Chapter XV

Fractal Approach to Managing Intelligent Enterprises

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ABSTRACT

This chapter introduces a fractal-based approach to managing intelligent enterprises. Faced with intense competition in the growing global market, fundamental changes are mandatory in business models, management approaches, and technology resources. In this chapter, therefore, several strategic issues for managing intelligent enterprises are discussed in a comprehensive manner, including: (1) fractal models of an intelligent enterprise with new hierarchies and structures for future organizations, (2) strategic supply chain models of e-biz companies based on fractal architectures, and (3) Fractal Manufacturing System (FrMS) as a type of a future manufacturing system. The authors hope that understanding the proposed methodologies and approaches based on the fractal concept will not only facilitate the realization of fractal-based systems, but also give readers an insight into the requirements of future organizations.

INTRODUCTION

To facilitate effective and efficient Information and Communication Technologies (ICTs) in enterprises, an organization can autonomously change itself to take advantage of the changes in the environment. Globalization of enterprises brings complicated structures and relationships not only to persons in a group of an enterprise but also to groups in the enterprise. Complex structure, however, prohibits members of an organization from communicating opinions with each other. It finally seems to decrease the ability to accurately make ventures on rapidly emerging markets and technologies. Therefore, an intelligent enterprise must be autonomous, adaptable, flexible, and applicable to any situation in a comprehensive and consistent manner to cope with variously growing customer requirements. Overcoming spatial limitations, a spontaneous structural rearrangement of an organization is a prerequisite for survival in turbulent electronic market places.

A fundamental goal of any enterprise is to maximize the profit or minimize the cost. However, this truism alone cannot play the role of a locomotive for a successful enterprise. Corporate culture and relations with business customers are also important factors for managing enterprises. Now more than ever before, enterprises constantly persevere in their efforts to defend themselves against competition. They also try to maintain the innovative potentials needed for survival through the revolutionary change of their organizational matters, such as reconfiguration of the structure and Workflow Management (WfM) of the enterprise. Research on Supply Chain Management (SCM) continues for managing enterprises in the Internet era as the term *e*-SCM implies. These are, however, nothing more than one of several new strategic methods that are being used nowadays to increase the profitability of a business model. To achieve the highest goal of an enterprise, various technologies are needed for managing an enterprise.

In this chapter, several strategic issues for managing intelligent enterprises are discussed in a comprehensive manner. As a challenging theoretical framework of the intelligent enterprise of the 21st century, fractal-based approaches are fully discussed throughout this chapter. Intelligent enterprises can apply the characteristics of a fractal to identify, define, and explore the subject matters closely related to their businesses. First, new hierarchies and structures for future organizations are suggested by considering the methods for making profits through understanding and solving organizational problems. Then the definition and modeling of a fractal-based system are followed by methodologies of applying fractal models to an intelligent enterprise. Also discussed is a Workflow Management System (WfMS) for fractal-based systems. We propose supply chains and strategic models based on fractal architectures, focusing on numerical models for solving SCM problems in e-biz companies. Finally, we propose a Fractal Manufacturing System (FrMS) as a type of future manufacturing system.

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