

# Chapter 10

## Environments for Virtual Enterprise Integration

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### ABSTRACT

*The Virtual Enterprise model relies on dynamically reconfigurable collaborative networks, with extremely high performances, strongly time-oriented while highly focused on cost and quality, in permanent alignment with the market, and strongly supported by information and communication technology. Networking and reconfiguration dynamics are the main characteristics of this model, which claim for enabling and supporting environments, assuring cost-effective integration in useful time and preventing the risk of leakage of private information about products or processes. Some existing technologies and Internet-based environments can partially support this organizational model, but the reconfiguration dynamics can only be assured by environments able to manage, control, and enable virtual enterprise creation/operation/reconfiguration. Several environments are introduced in the article, and particular focus is given to the Market of Resources, an environment coping with the requirements of the Virtual Enterprise model.*

### INTRODUCTION

The new requirements of the business environment, in permanent change, claim for dynamically reconfigurable global networked structures, with extremely high performances, strongly time-oriented while highly focused on cost and quality,

permanently aligned with business opportunities, and strongly supported by information and communication technology, dictating a paradigm shift face to the traditional organizational models. The leading organizational model traducing these characteristics is the Virtual Enterprise (VE) organizational model.

Virtual Enterprise Integration is one of the most important requirement for making VE a real, competitive, and widely implemented organizational and management concept. It is virtually the most important requirement (Putnik, Cunha, Sousa, & Ávila, 2005).

VE creation, operation, and reconfiguration must be supported by environments, managed and maintained by third parties, able to assure the VE requirements of high reconfiguration dynamics and business alignment, overcoming the VE reconfiguration disablers as transaction costs and leakage of private information on products or processes. The authors have been working on the concept of Market of Resources, detailed in the article.

Other examples of third party entities acting as VE enablers (Market of Resources alike concepts, services, and products), include the new generation of high value-added electronic marketplaces, Electronic Alliances (Malhotra & Gosain, 2005), Virtual Organization Breeding Environments (Camarinha-Matos & Afsarmanesh, 2004; Romero, Galeano, & Molina, 2007), Electronic Institutions (Cardoso & Oliveira, 2004; Rocha, Cardoso, & Oliveira, 2005), Virtual Enterprise Cluster (Zhang, Gao, Zhang, & Chang, 2008), Virtual Industry Clusters (Molina & Flores, 1999), brokerage services (Ávila, Putnik, & Cunha, 2002; Mejía & Molina, 2002) and “guilds.”

It is expected that these environments will be in a near future the regular environments for VE integration, reconfiguration dynamics, and operation.

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 toward satisfactory and competitive solutions.

This article intends to be part of this effort. It discusses the VE reconfigurability requirement and the requirements of reconfiguration dynamics; introduce some of the most recent developments and environments to cope with these requirements; and presents the Market of Resources as part of a new generation of electronic marketplaces, a tool for managing, controlling, and enabling networking and dynamics in VE integration at low transaction cost and preserving the firms' private knowledge.

The article makes two contributions: (1) to industry managers, it highlights the importance of dynamic organizational models, as the ultimate paradigm; and (2) to information systems professionals, it alerts to the development of a new generation of environments, able to effectively and efficiently cope with the VE model.

## **REQUIREMENTS FOR VIRTUAL ENTERPRISE INTEGRATION**

Several VE definitions and similar models exist and many similar and sometimes overlapping designations are used: collaborative networks, collaborative supply chains, networked enterprise, star alliances, agile/virtual enterprises, and so forth. These are all forms of virtual enterprises, in a broad sense. What makes the distinction is the duration and the links established or intended to establish, the legal formalities, scope, sharing of responsibilities and results, coordination, reconfiguration dynamics, and so forth.

Concerning duration, such networks can be established on a temporary or a long-term basis. Temporary organizations seem to better fit the dynamics of the market and the typically short duration of business opportunities, whereas long-term organizations better cope with the trust building process and the investment on common

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