How Kodak Transformed its Service Parts Supply Chain

To stay ahead of the digital transformation in its marketplace, Eastman Kodak Company knew that it had to go through a transformation of its own in its service parts supply chain. The guiding principles in this endeavor would be velocity, value, and visibility. This is a story of that transformation—the motivation, the methods, and the results.

By Mark Brienzi and Dr. Sham Kekre

The traditional imaging business is being replaced rapidly by a growing digital business that is more demanding, changes faster, and is increasingly global. This development has affected every company in the photographic business. The impact at Eastman Kodak Company, in particular, has been profound, affecting the whole service parts value chain.

Kodak makes a diverse range of products—from user-friendly Picture Maker photo kiosks found in retail stores to the sophisticated computer radiography equipment so critical in trauma centers and hospitals. Compared with traditional photographic products, digital products have shorter life cycles and more expensive after-market parts. Examples

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of digital parts in this market include circuit boards, print head controllers, CPUs, optical drives, and monitors.

At the current pace of technological innovation, digital parts become obsolete very quickly, creating conflicting pressures in the organization. On the one hand, our service parts supply chain managers are under tremendous pressure from the product group managers to lower inventories. On the other hand, the service team—our field force—expects a very high stock level of parts. That dilemma soon raised a basic question: what should be the value proposition of our service parts logistic chain and network? We had to develop a value proposition that optimized parts inventory over the entire product life cycle while enabling better management of inventory costs.

We identified three key value propositions for our parts logistics network that could be used to deliver smarter asset control as the product works through its life cycle. Velocity was the first value proposition. Velocity helps in the launch phase so that only a few parts (often scarce) are needed to support a product launch when machine placements are uncertain and parts themselves are subject to revisions and version-level changes. The second proposition is value (in terms of efficiency and distribution costs); value applies to the cost savings achieved in the maturity phase, and helps us monitor that phase for transaction costs and efficiency. Visibility, the final value proposition, refers to the parts in the entire supply chain that can be exploited during the product's decline phase. This could help us lower the number of new buys required and lower product support costs. In short, we needed to develop a logistics supply chain that had all three ingredients—velocity, value, and visibility—across an anticipated product life cycle.

Our efforts to transform Kodak's service parts supply chain began in January 2003. That's when we realized we had to match the company's powerful digital vision and we also had to meet stringent service goals in a cost-effective manner. In this article, we will describe the motivations of our service parts supply chain (SPSC) team as well as our methods and our results. It is an account of how simple ideas, sparked by an enthusiastic team and enabled by smart technology, made a significant difference to the day-to-day management of expensive assets. In essence, it is a story of innovation.

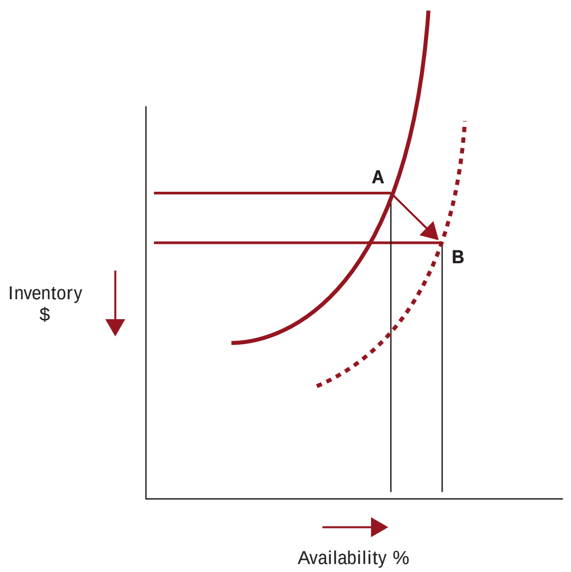
JAMES STEINBURG

Identifying the Inventory-vs.-Service Tradeoff

In the digital world, the pressures to manage service parts efficiently are huge. The focus on product margins coupled with rising customer expectations meant that we had to improve parts availability as well as reduce total parts inventory. Exhibit 1 explains this dilemma graphically. We were operating at Point A, but product group managers wanted us to move to Point B. This looked like a paradox in itself; it went against all common rules of inventory management. We had to reason and reengineer the supply chain.

EXHIBIT 1

Depiction of a Dilemma: Less Inventory and More Availability?

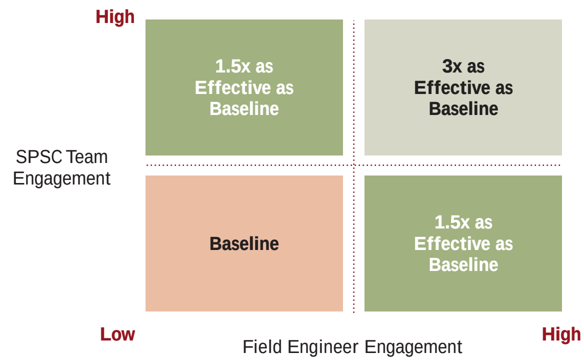


We brainstormed over the challenge and realized that our service parts value chain could be reengineered with two types of engagements—field engineer engagement (working with our internal customers) and our SPSC team engagement (involving those planning and managing the logistics chain). Based on the levels of these two types of engagement, the interaction could deliver different levels of returns. For example, the SPSC planners could tighten replenishment of central warehouses or the field engineers could optimize trunk stock. However, experience had taught us the valuable lesson that when both teams' levels of engagement are high, the returns from operational effectiveness and cost savings are the highest—almost threefold compared to the current, or "baseline" model. (See Exhibit 2.)

We concluded, therefore, that to really make a difference, we had to think about process changes—and maybe structural changes—that involved both the SPSC team and the field engineers. Although this was a simple truth, we knew it would be difficult to implement because it involved internal customers at Kodak who, in some cases, were averse to risk and hesitant to change. The core question was still there:

EXHIBIT 2

Identifying the Highest Returns



what exactly did we want to change in the service parts value chain? What was the opportunity? This is where our initial data analysis showed us the way. We took a hard look at our current process and our field inventory profile—and we were surprised by what we saw.

Analyzing the Inventory Profile

Traditionally, Eastman Kodak had two echelons of inventory: one at the central warehouse in Rochester, N.Y., and the other in the trunks of our field engineers. The field engineers obtained the parts from the central warehouse or, in rare cases, from each other. Some of the parts were expensive, and often repairable. Repairable parts had to be returned to the Rochester warehouse, where they were moved on to the repair vendors. Exhibit 3 depicts the "old way" of parts supply.

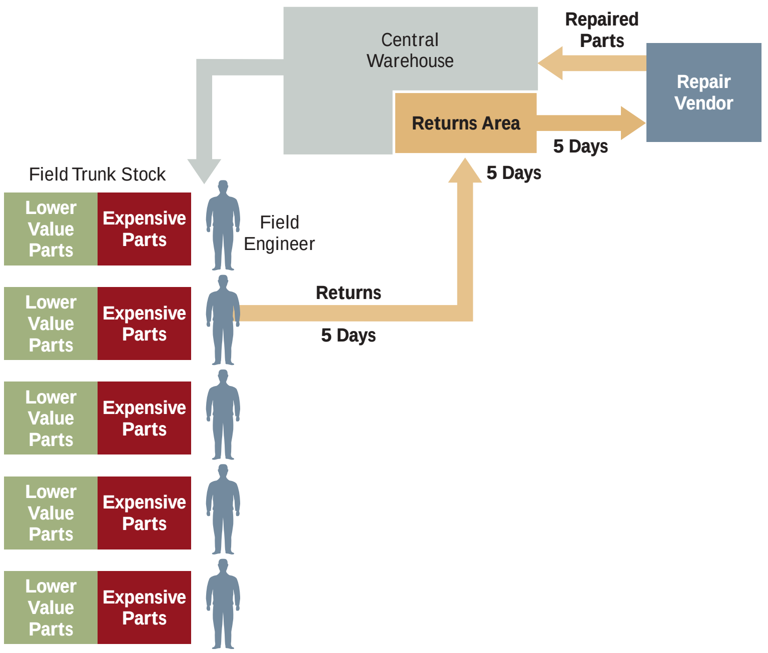
The ratio of central to field inventory was approximately 50:50. But we needed to know much more than that, so we launched a detailed inventory profile analysis. The results were revealing. Labeling parts with a unit cost of more than $700 as "expensive" (the idea being that they deserved special logistics and handling), we found that they accounted for less than 5 percent of the actual usage even though they made up 50 percent of our total field inventory. Similar analyses for service parts in other cost ranges helped build up a very detailed picture of our inventory profile.

We quickly concluded that "expensive" parts had to have a leaner supply chain—one that was still reliable yet more agile. We estimated that if we could scale back the inventory of those parts, we could change the central-to-trunk inventory ratio from 50:50 to 70:30 and achieve our inventory reduction targets. And since we knew that the usage of the $700-plus parts was not high (only 5 percent), we realized that we could spend some effort and money to deliver them on demand as required to satisfy service-level requirements. The idea of centralizing expensive parts at strategic field locations and delivering them on demand to the field engineers seemed logical and simple. The challenge was how to execute it.

There was no doubt that wisely managing the costly parts was the big opportunity that we had to explore. We were con-

EXHIBIT 3

Kodak's Old Way of Supplying Parts



fident that if we could find a better way to manage their storage and distribution, we could meet the needs of our product managers and our field force—and ultimately our customers. Put another way, we could move from Point A to Point B shown in Exhibit 1. But the execution challenge seemed all the more daunting because the company's management team wanted quick results—in a matter of four months, not several years. Eastman Kodak's digital transformation could not wait. We had to act right away—we had to manage the risks of change and keep our entire team energized and motivated to accept the change. We also knew that we could not modify the supply chain all by ourselves. We wanted to tap the resources available in our industry, especially those that specialized and excelled in their specialized fields. We began looking for providers that could take the best process and deliver a cost-effective solution. Management was ready to support us provided that we could demonstrate a viable business case for what we planned to do.

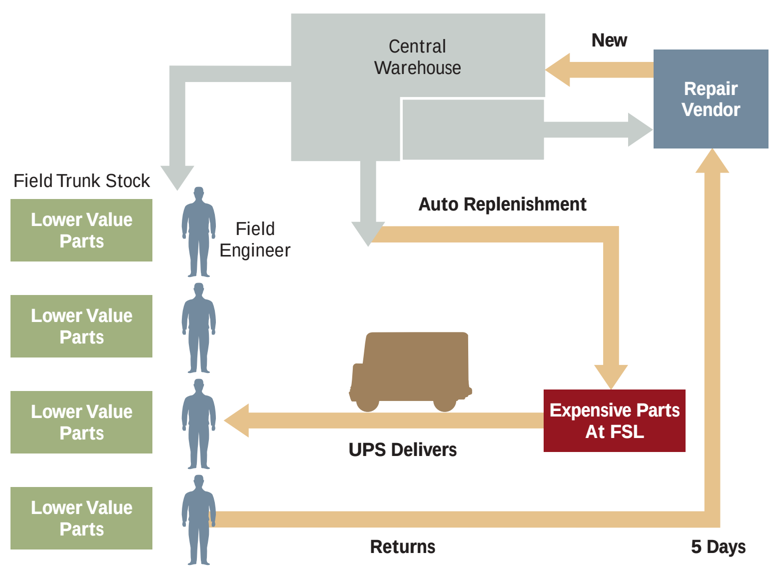
Developing a Clear Business Case

The next phase of our analysis was to prepare a business case for our idea of centralizing expensive parts at strategic field locations and delivering them on demand to field engineers. Preparing that business case meant that we had to estimate future inventories in strategic field locations by examining past parts usage and equipment locations. For this task, we researched available inventory-management tool sets and expertise. Our choice was to leverage a tool set from Baxter Planning Systems called Prophet by Baxter. The tool would optimize our proposed pooled inventory and determine the number of inventory locations desired. We also had to decide who would operate the remote inventory locations and deliver parts to the field engineers. We selected UPS Supply Chain Solutions as our third-party logistics partner (3PL) in United States markets, and noted that they were completely integrated with the Baxter Planning Systems' tools.

With operational cost quotes from UPS Supply Chain and inventory savings projected by Baxter Planning, we had enough data to prepare a business case. Data validated that our pooled inventory concept—which we termed "FSL" ("forward stock locations")—did indeed present a robust business case. Additionally, through its ongoing partnership with UPS Supply Chain, Baxter Planning had solid geographic knowledge of the 3PL's locations, the distance between them, and parts delivery timeframes—all of which was information that was not readily available to us. We were counting on such field-based expertise to meet our four-month timeframe and minimize the risk of adversely

EXHIBIT 4

The New Way of Supplying Parts



- Field Engineer is not allowed to carry expensive slow-moving parts.
- Repairable parts are tracked closely. Return in <5 days or escalation starts.
- Field Engineer needs to identify parts requirements before the site visit.

affecting our customers. In fact, one of our absolute requirements for the new model was zero tolerance of any fall-off in service levels. We insisted that at no time during implementation would customers have to pay for our learning process.

Armed with all the facts and estimates, and the business case, we went to seek management approval. Kodak service leaders were ready to sponsor the idea—at least for a pilot to show proof of concept. The FSL pilot program was formally approved in early February 2003. Our mandate was to develop and demonstrate radical process innovations. As reengineering expert Michael Hammer has noted, "Operational innovation is by nature disruptive."[1] Yet we believed that if the field engineers could quickly see beneficial results in a short period of time, then the new model would more easily overcome any natural resistance to change. Our first task, then, was to design the new way of distributing and managing the "expensive" parts.

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Designing the New Way

Central to the model was a new procedure whereby the field engineers would order the necessary expensive parts from the forward stock location prior to making a service call. (The general idea concept for the "New Way" is shown in Exhibit 4.) The part would either be transported directly to the customer site or picked up at a UPS Supply Chain Solutions facility by the field engineer on the way to the service call. Alternatively, the part could be delivered to the home of the field engineer for service use the following day. In most instances, the engineer could identify what part was required by the customer's description of the malfunction, or by the error code shown on the machine's display panel.

An additional benefit was that the Baxter system would completely automate inventory levels among the FSLs. If, for instance, the count of a certain part fell below a predetermined level at one FSL, then an electronic message would automatically be sent to UPS to ship that part from another FSL that had inventory of the part above its predetermined levels. If there were no excess parts in the FSL network, then the electronic message would go to Kodak's central warehouse, which would then release the part. The model would also allow for some sharing of the pooled inventory across our various business units.

Another key element of the model was a new parts repair loop for high-cost, low-use parts. Normally, repairable parts were shipped back to our central warehouse, and from there they were shipped to the repair vendor. Once the part was repaired, it was returned to the Rochester warehouse to be available for redistribution as needed. This practice required return transportation times of more than 15 days on average. With the new model, repairable parts would be shipped directly to the repair vendor, and from there directly back to the Kodak warehouse. This would reduce the return time to around five days, eliminating the excess safety stock that had been typical of the longer repair turnaround times.

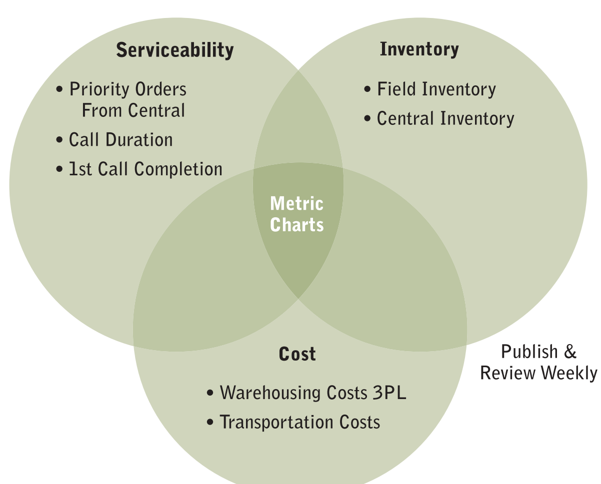
Piloting the New Way in the Northeast

Based on the data model developed by Baxter Planning, the SPSC project team put together our business plan for a pilot program in Kodak's northeast region. The pilot would encompass the territory east of Cleveland and north of Washington, D.C., which included nine states. One of the key ingredients of the proposal was a Balanced Scorecard of metrics that would follow the progress of the new model on a weekly basis (See Exhibit 5.) The metrics would quantify changes in service levels, inventory count, and project costs. They would show us how well we were doing in such areas as first-call completion rates, field inventory vs. central inventory, and 3PL warehousing outlays.

Most importantly, the metrics would show us whether we were improving in any of those three areas at the expense of the others. There would have been no point in optimizing our inventory levels in the field if we had to order additional expensive parts from our central warehouse. Similarly, there would have been no point in synchronizing parts deliveries and service calls if our 3PL warehousing and transportation costs increased our overall budget. All three goals—enhanced serviceability, reduced inventory, and cost savings—had to be

EXHIBIT 5

Balanced Scorecard of Metrics



realized if the FSL plans were to be deemed a success. The Balanced Scorecard of metrics would give senior management a weekly check on our progress.

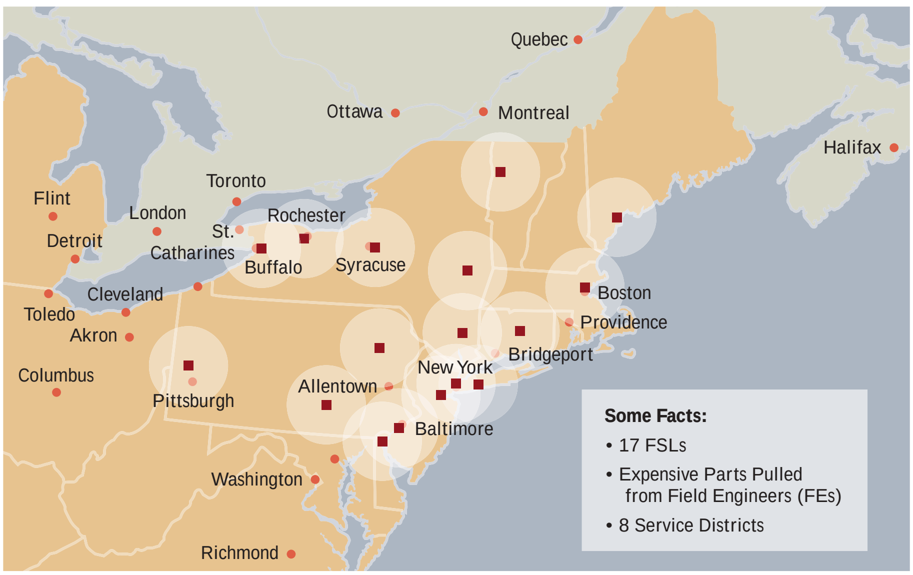
The plan called for a four-month pilot program involving two of Kodak's business units: the Health Group, which provides radiology products to hospitals, clinics, individual practices, diagnostic centers, and dental practices; and the Graphic Communications Group, which provides digital printing solutions, color publishing, and document products and services to businesses and to government agencies. The tests would cover eight service districts within the pilot area. Based on our parts usage data sorted by ZIP code, Baxter Planning picked 17 UPS Supply Chain facilities in the area that would become our forward stocking locations, and determined what parts and quantities should be stocked (See Exhibit 6.)

The pilot was large enough in scope and scale to prove that our parts pooling strategy was feasible and effective, while small enough for us to take the calculated risk of a process change. With senior management's go-ahead, we scheduled the pilot program to run from May to September of 2003.

Our benchmarking efforts with other companies, our research on the subject, and our experiences with past reengineering efforts led us to believe that implementation of the new supply chain model would be as much a behavioral challenge as a technical one. To make FSLs a success, we knew we would have to influence the field engineers' behavior and overcome their natural resistance to changing a system that had worked very well for them for so many years. It was not an easy task considering that we were proposing pulling inventory away from field engineers, making them vulnerable to showing up at a customer site without the needed part—a situation no field engineer ever wants to be in.

EXHIBIT 6

Kodak's Pilot FSL Network



For that reason, we chose an experienced and capable project manager, John Shorkey, who had both technical and communication skills. Shorkey had an IT background, which gave him an in-depth understanding of the FSL model, but he also had extensive experience in customer service and field work. We took the approach that we were not putting an IT solution in place; we were rolling out a field solution, one that would involve continual fine-tuning and feedback from field operations. Therefore, only an individual such as Shorkey, who had shared the day-to-day concerns of the service engineers, could appreciate and evaluate the responses that would come back from the field.

To ensure that we were responsive to the concerns of the business units before and during implementation of the FSLs, we actively sought their input to better understand inventory flows, parts usage, and customer requirements. In some cases, we actually put more parts out in the field based on these inputs. For instance, Baxter Planning's analysis of the data for seldom-used parts indicated that one unit in a regional FSL was sufficient to satisfy the needs of key customers. However, field management told us that customers required that the key parts be kept on-site to keep their equipment up and running at all times. In those cases and a few others, we deferred to the field management. With such corrective measures in place, we were able to assure the field staff that we would use them as a reality check on the impact of the new model and adjust it accordingly.

We also assured them that they would be well-trained for the new methods of ordering and transferring the affected parts, and that the transition to using the FSLs would be meticulously carried out. In the last regard, we looked to flawless execution as the best antidote for human resistance. And to make sure that happened, we put together a comprehensive training schedule and a detailed changeover plan of the necessary tasks leading up to and following initiation of the new model.

High Compliance Levels

Compliance with the pilot project was generally very good. It is difficult to gauge human responses accurately, but based on the record of stock moved during the cutover plan, as well as the staff feedback via e-mail and phone calls, we believe that about 80 percent of the field supported the program from the beginning. As might be expected, the actual comfort level with the new model appeared to vary with usage. The field engineers who requested parts from the FSLs every day very quickly got used to the new system. Of course, some field engineers simply welcomed the opportunity to remove the most expensive aftermarket parts from their vehicles. Many of them found it easier to accept the new program because the parts involved represented only a small percentage of their inventory—again, only one in 20 service calls at most required the $700-plus parts.

Generally, though, we believe that the field staff bought in to the new supply chain model because they realized its benefits. They appreciated the underlying philosophy: that we were replacing a "stationary" inventory model with one that was dynamic and easy for them to use.

As we monitored the weekly data, the project manager was able to identify situations where field engineers were not using parts available to them at the FSLs. Using Baxter Planning's "miss analysis," Shorkey detected the incidents in which an engineer would request a part from our central warehouse when the same part was available at less cost from the closer UPS Supply Chain facility. Alternatively, working with Baxter Planning, Shorkey would find a usage trend for certain parts that suggested they should be located in the FSLs, even though historical data had not supported their remote stocking. In both cases, corrective action was implemented as soon as possible.

Operational innovation and transformation is not a choice in today's digital world; it is a necessity.

Our Balanced Scorecard of metrics also showed excellent results week by week. In all three major areas—serviceability, inventory, and costs—the numbers were going in the right directions. For example, costly priority orders from our central warehouse were down, while the first-call completion rate was comparable to pre-FSL figures. Meanwhile, our field inventory was considerably lower and our overall costs were going down in the range of 13 to 15 percent.

The positive results in the northeast allowed us to phase in Kodak's three other U.S. market quadrants, which were brought on board six weeks apart from September 2003 to January 2004. Again, Baxter Planning helped to select the FSLs using the goal of a maximum of four hours' travel time from FSL to customer site. Today, UPS Supply Chain Solutions runs more than 100 FSLs for Kodak nationwide. We have also expanded the program to include our Digital & Film Imaging Systems business unit.

As we phased in the program in different parts of the country, we continued to analyze the data to determine the appropriate mix of parts for each FSL. We also continued to fine-tune the model itself.

Promising Results

Based on the metrics we have tracked, we believe that the FSLs have achieved many of our objectives. During its first year of operation, the program has:

- Reduced overall field inventory for all FSL parts by 66 percent.
- Reduced central inventory by 32 percent.
- Improved service level metrics.
- Reduced priority shipments by 22 percent.
- Reduced field days of supply of inventory by 48 percent.
- Reduced total acquisition costs with the rebalancing of stock and return of unused parts.
- Had no negative impact on call duration.

The success of the program was also borne out by anecdotal evidence and the testimony of field engineers. Here's an actual field report regarding a hospital that needed repairs to a laser imager: "The call came in at approximately 8 P.M. Based on information from the customer, the field engineer determined that the laser imager needed an optics module. The engineer called UPS and found that the closest part was at an FSL in Mobile, Alabama. UPS had no capability to deliver the part to the hospital until 11 A.M. the next day, which would have been too late for the hospital's needs. So the FE arranged a meeting with the UPS courier to rendezvous in Pensacola, Florida, to collect the part that evening. Then the FE drove to Tallassee and repaired the equipment by 2:00 A.M. the next day."

Our SPSC team is now working to expand the FSL model worldwide, using similar concepts in Europe beginning this year, and later in Asia. Also, we are further enhancing the value proposition of the FSL program with capabilities such as ordering parts over the Internet, consigned inventory of service parts, and automatic balancing of excess stock.

Lessons Learned

Our biggest lesson from the FSL program is that nobody should ever assume that a business process cannot be improved significantly. Operational innovation and transformation is not a matter of choice in today's digital world; it is a necessity. We also found that when an organization is implementing a step-function change, the "soft" issues—the issues of personal motivation, for instance—need just as much attention as the hard process issues. At the same time, flawless execution is key; it calls for superior data analysis, excellent process modeling, and detailed planning. Additionally, the effects of change must be monitored frequently using meaningful metrics, which in our case meant a Balanced Scorecard. We could not have achieved sustainable benefits if we had recorded improvements in some key areas (such as lowered field inventory) at the expense of others (such as higher warehousing costs).

Meaningful metrics are also essential in dealing with the soft issues of behavioral change. Employee reactions to step changes are often similar to those of individuals coping with life-altering events. Most manage to deal with step changes at their own pace and reach a stage of acceptance and support, but a clear-cut set of metrics facilitates the process. Although reporting metrics can put the project at risk—the numbers may well turn out to be negative or insufficiently positive, especially at first—such quantification is the cost of achieving an atmosphere of openness and trust, leading to eventual buy-in.

Another critical factor, and one that pertains to both hard and soft issues, is good leadership—and not just at the top. In addition to having an excellent project manager, we were fortunate to have managers at every level who not only "took the ball and ran with it" but also gave us quick feedback, both good and bad. We did not expect blind support for our ideas and we did not get it. When some aspect of the FSL initiative turned out to be flawed, either in its conceptual state or after we had attempted to implement it, we got the message back loud and clear that we had to take another look. And we did, carefully considering every input, and quickly reacting to it by improving the process.

Finally, we could not have successfully developed and implemented the new model without the ongoing assistance and insights of our project partners. UPS Supply Chain Solutions provided the requisite warehousing and transportation services. Baxter Planning Systems supplied the smart computer software to model the FSL network and select the inventory placements. Our field force provided valuable insight and a customer perspective to fine-tune the various transactions for seamless support. From beginning to end—and continuing to this day—it has been a team effort, and the success we achieved can largely be attributed to the leveraging of our combined capabilities.

In general, we were pleased to see just how well the new model worked across so many geographic regions, business units, and levels of management. However, the lesson was continually brought home to us that the best supply chain model must be as flexible as the marketplace, a marketplace that is vibrant and dynamic. For that reason, we are continuing to analyze our data, seek improvements, and expand the program as warranted. Virtually every week, it seems, we learn something new. We change to learn, and we learn to change.

Footnotes

1 Michael Hammer, "Deep Change: How Operational Innovation Can Transform Your Company," *Harvard Business Review*, April 2004, pp. 85-93.