Chapter XIII
Beyond the Thresholds of Manufacturing Organizations

INTRODUCTION

The major contributions of this chapter are concerned with:

a. Analysis of the limitations of past and current manufacturing organizations (and operations management systems).

b. Definition of concepts and features for new manufacturing organizations through perspectives of management, socio-technology and organizational systems theory. From these perspectives we derive the concept of a new organizing and production model that we call customer-centric organizations.

MOTIVATIONS

The technological and organizational developments presented in this book inspired the writing of this chapter. After reviewing the literature, problem analyses have been understood and solutions design have been proposed.

Our point of departure is that despite some academic and industrial efforts to add performance criteria such as quality, flexibility and agility to manufacturing and operations management systems (Steiner et al, 2001), they still are a long way from being classified as “customer-centric systems” – which are organizational systems with high maturity levels of management of complex environments, with capabilities to pursue high degrees of mass customization, and with the ability to
provide customers with immersiveness – where the concept of immersive systems is defined in Chapter XIV.

To be in conformance with the property of customer-centric systems, we propose that new capabilities need to be embedded into the current manufacturing and operations management systems of the organization. For this purpose, our task is threefold, and therefore we propose three complementary perspectives on management, socio-technology and organizational systems theory respectively in order to introduce concepts towards new manufacturing organizations.

The first perspective is concerned with the concept of environmental management - which comprises customer relationship and supply chain management, and the development of organizational learning, value chain and competitive advantage processes for the organization.

The second perspective is concerned with the design of machinery and management systems with high degrees of cognition, intelligence and autonomy. These systems are supposed to operate at the technical (shop floor), managerial and institutional levels of the manufacturing organization. Moreover, and most importantly, these systems have to be equipped with structures, processes, goals, agents and technologies which are able to provide the organization with the capability to pursue high levels of immersiveness – where immersiveness represents the ability of an organizational system to interact with customers (either people or machines) in a friendly way, by immersing them into the organization through approaches such as virtual reality, simulation or real world operations.

The third perspective is concerned with organizational systems theory. Analyses of manufacturing organizations from the past and the present time to the future are introduced through organization theories developed by organizational schools of the 20th century, as well as by the concept of hierarchical levels of complexity and cognition of organizational systems.

**A REVIEW OF MANUFACTURING ORGANIZATIONS**

During the 20th century, manufacturing organizations have evolved from mass to batch production systems. These systems entered the 21st century moving towards a new production model called mass customization. With such a new model, information management systems have been playing an increasing and dominant role. A representation of such a transition from mass and batch production to mass customization processes was presented by Monfared & Steiner through a mathematical model of paradigm shift (Monfared & Steiner, 1997). In their work, they argued that the current and dominant scientific principles of the time are incompatible with the emerging needs of the present and future of manufacturing systems. To support
An Evaluation Method of Relative Reducts Based on Roughness of Partitions
Yasuo Kudo and Tetsuya Murai (2012). *Developments in Natural Intelligence Research and Knowledge Engineering: Advancing Applications* (pp. 305-314).
[www.igi-global.com/chapter/evaluation-method-relative-reducts-based/66456?camid=4v1a](www.igi-global.com/chapter/evaluation-method-relative-reducts-based/66456?camid=4v1a)

Image Dimensionality Reduction Based on the Intrinsic Dimension and Parallel Genetic Algorithm
Liang Lei, TongQing Wang, Jun Peng and Bo Yang (2011). *International Journal of Cognitive Informatics and Natural Intelligence* (pp. 97-112).
[www.igi-global.com/article/image-dimensionality-reduction-based-intrinsic/55259?camid=4v1a](www.igi-global.com/article/image-dimensionality-reduction-based-intrinsic/55259?camid=4v1a)