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Development of educational program for production manager leading new perspectives on manufacturing technology

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ABSTRACT

In this paper, we consider the problems associated with the development and management of an educational program for manufacturing managers in leadership roles who are making contributions towards the creation of customer delight as well as customer satisfaction using manufacturing technology. The basic concept combines an intelligent knowledge-based approach with the *kaizen* activity program within the framework of value creation and comparative advantage models based on a network referred to as Academia, Business, Consultancy, and Government (ABC-G). This educational program, which reflects the characteristics of manufacturing technologies and practices in the Hokuriku District of Japan, was developed in 2005–2006 and the trial education was developed in 2005 and 2006, and a trial run of this program was conducted in 2006 and 2007 in close collaboration with local manufacturing companies and their employees. The results are informative of the effects of educating manufacturing managers in Japan and the problems that will have to be overcome for the continuous improvement of the program.

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1. Introduction

In the last two decades, international collaborative activities aimed at quality assurance in engineering programs have received increased emphasis and attention (Aberle et al., 1997; National Institute of Standards and Technology, 2004; www.abet.org). On the other hand, the comparative advantages of various nations have been studied and reported by organizations, such as the Institute for Management Development (IMD) (Institute for Management Development (2005), and by US (United States President's Commission on Industrial Competitiveness, 1985; Tallman, 1993) and Japanese (Japan Techno-Economics Society, 2000; Kameoka, 2000) researchers. Based on such research, we have devel-

oped a basic model and method to evaluate the comparative advantages of a business model of the global market based on the *competere* concept (Inose, 2000) to design a business model for creating new values as business output. The model and method were applied to evaluate Japanese industry and identify their weaknesses and strengths. We conducted a questionnaire survey among Japanese academicians, business executives, and consultants, who stated that the main weaknesses of Japanese industry in terms of value-creating activities were leadership, management resources, and business processes. Among these, leadership was ranked the weakest value-creating activity. The results of our research indicate that the Japanese industry has an advantage in production and employee relations, and should maintain it. In addition, the Japanese industry should focus on improving the values of the stakeholders at the national and local levels as well as at the company level (Ishii et al., 2004).

In this paper, we propose a concept for an educational system and show the results obtained from a prototype of such a system applied to manufacturing managers in

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leadership roles who are contributing to manufacturing technology. The basic concept combines an intelligent knowledge-based approach with the *kaizen* activity program within the framework of value creation and comparative advantage models based on a network referred to as Academia, Business, Consultancy, and Government (ABC-G). The goal of the educational program developed is to help such individuals acquire sufficient knowledge and skills to ensure total optimization instead of partial optimization (Dettemer and Goldratt's, 1996) of all processes and operations as well as to facilitate continuous improvement in the workplace. Total optimization can be defined as the optimization of quality, cost, and lead time through the improvement of multiple processes and operations. The program was approved by the Ministry of Economy, Trade, and Industry. Cooperation among business people, academicians, and consultants in developing and running the educational program is based on symbiotic competition. Members of both businesses and academia focus on the collaborative development and sharing of instruction materials. In addition, academicians and consultants share methods to promote *kaizen* in the workplace. Consultants and business people share methods to introduce *kaizen* into the workplace.

This study aims to meet the following objectives:

- (1) To propose the basic concept of an educational system that combines an intelligent knowledge-based approach with a *kaizen* activity program within a framework of value creation and comparative advantage models.

- (2) To develop an educational program for industrial engineers and managers in leadership roles who wish to create values in manufacturing technology and to discuss the results of the program.
- (3) To discuss the results of the survey for customer satisfaction with the stakeholders, such as the participants and companies.

2. Model and assumptions

2.1. Leadership in management circles

The management system that enhanced the performance and profitability of Japanese companies from the 1950s to the 1980s can be characterized by the use of a scientific approach to management. The Plan-Do-Check/Action (PDCA) cycle was the core concept underlying a series of company-wide improvement movements that took place in Japan, including total quality control Mizuno (1969), total preventive maintenance (Japan Institute of Plant Maintenance: JIPE, 1996), and Just In Time (Ohno, 1988). The concept of PDCA also advantaged the well-known global management standards that were introduced in Japan in the late 1980s, namely, ISO9000 and ISO14000 (Wilkinson and Dale, 2002). The concept of Scientific Management, which was invented by F.W. Taylor (Spender and Kijne, 1996) in the US in the early 20th century, underwent vigorous review and refinement in a

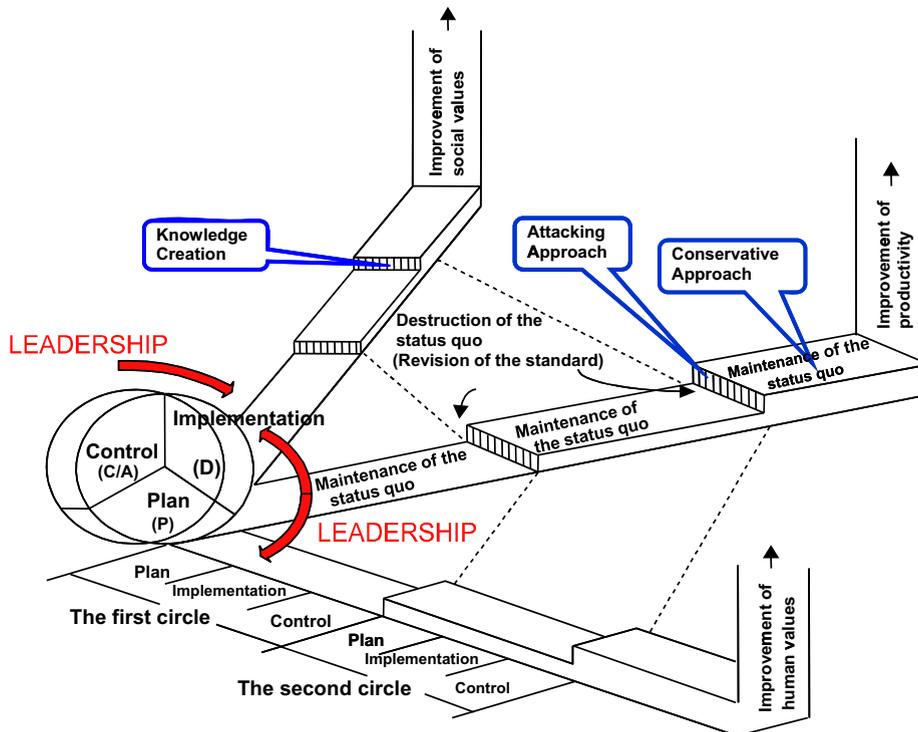


Fig. 1. Concept model for the management circle.

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