Chapter 1

E-Business Interoperability: A Systematization Attempt Based on the Morphology Concept

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ABSTRACT

A long-standing and important goal in the field of e-business is to achieve interoperability between interacting commercial, private, and public partners as well as to support it by adequate communication and Information Systems. For the design and realization of such interoperable systems, many instruments, methods, and technologies were developed in the past, such as standards and ontologies for the exchange of data and knowledge. Most of them focus on the technical issues of interoperability. But in practice, e-business refers to interactions between self-determined, goal-driven social-technical systems. Thus, further aspects like business goals, organizations, business processes, and social relationships have to be modeled and discussed. Therefore, a more holistic understanding of interoperability is attempted in this chapter. Based on this extended perception of interoperability in e-business this chapter will consider and discuss not only well known facets of interoperability, but also additional often neglected facets of interoperability, and try to systematize them with the aid of the concept of morphology.

INTRODUCTION

Enterprises as well as public organizations more often act on a global level and in an environment which is becoming more complex and more dynamic. So enterprises have to deal with changing business partners and business networks as well as with changing preferences on the part of customers. With the upcoming of the Internet, its online-services, and e-business applications people expected quick and efficient solution for many of these problems.

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To meet these challenges many and fairly successful efforts and projects were initiated providing a multitude of concepts and techniques for the design, the development, and the management of appropriate information and communication systems. In this context also various artifacts have been created, e.g., the standards and guidelines provided by the World Wide Web Consortium (W3C) and the Web Services Interoperability Organization (WS-I), as well as implementations of these standards by major information and communication technology (ICT) companies. Some of these projects especially focus interoperability issues, e.g., the TERREGOV project (Bettahar et al., 2009) or the workshop by the European Committee for Standardization (CEN) on Business Interoperability Interfaces (CEN, 2010).

But the results could not fulfill the high initial expectations in e-business, and thus nowadays many interoperability problems in trade, industry, and public organizations still remain unsolved and many questions are left open. So in practice you will still find many barriers preventing interoperability between information systems. Some of them are due to business models, business rules, and in the case of transnational information systems they are due to different laws, languages, or currencies, which will then affect the design and implementation of interoperable information systems.

The most accepted definition of interoperability defines interoperability as the “ability of two or more systems or components to exchange information and to use the information that has been exchanged” (Institute of Electrical and Electronic Engineers [IEEE], 1990, p. 114). Here the term “system” is interpreted as a technical system. But e-business deals with complex social-technical systems, and so we have to enhance the view on such systems by including aspects and elements like business strategies, behavior of human beings in organizations, and last but not least the supporting ICT. To reach such an extended and holistic understanding of interoperability in e-business the diversity of e-business and the special scenarios, concepts, barriers, and existing solutions in miscellaneous domains and fields of application have to be taken into account. To delimit the complexity of this task and to support a better understanding in our approach we try to systematize the different types of interoperability using the technique of the Morphological Box (Zwicky, 1971, pp. 94–100).

This chapter is divided into three sections. After the introduction, the second section starts with an overlook about the reasons and drivers of interoperability. Thereafter, the concept of interoperability will be regarded from a more general and economic point of view. Major business relations and their interoperability aspects will be highlighted and discussed from a strategic and an operational point of view. Based on this, we elaborate and systematize the different dimensions and facets of the phenomena interoperability. A conclusion resuming and valuing the key aspects will complete the chapter.

**INTEROPERABILITY IN E-BUSINESS**

**Reasons and Drivers for Interoperability in E-Business**

In practice we find many barriers and interfaces that have to be identified and handled properly to fulfill the objectives of the e-business partners.

Referring to Chen et al. (2006, p. 18) we distinguish three categories of barriers:

- **Conceptual barriers:** Chen et al. (2006) understand by this “syntactic and semantic differences of information to be exchanged” (p. 18) on a high level of abstraction. Examples for such type of barriers are the use of differing model constructs and structures to represent exchanged information or the use of programming artifacts which lack capability to express business circumstances and issues properly.
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