Magazine Article

Finding the Right Balance

Effective supply chain strategy involves network planning to balance inventory, transportation and manufacturing costs.

by David Simchi-Levi, Edith Simchi-Levi

Only 7% of companies today are effectively managing their supply chains, according to a global manufacturing benchmarking initiative undertaken by *Deloitte & Touche*.(1) However, these companies are 73% more profitable than other manufacturers.

So the obvious question is: What makes supply chain management (SCM) so difficult? Supply chains are inherently complex, encompassing the entire process from customers to suppliers. The simultaneous pressures to reduce costs, expand globally, introduce new products fast and increase service levels make the challenge of adopting SCM even more daunting.

In creating a supply chain strategy, the goal is to design and operate a supply chain so that total system-wide costs are minimized, and system-wide service levels are maintained. Indeed, it is frequently difficult to operate a *single facility* so that costs are minimized and service level is maintained. The difficulty increases exponentially when an *entire system* is being considered. The process of finding the best system-wide strategy is known as **global optimization.**

This challenge is compounded by uncertainty inherent in every supply chain — customer demand can never be forecast accurately, travel times are never certain, and machines and vehicles break down. Supply chains need to be designed to eliminate as much uncertainty as possible and to deal effectively with the uncertainty that remains.

The Deloitte study calls companies who have been successful **complexity masters** and describes them as follows: “Complexity masters have developed an overall process view

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of their supply chain, rather than a functional view. This end-to-end approach enables them to optimize the supply chain process across the entire organization and generate significant profit and returns. Complexity masters have synchronized key activities both within and across their customer, product and supply chain operations — moving from sub-optimization to creating a profit cycle."

To become a complexity master, companies need to make supply chain strategy an ongoing activity enabled by technology. For this purpose, ERP, SCM and visibility systems provide accurate operational data needed for decision-making. Strategic planning software takes this data and allows companies to develop robust and effective strategies through optimization and "what-if" analysis.

Effective supply chain strategy deploys the process of **network planning** (2), the objective of which is to structure and manage the supply chain so as to:

- Find the right balance between inventory, transportation and manufacturing costs.
- Match supply and demand under uncertainty by positioning and managing inventory effectively.
- Utilize resources effectively in a dynamic environment.

Of course, this is a complex process, which requires a hierarchical approach in which decisions on network design, inventory positioning and management, as well as resource utilization are combined to reduce cost and increase service level. Thus, the network planning process is divided into three steps (**see table below**):

1. Network design: This includes decisions on the number, location and size of manufacturing plants, production lines, distribution centers or warehouses, and the assignment of retail outlets to warehouses. In addition, it includes decisions such as where to produce different products in situations when the firm has multiple manufacturing plants.

2. Inventory positioning and management: This includes identifying stocking points, deciding which products should be stored centrally and which ones regionally, as well as selecting facilities that will produce to stock and thus keep inventory, and facilities that will produce to order and hence keep no inventory. It also includes inventory management strategies that take into account demand and supply uncertainties, lead times, cost, etc.

3. Resource allocation: Given the structure of the logistics network and the location of stocking points, the objective in this step is to determine when and how much to produce or purchase, and where and when to store inventory. These decisions require identifying the optimal tradeoff between setup costs and times, and inventory and transportation costs, taking into account production, sourcing and warehousing capacities as well as

other business rules and constraints. **CLO**

David Simchi-Levi is professor of engineering systems at the Massachusetts Institute of Technology (www.mit.edu), *as well as chairman of* Logic Tools (www.logic-tools.com). *The latest edition of his award-winning book,* Designing and Managing the Supply Chain, *co-written with P. Kaminsky and E. Simchi-Levi, was published by Irwin/McGraw-Hill in 2002. He can be contacted at* dslevi@mit.edu.

Edith Simchi-Levi is co-founder and vice president of operations of Logic Tools, *and can be contacted at* edith@logic-tools.com.

Network Planning Characteristics			
	Network Design	Inventory Positioning and Management	Resource Allocation
Decision Focus	Infrastructure	Safety stock	Production distribution
Planning Horizon	Years	Months	Months
Aggregration Level	Family	Item	Classes
Frequency	Yearly	Monthly/Weekly	Monthly/Weekly
ROI	High	Medium	Medium
Implementation	Very short	Short	Short
Users	Very few	Few	Few

This table summarizes the key dimensions of each of the planning activities, network design, inventory positioning/management and resource allocation.

The table shows that network design involves long-term plans (typically over years), is done at a high level and can yield high returns. The planning horizon for supply chain master planning is months or weeks, the frequency of re-planning is high (e.g., every week), and it typically delivers quick results as well. Inventory planning is focused on sort-term uncertainty in demand, lead time, processing time or supply.

The frequency of re-planning is high, e.g., monthly planning to determine appropriate safety stock based on the latest forecast and forecast error. Inventory planning can also be used more strategically to identify locations in the supply chain where the firm keeps inventory, as well as to identify stages that produce to stock and those that produce to order.

References:

1: "Mastering Complexity in Global Manufacturing: Powering Profits and Growth Through

Value Chain Synchronization," Deloitte Global Manufacturing Study, October 2003

2: Simchi-Levi, D., P. Kaminsky and E. Simchi-Levi, *Managing the Supply Chain: The definitive guide for the business professional,* McGraw-Hill, December 2003.