Productivity Methodologies, Tools, and Techniques

Supply chain management

Contributed by Prof. James C. Chen, Department of Industrial Management, National Taiwan University of Science and Technology, Taiwan, Republic of China. Chen is the founder of Inforeverest (IET), PouChen International Group, and was an expert for the APO TES Program.

A supply chain is the network of raw material producers, component manufacturers, final product manufacturers, wholesalers and distributors, retailers, and customers, interconnected by several types of flows, including material, information, finance, and people flows. The figure shows a typical footwear and apparel supply chain network. The APICS (Association for Operations Management) dictionary defines supply chain management (SCM) as the “design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand, and measuring performance globally.”

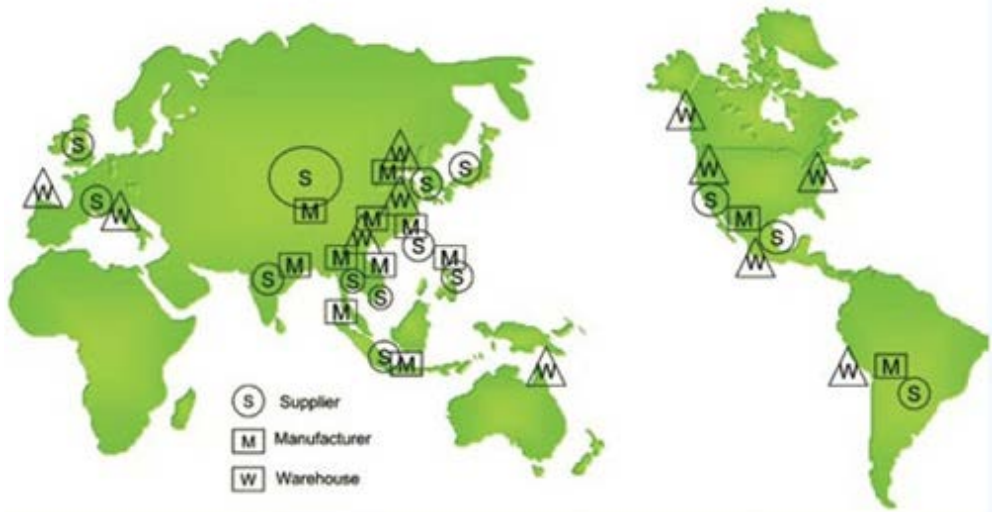

Figure. A typical footwear and apparel supply chain network

SCM and other similar terms (such as supply chain synchronization, integrated logistics, value chain management, and value stream management) have become increasingly popular in recent years, since SCM first received attention in the early 1980s. Dell, Hewlett-Packard, Walmart, Zara, 7-Eleven, Toyota, and ASUS are successful SCM players that manage supply chains well to gain and sustain a competitive edge in today’s global business environment. The benefits of SCM include:

- heightened customer satisfaction;

- greater customer loyalty;
- higher competitiveness;
- higher profits;
- lower costs;
- higher quality;
- greater flexibility;
- higher productivity;
- better sustainability;
- lower inventory;
- less transportation;
- shorter lead times;
- shorter times to market;
- quicker decision making; and
- better data transparency.

As one example, *Case Studies of Manufacturing and Commerce Integration* published by the Ministry of Education, Republic of China, in 2004 cited ASUS, which implemented an e-logistics project to improve SCM by integrating its motherboard and notebook PC assembly factories with 200 component vendors, 50 logistics service providers, and three banks. This project developed an e-procurement and an e-payment system and integrated them with the enterprise resource planning system. A vendor-managed inventory model was introduced, and materials can be tracked through the entire supply chain on a real-time basis. The following results were achieved:

- 30% increase in productivity per man-year;
- 30% increase in customer service level;
- 30% reduction in processing time;
- 30% increase in productivity per man-year;
- 30% increase in customer service level;
- 30% reduction in processing time.

It is critical to have effective coordination and collaboration among the members in the supply chain, on the basis of trust and communication. The roles and responsibilities, cooperation mechanism, and conflict resolution model must be defined and clarified to facilitate mutual benefit and avoid ambiguity and misunderstandings.

A supply chain can help a company become an order winner rather than only an order qualifier, as the competition is not only among individual companies but also among their supply chains. Supply chain competitiveness can be increased by selecting a good supplier as a partner. The following are major evaluation factors: quality, price, lead time, on-time delivery, flexibility, location, reputation and financial stability, capacity, inventory policy, product and/or service, capability for the development and changes to products and/or services, globalization capability, and crisis/event management capability.

A bullwhip effect is widely observed in supply chains. The scale of demand oscillations increases from downstream customers to upstream raw material producers. As companies usually carry safety stock to manage unstable demand, the inventory level increases backward through the supply chain due to the amplified variation in demand upstream in a supply chain. Visibility through data transparency and information sharing are important in supply chains, as this can help upstream partners to manage the bullwhip effect better by looking ahead and making necessary preparations and adjustments in advance. Typical shared information includes order forecasts, order status, inventory, promotion, and shipment.

After 30 years of development in SCM, there is still room for improvement due to the following progress in recent years:

- emphasis on green/reverse supply chains (considering the recycling of products and components) and global supply chains;
- development of management philosophies such as collaborative planning, forecasting and replenishment, the supply chain operations reference model, design chain operations reference model, and SCM 2.0; and
- advances in information and communication technologies, such as radio frequency identification and global positioning systems.

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