With Supply Management, Technology Rules!

Technology may not necessarily be the be-all and end-all. But in the supply management space, it's certainly the quickest and most direct route to cutting costs and improving profitability. The companies profiled here show how—with the right people and processes in place—technology can deliver stunning performance results.

By Patricia E. Moody

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There is no surer way to make hyperextended global supply chain managers roll their eyes back into their heads and move on to their next emergency than to tell them that they need advanced technology tools because they are so cool, or because they are fun, or sexy. What these people care about, above all other issues, is profitability—where to find it and how to create it.

Profitably can be enhanced in any number of ways. But one of the most rewarding and direct avenues is through technology. Properly

selected and applied to supply management, technology can be a prime profitability lever—a key that can unlock the vault.

Different companies leverage technology in different ways. Some turn to external solutions and expertise. Others rely mainly on their in-house resources. Still others fall somewhere in between. But in every case, a successful technology implementation in the supply management space is characterized by a determination to make the technology work for the betterment of the business. And that means making any necessary process or organizational changes that may be keeping the technology from reaching its full potential.

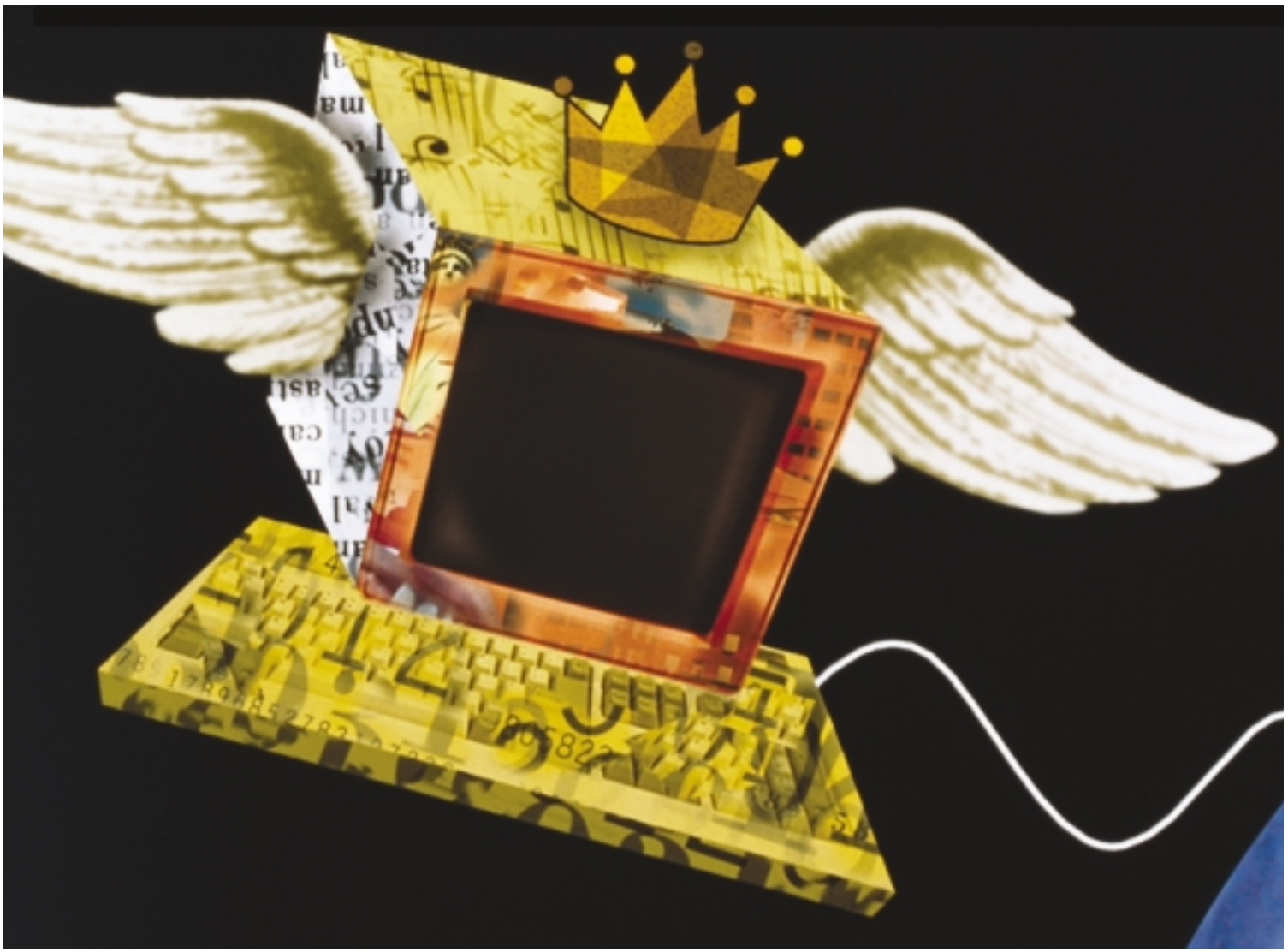
In researching my last two books, I focused on successful approaches to putting technology to work. This article describes three companies that have used these approaches: Hewlett-Packard, Caterpillar, and Datacraft Solutions. Although these companies compete in very different arenas, they share some common characteristics in their approach to using technology to cut costs and increase profits. They understand the value of technology and the importance of unlocking that value for the good of the business. These three companies share one other common characteristic: people with the vision and perseverance to make the technology work!

Hewlett-Packard: Leveraging the Tools

Hewlett-Packard (HP), a giant built on breakthrough technology advances, leverages its own supply management organization's unique technology tools to deliver corporate profits. These profits are converting Wall Street skeptics, who doubted HP's future after the departure of former CEO Carly Fiorina. A series of stick-to-business wins has proved that this company can still deliver to shareholders as well as customers.

A key component of the company's success story is its tech culture, say HP procurement executives. "[Technology] facilitates our need and our desire to take a leadership position in supply chain," explains procurement chief, Dick Conrad.

Indeed HP is a supply management leader that understands that its future profitability rides on smart use of technology tools. According to Greg Shoemaker, the vice presi-



dent of Central Direct Procurement, HP is leveraging a number of supply management and analytical tools, developed both internally and externally.

Successfully leveraging this technology, however, requires resources—foremost among which are dedicated people. In HP's case, Patrick Scholler, director of its Procurement Competitive Edge initiative, manages the deployment of systems across the company. His dedicated technology team makes sure that HP's complex map of tools and database are well-integrated to leverage information power. The team's theme is convergence, which Scholler believes is the key to achieving the goal of commonality—that is, one system with one master database instead of several.

E-sourcing

Among the best-practice initiatives that Scholler's group is pursuing, e-sourcing is the furthest along. E-sourcing is a Web-based, real-time, interactive procurement solution that provides capabilities such as bidding, open auctions, reverse auctions, and private auctions. This tool also handles requests for quotes or sealed bids (private offers). "At HP we have reached more than $30 billion of spend through e-sourcing," Scholler says. "Some business units, such as the Personal Systems Group, have more than 80 percent go through e-sourcing."

In particular, HP has heavily promoted the use of e-auctions throughout the company, says Scholler. "We have run 800 auctions or e-sourcing events in direct, indirect, and service procurement," he says.

A primary goal here is to move processes off spreadsheets and e-mails. "It's more effective, more efficient, and more secure—security is very important," Shoemaker says. Going forward, HP wants its commodity managers to be able to buy over the Internet with an encrypted credit card. E-sourcing tools, all of which share a common database and security and audit protection, will make this a reality, HP believes.

HP has recently added even more capabilities to its e-sourcing initiatives. One is e-optimization, an expert buying tool pioneered at the company. E-optimization can be explained by using the example of a buyer working with a commodity, such as memory, for which there are several hundred part numbers. "When we get quotes from the vendor, we usually receive several hundred quotes to reference," says Scholler. "With five suppliers, we get five times the number of quotes. At the end of the day, when we have committed a percentage of our business to a given vendor, how do we make sure we have optimized our allocation with a specific vendor, part number by part number? It's a huge information management challenge that this new tool makes easy to manage."

Layered on top of this e-sourcing capability is transformational bidding. Transformational bidding allows suppliers to bid not just on price but also on other strategic elements, including quality, services, and delivery time. HP buyers want to obtain the best price. But they also need to know that their global suppliers for technology components align with HP's high quality, delivery, and advanced technology standards. The ability to identify other key parameters beyond price will allow buyers to take a more comprehensive approach. They are no longer simply limited to cost. Instead the system also shows them supplier history and key performance metrics such as quality, delivery, and post-shipment support. The more information that buyers have at their fingertips, the lower the actual overall or total customer cost will be.

Procurement Risk Management

Riding the roller coaster of global tech trends and costs also requires a certain degree of flexi-

bility. Shoemaker believes that information management is key here. "It is easy to get the information," he says, "but it's also a question of what to do with it. You don't necessarily get the best deal because you are the biggest guy on the block. ... You aren't guaranteed cost advantage. It's about making sure that our procurement pros are educated, that they have the right info, and that they know their suppliers."

For some markets and commodities, for instance, HP uses sophisticated cost models that provide planners with detailed "should cost" information on items. It's a disciplined approach that allows HP to focus on key cost drivers, add differentiators and features, and still understand the total cost impact. When they have the right tools, buyers can rely less on negotiation and more on information.

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One such technology resource is called procurement risk management, which Scholler characterizes as a tool copied from the financial world. By using regression analysis of procurement costs, the software enables negotiation with suppliers based on price ceilings. These price ceilings allow buyers to leverage volume-purchase commitments, which contribute to higher profitability. The software helps HP tackle uncertainty in demand, supply, price, and material costs. It quantifies the risk and the likelihood of certain changes and allows the company to manage risk over a longer time horizon.

For example, when HP completed a three-deal contract with supplier LG Phillips LCD for $5 billion in TFT-LCD panels, company planners did not know what price or market conditions would arise in the future. The planners were thus unsure of the exact quantities that would be required. But they needed to put a value on the contract that would protect their interests. The risk management software allowed them to do that by generating a contract valuation solution.

By balancing critical cost factors against projected market conditions, planners use the software to minimize their risk exposure and to protect their financial investment as uncertainty increases over time. No one can predict exactly the moment when hot commodity prices will peak or drop. But when buyers want to keep their place in line without paying long-term premiums to suppliers, they can use risk management software to play with different scenarios. Simulating market swings takes some of the risk out of buying over long-term contracts; risk management software helps planners lock-in reliable supplies of key commodities from great suppliers without giving away the store.

Another software offering analyzes forecast quality, which helps to further frame forecast uncertainty. Scholler describes the tool's benefits: "When we know that [uncertainty], we can know how much we can commit as a fixed quantity. Even with a portfolio of contracts, the valuation tool will take into account the uncertainty of the market and supply conditions, as well as demand, and uncertainty in the market price." On a range of specific volumes, planners can work at an 80 percent confidence level that whatever happens HP will buy certain parts. This, in turn, enables HP to request a discount because with a fixed commitment, the company assumes the risk itself. Shifting risk from suppliers to HP also reduces the suppliers' costs.

Further, technology allows planners to calculate lifetime buys, resulting in one less headache for the supply management function. Price forecast tools, particularly for volatile commodities such as drams and panels, bring HP buyers one solid step closer to a world of less uncertainty and more control—a supply manager's dream.

The ABC Framework

Few procurement organizations have detailed insight into life-cycle costs from design through shipment. HP does, however, through its ABC (absolute best cost) framework. This software provides an advanced framework that predicts and optimizes the total cost of a complete product or subcomponent. The tool provides information on life-cycle cost to enable better buying and design decisions. Its value lies in ensuring delivery of market-competitive product prices; prices are defined, however, as customer value, which is not always "lowest cost." This software tool is especially relevant in any heavily outsourced business, because it focuses in so sharply on true competitive pricing.

The ABC framework is an aggressive approach to seeking the best total-cost solutions that improve profitability. The software allows commodity managers, for instance, to execute cost-to-value optimization across various corporate functions, such as manufacturing or packaging. Further, it identifies and values cost competitive threats and opportunities. This gives buyers better positions during supplier negotiations.

Scholler contrasts the approach enabled by the ABC framework with traditional cost planning: "Usually when you do cost planning of a product, you start with an affordability model—that is, what is the customer willing to pay, how much margin, and so forth. Next, you go down a level to prepare a budget for each part of the product—so much for the power supply, the keyboard, motherboard, and so forth."

Basically, it's a top-down approach, he says.

The ABC framework, by comparison, gives HP another cost perspective—working from the opposite direction. The idea is to look at the lowest total cost to make a particular product. For instance, HP might take a cheap widebox PC made in China and break it down into its sub-costs. Planners would next locate the cheapest PC available, which would become the absolute best cost. Starting with that bottom-up approach, the challenge becomes to define an acceptable product for HP. Cost/value analytics bring together procurement as well as engineering and marketing interests. It's a more comprehensive way to define costs, the company believes.

Line-of-Sight Management

HP is also using technology tools, especially compensation systems, to link supply management directly to corporate goals. This provides what Shoemaker calls a "direct line of sight" between HP's objectives and procurement's actual performance. "Our entire compensation package is a mixture of overall company results and individual performance results," he says. "It's one aggressive step up that is raising procurement's visibility and power."

A procurement professional can have direct impact on corporate goals by obtaining what Shoemaker calls advantaged costs, materials availability, and the right quality during allocation periods. To achieve this, they can avail themselves of tech tools that provide more of the right kind of information, at the right time, that ensure better decision making. And this, in turn, helps the company maintain its lead in competitive buying.

Indeed, better sourcing and buying by every commodity manager has the potential to improve HP corporate profits. The HP total spend of $60 billion includes $45 billion for direct materials, $10 billion for indirect, and the remainder in logistics and services procurement.

Everyone on HP's procurement team understands the possibilities that even a 1-percent improvement in spend can create. In fact, merely a 1-percent improvement, or about $60 million, is significant. Armed with new advanced technology tools, HP buyers can keep their focus on making decisions that build profits, as well as ensure that the legendary innovation machine continues to roll.

Caterpillar: Technology Shows a Better Way

Caterpillar, the big, yellow king of earth-moving and construction equipment, has put in place some of the quickest brains in industry to pioneer leading-edge technology applications that will redesign the way buyers work. A big part of that effort is being led by Syamala Srinivasan, manager of Caterpillar's Information Analytics Center of Excellence.

Srinivasan likes to play with numbers. In fact, she likes them so much that she has made a career of creating innovative new solutions from the mountains of data that supply chains typically accumulate around parts and cost. Hired 16 years ago as a reliability analyst, Srinivasan describes herself as a natural entrepreneur. "I like to do things different and new," she says. "And so I always look for solutions that not only help Caterpillar but also have potential opportunities for spin-offs."

Srinivasan currently leads the information analytics group that provides consulting services for all divisions of Caterpillar. The group has wide expertise in general statistics and data mining as well as in probabilistic business simulation, discrete event simulation, and probabilistic engineering simulation. It gets involved in a lot of interesting projects such as a predictive buying initiative to help improve sales of Caterpillar truck engines. Srinivasan gives the details: "We purchased the truck engine registration database to extract the customers' purchase history information and integrated it with the customer business information. We used pattern-recognition techniques to analyze this large database and were able to predict future buying patterns of individual customers very accurately. This information allowed the sales force to target specific potential customers."

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Srinivasan reports that truck engine sales significantly improved after completion of the project. The initiative also won Caterpillar the National Grand Challenge Award from the University of Illinois, presented for breakthrough business results using state-of-the-art technologies.

With this project, as with most, lack of data is not the problem. Srinivasan explains: "Generally in any big company, nine out of 10 people will be responsible for creating a database, and then inputting to the database, and that's where most of the effort is expended," the analytics center director says. "But only one out of 10 people would actually take data out of the database and analyze and convert it to useful information. The others are missing the value of the data kept in the warehouse. It's not going to help one bit until you take it and do something with it—and that's what my group focuses on."

Using Technology to Reduce Costs

Buyers traditionally use negotiation or leverage to seek lower prices from suppliers. But do they actually understand which parts hold the most potential for price cuts that will have an impact on profits? Is there a better way to analyze and develop better pricing, aside from tougher negotiations or a bigger hammer? Srinivasan believes there is, and the answer lies in powerful technology tools for cost analysis. She relates how one innovative tool was developed that ultimately resulted in the creation of a new software company.

"The whole journey started with a simple question," Srinivasan relates, "'How could we reduce material costs?' Here's how it came out: I was working in the engine division, where diesel engines are made. These engines get used in Caterpillar machines as well as in the on-highway trucks. Significant costs were spent on engine parts, so that was the biggest factor under review."

The underlying message here is that technology can make your supply management life simpler and more profitable.

Srinivasan notes that under conventional practice, if a company wanted to reduce material costs in this type of environment, it would review high-volume/high-cost parts first. "The review usually would be a manual exercise," she explains. "For a specific part number, the engineering features such as material and size and the manufacturing features such as holes and surface finish are reviewed. The costs of each of these features are estimated. Finally, all the individual costs are rolled up to estimate the total cost of the part."

This largely manual process normally takes three to four weeks, with consultants often employed to complete the work. If the estimated part cost is significantly less than the actual price of the part, then the analysis provides an opportunity to negotiate with the supplier.

But Srinivasan and her partner Nelson Jones believed that there had to be a better way through technology. They sought out a more efficient approach that allowed buyers to do cost analysis of large groups of part numbers very quickly. "The first step was to identify all the relevant data sources, such as the engineering database, the purchasing database, and the logistics database, for the engines," Srinivasan says. "The second step was to clean up the data and extract cost-impacting features such as type of material, weight, annual sales volume, and so forth. The third step was to classify the parts into homogenous groupings, such as brackets, flywheels, and valves. Next, we built a mathematical model, for a specific grouping, for the price as a function of features."

This phase was critical to producing an accurate cost total across thousands of part numbers, which were classified into dozens of part groupings. These mathematical models were analyzed and the results were stunning. "The cost-volume curves of several part groupings showed several 'outliers,'" Srinivasan says. "This means that several part numbers are costing significantly higher than what they are supposed to. The model also identified several 'similar-featured' part numbers for these outliers that have significantly lower costs. This provided a fact-based approach, which helped to start negotiations with the suppliers. Several Six Sigma teams used this tool to analyze thousands of part numbers and were able to realize significant cost reductions for Caterpillar."

Now normally these one-time analyses can easily save millions, but why stop there, Srinivasan and her team asked. "We thought that because we had come up with an automated business solution—not a one-off project—there might be outside opportunities to expand this approach to other divisions, even to companies outside Caterpillar!" says Srinivasan. "After all, everyone could understand the value of obtaining comprehensive cost answers in three minutes or less—compared with three weeks of labor-intensive digging for a one-shot project. So the next step was a pilot that took the system's user-friendliness one step higher with the addition to the model of a Web-based interface."

To protect the concept, Nelson and Srinivasan patented the methodology for Caterpillar. "The algorithms are pretty new," says Srinivasan, "and the way we integrate them has never been done before." Caterpillar has formally recognized Srinivasan and her partner Nelson for their innovation. The company has also licensed the technology to a private software startup for further commercialization.

Extending beyond the supply management space, Srinivasan sees no end in sight for better applications of modeling in, for example, the financial world for portfolio optimization as well as in marketing analysis. In manufacturing, the ability to extract features and their costs from drawings and to integrate the key data with other systems' input will go a long way toward putting real, in-depth cost knowledge into the hands of the decision makers—the buyers and designers.

One more application idea arises from the ability to look at true costs in depth—outsourcing. Although many outsourcing decisions have been made on labor costs alone, Srinivasan believes that with a better, in-depth review of true life-cycle costs—including freight, materials, handling, and so forth—the decision to outsource might look less attractive in many areas. The more information, she says, the better the outcome.

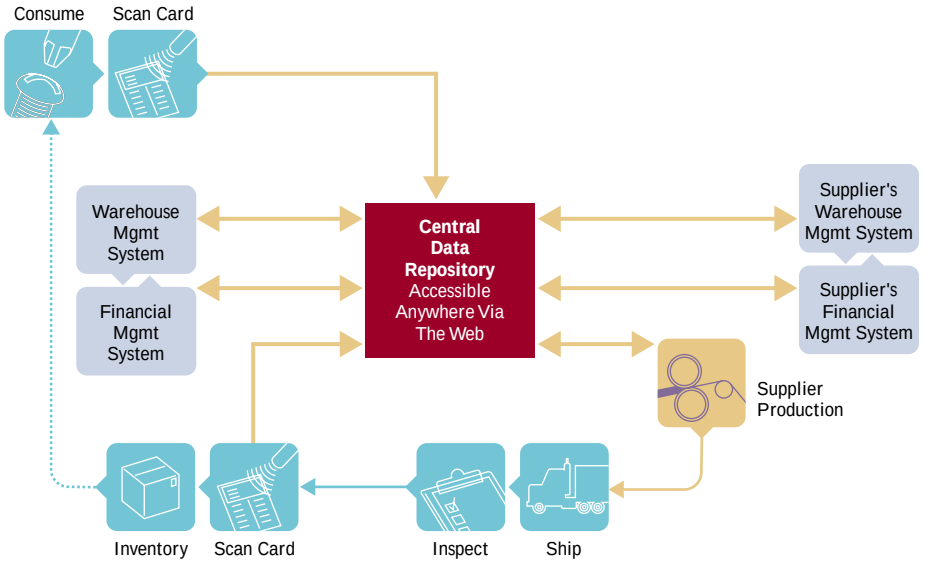
Datacraft Solutions: Giving Lean a Profitability Boost

Datacraft Solutions, an on-demand supply management solutions provider headquartered in Raleigh, N.C., has developed a next-generation tool based on the business rules of the Toyota Production System. This software solution

builds on best practices in lean manufacturing and supply management. By replacing manual pull signals—"kanban" in Toyota Production System terminology—with electronic ones, manufacturers shave costs off their replenishment expenses, as they continue to improve communications and global material movement velocity. (Exhibit 1 gives a high-level overview of the electronic kanban system.)

EXHIBIT 1

Digital Kanban Drives Supplier to Consumption



Producers such as dj Orthopedics, a manufacturer of orthopedic braces, have streamlined their replenishment process using Datacraft Solutions' electronic kanban. For dj Orthopedics, the implementation made deliveries to North American end customers more consistent while taking significant costs out of the material movement and handling steps. The simple act of replacing manual kanban replenishment cards with electronic signals bar-coded from production cells allows manufacturers to speed throughput and communications. It also builds valuable database information on supplier performance, shipping history, and other critical operating needs.

Other lean leaders are finding strong profitability improvements in the digital kanban solution.

■ Outokumpu Copper, a copper tubing provider, has increased inventory turns from 30 to 60 per year. The company also has eliminated waste in the replenishment cycle by cutting the replenishment process from 20 manual steps down to seven. In two weeks, they took out one quarter of finished inventory at their customer site in Mexico.

■ Pacific Scientific, a global West Coast aerospace/defense manufacturer, has doubled inventory turns, reduced excess inventory by 30 percent, and increased productivity by 20 percent in procurement. Replacing manual kanban with digital kanban has freed up planners from tactical work—fire fighting, chasing, and expediting—to pursue strategic planning and execution.

■ A tier-one automotive manufacturer has reduced excess inventory by 50 percent and eliminated stockouts.

Electronic kanbans create better and more immediate data that is bar-coded directly into the system. They allow instantaneous online updates for these companies and enable real-time supplier performance measurement. If supplier delivery performance falls to 60 percent, for instance, planners can quickly make production schedule adjustments or shift material flows to Plan B. As a result, there are fewer catastrophes and less expediting and premium shipping costs. Essentially the electronic kanban tool helps planners identify and zero in on in-process wastes—and that improves profitability for any operation.

Making Life Easier

The underlying message in the HP, Caterpillar, and Datacraft Solutions stories is that technology can make your supply management life simpler and more profitable. As supply networks become complex global webs of cost and information flows among many layers of suppliers and end users, you have no other choice but to embrace the technology. Spreadsheets and seat-of-the-pants calculations are no longer enough to tame the turbulent global supply chain.

Although the companies profiled here have adopted different approaches to applying technology to supply management operations, they all have recorded impressive results. Their operations are more nimble and less manual, they are able to respond better to customer demands, and they are more profitable. And it's not because technology is the silver bullet. Rather it's because these companies have recognized the power of technology and marshaled the people and processes to release that power.