Do technology and information really create supply chain gains?

Supply chain managers crave innovative ways to cut costs and streamline systems. Often, they turn to technology, hoping for big savings and process improvements. But not every tool that promises huge cost reductions and streamlined operations is right for every business.

That's why Ann Marucheck cautions supply-chain managers to be skeptical about anecdotal reports of how technology or information sharing have resulted in huge cost savings.

Marucheck is chair and professor of the operations, technology and innovation management (OTIM) area at UNC Kenan-Flagler.

Since substantial investments of money and time are required with a new technology, supply chain managers need to take a nuanced approach and ask if the technology or information sharing will provide additional information that realizes gains.

Reducing perishability in the supply chain

Questions remain about the sustainability of the online grocery business after Webvan's 2001 failure. Learning from the firm's mistakes, today's online grocers follow one of two business models.

- Many large grocers, like Safeway and Albertson's, piggyback online services on their brick-and-mortar infrastructures. Their incremental investment is low, but since food items stay in the supply chain much longer, many only offer non-perishables, such as laundry detergent and canned goods. With these items' paper-thin margins, the grocers' key to profitability is volume, which their warehouses can handle.

- Purely online grocers, like FreshDirect and Peapod, operate regionally. They have a shorter supply chain, which means perishables move faster and arrive fresher. This model can make money, but it doesn't have the scale needed to expand nationally without having a direct impact on supply chain length and product quality.

Marucheck investigated the profitability of different operations models for online grocers and finds that both models can be profitable if businesses correctly match product mix to supply chain length.

Managing inventory transactions

A shorter supply chain is more responsive to demand, keeping inventory levels low and customer satisfaction high. To achieve this, many industries—including the auto sector—have invested in electronic data interchange (EDI) systems to seamlessly transmit information from the demand side through the supply chain and back again.

Marucheck undertook an integrated analysis of EDI research and the technology's impact. Cost savings from EDI often depend on the degree of coordination within the supply chain. Unfortunately, many businesses use different types of applications software from different vendors. This makes it difficult—if not impossible—to integrate EDI data with an existing application program.

For instance, a supplier in the auto industry began receiving purchase orders through EDI. Because of different communication standards, it never was able to fully integrate the purchasing information from the EDI system into the order-processing software or inventory management software. Costs actually increased—with no benefits realized.

Reducing uncertainty

Marucheck reviewed research on how supply chain information is used and developed guidelines for making successful adoption and implementation decisions.

Information about customer demand gets distorted over time by the various ordering policies used by different firms, Marucheck found. As a result, its w accuracy and reliability are highly suspect.

Not surprisingly, data is of greatest value when it reduces uncertainty around actual demand or supply. When EDI is deeply integrated across the enterprise and through the supply chain, a firm can achieve meaningful efficiencies and savings—and its supply chain nears "perfection" through continuous replenishment.

Dell, for example, uses EDI to match demand to inventory and delivery. At point-of-sale, orders for components in the batch size are transmitted via EDI to the supplier for nearly immediate delivery. As a result, Dell holds virtually no inventory.

So while reduced uncertainty equals reduced costs, more information doesn't necessarily mean more savings and efficiencies, Marucheck advises.

Seeing the value

In fact, only information that creates cost-savings or generates revenue is of true value to the business. This is borne out in a study of RFID applications by Marucheck and UNC Kenan-Flagler colleagues Noel Greis and Monica Nogueira and Linning Cai of Tsinghua University.

One company deployed RFID tags to capture more information of value to the customer. But customers had never asked for the information and were unlikely to pay for it. And because the business wasn't using RFID in other capacities, it invested in a technology that added no real value to the enterprise.

Even the world's largest retailer, Wal-Mart, didn't get it right. After requiring suppliers to use the tags (and at their own expense), Wal-Mart saw only incremental cost savings. Said one food supplier interviewed for the study: "We tagged our product to meet the mandate of Wal-Mart, but probably haven't realized enough gains through tracking to expand it to all our products."

On the other hand, the same supplier sees how the RFID tags could potentially provide very meaningful input related to food safety. "We are interested in the ability of more sophisticated tags which have sensing capabilities which can keep records of the temperature and humidity the product is exposed to throughout the supply chain. That would really help us better manage our perishable products."

In this case, RFID tags could provide managers information about conditions (such as temperature and moisture) during shipping, storage and handling that affect a product's shelf life. The same data also could be used to track an item in the case of contamination and determine which items need to be recalled in case of a safety or security problem. At the very least, better RFID tags could provide information on how long the product has been in the supply chain and where it has been to determine how long it could safely be offered on the retail shelf.

The bottom line

Marucheck's research clearly shows that managers should not assume that investing in a technology—even when coerced to do so by a more powerful channel partner—will produce huge cost savings. And savings generated by automated processes can be erased by the costs of hardware, software, training and maintenance—particularly if the underlying processes aren't changed to leverage the new technologies and the information they can provide.

The take-away for supply chain managers, then, is to take an analytical approach to new technologies and practices.

Questions to ask when evaluating technology for supply chain operations and process management:

- Have the problems that the technology is designed to address been created by “broken” processes or “work arounds” due to process bottlenecks? (If so, you probably won’t realize the purported cost savings).

- What benefits do we expect from this technology and are there other “closed system” technologies that can provide the same benefits?

- What standards does the technology use and are these the same as our global supply chain partners’?

- As the technology industry consolidates, will the vendor likely be around in the next 3-5 years to support the technology and to provide the upgrades and integration to other systems needed for supply chain integration?

- What areas of the business and the supply chain, besides those immediately impacted, need to learn about the technology?