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Japanese Technology Management: Introduction to the Special Issue

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Japanese methods of production technology management have attracted much global attention since the early 1980s. The driving force of Japanese manufacturing competitiveness has been the successful implementation of various forms of the Just-in-Time (JIT) manufacturing system, by which minimum inventories are kept throughout the system. JIT, originally developed by Toyota in the late 1960s, was disseminated to other Japanese manufacturers in auto and other industries by the late 1970s. JIT emphasizes bottom-up decision procedures such as teams, quality circles, multi-skilled workers and *kaizen* (continuous improvement). Successful implementation of JIT also requires successful management of quality and suppliers. Transfer of JIT to outside Japan, however, has taken place with varying degrees of success.

The first two papers discuss issues associated with transplanting JIT and other Japanese manufacturing practices to the US. The paper by Lieberman and Asaba compares auto assemblers and parts suppliers in Japan and the US which have adopted JIT. It finds that while the US auto assemblers have made significant progress in reducing inventories and productivity, US parts suppliers have lagged behind in both dimensions. In contrast, the performance of Japanese auto assemblers and suppliers seems more even, suggesting the importance of supplier management in JIT manufacturing in Japan.

The paper by Tsurumi and Tsurumi discusses the issues associated with transferring the steel production technology and Total Quality Control (TQC) practices developed by NKK in Japan to its subsidiary, National Steel Corporation (NSC). NSC, a supplier to the Ford Motor Company, suffered a significant deterioration in product quality and delivery time during the early 1990s. This paper empirically identifies the effect of new management, brought in to revitalize the firm, in successfully implementing TQC at NSC.

The drastic appreciation of the Japanese yen since the mid-1980s as well as increased international competition have caused Japanese competitiveness to deteriorate over the last decade. In response to this challenge, Japanese manufacturers are exploring new methods of management of technology and production, which incorporate company or factory-wide top-down cost cutting and productivity enhancement approaches, within the JIT framework. The next three papers discuss some of these methods. The methods presented here generally extend the current capabilities of JIT practices.

The paper by Tamura, Fujita and Kuga discusses the production seat system and its applications at three manufacturing plants. An important feature of this system, which mimics airline reservation mechanisms, is the establishment of a production seat table based on the forecasted demand for incoming orders. The table is then used as a place where cyclical matching takes place between actual customer orders and factory production capabilities, thus integrating information from sales and production departments.

The paper by Monden, Akter and Kubo discusses the target costing practice, which aims to match the company requirements for a new product, to alternative designs of the new product being developed. This practice is used by many large assembly-based manufacturers during new product development. The paper presents some exploratory experimental evidence on how to achieve effective participation by new product development team members, and how to

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evaluate the effectiveness of target costing. The paper by Fruin and Nakamura discusses another Japanese productivity enhancement practice called Total Productivity Management, by which a company-wide goal for productivity gains is transformed into specific numerical targets for individual departments as well as tasks.

The next three papers discuss special features of the Japanese research environment. The paper by Nakajima and Hamada considers economic, cultural and other reasons why there are differences in the performance of basic research and intellectual products in Japan and the US. The paper by Nakamura, Vertinsky and Zietsma explores the effects of various factors on inter-firm cooperation in R&D in Japan and the USA. Saxonhouse discusses the development of Japan's optoelectronics industry, conducts an event study using the formations of government sponsored joint research programs as events, and presents empirical evidence which questions the role of the government in cooperative research in Japan.

Developing environmentally friendly production technologies is an important issue facing Japanese manufacturers. The last paper by Hayami, Nakamura, Suga and Yoshioka presents applications of input–output analysis to issues surrounding the management of global warming gases. Methods to assess the relevant properties of alternative technologies are discussed with some empirical results.

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