

AN EMPIRICAL ANALYSIS OF SUPPLY CHAIN MANAGEMENT: A CASE STUDY FOR JAPANESE MANUFACTURING COMPANIES

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ABSTRACT

This paper tries to find the prerequisites for supply chain management (SCM) and the impacts of SCM on operations practices and competitive performance from the empirical perspective. Three measurement scales concerning SCM, Coordination of Plant Activities, Stability of Demand, and Supply Chain Planning, are found reliable and valid for thirty-five Japanese manufacturing plants. Using these measurement scales and a summated super-scale for SCM, along with constructs for other operations areas such as human resource management, total quality management, total preventive maintenance, JIT production, theory of constraints, new product development, technology development, and manufacturing strategy, interrelationships between SCM and other areas are examined by canonical correlation analysis. Reliable scales cannot be constructed for supplier lead time and trust-based relationship with suppliers. A plant superintendent, an inventory manager, four supervisors from each manufacturer were asked to answer the question items for all of the five SCM practices on a 7-point scale from 1 to 7.

It turns out that JIT production, total preventive maintenance, human resource management, theory of constraints, and some aspects of manufacturing strategy are critical for successful SCM. More precisely, the first canonical variable of SCM scales is closely related to the following twenty-two scales: Small Group Problem Solving, Rewards/ Manufacturing Coordination, Coordination of Decision Making, Recruiting and Selection, Shop Floor Contact, and Supervisory Interaction Facilitation from human resource management; Implementation of TOC and TOC Philosophy from theory of constraints; Preventive Maintenance, Maintenance Support, and Team Based Maintenance from total preventive maintenance; Synchronization of Operations, Equipment Layout, Setup Time Reduction, Daily Schedule Adherence, Just-in-Time Delivery by Suppliers, Just-in-Time Link with Customers, and Repetitive Nature of Master Schedule from JIT production; Effective Process Implementation and Inter-Functional Design Efforts from technology development; Leadership for Functional Integration and Unique Practices from manufacturing strategy. Those practices are regarded as requisites for SCM implementation.

Competitive performance of the manufacturing companies is subjectively judged by plant managers on a 5-point scale for each of unit cost of manufacturing, quality of product conformance, delivery performance (on time delivery), fast delivery, flexibility to change product mix, flexibility to change volume, inventory turnover, cycle time, speed of new product introduction, product capability and performance, on time new product launch, product innovativeness, and customer support and service. In terms of the impact on overall competitive performance, SCM is ranked as the first position, followed by JIT production, total preventive maintenance, quality management, and manufacturing strategy. Especially, supply chain planning and coordination of plant activities have significant impact on the competitive performance of the manufacturing companies.