

# 5

## CHAPTER

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### **Core Discipline 5: Use Metrics to Drive Business Success**

**M**ost people agree with the adage, “If you can’t measure it, you can’t fix it.” Yet few metrics programs actually provide a clear picture of overall performance, pinpoint the root of performance problems, or identify improvement opportunities. The reason is simple: Establishing a robust—and useful—performance measurement program is difficult! Just getting agreement on what to measure, how to define the chosen metrics, and how often they should be measured can be a major effort. And getting management to agree on the fundamental purpose of a metrics program can be the most contentious activity of all.

Think about the metrics your company uses to determine its operational health. Like many companies, you may have functionally focused scorecards for customer service, purchasing, and manufacturing already in place. Few companies, however, track cross-functional supply chain metrics, even though actively monitoring these metrics for management purposes is a key component of an integrated supply chain organization (see Chapter 3).

Most corporate metrics focus on financial impact and outcomes. This isn’t surprising because financial reporting must be done on a regular basis. Financial metrics are also relatively easy to obtain once the books are closed for any given period. Moreover, regulations such as the Sarbanes-Oxley Act

of 2002 oblige companies to be thorough about ensuring the validity of their financial data and diligent about documenting the controls and procedures used to arrive at those numbers. (Sarbanes-Oxley requires that officers of U.S. public companies certify the accuracy of their financial statements and the effectiveness of the associated disclosure controls and procedures. As such, it requires that companies establish and actively manage sound internal controls.)

Indeed, many executives laud the Sarbanes-Oxley Act for enforcing good business practices and providing external validation for company initiatives.<sup>1</sup> The strict reporting requirements give managers more and better information that can make business processes more efficient and cost-effective. Some executives even regard the Sarbanes-Oxley Act as a leverage point in making the case for process improvement.

Yet, while financial metrics can help to gauge the impact of process changes on a company's financial health, we think they're inadequate when it comes to measuring supply chain performance. Why? Since most financial measures are historical, they don't provide a forward-looking perspective and can be very difficult to tie to operational effectiveness. Nor do they provide insight into strategic nonfinancial performance indicators such as order-delivery performance and customer service levels.

What exactly is a *metric*? The *Merriam-Webster Dictionary* defines a *metric* as "a basis or standard of comparison." Note that by this definition, a stand-alone number or value is *not* a metric. A number or value only becomes a useful management tool when compared with another number or value. This is the premise of an effective performance measurement program.

## WHY MEASURE?

Is measuring supply chain performance really that important? Absolutely. For starters, the right set of metrics can tell you how well each *plan*, *source*, *make*, *deliver*, and *return* supply chain process is performing, highlight where there's room for improvement, and help you to diagnose problems and decide where to focus your improvement efforts. Metrics also can be a powerful management tool by letting people know what is expected of them and allowing you to track progress—or lack thereof—over time.

Supply chain metrics can be difficult to define and even more difficult to measure. At the highest level, supply chain operations are expected to contribute to a company's financial performance. Supply chain metrics,

therefore, have three important objectives. First, they must translate financial objectives and targets into effective measures of operational performance. Second, they must do the opposite—translate operational performance into more accurate predictions of future earnings or sales. Finally, they must drive behavior within the supply chain organization that supports the overall business strategy.

Even if you don't measure nonfinancial metrics on a regular basis, you can be sure that your customers do. For instance, they'll take into account how good your service was on their last order when deciding whether to order again. This is just one way that nonfinancial performance metrics can be leading indicators of future financial performance.

Measurement is the only way to understand whether process performance is improving or worsening and whether action is required. All too often companies learn about performance problems or the failure to meet stated objectives after the fact—when revenues fall short of targets, customers take their business elsewhere, or margins fall below expectations.

Our research and experience show clearly that companies with good supply chain management skills have higher levels of process maturity that lead to better supply chain performance overall. They avoid the difficulties associated with “steering by the rear-view mirror” and can take steps to correct problems early—before they become overwhelming.

This chapter will examine the universe of supply chain metrics, their definitions, and the ones that apply to supply chain performance management. We'll also provide guidance on how to gain a comprehensive view of overall supply chain performance and pinpoint opportunities for improvement.

It's important to draw the distinction between performance *measurement* and performance *management*. Performance measurement is about putting in place the right metrics to assess the health of your supply chain. Performance management uses those metrics to support your company's strategic objectives. Your metrics program is an effective management tool if it includes the following three activities on an ongoing basis:

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- ◆ *You integrate quantitative targets into plans and budgets.* If cutting distribution costs is a priority, for instance, budget assumptions are adjusted to integrate the specific cost-reduction targets.
- ◆ *You establish meaningful targets at the individual and departmental levels that link to overall corporate objectives.* For example, if you plan to drive lower delivery costs, a distribution center's targets might aim for a lower percentage of express versus standard deliveries. To track process changes, you might measure the adoption rate of new practices that drive lower premium freight costs, such as adherence to order cutoff times.
- ◆ *You have well-defined mechanisms and processes in place for tracking progress and managing performance.* Performance exceptions are identified easily and drive appropriate actions that involve the right individuals and organizations in a timely manner.

## MANAGING PERFORMANCE WITH METRICS

To make these activities a regular part of your company's supply chain management process, you'll first need to define an approach to supply chain performance management. We've found that the most effective approaches share these characteristics:

- ◆ Supply chain metrics are linked to the business strategy.
- ◆ Supply chain metrics are both balanced and comprehensive.
- ◆ Targets are set based on both internal and external benchmarks.
- ◆ Targets are aggressive but achievable.
- ◆ Metrics are highly visible and monitored at all levels of the company.
- ◆ Supply chain metrics are used as a continuous improvement tool.
- ◆ Metrics are implemented via a formal implementation plan.

Let's look at each of these characteristics more closely.

### Link Your Metrics to Your Business Strategy

Traditional supply chain metrics focus on efficiency and productivity. Improvements in service levels, costs, and inventory levels are the desired outcome of an operations strategy and are measured accordingly. A more strategic perspective looks at these measures as *enablers* of business objectives such as growth within a specific segment or market, accelerated

product development, or immediate product availability. When aligned with key business objectives, the supply chain becomes an added source of competitive advantage.

For example, a leading maker of personal computer (PC) peripherals developed a business strategy focused on low cost, constant innovation, and a make-to-stock approach for fast order fulfillment. Each business unit was expected to manufacture at the lowest possible unit cost and have products available for shipment within two to three days of receiving a customer order. Supply chain metrics tracked on a regular basis included product cost, delivery performance, and fill rate.

To compete based on cost, the company set up plants in locations with low labor rates and developed long-term contracts with carriers to ship the products by sea to local distribution centers. Although most of the manufacturing sites were in Asia, most of the company's business was in North America and Europe, so products took up to five weeks to reach the distribution centers. This made achieving the strategic objective of fast order fulfillment a major challenge. Accurate forecasting was critical but extremely difficult in the highly volatile peripherals market. And constant product introductions and phase-outs made it even harder.

As a result, the company had to depend increasingly on flexibility within the supply chain. One of the few levers available was shipping products by air rather than sea. This nearly tripled transportation costs but was necessary to maintain customer service levels. The need to rework products to better align them with current demand when they arrived at the local distribution centers also boosted costs.

The product managers didn't see these added costs as an issue: The transportation and rework costs appeared as expenses charged to the operations function. As such, they did not affect the product-cost metric.

Of course, the total cost of managing the supply chain increased significantly because of these unplanned expenses. To address this problem, the management team began measuring total supply chain management costs on a quarterly basis (see Figure 5-1). The team also examined how the supply chain strategy affected costs related to order management, materials acquisition, inventory carrying, and planning—not just the cost of goods sold.

The management team worked closely with each product group to communicate the importance of total supply chain management cost. Product costs were still measured regularly, but the entire company was asked to focus on the new total-cost metric. As a result, product managers saw for the first time the huge expense associated with expediting shipments

**FIGURE 5-1**

Components of total supply chain management cost.

<b>Total Supply Chain Management Cost</b>	
<i>Order Management</i>	<ul style="list-style-type: none"> <li>• New product release, phase-in, and maintenance</li> <li>• Customer order creation</li> <li>• Order entry and maintenance</li> <li>• Contract/program and channel management</li> <li>• Installation planning</li> <li>• Order fulfillment</li> <li>• Distribution</li> <li>• Transportation, outbound freight, and duties</li> <li>• Installation</li> <li>• Customer invoicing/accounting</li> </ul>
<i>Materials Acquisition</i>	<ul style="list-style-type: none"> <li>• Materials/commodity management and planning</li> <li>• Supplier quality engineering</li> <li>• Inbound freight and duties</li> <li>• Receiving and materials storage</li> <li>• Incoming inspection</li> <li>• Materials process and component engineering</li> <li>• Tooling</li> </ul>
<i>Inventory Carrying</i>	<ul style="list-style-type: none"> <li>• Opportunity cost</li> <li>• Shrinkage</li> <li>• Insurance and taxes</li> <li>• Total inventory obsolescence—raw materials, WIP, and finished goods</li> <li>• Channel obsolescence</li> <li>• Field service parts obsolescence</li> </ul>
<i>Finance and Planning</i>	<ul style="list-style-type: none"> <li>• Supply chain finance costs</li> <li>• Demand/supply planning costs</li> </ul>
<i>Management Information Systems (MIS)</i>	<ul style="list-style-type: none"> <li>• Plan <ul style="list-style-type: none"> <li>– Product management</li> <li>– Finished goods demand/supply planning</li> </ul> </li> <li>• Source <ul style="list-style-type: none"> <li>– Sourcing/materials acquisition</li> </ul> </li> <li>• Make <ul style="list-style-type: none"> <li>– Manufacturing planning and execution</li> </ul> </li> <li>• Deliver <ul style="list-style-type: none"> <li>– Order management</li> <li>– Logistics and distribution</li> <li>– Channel management</li> <li>– Field service/support</li> </ul> </li> </ul>

Source: The Performance Measurement Group, LLC—definitions used in benchmarking studies

because of forecast inaccuracies. This was the catalyst needed to move forward with a major initiative to improve the forecasting process, which greatly improved forecast accuracy—and reduced reliance on supply chain execution to make up for planning errors.

This example is not unusual. Measuring operational metrics in isolation is a common—and often counterproductive—way to use performance-related data. A more effective approach is to start with your company's strategic goals and work backward to identify the supply chain performance metrics that support those goals.

### **Make Sure Your Metrics Are Balanced and Comprehensive**

The goal of performance management is to drive desired behaviors—not across-the-board excellence. This may sound obvious, but many companies have a hard time agreeing on where performance excellence is critical and where it's merely “nice to have.”

Consider the classic triangular balance of customer service, cost, and quality. Which is most important? Least important? The natural tendency is to say that all are equally important and that inferior performance in any of the three areas is not an option. Excellent customer service costs money. So does superior quality. And cost cutting usually means shaving dollars allocated to improving product quality or service excellence. This is the classic dilemma of managing supply chain performance. If you want to pursue balanced objectives, you need to cover multiple performance perspectives and then select your metrics accordingly. An effective metrics program must include a balance of

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- ◆ Internally focused and customer-facing metrics
- ◆ Financial and nonfinancial metrics
- ◆ Functional and cross-functional metrics
- ◆ Metrics designed to measure innovation and continuous improvement

In the chapter on strategy (Discipline 1) we talked about the need to constantly look for ways to improve and differentiate your supply chain performance. Once you have decided on the appropriate path forward, the

next step is to decide how you'll know if you're meeting your objectives. This assessment forms the basis of your performance-management approach. A necessary step in this process is determining where average performance is acceptable and where superior performance is a must.

For the computer peripherals company discussed earlier, the objective of reducing total supply chain management cost may result in a supply chain configuration that forces a trade-off between low product costs and high fill rates. Achieving best-in-class performance for both is unlikely because each requires a different focus and configuration. The company must choose among higher transportation costs for specific products, higher finished goods inventory levels, or slower order fulfillment.

We worked with a large telecommunications company whose first attempt to develop a comprehensive set of metrics resulted in the selection of 21 key performance indicators. The management team had spent a lot of time winning commitment to the program, making the metrics highly visible, and even modifying individual performance objectives to support the chosen targets. Then the team realized that not one metric focused on the customer. Instead, the program focused on such metrics as market penetration, inventory levels, and cost data. In the end, the team kept the 21 performance indicators they'd worked so hard to develop but added a set of metrics focused on customer satisfaction, with an emphasis on delivery performance.

As you begin to structure your performance-management program, consider including metrics that align with the four dimensions of the well-known balanced scorecard approach:<sup>2</sup>

- ◆ The *financial* dimension includes metrics such as cost of goods sold, labor rates, transportation cost per mile, value-added productivity, and asset turns. As we noted earlier, financial metrics are relatively easy to measure but don't provide a complete picture of how well your supply chain is performing.
- ◆ The *internal* dimension includes metrics such as forecast accuracy, production quality, production flexibility, and internal cycle times. These metrics assess operational performance but are not tied to specific financial results.
- ◆ The *customer* dimension includes metrics such as on-time delivery to commitment, order-fulfillment cycle time, fill rates, and perfect order fulfillment. Customer-oriented metrics are designed to show how your company performs from the customer's perspective.



- ♦ The *innovation and learning* dimension is the most difficult to define because metrics in this area quantify your company's effectiveness at learning new skills. Setting goals for employees who are APICS-certified or have completed Six Sigma training is an excellent way to establish meaningful metrics for this dimension.

How often should metrics be monitored? This depends on the life cycle or clock speed of your business, but monthly reporting is fine for most top-level metrics. This usually allows you to spot trends before they become problems and avoids overreporting with little value. Detailed operational metrics should be monitored and reported at least weekly, if not daily. Often these are key customer-facing metrics such as fill rate or delivery-to-commit performance.

While invoiced costs, such as warehousing and transportation, should be tracked on a monthly basis, costs related to internal headcount should be reexamined during the budgeting cycle, the frequency of which may vary from one company to another but typically is on an annual cycle. Despite making large investments in supply chain planning tools, most companies track inventory and delivery performance only on a monthly basis. These metrics should be tracked at least weekly—if not daily—to ensure excellent customer service.

Creating the capability to use existing metrics more effectively also can be an important lever in gaining organizational support. Increasing the frequency with which you monitor an existing metric is an excellent way to leverage already available infrastructure while improving its effectiveness.

### **Base Performance Targets on Both Internal and External Metrics**

Benchmarking—both internal and external—can provide valuable data for improving supply chain performance and has two main benefits. First, external comparisons place your performance in an industry context, which helps to identify supply chain improvement opportunities. And second, internal benchmarking helps you to identify which of your business units, regions, or locations are the best performers. Then you can pinpoint the underlying practices that make the difference and adopt those practices across the company.

Companies typically use external benchmarking to study business practices of industry competitors as a basis for improving their own performance. Benchmarking is *not* just the study of another company's performance levels—it's about the practices that lead to those performance

levels. An effective benchmarking effort will help you to understand what level of quantitative performance is possible and, more importantly, what practices can deliver this level of performance.

Besides external competitors, we believe that companies should study noncompetitors in other industries—provided that they have similar supply chain characteristics. Why look outside your own industry? Because often what works in one industry can be applied successfully to another. But be careful which companies you compare yourself against. You should compare yourself to peers—companies with similar production processes, distribution channels, or other dynamics that allow a valid comparison. Otherwise, it's less likely you'll be able to set realistic targets.

External benchmarking requires collecting performance data—often highly sensitive data—from other companies. Many companies are reluctant to provide such data directly to competitors or even to noncompetitors. To get around this roadblock, consider participating in benchmarking surveys managed by independent third parties. These benchmarking service providers specialize in defining relevant supply chain metrics and working with participating companies to ensure that the data collected are unambiguous and accurate. When choosing a service provider, look for one that offers a thorough assessment of the supply chain practices associated with best-in-class performance. This link between practice and performance is the key to understanding how to change your supply chain to reach new performance levels.

Many companies make the mistake of thinking that participating in a benchmarking survey is the same as conducting a benchmarking assessment, or they want to have access to a supply chain database without any plans to participate in a survey. As Michelle Roloff, general manager of PRTM's benchmarking subsidiary, The Performance Measurement Group, LLC, notes, "The benchmarks are only as good as the data the organizations submit. We want survey responses from companies that are using benchmarking to change how they do business. This means they're willing to invest the time needed to collect accurate information from a variety of sources."

An external benchmark is only useful if a company knows how its own organization is performing in the same area. An effective benchmarking program starts with a thorough understanding of your own processes and level of performance. This means generating a comprehensive set of internal metrics.

Internal benchmarking doesn't depend on sensitive data from other companies. Instead, it involves measuring the performance of comparable

functional areas, processes, and facilities within your company using consistent definitions. For instance, you might compare the performance levels of a set of manufacturing facilities, warehouses, distribution centers, purchasing organizations, or order-management groups. In an internal benchmarking program, best-in-class functions are identified, and their benchmark metrics become the basis of performance targets for similar functions within the company.

Although internal benchmarking can be easier than collecting external data from competitors, most large companies are extremely complex, with multiple regions and business units. If your company does not have common processes, information systems, and underlying data across business units, internal benchmarking can be a major undertaking. Even so, it's the right place to start.

Once you've agreed on what to measure and how to define the metrics, collecting internal benchmarking data is relatively simple. Since internal organizations operate within the same corporate structure, there's usually minimal controversy about whether or not the basis of comparison is relevant. You should monitor your internal benchmarking effort closely—on rare occasions, internal benchmarking can result in unproductive competition among business units or divisions. In extreme cases, business units may try to “game the system” to deliver winning results. If you see this, you will need to take immediate action to reset behavior.

Once you've generated your internal metrics and collected relevant benchmarking data, the next step is external benchmarking—comparing your company's performance against that of other companies. You may choose to limit your comparison to companies within your own industry or extend your comparison to companies in other industries. Some benchmarking services offer custom comparison populations, where you can select a specific set of companies that share similar business characteristics, such as product complexity, geographic distribution, or manufacturing strategy.

Analyze the performance gaps between your company and your comparison group. Pay special attention to strategically critical areas that have subpar performance. Follow this gap analysis by investigating the causes of any performance issues and assessing the business practice changes that will be necessary to close the gaps. To do this effectively, make sure to benchmark both qualitative and quantitative data. Qualitative data include an assessment of the business practices that the comparison population uses to run its businesses.

External benchmarking can be a very powerful tool when making the business case for supply chain transformation because an external

view often is needed to justify making major internal changes. To minimize potential skepticism about the relevance of the comparison population, you'll need to do a thorough analysis to ensure that the external benchmarks are meaningful. Your benchmarking service provider can help you to choose a relevant population, especially if you're looking beyond your own industry.

BASF Corporation used a combination of internal and external benchmarking to drive process improvements throughout its operations. The BASF Group, headquartered in Ludwigshafen, Germany, is one of the world leaders in the chemical industry, with more than 160 subsidiaries and affiliates. In 2003, its North American Free Trade Agreement (NAFTA) operations in the United States, Canada, and Mexico set up a task force to assess the core supply chain operations of its 13 business units, identify any performance gaps, and develop a plan to close those gaps. The task force planned to use both internal and external benchmarks to compare the performance of each business unit against other BASF businesses and a customized external population.

At first, the business unit leaders were somewhat skeptical about the proposed approach and expressed concern that the benchmarks wouldn't provide a meaningful comparison. As Mary Scheibner, the NAFTA director of supply chain consulting, explains, "Each of the business units is unique. Each produces different products through different manufacturing processes and sells to different customers. So we needed each business unit to feel confident that the population to which they were being compared was appropriate."

To address this concern, BASF used a "bundling" approach to create meaningful comparison populations. The 13 business units were grouped into two high-level categories based on their primary manufacturing process—continuous or batch (see Figure 5-2). Then each unit completed a PMG supply chain scorecard (see generic scorecard shown in Figure 5-3). Similar external companies were chosen to create a comparable benchmark population for each of the two bundles. The performance of each business unit was compared against two groups—the BASF units with the same manufacturing process and the population of similar external companies.

Each business unit got a report comparing its performance with that of the two different comparison groups. The results were used to set performance-improvement targets. Scheibner worked closely with senior management to establish aggressive but reasonable targets for each unit. "This was a huge effort, so we needed to come up with a fairly simple approach," she notes. "We looked at each business unit's percentile-based

**FIGURE 5-2**

BASF benchmarking population.

Continuous Manufacturing Population				Batch Manufacturing Population			
Continuous Manufacturing Bundle	BASF Business Unit 1	BASF Business Unit 2	BASF Business Unit 3	BASF Business Unit 6	BASF Business Unit 7	BASF Business Unit 8	Batch Manufacturing Bundle
	BASF Business Unit 4	BASF Business Unit 5		BASF Business Unit 9	BASF Business Unit 10	BASF Business Unit 11	
	Comparison Company A	Comparison Company B	Comparison Company C	Comparison Company G	Comparison Company H	Comparison Company I	
	Comparison Company D	Comparison Company E	Comparison Company F		Comparison Company J		

performance compared with the benchmarking population and set a target of 25 percent improvement.” For example, if a unit ranked in the 50th percentile for inventory performance, the target was to achieve a performance level consistent with the 75th percentile. Business units that were already at the 75th percentile level or higher for a given metric were off the hook.

This top-down approach provided a relatively straightforward way to set stretch targets. Notes Dave McGregor, BASF’s senior vice president of logistics, “Historically, business units have taken a bottom-up approach to incrementally improving productivity. The benchmarking data are allowing us to link theoretical opportunities with proven supply chain practices to achieve breakthrough performance.”<sup>3</sup>

**Set Aggressive but Achievable Targets—and Tie Them to Actions**

If you plan to use metrics to determine how your supply chain is performing, you must set a target for each metric. Only a target gives you a basis for tracking whether performance is improving, holding steady, or getting worse.

Don’t aim to be best at everything—no company can excel at every key metric. Unattainable goals are more likely to result in behaviors that disrupt rather than enhance a company’s performance. Instead, start by agreeing on your overall strategic objectives, and acknowledge that previous targets may not align with those objectives.

**FIGURE 5-3**

Typical supply chain scorecard.

Key Perspectives	Metric	Performance Versus Comparison Population					Your Org.
		0-20% Major Opportunity	20-40% Disadvantage	40-60% Median	60-80% Advantage	60-100% Best-in-Class	
Customer-Facing Metrics	On-Time Delivery to Request %			82.1%		97.3%	96.3%
	On-Time Delivery to Commit %			91.1%	▲	99.2%	92.8%
	Order Fulfillment Lead Time (OFLT): Primary Manufacturing Strategy (days)		▲	7.9		2.4	11.0
	Upside Production Flexibility: Principal Constraint (days)			49.0	▲	5.5	25.0
Internal-Facing Metrics	Total Supply Chain Management Costs (% of revenue)			10.3%	▲	4.7%	6.9%
	Total Returns Processing Costs (% of revenue)			0.9%		0.2%	66.6%
	Inventory Days of Supply			64.2	▲	23.6	39.0
	Cash-to-Cash Cycle Time (days)			76.3	▲	22.3	43.6
	Net Asset Turns			2.0		9.1	5.9

▲ Your Organization

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We noted earlier that a balanced set of metrics is critical to an effective performance-management program. The same is true for performance targets. While optimizing supply chain performance isn't a zero-sum game—a performance improvement in one area doesn't have to be at the expense of another—it's true that to reach a target in one big area, you might have to accept a lower metric in another.

It's also true that you can improve the performance of numerous parts without improving the performance of the whole—an idea that can be hard for companies to grasp. Sometimes compromises at the functional

level are needed to improve overall performance, but this can be a bitter pill to swallow for managers of those functions: It may appear that their own performance is declining.

There are many ways to set performance targets. Perhaps the simplest is to develop specific percentage-improvement goals based on historical and baseline performance. With this method, you simply measure performance in a specific area over a specified time period, determine the baseline, and set a target for improvement. But be sure to link the target to a specific change in strategy or execution. Too often targets are based on the assumption that because a certain level of performance is possible—as indicated by benchmarking data—it is a logical, attainable goal.

For example, a telecommunications equipment company was dissatisfied with the service its key suppliers were providing and embarked on a program to improve supplier on-time delivery. The company measured the performance of 25 key suppliers over a three-month period and found that on-time delivery ranged from 70 to 80 percent. It then set an objective of achieving average on-time delivery of 95 percent for these key suppliers within six months.

After six months, supplier performance hadn't improved noticeably. The manager of the procurement group explained that the 95 percent target wasn't tied to any specific program. The company had just assumed that improving performance by about 5 percent per month was a reasonable goal. Later, after benchmarking delivery performance within the telecom industry, the company found that the top performers were achieving supplier delivery performance of only 87 percent. Using these data, the company set a long-term goal of 95 percent but also set interim targets tied to specific practices shown to be lacking by the benchmarking program. These included the use of joint service agreements, increased use of electronic data interchange (EDI), and upgraded supplier certification programs.

We advocate setting “stretch” targets, but we also caution against setting unrealistic goals, which can hurt morale and breed cynicism. The best approach is to combine historical analysis and baselining with internal and external benchmarking and—in some cases—an assessment of what is realistic given specific business conditions and planned process improvements.

### **Make Your Metrics Highly Visible and Monitor Them at All Levels**

You've probably experienced a performance-management program that got off to a great start and then failed. In our experience, the most common reason for failure is a lack of attention paid to the program once it's



off and running. Consistent measuring and reporting will help you to avoid this problem.

One of the most successful metrics programs we've seen was put in place by the supplier of software tools and related hardware we first discussed in Chapter 3. The company's customers were very unhappy with how long it took to get their orders. Order fulfillment averaged 25 days, whereas 2 to 3 days was a reasonable expectation; the sales force cited long order-fulfillment cycles as the primary cause of the company's inability to meet its growth objectives. A supply chain analysis revealed the source of the company's slowness—too many functional handoffs throughout the order-fulfillment process. As a software provider, the company didn't have to deal with most traditional manufacturing issues, such as supplier performance and manufacturing cycle times. Instead, processing customer orders, getting them through the contract negotiation cycle, and packing them for delivery were the major issues.

To improve supply chain performance, the company set targets for each functional area involved in order fulfillment. Then, in an effort to break down functional barriers, it set up a highly visible system for tracking order-fulfillment cycle time overall. Convinced that e-mail updates or Web site postings would lack the necessary impact, the chief financial officer (CFO) placed huge scoreboards in high-visibility areas—near the executive offices, in the local sales office, and in the shipping area—and manually updated the cycle-time scores each week. Since the cycle-time metric was made up of data from every function involved in order fulfillment, many people were involved in data collecting and were well aware of the progress toward the goal of four days or less.

In an unexpected twist, the strategy of high-visibility tracking nearly derailed the project at the beginning. The metrics allowed the project team to look at each activity in the order-fulfillment process, eliminate those which didn't add value, and create a new process designed to do away with many of the handoffs between functions. The heightened scrutiny of people and the added burden of manually tracking each exception and cause of delay actually slowed the process down, and at first, cycle time increased from the historical average of 25 days.

After the first several weeks of posted results, many project team members feared that the initiative would fail. "It's going the wrong way," was a frequent comment. Despite concerns that the highly visible data would discourage people and make them resistant to change, the CFO insisted on continuing to update the scoreboards. Each board showed both the order-fulfillment cycle time and a rolling average of the most recent



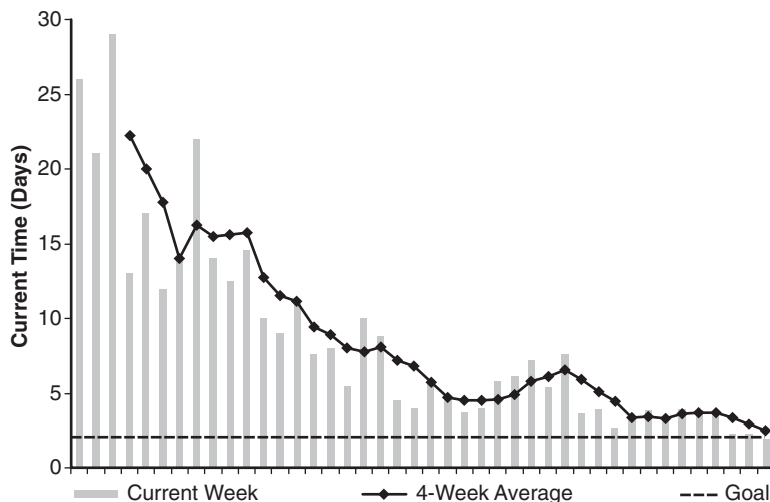
four-week period. This second metric was added as a way to smooth the results and reduce the perception that a one-time backslide was the sign of a negative trend. After about a month, when the first elements of the new process were put in place, the results were immediate and significant. After two months, average cycle time had been cut by nearly 10 days, and after 10 months, the stretch goal of two days was nearly a reality (see Figure 5-4). An added bonus: The boards have proven effective as a sales tool. Sales reps show them to customers as proof of the company's focus on customer service.

This example shows clearly the need for demonstrated commitment by leaders within your business. Identify a set of "metrics champions" early on and work closely with them to secure their commitment. They will serve as the advocates for performance management. To take their role seriously, they will need to actively monitor relevant metrics and take immediate action if the program is not being executed as designed.

You also should define the decision-making processes and workflows resulting from the metrics program. Measurements are only useful to the degree that they enable timely decision making. All too often action stops at the point at which the measurement is made. Successful performance management must include specific actions to be taken when

**FIGURE 5-4**

Order-fulfillment cycle time for Company X.



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Measurements are only useful to the degree that they enable timely decision making.

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a measurement falls outside a defined tolerance level. Processes and workflows should show which decisions are to be made, by whom, and within which limits.

### **Use Your Metrics to Drive Continuous Improvement**

Gathering comprehensive benchmarking data takes time and effort. And since most benchmarking services charge a fee for participation and database access, there's usually an out-of-pocket cost as well. Logic would say that any company willing to make this sort of investment would highly value the resulting information and make every effort to leverage it. Yet, a recent survey of hundreds of companies found that few had used their supply-chain metrics to drive strategic management practices, and most had failed to realize a full return on investment from their benchmarking efforts.<sup>4</sup> This is true of many companies. Too often they review the benchmarking information but don't use it to move the company forward. Over time, the data-collection effort no longer may seem worth the benefits achieved.

### **Develop an Implementation Plan**

There are four major steps to putting a performance-management program in place:

1. *Set supply chain strategy objectives.* Start with your company's business strategy, and then develop supply chain objectives that support this strategy.
2. *Choose supporting metrics and targets.* Identify the specific metrics and targets that you'll use to track progress toward your supply chain objectives.
3. *Identify supporting initiatives.* Develop performance-improvement programs to help meet the supply chain objectives.
4. *Implement the programs.* Collect data and develop tools for reviewing the data and to support decision making.

### **Set Supply Chain Strategy Objectives**

Create supply chain objectives and priorities that support your company's business strategy. Although senior management may agree with the supply

chain strategy overall, opinions may vary as to which supply chain performance criteria are most important. This is where a standard framework for performance management, such as the Supply-Chain Operations Reference-model (SCOR), can come in handy.

If necessary, interview senior managers or conduct workshops to validate the supply chain priorities. Articulate the key objectives expressed during these sessions and then validate them with the entire management team and with other stakeholders inside and outside your own organization.

### Choose Supporting Measures and Targets

Once you've agreed on the key objectives of your supply chain strategy, choose the metrics you'll use to gauge progress toward those objectives. The best place to start is with an assessment of current performance levels. Then use a tool such as PMG's supply chain performance scorecard to define a list of metrics and ensure consistency. Group the metrics according to which aspect of the business strategy they support. Use the standard definitions to determine the baseline performance level and internal and/or external benchmarking to set near- and long-term targets. As mentioned earlier, choose aggressive but achievable targets.

Start with a few metrics and insist on widespread use before adding additional metrics. Metrics to consider as a starting point include SCOR level 1 metrics, such as inventory days of supply, delivery performance, order-fulfillment lead time, and cash-to-cash cycle time.

### Identify Supporting Initiatives

Start by looking at all existing initiatives, their expected impact, and how well they're aligned with the objectives of your supply chain strategy. Eliminate any initiatives that are redundant or misaligned, identify gaps that might prevent achieving the stated objectives, and develop programs to address those gaps. Then update your performance targets, tying targeted improvements to specific activities to clearly show the cause and effect. Getting management support for these improvement programs is critical.

### Implement the Programs

Almost every performance-improvement program will require systems support. You may choose to design and build an in-house system or buy a data warehouse, an enterprise resources planning (ERP) module, or a stand-alone solution that offloads data from your ERP system. Knowing the specific data sources is critical when choosing the right system tool. So is understanding how your performance-management approach will link to other efforts and

metrics used in other core functions. Never develop a performance-management system in a vacuum.

Understand and respect your organization's capabilities, and strike a balance on business criticality when introducing new measurement requirements. Products and geographic regions can be brought online progressively. A metrics program does not have to be initiated simultaneously for all regions, channels, and products.

Establishing the measurement frequency up front can help to avoid costly reimplementations of data structures. This does not preclude providing reporting on a less frequent basis, a tactic that may be useful if the organization is not ready to exploit more real-time information. Focus on fast "clock speed" metrics on a daily or weekly basis and report the remainder as part of your balanced scorecard. Also determine the appropriate level of visibility. The goal should be visibility all along the supply chain, including a sufficient amount of drill-down capability to understand performance differences by, for example, originating factory and warehouse.

Identify all required data sources, and make the data accessible. For example, if you choose to monitor the percentage of orders delivered on time to the customer's request, you will need the ability to capture the customer request date. Some transactional systems do not have a field for this information, and many systems, while capable of tracking this date, are not programmed to do so.

A gap analysis of data elements and data sources is a vital first step to ensure that existing data are accessible to decision makers. If you are like many companies, you may have large amounts of data buried within multiple, disparate systems. An information systems architecture for both applications and infrastructure is needed to pull data from different sources and enable timely decision making. To simplify both data gathering and reporting, design the data-capture and reporting infrastructure using standard data and metric definitions.

Take the time to understand the performance-management software market. It is made up of many discrete tools and components, enterprise suites, and packaged applications, including such categories as reporting, business intelligence, advanced planning and scheduling (APS) analytics, supply chain event management, and supply chain performance management. As you evaluate the system tools available, resist the temptation to create an all-encompassing data warehouse to enable "slicing and dicing" for root-cause analysis and resolution. Integrating extensive sets of lower-tier metrics can lead to an overly complex implementation and should not be seen as a prerequisite for an effective metrics program.

The remainder of this chapter provides guidance on how to choose the right metrics and build an infrastructure that supports ongoing measurement.

## WHICH METRICS?

When faced with a universe of metrics, companies tend to choose more than they actually need. This is especially true when one or two key metrics are first put in place—providing visibility into operational capabilities and results for the first time. For companies used to backward-looking metrics and rear-view-mirror steering, data that can offer insight into cause and effect of key supply chain processes are extremely powerful. The natural inclination is to want such data for all processes.

As an example, let's look at order-fulfillment cycle time. The macro-level metric used by most companies measures the elapsed time between when a customer order is entered and when the associated product is shipped. Orders go through numerous “gates”—an order may be received, verified, entered, priced, credit-checked, released, picked, packed, and shipped—and it is possible to measure the elapsed time between each gate and the next. From the customer's perspective, though, the clock starts when he or she issues the order and stops when the product is received; customers are not particularly interested in the interim stops the order may take along the way. Because of this, it probably doesn't make sense to measure each gate-to-gate cycle. Instead, choose larger “process sets,” such as the time between order receipt and order release. And if the results indicate a performance issue, consider adding additional granularity at that point.

You also should avoid using a predefined set of metrics designated as being “right” for your business. No predetermined set of metrics is appropriate for all businesses. Earlier in this chapter we discussed the need to align metrics with strategic objectives. Since a supply chain strategy is based on a company's overall strategic direction and core competencies, you'll need to carefully choose the metrics that make sense as signals of performance to your objectives.

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The metrics you use will evolve as your supply chain processes mature and will vary based on how functionally focused your supply chain is. Clearly, it's futile to establish aggressive targets for cross-enterprise collaboration if your company is still struggling to move beyond a functional focus (see Figure 5-5).

Even if your company focuses only on functional processes, metrics based solely on functional performance are inappropriate. Besides encouraging functional silos, measuring functional performance alone can promote functional excellence at the expense of overall supply chain excellence. For example, the customers of a large telecom company were demanding lower prices. In response, the company pressured its procurement group to lower the cost of materials by negotiating better prices with suppliers. The buyers negotiated substantial discounts by committing to higher-volume purchases for some materials and finding lower-cost suppliers for others. On a monthly basis, the purchasing group posted the results of its efforts—a declining cost per unit of materials.

After a few months, however, it became clear that the focus on reducing materials costs was having a negative effect elsewhere in the

**FIGURE 5-5**

Focus of metrics to solve performance problems.

Supply Chain Characteristics	Focus of Metrics
<p><i>Functional Focus</i> Lack of functional policies/processes and basic operations management leads to unpredictable product quality and supply.</p>	Performance of specific functions or departments
<p><i>Process Focus</i> Although processes, systems, and disciplines are in place to optimize functional quality, cost, and cycle times, cross-enterprise performance may be suboptimized.</p>	Performance of specific processes within or beyond a functional area
<p><i>Enterprise Focus</i> Supply chain processes are integrated, aligned across all subprocesses and levels of management, and display world-class performance and continuous improvement.</p>	Performance of cross-functional processes
<p><i>Cross-Enterprise Focus</i> Integration of both internal and external processes allows enterprise partners to focus on their customers, supply chain partners, core competencies, and on creating value.</p>	Performance of cross-enterprise processes and designated external processes

business. Buying in volume caused inventory levels to increase. And manufacturing yields were dropping—a problem traced back to lower-quality materials purchased from the low-cost suppliers.

The moral of this story is clear: Exclusive use of functional metrics can drive unwanted behaviors and interfere with overall strategy execution. Functional metrics aren't bad in and of themselves, but they can hurt overall performance if not combined with cross-functional measurements that enhance the end-to-end supply chain.

### **Choose Metrics That Support Your Strategy**

In Chapter 2, we discussed the importance of organizing around cross-functional processes and breaking down functional silos to support the end-to-end supply chain. Your metrics program must do the same—break down the barriers and handoffs between functions by using cross-functional and process-based performance measures to supplement functional metrics. Functional metrics then become useful tools for diagnosing the causes of performance problems.

The first step in choosing the right metrics is to assess your company's supply chain maturity. The next step is to review your overall strategic objectives and any plans you have to move to the next stage of maturity—cross-process excellence, for instance, or cross-company excellence. Then you can begin to structure a balanced set of supporting metrics, including top-level metrics that evaluate whether or not your supply chain is supporting your company's overall strategy.

Our design of the SCOR model was influenced heavily by our work with hundreds of companies in establishing appropriate approaches to supply chain performance management as part of operations strategy and performance-improvement programs. This work allowed us to establish one of the world's most comprehensive databases of supply chain metrics and associated best practices, which, in turn, became the foundation for PMG's supply chain management database. These metrics and practices are embedded in the SCOR model and are leveraged widely by all industries today.

PMG's Supply Chain Management Benchmarking Study, an ongoing survey of supply chain practices and performance, is based on the same work that led to creation of the SCOR model and uses the same hierarchical construct. At the highest level, the SCOR model provides quantitative measures of performance under 5 key attributes and 13 specific measures.<sup>5</sup> SCOR level 1 metrics typically are associated with executive-level concern (see Figure 5-6).

**FIGURE 5-6**

Performance attributes and associated level 1 metrics, SCOR, version 6.0.

<b>Performance Attribute</b>	<b>Performance Attribute Definition</b>	<b>SCOR Level 1 Metric</b>
<i>Delivery Reliability</i>	Supply chain performance in delivering: <ul style="list-style-type: none"> <li>• the correct product</li> <li>• to the correct place and the correct customer</li> <li>• at the correct time</li> <li>• in perfect condition and packaging</li> <li>• in the correct quantity</li> <li>• with the correct documentation</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery performance</li> <li>• Fill rate</li> <li>• Perfect order fulfillment</li> </ul>
<i>Responsiveness</i>	How quickly a supply chain delivers products to the customer	<ul style="list-style-type: none"> <li>• Order fulfillment lead time</li> </ul>
<i>Flexibility</i>	How quickly a supply chain responds to marketplace changes; agility in gaining or maintaining a competitive edge	<ul style="list-style-type: none"> <li>• Supply chain response time</li> <li>• Production flexibility</li> </ul>
<i>Cost</i>	The costs associated with operating the supply chain	<ul style="list-style-type: none"> <li>• Cost of goods sold</li> <li>• Total supply chain management cost</li> <li>• Value-added productivity</li> <li>• Warranty/returns processing cost</li> </ul>
<i>Asset Management</i>	How effectively a company manages assets to satisfy demand. Includes fixed assets and working capital.	<ul style="list-style-type: none"> <li>• Cash-to-cash cycle time</li> <li>• Inventory days of supply</li> <li>• Asset turns</li> </ul>

Note that the SCOR level 1 metrics include both internally focused measures (total supply chain management cost, value-added productivity, warranty/returns processing cost, cash-to-cash cycle time, inventory days of supply, and asset turns) and customer-facing metrics (delivery performance, fill rate, perfect order fulfillment, order-fulfillment lead time, supply chain response time, and production flexibility).

SCOR level 1 metrics are designed to provide a view of overall supply chain effectiveness. Explains Michelle Roloff, “While it is virtually impossible for one company to perform at a best-in-class level for



each of the level 1 metrics, strong performance in targeted areas is a reflection of overall supply chain health and therefore a very good indicator of return on supply chain spending.”

While level 1 metrics are appropriate for monitoring performance at a high level, they are less useful for diagnosing the causes of performance problems. More detailed performance measures that provide details on tactical execution provide a better understanding of these problems. In keeping with the SCOR model’s hierarchical structure, each level 1 metric is associated with a group of level 2 and level 3 metrics. These lower-level metrics can be used to diagnose the causes of any performance problems that appear at level 1. Before you start, make sure that you create an overall architecture for your performance-management program—determine which level 1, level 2, and level 3 metrics you will monitor. (See Appendix C for a comprehensive list of level 2 and level 3 metrics.)

### **Measure Yourself as Your Customers Measure You**

The metrics embedded in the SCOR model are consistent with the premise of the supply chain as an end-to-end process. As such, each metric is considered from the perspective of customers and suppliers—not just from an internal perspective. The supply chain scorecard is necessarily prescriptive. It provides detailed definitions for each metric and specific recommendations for how to collect the needed data.

In many cases a company may stray from the standard definitions. This may be done to ease the burden of data collection, to influence the behavior of an internal or an external constituent, or—consciously or unconsciously—to make performance seem better than it really is. While it may be appropriate to “tweak” the standard definitions, always make sure that your metrics are consistent with what your customers and suppliers would use.

We worked with a global automotive parts company that spent more than two years making sure that each of its business units adopted a consistent measurement for delivery performance to its primary customers—retail chains and stores. With daily deliveries and an official policy that all products would be available to customers within one day of ordering,

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The metrics embedded in the SCOR model are consistent with the premise of the supply chain as an end-to-end process.

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“on-time delivery” was based on the percentage of products received by customers within one day of the order being placed. However, while the business units reported good results, customers were complaining about delivery performance, and a customer satisfaction survey showed that the company was performing worse than its competition.

A closer look revealed that the order desk used a default of next-day delivery except when a product was not available. Products were considered available if they were either in a local distribution center or scheduled to arrive the next day. Customers who ordered a product that was not available were given an estimate of when it would be delivered.

Of course, customers expected delivery the next day or on the estimated date provided by the order desk. They measured on-time performance based on these dates, as did the industry association that reported customer satisfaction data. The company, on the other hand, based its calculations on the assumption that only products that were not available at the time the order was placed had missed their target. Missed “next day” deliveries were not tracked, nor were failures to meet the estimated dates provided when the requested products were not available immediately. In addition, business units calculated their performance on a per-item basis, whereas customers based their measurement on whether or not the entire order was received on time.

Following this analysis, management established two new metrics for order-delivery performance. The first was on-time delivery to commit, defined as the percentage of complete orders received by customers on the delivery date that the company committed to. When a later delivery date was requested by the customer, the commit date was updated accordingly. The second metric, order-fulfillment cycle time, tracked the elapsed time between when an order was received by the company and when the product was delivered to the location specified by the customer.

Interestingly, by analyzing the discrepancy between performance as reported by the business units and performance as reported by customers, the company made a valuable discovery: Customers valued an accurate delivery date for their entire order more than they valued 24-hour turnaround. This insight led the company to reassess its entire service-level strategy.

### **CASE IN POINT: PERFORMANCE MANAGEMENT AT 3COM**

In 2003, 3Com Corporation, a leading maker of networking products, set out to develop a way to use performance management to help execute its business strategy. The company’s sales, marketing, product management,

research and development (R&D), and supply chain operations are centralized and support all product lines. 3Com hoped to develop an infrastructure that would allow the leaders of each of these functions to

- ♦ Align the organization's activities and priorities with overall corporate objectives
- ♦ Monitor key performance indicators
- ♦ Provide timely information for better decision making and responsiveness

3Com put together a project team, along with a cross-functional steering committee, to provide executive oversight. Before starting, the company went through a major strategic planning effort. Ari Bose, chief information officer (CIO) and chair of the steering committee, explains, "We wanted to make sure that we had a clearly defined business strategy that was bold and forward-looking. And the functional heads had to clearly understand the strategy so [that] they could execute against it."

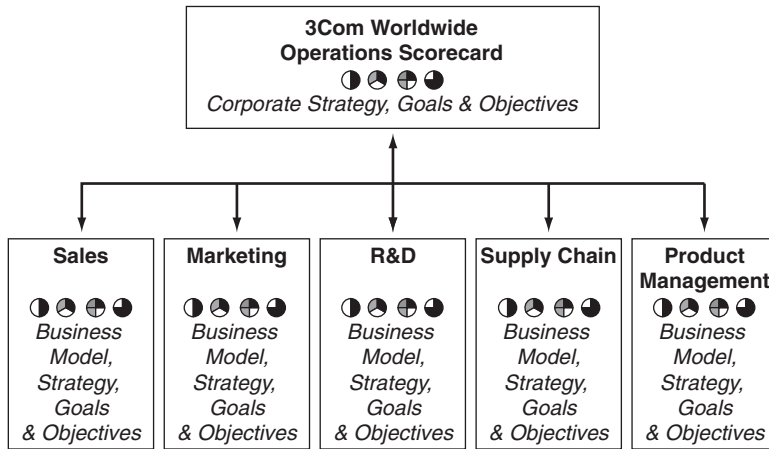
Once the strategy was set, 3Com focused on aligning each function. Using the balanced scorecard framework, each function set up actions and metrics along the four key dimensions of customer, financial, internal ("operations"), and innovation and learning ("people"). Each function's objectives and actions were designed to support the overall company strategy, and key initiatives were derived from the corporate goals. For example, the service organization had an initiative to upgrade its capabilities to support 3Com's reentry into a specific market segment, and the operations organization had an initiative to move manufacturing to a contract manufacturing partner. Each functional scorecard rolled up into an overall worldwide operations scorecard (see Figures 5-7 through 5-11).

The supply chain organization chose a set of metrics that measures critical aspects of performance and also supports the business goals, as well as more detailed metrics that provide broader visibility into the health of the function. Performance metrics include delivery predictability, stockout percentage, order cycle time, and supply chain costs. These costs can be broken down into materials costs, overhead costs, and period costs, which have even further detail.

Figure 5-9 shows the graphic format that 3Com uses to emphasize the key targets at various levels of the scorecard. To identify the root causes of any problem areas, the company analyzes lower-level metrics in the drill-down option of the supply chain scorecard (see Figure 5-10).

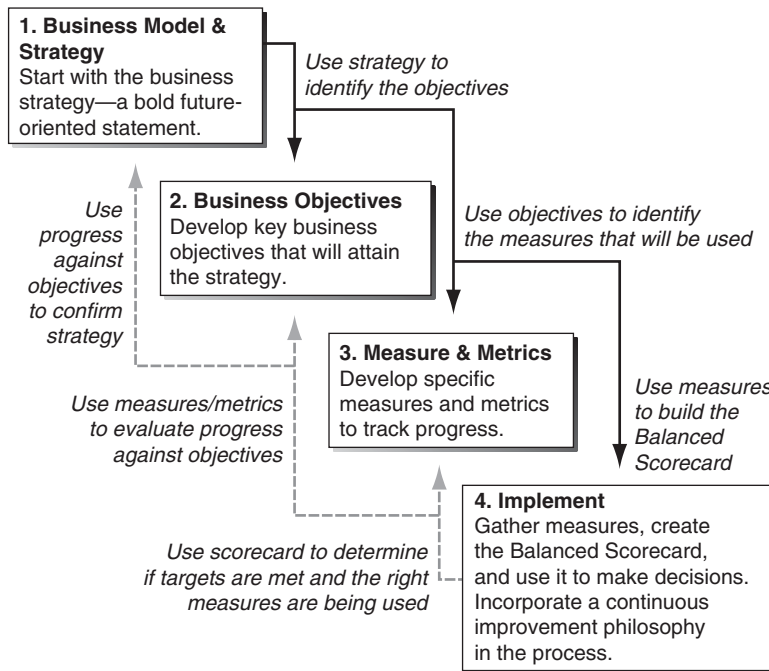
**FIGURE 5-7**

3Com's approach to performance management.



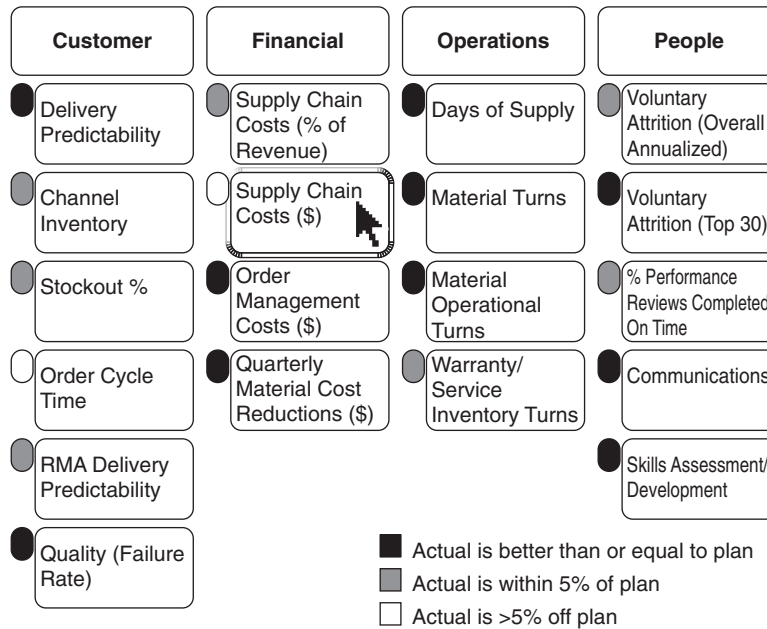
**FIGURE 5-8**

Setting up a balanced scorecard at 3Com.



**FIGURE 5-9**

Supply-chain scorecard for 3Com.



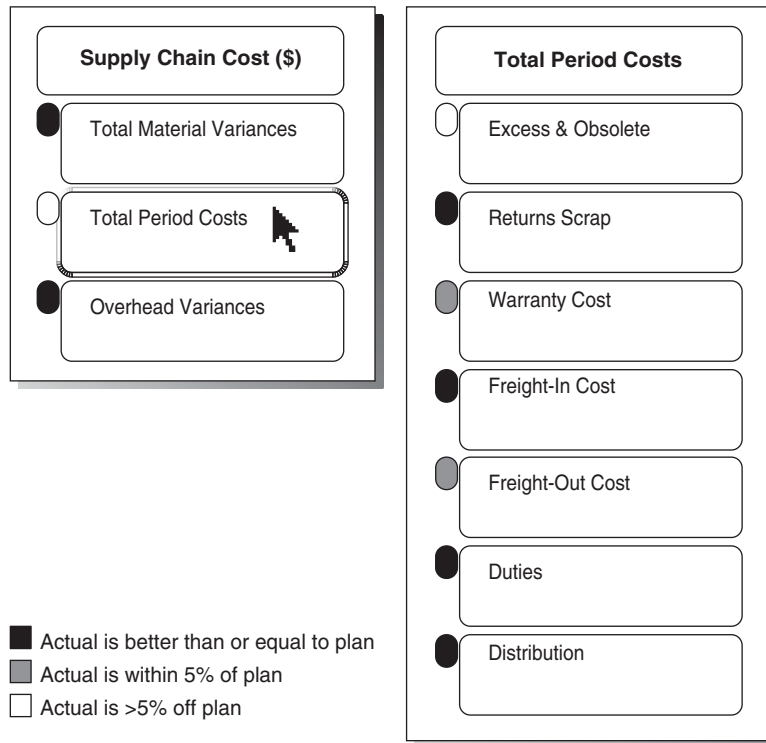
Today, the worldwide operations scorecard resides on every 3Com executive's desktop and is used daily to monitor performance at both a corporate and a functional level. At weekly executive staff meetings, each functional area takes turns making a presentation that includes the summary scorecard and an update on key initiatives that align with overall corporate objectives. "This process has really helped our supply chain organization focus on what's important," says Jim Ticknor, 3Com's vice president in charge of supply chain operations. "But even more, it has helped all the groups see how their activities and decisions affect other areas of the company."<sup>6</sup>

## NEXT-GENERATION PERFORMANCE MANAGEMENT

Like 3Com, many organizations are moving away from a piecemeal approach to performance management and toward a more holistic approach. This means that supply chain performance management will become an integral part of an overall performance-management strategy—what Gartner calls "corporate performance management" (CPM).

**FIGURE 5-10**

Submetrics of supply chain scorecard for 3Com.



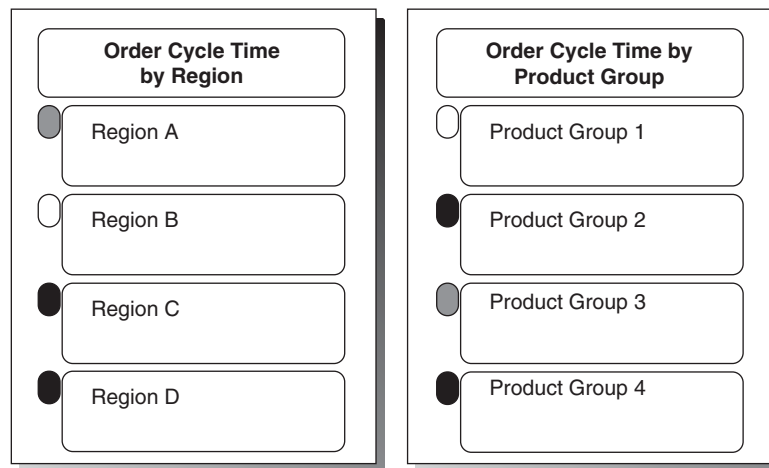
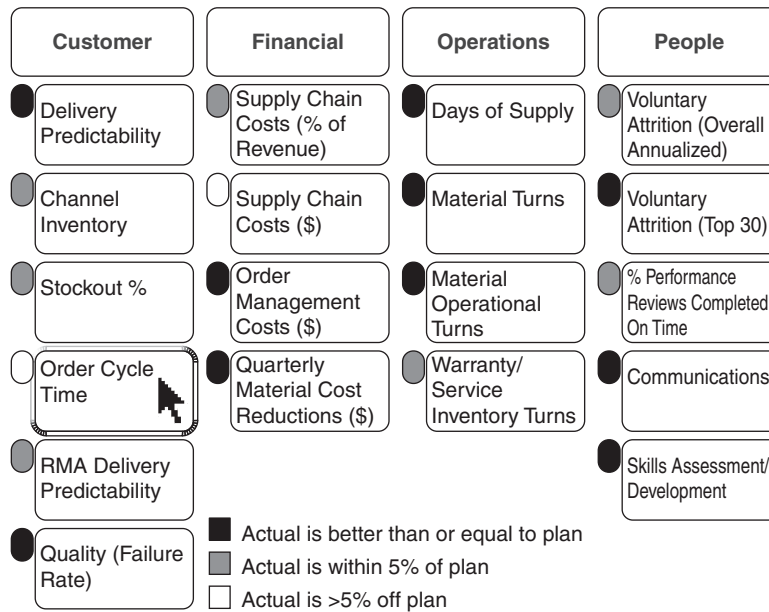
CPM describes the methodologies, metrics, processes, and systems used to monitor and manage an organization's overall business performance.<sup>7</sup> It's more than software. It includes the processes for managing corporate performance, the methodology for choosing the right process metrics, and the processes for managing those metrics. It also blends data from ERP, customer relationship management (CRM), product life-cycle management, human resources management, and business intelligence systems, providing necessary and valuable links between the disparate points of internal operations.

Supply chain performance management is a key element in overall corporate management-performance strategy, which also must include the processes and tools that will enable links with supply chain partners.

While CPM solutions are evolving quickly, there's no silver bullet or system that offers one-stop shopping. This means that your company

**FIGURE 5-11**

Regional/product group scorecard for 3Com.



needs to think critically about its immediate performance-management requirements but plan for an integrated solution. Disconnected initiatives managed within specific functions should be avoided at all costs. This integrated CPM approach is wholly consistent with the concept of tightly integrating your end-to-end supply chain with your overall business.

As CPM evolves, we expect to see the following changes:

- ◆ Organizations will use consistent supply chain metrics and definitions based on industry standards such as PMG's supply chain scorecard.
- ◆ As these standards are embraced, ERP vendors will make performance monitoring and reporting capabilities a basic part of their solutions.
- ◆ Companies will develop integrated, enterprisewide performance-management systems. Supply chain, CRM, product life-cycle management, and other functional performance management strategies will be designed within the context of this integrated whole.
- ◆ The architecture for business intelligence solutions will be based on a comprehensive approach to corporate performance management, of which supply chain performance management will be a key element.
- ◆ Event management systems—which monitor business events in real time and notify users of exceptions and alerts—will become increasingly prevalent, allowing companies to react more quickly to changes in the marketplace.
- ◆ Companies will see a growing consensus on how often key metrics should be monitored. Real-time reporting will be reserved for real-time processes.
- ◆ “Dashboards” will be replaced by tools with greater functionality. These tools will enable decisions based on current business conditions.





## **General Motors Profile: Driving Customer Satisfaction**

*Faced with declining market share and a changing industry, General Motors (GM) launched an ambitious effort that transformed its supply chain and made customer satisfaction a priority.*

In the late 1990s, the Internet seemed poised to transform the automobile industry. Consumers armed with information could quickly compare prices, options, quality, and service—and make more informed choices. New business models threatened to squeeze industry margins and disrupt the long-standing original equipment manufacturer (OEM)-dealer relationship. General Motors observed these changes warily.

The world's largest vehicle manufacturer, GM has revenue of \$185.5 billion, production facilities in 32 countries, and a workforce of about 325,000. In 2003, the company sold more than 8.6 million cars and trucks—about 15 percent of the global vehicle market. Despite its size and clout, though, GM had seen its global market share erode from 17.7 percent in the early 1990s to 15 percent in 2002 mainly due to declining levels of customer satisfaction and competition from foreign imports. The industry had changed.

In the 1970s and 1980s, GM alone decided what products to make—with little input from dealers or customers. Explains Harold Kutner, group vice president of worldwide purchasing and production control and logistics at the time, “We were an arrogant company. We had an attitude of ‘we’ll make it, and the customer will take it.’” This attitude typified the “Big Three” automakers at the time. Running plants at full capacity was the name

of the game—whether or not the vehicles being made were the ones customers wanted.

### THE IMPETUS FOR CHANGE

By the late 1990s the need for change was becoming clear. Consumers were more savvy, powerful, and demanding. Yet GM's responsiveness lagged the industry. Dealers grew increasingly frustrated by the mix of inventory foisted on them. Even in key markets, dealer lots were clogged with over 100 days of supply. To clear out slow-moving products, GM had to offer sales incentives, which squeezed profit margins.

Dealers couldn't get the vehicles they wanted—the vehicles their *customers* wanted. Desirable options such as aluminum wheels, leather interiors, and V8 engines often were not available in adequate quantities. Unavailable options, or *constraints*, were high at GM dealerships relative to the industry as a whole, averaging tens of thousands of orders affected at any given time over the range of GM products. This meant that customers could rarely get their first-choice vehicle. As a result, they often settled for more basic, lower-margin models, which ultimately hurt GM's bottom line.

Customers who chose to special-order a vehicle had to wait as long as 70 to 80 days for it to arrive. Furthermore, GM was uncertain of its delivery-date reliability because delivery-date promises were not tracked at the time, and neither dealers nor customers had any way of checking on the status of their orders—there was no visibility into GM's order-fulfillment process.

At the same time, the company's supply chain costs were growing. High levels of raw materials and work-in-progress inventory, inefficient processes, outdated information-technology systems, and bloated overhead resulted in a costly, sluggish organization—at a time when streamlined operations were becoming more and more critical. Now, with market share down and Internet-driven change on the horizon, GM knew that it could no longer operate as it once had if it hoped to remain a market leader.

Change at the mammoth company wouldn't be easy. After all, GM makes over 30,000 vehicles every day, using over 160,000 parts from a vast network of global suppliers—a staggeringly complex undertaking. Brad Ross, head of GM's global order-to-delivery (OTD) organization, describes the process as a “tremendously orchestrated set of events that integrates orders across sales, manufacturing, and logistics, resulting in what we refer to as the daily miracle of production.”

GM's OTD process encompasses four of the Supply-Chain Operations Reference-model's key supply chain processes—*plan*, *source*, *make*, and *deliver*. Given this complexity, transforming OTD would be like “turning the *Titanic* around on the Flint River,” notes Kutner. Yet that's what GM set out to do. The goal? To ship customer orders in less time, with less inventory, at a lower cost—and to satisfy customers better than anyone else in the industry.

### **THE NEW MANDATE: SENSE AND RESPOND**

GM's ambitious undertaking meant moving from a make-and-sell to a sense-and-respond organization. First, the company had to start tuning into what customers wanted by sensing the marketplace better. GM had been making the wrong products. Its declining market share and the glut of inventory at the dealer lots were proof of that. Notes Ross, “In this business, product is everything. The supporting processes are important, but without the right product in the right place at the right time, you're not even in the game.”

Second, GM had to put in place an organization that could respond more quickly and effectively to customer demand—and provide better service quality. This meant rethinking key processes and replacing the functional mind-set with a more cross-functional, collaborative approach.

The Internet became a critical tool for sensing consumer preferences and market trends. In collaboration with dealers, GM developed BuyPower, an online portal that lets potential customers get detailed product and dealer information. By monitoring the “click streams” of online shoppers doing vehicle research, GM now gains a wealth of information that helps with product development, production planning, and sales forecasting. The company also set up dealer councils, regular forums for getting dealer input on consumer trends and better ways to sell.

To align real demand with production schedules—and provide visibility into the OTD process—GM upgraded its vehicle order management (VOM) system to allow dealers access through the Internet. Previously, customer-specified orders went to the end of the manufacturing queue, which is why lead times were so long. Dealers were unable to specify the mix of inventory they wanted. Instead, GM “pushed” inventory to the dealers. With the new VOM system, dealers place orders for the vehicles they want on a weekly and daily basis and can see the status of those orders as they move through the order-fulfillment process.

Using the new system, dealer orders are automatically compared with the current manufacturing schedule. In the past, GM often built the

“right” vehicles but sent them to the “wrong” dealers because there was no mechanism in place for matching production with demand. Now GM does its best to make sure that dealers get the vehicles they want. To speed order delivery, the new process looks for the fastest way to fill orders. Is a desired vehicle already in production? Scheduled for assembly? Available at another dealer’s lot? Close enough to a vehicle currently in production that a few adjustments will seal the deal? Orders are viewed daily, and assembly schedules are adjusted accordingly.

When desired options are constrained by parts availability, those constraints are systematically flagged, analyzed, and minimized through a new constraint-elimination process. Strategic parts buffering has been a useful new approach to minimizing parts shortages (and order constraints); a new tool has been implemented that enables GM to stock up on select parts and materials that are potential bottlenecks. Getting the right part to the right operator in the plant at the right time is critical. With better supply chain visibility and a focus on strategic parts buffering, GM has been able to improve parts availability overall, boosting quality and cutting costs.

Although demand forecasts still drive production—long lead times for certain materials make this the most practical approach—GM now balances its traditional build-to-stock model with more build to order to lower inventory levels throughout the distribution chain and better respond to customer needs. The company now accepts new orders on a daily basis and can schedule them for the assembly plant the same day and have them come off the line in the same week.

As a result of these changes, lead times for special orders and dealer-replenishment orders have improved by 60 percent, and customer surveys show that GM customers receive their vehicles eight days faster than vehicles from competitors. Delivery reliability also has improved dramatically. Today, GM meets its delivery date commitments 90 percent of the time. Now recognized as one of the most reliable suppliers to the commercial fleet market, GM recently received *Fleet Magazine’s* Best Order to Delivery Fleet Company award for the second consecutive year.

And since production better matches demand, customers have a greater probability of receiving their first-choice vehicle. Orders affected by constraints have been reduced by over 90 percent. GM received its best-ever National Automobile Dealers Association (NADA) survey results for OTD/distribution elements for allocation system, product availability, and timeliness of delivery. And it’s realizing higher margins on vehicles that are built to customer order.

## **A NEW ORGANIZATION**

One of the greatest obstacles to transforming GM's OTD organization into one that would be customer driven was the company's functional "silos." Too often different groups worked at cross-purposes rather than together. This led to finger pointing and an added layer of complexity while boosting schedule changes and increasing parts shortages, causing unnecessarily high inventory levels and carrying costs.

GM created a global cross-functional OTD organization to ensure that operating objectives were aligned and to eliminate competition for resources. It is organized around GM's three core supply chain subprocesses: supply operations, order fulfillment, and logistics. Order fulfillment deals with dealer-facing and planning activities; supply operations manages materials, internal plant activities, and supplier interaction, and logistics coordinates the movement of parts inbound from the suppliers to the assembly plant and outbound transportation of vehicles to the dealer. Each of these subprocesses is run by a global leader. Together, the three leaders formed a global leadership team that drove the OTD transformation.

The new organization colocates the people who support each other and depend on each other for information. Supply operations was aligned within manufacturing, for instance. Likewise, order fulfillment was embedded within sales and marketing. Outbound logistics was colocated with order fulfillment and inbound logistics with supply operations.

In the old organization, GM had two order-management groups. Vehicle order management reported to sales and marketing, production order management reported to production control and logistics. The OTD team realized that only one order-management process was needed. Accordingly, both processes were combined under OTD within sales and marketing. (See Chapter 3 for more detail on designing processes first and then realigning organizational structure to empower the processes.)

When the dust had settled, GM was able to cut back on the number of people needed to run the global OTD organization by nearly 30 percent, achieving far greater efficiency and a major reduction in costs.

## **RETHINKING LOGISTICS**

In seeking ways to further streamline the OTD organization and cut costs, GM realized that logistics were a weak link. The company had long outsourced inbound and outbound logistics activities to a network of

third-party service providers at a high cost. However, a lack of communication and coordination among the providers led to inconsistent performance and long lead times.

To reduce costs and improve efficiency, GM partnered with a global logistics company to create the joint venture Vector SCM. Today, Vector centrally manages GM's large, complex logistics network through a series of command centers equipped with the technology needed to track GM's assets and carriers. To further improve performance and visibility, Vector created one integrated information system for the third-party service providers. By improving logistics, GM's goal was to reduce costs by 20 percent in five years. By year three, GM had already achieved cost savings of 17 percent.

The logistics team also sought to further cut costs by minimizing in-transit damage. Vehicles are treated as "jewels" in the auto industry, and consumers want their jewels delivered unscratched, undented, and "polished." By streamlining the route from assembly plant to dealer and minimizing vehicle handling, GM has reduced vehicle damage incidents by 35 percent.

## **A FOCUS ON BUSINESS RESULTS**

Throughout the OTD transformation, GM maintained a rigorous focus on business results. Because the initiative was so ambitious—with so many improvement opportunities—the company risked losing sight of the big picture while chasing down avenues with limited value-add. GM chose four key metrics to guide the transformation: quality, net income, cash conservation, and market share. Every initiative and every decision had to support one or more of these metrics.

The primary drivers of quality are fewer vehicle damage incidents and providing parts to the assembly line on time to support the build plan. Lower costs and fewer constraints boost net income. Lower inventory levels help to conserve cash. The OTD initiative systematically addressed each of these areas.

The final metric—market share—was selected as the way in which customer satisfaction improvements could be translated into improved company performance. The drivers of customer satisfaction that OTD can influence are order lead time, delivery-date promise reliability, and vehicle-of-choice availability. By improving these drivers, GM would boost customer satisfaction. This would be good for business because satisfied customers buy more products.

These four business-focused metrics were a focal point for the transformation, driving the change forward by forcing the organization to keep its eyes on the road. Notes Ross, “We were always able to map the improvement initiatives to these objectives.”

## **THE INFORMATION TECHNOLOGY CHALLENGE**

Although the primary focus of GM’s transformation effort in the early stages was on redesigning the key processes and organization, GM couldn’t have transformed its OTD capability without addressing the company’s underlying information systems. Like most large, complex organizations, GM had a tangle of legacy systems—many redundant—and a lack of integration across functions, business units, and geographies. Since most off-the-shelf software requires significant customization, many of the legacy systems and applications were developed by or for GM and were specifically designed to manage the company’s high degree of product and process complexity. GM is in the process of moving many of its legacy systems to the Internet, but a high-performance, wholly integrated IT environment remains a vision that will take many years to achieve.

In the meantime, GM is working with what it has. Given the scope of the effort, the OTD team had to prioritize the needed capabilities and then find technology solutions that didn’t cost too much or take too long to implement. The team’s strategy has been to enhance key legacy systems with Web-enabled tools and integration, incorporating new tools selectively.

Bill Kala, director of North American manufacturing supply operations and part of the original OTD leadership team, credits GM’s global materials scheduling system—a legacy system dating back to the 1980s—with driving many of the savings in supply operations. Kala realized early on, however, that he had to rein in enhancement and maintenance costs. As he explains, “Everyone wanted to make frequent changes to the system, and those changes were contributing to a \$70 million annual spend.” To gain control, Kala stipulated that any changes be clearly explained and justified. Moreover, changes had to benefit at least two geographic regions. Any request for a new stand-alone system was scrutinized carefully. The result? Kala’s group cut the annual cost of the system by almost 30 percent.

In some areas, GM had to push IT changes faster than planned to improve partner collaboration. GM’s Information Systems Group supported a move to better integrate the company’s processes and systems with those of GM’s dealers at the point of sale. Until then, integration had



been limited to the basics—parts ordering or submission of warranty claims and financial reports. GM is also piloting a program that deploys one personal computer (PC) for every two service bays at dealer locations to support integration between service and parts and GM. Early tests at Saturn have shown that GM can centrally manage parts inventory at the store level with this system, increasing inventory turns and first-time fill rates and lowering retail inventory levels.

GM's IT strategy is working. The company has taken an additional \$1 billion out of IT expenses related to the supply chain since the OTD initiative was launched. The focus on process first and technology second has had a bonus effect. Explains John Whitcomb, GM director of global sales, service, and marketing, "Once people have a common understanding of business process, which is manifested by the workflow, the discussion about legacy components becomes much more fact-based. You remove the emotional arguments about keeping those systems which people have grown comfortable with."

## THE NEXT FRONTIER

What's next for GM's OTD transformation? Reduced cycle times and lead times. More personalized vehicles with special accessories and features. Better integration with dealers, who have already embraced the VOM system and several other Web-based tools that are being built into an integrated "workbench." GM is also looking at more build to order through the dealer channel, which is valuable for its high-touch, high-tech capabilities, and a more flexible supply base. It's looking at more commonality among global systems and processes. "There really is no end point to an initiative like this," says Ross. "We expect to continue on this improvement trajectory for the next several years, providing more competitive advantage for GM—and setting new standards for customer satisfaction."

### **GM SERVICE AND PARTS OPERATIONS— A TRANSFORMATION OF ITS OWN**

The story of GM's supply chain transformation would not be complete without a discussion of another, parallel effort to transform the supply chain of GM Service and Parts Operations (SPO), another key factor in customer satisfaction.



The SPO supply chain is complex: 400,000 order lines every day, generating requirements for 600,000 part numbers from 4,100 suppliers. In the mid-1990s, GM SPO lagged the service parts operations of OEM competitors in several measures by a wide margin. Costs, inventory levels, and response times were all out of line with the competition. To make matters worse, GM's dealers' service parts business was hurting. Faced with new competition from quick service chains, dealers with slow response times were having trouble holding onto customers beyond the warranty period. Today, however, the organization is focused on closing the gap with the competition, and GM SPO is setting its sights for top performance in the industry.

By focusing on five common objectives, SPO has been able to align all of its people and energy behind a common strategy. According to Dennis Mishler, GM SPO's director for logistics and supply chain management, "We focus everyone on better serving the customer through improvements in *order response time, material availability, inventory management, value creation in logistics, and new-launch support*. We learned quickly that change cannot come from spreading ourselves too thin. We say, 'The main thing is to keep the main thing the main thing.'"

#### **FOCUSING ON THE CUSTOMER**

The "main thing" for SPO is the customer. The group recognized that its supply chain was defined by the needs of its customers, and therefore, the most important guiding principle for the transformation effort should be to "make it easier for SPO's customers to service the end customer." In fact, SPO realized that it was serving multiple supply chains, each with varying requirements. There are three separate brands and multiple product-line businesses covering collision, powertrain, maintenance, and repair, as well as accessories.

#### **IMPROVING ORDER RESPONSE TIME**

To provide dealers and retailers with better service, SPO had to improve order response times and delivery reliability. So it implemented a one-day delivery policy for most customers, shipping overnight or in some cases the same day. Meeting the new delivery

policy while continuing to lower costs required some key changes in inventory deployment. SPO reevaluated which inventories would be stored in the field and which would be held in central locations, leading to a more centralized deployment approach overall.

### **IMPROVING MATERIAL AVAILABILITY THROUGH FORECASTING**

The service parts business is one characterized by seemingly random patterns of demand spread across a wide range of products for a wide range of customers. According to Mishler, approximately 10,000 of the 600,000 parts are considered fast movers, requiring little in the way of advanced planning and forecasting. The other 590,000 parts are slow movers, requiring much more sophistication in forecasting and inventory planning. SPO restructured its overall approach to forecasting: Parts were grouped by business (collision, maintenance and repair, etc.) with similar life-cycle demand curves, and SPO forecasters were trained to understand characteristics, trends, and events related to demand across the life cycle. SPO also implemented world-class forecasting tools that allowed its experts to easily test different forecasting models and implications. For example, patterns related to seasonality, demand spikes, or supply chain events could be “clicked and dragged” into the models to test the overall impact on the forecast. While there is still room for improvement, the results to date have already been striking: SPO has reduced inventory by over 25 percent due to improved forecasting capabilities.

### **IMPROVING INVENTORY MANAGEMENT AND VISIBILITY**

Improving inventory management required GM to greatly enhance its ability to see and manage demand, supply, and inventory information at another level of detail. By developing forecasts and schedules at the level of each PDC (product distribution center), SPO is now moving into a more deterministic, data-driven environment that is enabling significant new reductions in inventory. SPO also has established the capability to see inventory availability across its network, which will soon be extended to include dealer parts departments.

**CREATING VALUE IN LOGISTICS**

SPO faced a significant gap in the competitiveness of its warehousing and logistics operations. The management team is addressing the challenge in partnership with a third-party logistics provider, systematically implementing principles of lean manufacturing. Over time, this consistent focus has enabled SPO's people to "lean out" material flows one at a time, implementing standardized work processes along the way. Says Mishler, "We have improved our productivity [in the distribution centers] by over 50 percent."

**CREATING A BALANCED PARTNERSHIP WITH SUPPLIERS**

SPO acknowledges that much of its improved supply chain performance has been due to its improved relationships with its suppliers, including its logistics providers. In conjunction with other GM organizations, it has implemented a rigorous process of supplier collaboration, whereby performance is reviewed and ideas for reducing waste in the supply chain are exchanged on a quarterly basis.

**EMPOWERING THE "OAKS"**

People also play a powerful role. As Mishler explains, they're the "oaks" that hold up the organization. The SPO is now organized around business lines, reinforcing the focus on customers in each brand/product business. Each business line is supported by a cross-functional team that is held accountable for supply chain performance. The teams include "oaks" from key functions—people who know the processes and have been around the business for years and are continuously trained in skills that will help them eventually optimize each of their supply chains.

Future plans include an aggressive "digital supply chain" initiative that will incorporate virtual warehousing, enhanced supplier collaboration, event management, advanced planning/optimization, and other new capabilities. "It's really a journey," says Mishler. "Once you get the entire organization focused on what is really important, you can really make progress."

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