Market of Resources as a Knowledge Management Enabler in VE

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INTRODUCTION

Knowledge is, undoubtedly, an indispensable asset for organizations to compete effectively (Alavi & Leidner, 2001; Murray, 2002).

New organizational models, such as the virtual enterprise (VE) model, characterized as dynamically reconfigurable information-based global networked structures, are emerging. New technological environments and solutions are being developed to support them, and the importance of knowledge and the capability of managing it by creating the organizational conditions that facilitate the generation, sharing, and application of knowledge are more and more critical.

In a global organization, as defended by Kluge, Stein, and Licht (2001), face-to-face relationships are not possible, giving rise to difficulties in accepting knowledge from outside. This applies more deeply in virtual enterprises (or in virtual organizations) in the interactions among the independent partners who tend more and more to fear the leakage of private knowledge. This situation promotes competition and rivalry and, as suggested by Prahalad and Hamel (1990), impedes collaboration and knowledge sharing, precisely two of the main underlying issues of this organizational model. A supporting environment, such as the market of resources proposed by the authors, is the way to assure effective knowledge management between the members of a virtual enterprise and business strategic alignment enabling the performance improvement of the VE.

In an environment to support VE integration, knowledge management is simultaneously a tool and an object. As a tool, knowledge management can be used by the market of resources to reduce transaction costs in VE integration and VE reconfiguration; as an object, knowledge must be protected and knowledge leakage prevented to assure trust and protection of VE participants.

The broker (an integrating element of the market of resources) is, besides other attributions, responsible for advising the VE owner in identifying and communicating the role of knowledge management within the VE business plan and for ensuring the permanent alignment between business strategy and knowledge strategy within the network of independent enterprises that constitute the VE. The broker must ensure that the global knowledge sharing is not threatened by deficient knowledge management procedures and, simultaneously, that any instance of the VE (as a reconfigurable network) at a given time, is able to respond to the market requirements with its maximum performance, that is, is business aligned.

In this article, we introduce the VE disabling factors and the functionalities for VE integration, briefly present the market of resources as an environment to support VE integration, assuring business alignment and knowledge management, identify the main strengths and problems associated with the implementation of knowledge management functions, and, finally, discuss the main opportunities associated to the implementation and exploitation of the market of resources.

BACKGROUND: VIRTUAL ENTERPRISE INTEGRATION

The virtual enterprise model can be viewed as a global networked and information-based organizational structure in dynamic adaptation (reconfiguration) to the market or business requirements. Virtual enterprises (in a broad sense) are defined as enterprises with

integration and reconfiguration capability in useful time, integrated from independent enterprises, primitive or complex, with the aim of taking profit from a specific market opportunity (Byrne, 1993; Camarinha-Matos & Afsarmanesh, 1999; Cunha, Putnik & Ávila, 2000; Preiss, Goldman & Nagel, 1996; Putnik, 2000). After the conclusion of that opportunity, the virtual enterprise dissolves itself. During its lifetime, the VE changes its physical structure (reconfigures) to be permanently aligned with that market opportunity.

We designate, by *resource,* any function, service, or product provided by independent enterprises (*resources providers*), candidates to integrate a VE. The *resource* is a recursive construct; resources can be primitive or complex where a complex resource consists on a meaningful combination of primitive resources.

There are several factors determining the performance of the VE model. In the BM_Virtual Enterprise Architecture Reference Model (BM_VEARM) (Putnik, 2000), the author presents "fast adaptability" or "fast reconfigurability" as the most important characteristic for the competitive enterprise, enabling the agile alignment with the market.

In this section, we introduce the VE disabling factors, the tools proposed to overcome the disabling factors, and the functionalities required to efficiently implement this organizational model.

The Virtual Enterprise Disabling Factors

The main critical aspects associated with the recent concept of dynamically reconfigurable global networked structures; that is, the main factors against networking and reconfigurability dynamics are the *transaction costs* and the *leakage of private knowledge*.

In an ideal business environment, a firm makes an informed assessment of the relevant costs, benefits, and risks of outsourcing *vs.* internal procurement. If there exists a profitable opportunity to outsource a service or operation, the client and the suppliers enter into a contract with full knowledge of the nature of the work, signing a complete and explicit written agreement covering all aspects of the outsourced service and payments, eventually including contingency plans. But in most contractual relationships, things do not happen this way; processes are much more complex than idealized.

In concrete, when integrating a VE rather than outsourcing a service or a set of simple products or operations, difficulties arise. Selection, negotiation, contractualization, and enforcement can be too complex and too delicate. There is a vast spectrum of available resources providers, each with different characteristics, leading to difficult selection and integration decisions.

The costs of outsourcing are composed of both the explicit cost of carrying out the transaction as well as hidden costs due to coordination difficulties and contractual risks. The major costs associated with outsourcing include (1) the transaction costs and (2) the leakage of private knowledge.

Transaction Costs

Transaction costs include the time and expense of negotiating, writing, and enforcing contracts. They include the adverse consequences of opportunistic behavior, as well as the costs of trying to prevent it. In the VE model, transaction costs are the firm (re)configuration costs, associated with partners search, selection, negotiation, and integration as well as permanent monitoring and the evaluation of the partnership performance (Cunha & Putnik, 2003a). If externalizing functions can involve high transaction costs, networking relies intensively on extending the enterprise boundaries, partnering functions, and the VE model is extremely dependent not only on networking but on dynamically reconfiguring. This way, the implementation of the VE concept requires tools to overcome the transaction costs barrier, and knowledge management is a tool, assured by the market of resources, supported by an intelligent knowledge base and by the human brokerage function.

Leakage of Private Knowledge

The *preservation of firm's knowledge* on organizational and management processes is the firm's competitive factor.

A firm's private knowledge is based on information that no one else knows and gives a firm an advantage in the market. Most of the time, this private knowledge is a core competitive advantage that distinguishes a firm from its competitors