



Supply Chain Technology

Supply Chain Planning In a Global Economy

Robert Malone is executive editor of Inbound Logistics. E-mail him at RMalone@inboundlogistics.com

Last month's column examined LogicTools Inc.'s *LogicChain* and *LogicNet* supply chain applications. This month, we talk with the person behind those applications — David Simchi-Levi, LogicTools CEO and president. In addition to running LogicTools, Simchi-Levi is a professor of engineering systems at MIT and the author of two books, including the prize-winning *Designing and Managing the Supply Chain* (with Peter Kaminsky and Edith Simchi-Levi). Simchi-Levi recently sat down with *Inbound Logistics* to discuss issues critical to logistics IT and supply chain management.

The Evolution of Optimization

With the growth of the global economy, businesses are changing the way they perceive supply chain planning.

"In the last few years, the industry has developed a number of strategies to allow supply chain partners to replace sequential planning, or sequential optimization, with global optimization," says Simchi-Levi. "In sequential

planning, each party optimizes its own profit with almost no regard to how its decisions impact other supply chain partners. By contrast, the objective of global optimization is to find what's best for the entire supply chain."

Reevaluating the Supply Chain

To facilitate this transition in thinking, companies are reevaluating ways they can use effective supply contracts, various types of strategic partnering, information sharing, and decision support systems.

"For example, revenue sharing contracts, which have been used in the movie video industry, allow the retailer and the studios that sell the movies to increase both service level to customers and profit for all parties," notes Simchi-Levi.

Technology — information systems and decision support systems in particular — provides a different approach.

"Indeed, a new breed of planning tools allows companies to develop a supply chain master plan using infor-

mation from across the supply chain," says Simchi-Levi.

"A supply chain master plan identifies production quantities, distribution strategies, and storage requirements by efficiently allocating supply chain resources to minimize system-wide cost or maximize profit over multiple time periods. Many companies in the food, chemical, and 3PL industries use tools such as *Logic-Chain* to globally optimize their supply chains," he says.

"Strategic partnering is another way to achieve efficiencies across partners in the supply chain. The celebrated Vendor Managed Inventory (VMI) strategy, in which the supplier manages the retailer's inventory, allows suppliers and retailers to significantly improve supply chain performance," Simchi-Levi adds.

Actualized Real-Time Visibility?

The evolution of technology, and specifically visibility tools, has made the availability of actual real-time information within the many dimensions of the supply chain a reality. But there are still obstacles to hurdle.

"This is an ongoing process that depends on the availability of data to analyze the entire supply chain," says Simchi-Levi.

"The data has become easier to access because of ERP's widespread adoption, and more recently the development and implementation of visibility tools.

"While gathering the data is certainly easier, organizing it in a way suitable for global optimization, and understanding the modeling and trade-offs, is still a challenge," he notes.

Accomplishing this in real time demands an even greater effort.

"While the ability to optimize large-scale supply chain models has improved significantly in the last few years, it is

still difficult to do that for large realistic models, especially if you need to make decisions in real time," says Simchi-Levi. "This implies that techniques such as data aggregation and model decomposition are very important. The challenge is to decompose the models or aggregate data without

ing a company's supply chain strategy.

"More and more companies understand the importance of being able to accurately calculate safety stock across their supply chain, taking into account service levels, uncertainty in demand, lead times, and capacities," says Simchi-Levi. "Again, this is not a sim-

Taming the Bullwhip Effect

"The 'bullwhip effect' refers to magnifying demand fluctuations as orders move up the supply chain," says David Simchi-Levi, CEO and president of LogicTools. "Improved forecasting techniques at any one level in the supply chain cannot eliminate the bullwhip effect and may worsen it if used improperly. Information flow and coordinating orders across the supply chain offer the only hope of taming the bullwhip effect."

Procter & Gamble executives coined the term bullwhip effect when they were studying demand for the company's disposable diapers. Despite being a steady market, the executives noted fluctuation in both distributor orders for its diapers to factories and P&G orders to material suppliers.

Enhancing visibility can greatly affect the imbalance that Procter and Gamble executives witnessed.

"Visibility in itself has a major impact on supply chain performance," notes Simchi-Levi. "Not only does it allow supply chain partners to view and act using real-time information, but it also has a major impact on the bullwhip effect.

"Specifically, the bullwhip effect suggests that variability increases as one moves up in the supply chain," he says. "That is, variability in orders placed by retailers (to distributors, for example) is larger than variability in customer demand.

And variability in orders placed by distributors is larger than variability in retailers' orders, and so on."

As Simchi-Levi and his colleagues argue in their book, *Designing and Managing the Supply Chain*, visibility and centralized information can reduce the bullwhip effect and, in turn, help supply chain partners reduce inventory, increase service levels, and more efficiently utilize resources.

reducing performance. This is possible, but it requires significant supply chain expertise."

The fallout after Sept. 11, and continued concern about safety and security in the movement of goods, present further considerations for review-

ing a company's supply chain strategy. The tools also allow supply chain executives to evaluate the impact of changes in safety stock on supply chain performance." ■

