Chapter 8
Ontologies for Guaranteeing the Interoperability in e-Business: A Business Economics Point of View

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ABSTRACT

For e-business, the computer-based processing of value-creation, especially for knowledge-intensive business processes, plays a prominent role with the help of modern information and communication techniques. At least since the further development of the classical Internet for the Semantic Web, the content-based knowledge processing and knowledge transfer have gained more importance. In this chapter it is shown that ontologies represent an auspicious instrument to ensure the interoperability of information and communication systems that have to work together on the work-sharing development of knowledge-intensive business processes. Ontologies become important when agents with heterogeneous knowledge backgrounds co-operate on such business processes. Firstly, the complex and often ill-considered use of the definition of ontology will be discussed critically and its meaning specified. Thereupon it will be shown (with the help of two application areas) how ontologies can be used effectively to support knowledge-intensive business processes in e-business. On the one hand, the chapter is concerned with the management of knowledge of competences, which agents have to have a command of for successful process execution. On the other hand, it is about the management of know-how, which has already been collected from completed projects and should be reused in new projects.

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INTRODUCTION

E-business is characterized by the handling of value-creating business processes with assistance from modern information and communication techniques. For over one decade the internet has played an important role as a technical base-infrastructure for computer-based – metaphorically often referred to as “electronic” – information and communication processes. Over the last few years the semantic web has gained, from a business economics point of view, a growing importance relating to the further development of the “classical” internet, because the focus is on the handling and transmission of content (semantic level) and not on information and engineering technical design of the network infrastructure (syntactic level). This content-based knowledge processing and knowledge dissemination is one of the main concerns of business economics concerning the management of knowledge-intensive business processes, because the primary value creation is carried out by “knowledge workers”, which transform their business process relevant knowledge, for example, into “added values” or “problem solutions” for their potential customers.

In modern, work-sharing – often even “globalized” – economic systems the realization of knowledge-intensive business processes is shaped by work-sharing economic activities. To achieve the intended process aims, for example the above mentioned “added values” and “problem solutions”, an effective collaboration (interoperability) of the agents involved in the process implementation is necessary. As e-business processes are being discussed in this chapter, it must be remembered that both human beings and information and communication technical systems (“computers”, “machines”) are considered as agents. For the sake of brevity, the terms ICT systems and their users will be employed in the following.

To guarantee the interoperability between ICT systems on the one hand as well as interoperability between these systems and their users on the other hand, it is necessary to have a common understanding regarding the process relevant knowledge on the level of the content-based knowledge processing and knowledge dissemination, although this common knowledge understanding does mostly not exist in economic reality. Instead of that, work-sharing and knowledge-intensive business processes are generally characterized by wide knowledge heterogeneity on the semantic level. Therefore many reasons come into consideration, for example idiosyncratic concepts for application software (“SAP terminology”), historically grown business vocabularies and professional terminologies from different functional areas. In addition, in companies and even in single business units, different acronyms are used for the same things. There are also specific difficulties on the semantic level when, as a result of cultural differences, certain terms, e. g. “responsibility”, are interpreted differently. The dissemination of e-business leads to more companies which belong to different linguistic, economic and cultural traditions working together on joint projects. Such cultural differences are behind the fact that knowledge heterogeneity on the semantic level in the context of e-business is of prime importance. For a further, more in-depth analysis and also a systematisation of the reasons, which could cause the problem of knowledge heterogeneity on the semantic level, the appropriate technical literature should be referred to (see for example Kim & Seo, 1991; Sheth & Kashyap, 1992; Park & Ram, 2004). Above all, Kajan and Stoimenov have provided a detailed focus on the problem of data (knowledge) heterogeneity in the area of e-business (Kajan & Stoimenov, 2005).

The reasons outlined above lead to the conclusion that the knowledge necessary for business processes is often spread throughout multiple, incompatible legacy (software) systems within a company and it is saved in conflicting formats (Park & Ram, 2004, p. 596). In contrast to this, successful efforts have been made to introduce standards for document formats in which most