

## Chapter 4.4

# Environments for VE Integration

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### INTRODUCTION

Most definitions of virtual enterprise (VE) incorporate the idea of extended and collaborative outsourcing to suppliers and subcontractors in order to achieve a competitive response to market demands (Webster, Sugden, & Tayles, 2004). As suggested by several authors (Browne & Zhang, 1999; Byrne, 1993; Camarinha-Matos & Afsarmanesh, 1999; Cunha, Putnik, & Ávila, 2000; Davidow & Malone, 1992; Preiss, Goldman, & Nagel, 1996), a VE consists of a network of independent enterprises (resources providers) with reconfiguration capability in useful time, permanently aligned with the market requirements, created to take profit from a specific market opportunity, and where each participant contributes with her best practices and core competencies to the success and competitiveness of the structure as a whole. Even during the operation phase of the VE, the configuration can change to assure

business alignment with the market demands, traduced by the identification of reconfiguration opportunities and constant readjustment or reconfiguration of the VE network to meet unexpected situations or to keep permanent competitiveness and maximum performance (Cunha & Putnik, 2002, 2005a, 2005b)

The implementation of the VE model should assure reconfiguration dynamics, which is dependent of (1) the reduction of reconfiguration costs and effort, that is, requires a balancing between reconfiguration dynamics and reconfiguration time and costs, and (2) the capability to preserve the firms' private knowledge on products or processes.

Considering that the VE concept aims to represent a new organizational paradigm for enterprises in general and, in that way, permeating virtually the whole economy and even society (through the concept of virtual organizations), we could talk about the social costs of ineffective

and inefficient integration of VE. However, many authors recognize that the present solutions for VE integration are either inexistent or insufficient. Therefore, there is a need for further effort by the community towards satisfactory and competitive solutions.

In the article, we introduce some of the most recent developments and environments to cope with the VE requirements, such as the electronic marketplaces, including the recent generation of collaborative electronic marketplaces, breeding environments, virtual clusters, and so forth, and present the market of resources as a tool for managing, controlling, and enabling networking and dynamics in VE integration.

## ENVIRONMENTS FOR VE INTEGRATION

Value chains have been supported by a wide variety of technologies to communicate, but the pace of competition requires more intelligent and effective information and communication systems and technologies. The literature suggests that “traditional” Internet-based tools (such as WWW search engines, directories, e-mail, electronic marketplaces, etc.), can support some activities of VE integration, helping from procurement processes until the search of partners for a partnership, including electronic automated negotiation, electronic contracting, and market brokerage (Cunha & Putnik, 2003a; Dai & Kauffman, 2001; Dogac, 1998; Hands, Bessonov, Blinov, Patel, & Smith, 2000; O’Sullivan, 1998; Wang, 2001).

Several authors (Carlsson, 2002; Martin, 1999) infer that the new VE paradigm claims for intelligent support for transactions, new effective methods for finding partners, intelligent support to virtual teams, knowledge management support systems, reliable decision support in VE/network design/configuring, effective tools for information filtering and knowledge acquisition, and support in the identification of the best alternatives to

keep the network aligned with the market, that is, competitive.

Several supporting infrastructures and applications must exist before we can take advantage of the VE organizational model, such as electronic markets of resources providers, legal platforms, brokerage services, efficient and reliable global and intelligent information systems, electronic contractualization and electronic negotiation systems, and decision support systems and tools.

This section introduces some examples of the recent generation of electronic marketplaces, the collaborative e-marketplaces, and introduces the recent concept of breeding environments, virtual clusters, electronic institutions, and the market of resources. We dedicate a separated section to the market of resources, a solution proposed by the authors, to fully support VE implementation, operation, and management, which is documented in depth in Cunha and Putnik (2006).

## Electronic Marketplaces

To contribute to the reduction of search time in procurement and engineering, and to reduce transaction costs, manufacturers in several industries created electronic marketplaces (e-marketplaces) to pool their purchasing power and to develop technology platforms to exploit networked technologies. Electronic markets, like *Covisint* (<http://www.covisint.com>) in the auto industry, *Elemica* in the chemicals industry, (<http://www.elemica.com>), or *ManufacturingQuote* (<http://www.mfgquote.com>) in the engineering domain, in general, provide environments to help collaboration, networking, and, to a certain extent, VE dynamics.

Elemica was founded in August 2000 by 22 of the world’s largest chemical firms. It was the premier global neutral information network built to facilitate order processing and supply chain management, offering an integrated suite of product solutions that enable buyers and sellers of chemicals to streamline their business processes

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