Chapter I

Virtual Enterprise Integration: Challenges of a New Paradigm

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ABSTRACT

Virtual enterprise integration (VEI) is virtually the most critical success factor for making virtual enterprise (VE) a real, competitive, and widely implemented organizational and management concept. However, according to many authors, the present solutions for VEI are either insufficient or inexistent. One of the reasons for the situation is the failure of the approach of "traditional" information systems and organizations to dealing with the nowadays turbulent market and organizations' requirements, where actual VEI solutions are mainly sought. This chapter presents a discussion on the VEI issue as a contribution to a better understanding of the VEI phenomenon, and it could be seen as a contribution to an eventual framework for VEI science, engineering, development, and implementation. Also, two metatheoretical structures for VEI research and development are proposed: VEI abstractions hierarchy and VEI semiotics.
INTRODUCTION

This introductory chapter presents a discussion of the virtual enterprise integration (VEI) issue as a contribution to a better understanding of the VEI phenomenon. Also, the discussion presented could be seen as a contribution to an eventual framework for VEI science, engineering, development, and implementations.

Integration of virtual enterprises (VE) is one of the most important requirements for making VE a real, competitive, and widely implemented organizational and management concept. Actually, it is virtually the most important requirement.

In the study on interoperability costs of the U.S. automotive supply chain (Brunnermeier & Martin, 1999, p. ES 5), it is estimated “that imperfect interoperability imposes at least $1 billion dollars per year on the members of the U.S. automotive supply chain. The majority of these costs are attributable to the time and resources spent correcting and recreating data files that are not usable by those receiving the files.” Additionally, “these estimates are conservative because they do not include elements of cost that our industry contacts could not quantify (p. ES 5).” Consequently, “members of the auto industry generally acknowledge that imperfect interoperability is an important and expensive problem” (pp. 3-8). The study by (Jhingran et al., 2002, p. 555) reported that the “state-of-the-art” concerning information technology (IT) is such that “as enterprises buy more and more packaged applications, it is estimated that the task of combining these application ‘silos’ results in over 40 percent of the IT spending, even though the amount of code written for integration is significantly smaller than 40 percent,” which is hardly a satisfactory situation. Consequently, “the question for software and services vendors is this: can the cost of integration be reduced to be more in line with that of packaged applications?” (Jhingran et al., 2002, p. 555).

Considering that interoperability and “information integration” are just part of the integration phenomenon, considering the supply chain as a model of VE, or at least as a transitional organizational model toward VE, with probably the least demanding requirements regarding the integration in comparison with more advanced VE models, and considering other manufacturing and business areas, it is not too difficult to imagine that the costs of ineffective and inefficient integration of VE, especially for more demanding VE models, are much higher. Further, considering that the VE concept aims to represent a new organizational paradigm for enterprises in general, and, in that way, permeate virtually the whole economy and even society [through the concept of virtual organizations (VOs)], we could talk about the social costs of ineffective and inefficient integration of VE. However, many authors recognize that the present solutions for VEI are either inexistent or insufficient. Therefore, there is a need for further effort by the community to develop satisfactory and competitive solutions, and this chapter represents part of this effort.

The presentation of the discussion is organized as follows. In the first part, the concept of the VE as a new organizational paradigm is presented. The second part presents definitions of (enterprise and system) integration. The third part presents the comparison between traditional enterprise integration versus virtual enterprise integration requirements. In the fourth part, challenges for building new approaches to the science of integration, in general, and for VEI, in particular, are presented. This fourth part outlines a metatheoretical structure for VEI that provides different views on different abstraction levels for the object-theoretical structures (VEI).
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