing business context is a major challenge in system development.

The problem is addressed in this chapter through introducing a mechanism for transformation from business domain to IT domain. The mechanism acts as a set of signs for a desired mapping. The study is inspired from the theory and technologies of convergent engineering (Taylor 1995) which tries to combine together traditionally separate development processes by converging them through transforming organization, process, and resource (OPR) (Hubert 2001).

7.2 Literature Review

7.2.1 Organizational semiotics

Semiotics is the science which studies the phenomena of signification, meaning and communication in natural and artificial systems (Nöth 1995).