The Pervasive Success of 6 SIGMA at Caterpillar

Accounting and finance efforts are a good example.

By Keith T. Jones, CPA, and Clement C. Chen, CPA

The increasingly competitive marketplace has for some time now made it necessary for organizations of all types and sizes to reexamine their business processes—from engineering and production to marketing and financial functions—in order to determine how they can improve them. As if it weren’t enough to tackle everything once, continuous improvement has become the standard in today’s global, constantly changing environment.
Organizations from banks to manufacturers have used Six Sigma to improve their operations. Conceived as a tool to improve product quality to certain standards, it has been used by many companies to transform their operations in other areas, too, such as accounting and finance. For example, companies have used Six Sigma to reduce cycle time and improve reporting processes (see “Near Zero-Defect Accounting with Six Sigma” by Peter Brewer and Nancy Bagranoff in The Journal of Corporate Accounting and Finance, January-February 2004, and “Using Six Sigma to Improve the Finance Function” by Peter Brewer and Jan Eighme in the May 2005 issue of Strategic Finance). Yet this management tool has met with varying levels of success as companies have tried to apply it to areas outside production. A recent series of articles in Business Week warned that some companies that had achieved initial success with Six Sigma encountered roadblocks because of a tradeoff between efficiency and creativity. Some people even suggest that Six Sigma has run its course.

Caterpillar’s experience with 6 Sigma (Caterpillar refers to Six Sigma as 6 Sigma) has been highly positive, despite traditional challenges inherent in any large top-down management initiative. We met with company representatives to learn how they achieved and have sustained a high level of success. While an article in Six Sigma magazine discussed Caterpillar’s overall success, the focus here is on how they applied it successfully in the finance and accounting functions. A specific example will illustrate briefly how this company-wide process has been applied successfully in the accounting and finance arena.

A Cultural Transformation
Caterpillar implemented 6 Sigma on a global level from day one, beginning in January 2001. The company never intended to try it in production, see how it worked, and then try it somewhere else. From their perspective, anywhere there was an outcome, there was a process. If there was a process, there was variation in performance. If there was variation in performance, the process was subject to 6 Sigma. No area of the company was excluded, from production to revenue recognition to client services.

The company rolled out the program in “waves,” and, by the end of 2001, had 700 Black Belts. Today there are roughly 2,000. Black Belts at Caterpillar are trained by Master Black Belts and receive a minimum of 160 hours of training while also working on their first project. The company develops its future leaders through the Black Belt program, administering a tight screening process to select employees for the Black Belt role. For example, they are looking for employees who are recognized to have strong project management skills. Within Global Finance, approximately one in three leaders has held a full-time 6 Sigma position.

Caterpillar used a “transformational” deployment strategy in implementing 6 Sigma as opposed to a functional or targeted strategy. The latter two focus on specific processes or individuals and, although they require less initial investment, make it difficult to integrate 6 Sigma into other parts of the company, largely because there’s no common language and company-wide commitment. In Caterpillar’s case, company leadership was committed up front and made it clear that 6 Sigma was here to stay. Everyone—every single employee—was trained in the basic concepts of 6 Sigma and equipped with common terminology. In fact, trainees were asked to formulate an “elevator speech” in which they would be able to describe in two minutes what 6 Sigma was about at Caterpillar. The training was the same for accounting Black Belts as for the production people in Beijing. The intent—and the ultimate result—was that 6 Sigma would permeate every corner of the company from day one. Every area—from research and development to production, marketing, finance, and accounting—has provided major inputs into implementation and used 6 Sigma to review and change internal processes. In fact, Caterpillar also rolled it out across their supply chain, bringing nearly all dealers and many suppliers on board.

Rigor and Reality
From the beginning, Caterpillar appointed a “metrics manager” who was responsible for establishing criteria to ensure that the benefits of every project were “real.” Calculating real, credible benefits is critical to a project’s success, and tracking the benefits requires great rigor and attention to detail, according to the company’s representatives who have managed 6 Sigma metrics. Rigorous standards are set for measurement of projected and actual benefits that are applied across the board, regardless of the process under review. This precision helps remove emotion and cynicism by providing real data. Policies are very specific about what counts and what doesn’t, but the company is still careful to ensure that this need for exactitude doesn’t stifle creativity and impede progress. The full intent behind the metrics is to drive desired behaviors and lead employees into making fact-based decisions.

The company stresses a budgetary, zero-based approach, focusing on relevant, incremental benefits. It
first establishes a benchmark of what the outcome would be if 6 Sigma weren’t implemented. Then, once the project is complete, the company compares the cost benefits because of 6 Sigma methodology. There are three levels of benefits that must be quantifiable and subject to an independent review, and each level is designed to drive particular types of results. Level 1 benefits must indicate a clear, causal relationship between the project outcomes and the bottom line. Level 2 benefits involve redeploying resources made available from process improvements to other value-added positions, avoiding the need for additional headcount. Level 3 benefits are more varied and generally involve cost avoidance or longer-term value creation that requires upfront investment. For instance, there may be an engineering change that produces a quality improvement and results in increased future sales. All levels of benefits are critical. While Level 3 includes a focus on long-term benefits, Level 1 and 2 benefits are intended to drive behaviors toward short-term benefits.

During earlier stages of implementation, rewards were tied to Level 1 and 2 benefits achieved during the first year of a project, with Level 3 benefits incorporated in the second year. Employees initially viewed the Black Belt role as a risky career move, but then they saw that top management supported them and recognized their success with noticeable financial rewards. Yet if the Black Belts and 6 Sigma teams didn’t deliver the results, management didn’t deliver the rewards, so accountability for the results was clearly established. Such linking of specific rewards to 6 Sigma success was important in driving the global cultural change.

An Example: Transparency in Financial Reporting

Following a reorganization in the early 1990s, there were three separate, distinct financial views of the entire organization: SEC/legal entity, business units accountable (internal management reporting ledgers), and enterprise product profitability. In the early 2000s, burdensome accounting headaches, coupled with changes in the regulatory landscape, motivated a move toward greater transparency in reporting. The company had accountants involved in the three different views of the organization, with approximately 75% working on legal entity reporting or business accountable reporting (legal reporting to the Securities & Exchange Commission (SEC)) and only 25% on insightful analysis. There were multiple business accountable ledgers and software packages, contributing thousands of reconciling journal entries made on a monthly basis just for internal management purposes. Extra hours worked during closing cycles sometimes approached 60%. In short, far too much time was being spent on generating reports and not enough time on generating insights from the numbers, not to mention the effect on the morale of the finance and accounting staff. Importantly, business decisions could be less than optimal as a result.

The goal was to implement an integrated, transparent financial reporting system to allow a clearer path to value creation. An analysis of stakeholders’ views determined that it was still important to keep the separate views of the company—reporting and analyzing results by principal lines of business and by geographical region—but the numbers must be easily reconcilable to the external view. The intent was to simultaneously create a substantial shift from “adding up” to “adding value.” A dedicated team was responsible for following the established methodology based on the 6 Sigma recipe of the “Three C’s,” that is, clarity, consistency, and commitment (see Table 1). Every business unit had a Black Belt assigned to it to apply the rigor of 6 Sigma and to improve leverage and communications across Caterpillar. A small core team in the company’s Peoria, Ill., headquarters were “subject matter experts” on such things as cost of sales. This team worked with the business unit Black Belts to create and implement changes in methodology and communicate the necessary changes and training plans.

What were the results? The company began the massive

Table 1: Caterpillar’s “Recipe” for 6 Sigma Success

<table>
<thead>
<tr>
<th>Clarity</th>
<th>✔ Everyone understands the terminology, expectations, and their reasons.</th>
<th>✔ There is a clear link from process improvement initiatives to company strategy and quantifiable benefits.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistency</td>
<td>✔ Every project is subject to the same rigor.</td>
<td>✔ The same principles are applied globally.</td>
</tr>
<tr>
<td>Commitment</td>
<td>✔ Leadership is committed to 6 Sigma principles at all levels.</td>
<td>✔ Management is committed to 6 Sigma leaders and to their success.</td>
</tr>
</tbody>
</table>
project in early 2003 and started to understand the impacts by August of that year and aligned and tested the financial reporting systems. Caterpillar went from thousands of reconciling differences to none almost immediately. Their cascaded financial reporting system now links SEC reporting directly with results for product lines, eliminating the need for reconciling journal entries.

The benefits were twofold. First, complexity and risk in the numbers were removed, and managers were able to use one set of numbers, with multiple views, to manage the company. Second, significant effort was redeployed from reconciling to analysis. This redeployment saved the company from having to hire additional support people during a period of tremendous growth. Table 2 shows a partial list of the benefits to Caterpillar.

**The Follow-Through**

There are challenges not only in the implementation of any major management initiative but in sustaining the emphasis once it has been established. One danger with any major process change such as 6 Sigma is that it will lose steam with a change in management. Caterpillar is significantly into its second chairman since implementing 6 Sigma and has experienced no such loss in momentum. When current CEO Jim Owens took over, he continued the emphasis on using 6 Sigma methodologies to capitalize on the talents of the people, firmly expressing a belief that the rigors of this methodology will continue to combine very powerfully with the talents of the people to tackle all business problems.

A significant issue lies in how to avoid an initiative becoming a project of some time horizon, such as five years, regardless of the initial high level of success and apart from concerns about CEO changes. As one company representative aptly characterized the challenge, “How do we change from building the house to living in it?” Caterpillar continues to carry out projects in the same way as before—and with the same rigor—following up and holding the process owner responsible for the results. The company intentionally puts its best people on the most important projects. Black Belt experience is an important factor in determining promotability, and Master Black Belt graduations are characterized by large ceremonies that afford the honorees the opportunity to interact with the CEO and other high-ranking company individuals.

In the early stages of implementation, tying rewards to 6 Sigma results was important. Those who participated early received rewards tied to benefits. Such links to financial incentives are important in driving behavior, and the incentives should be more than “tokens.” Significant incentives will signal that management believes in 6 Sigma and that others should get on board or be left behind. After 6 Sigma was well established, the direct rewards tied to specific results gave way to salary increases that naturally result when individuals are promoted to increasing levels of responsibility, again largely because of their participation and success within the 6 Sigma culture.

At the core, Caterpillar employees at all levels view 6 Sigma as the way they work to solve problems and make decisions that involve rigor and discipline, with a goal of process excellence. From a management perspective, it’s a way of implementing strategy more effectively and efficiently. It is data driven and structured, which minimizes the effects of cynicism that could have derailed early efforts to implement the initiatives. The company doesn’t have multiple management philosophies and tools; all projects are 6 Sigma projects. Employees understand the terminology and why they are doing it. Rather than turning into a “flavor of the month,” as top-down initiatives often do, 6 Sigma is ingrained into the company’s culture to the point that many can’t imagine Caterpillar without it. SF

Keith T. Jones, CPA, Ph.D., is associate professor of accounting at Illinois State University and is a member of IMA’s Central Illinois Chapter. You can reach him at (309) 438-2473 or kjones@ilstu.edu.

Clement C. Chen, CPA, Ph.D., is associate professor of accounting at the University of Michigan-Flint and is a member of IMA’s Detroit Chapter. You can reach him at (810) 762-3267 or clementc@umflint.edu.

<table>
<thead>
<tr>
<th>Table 2: The Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔ Caterpillar’s strategy is carried out with more focus and clarity.</td>
</tr>
<tr>
<td>✔ Cynicism is minimized as a result of consistent methodology and rigor.</td>
</tr>
<tr>
<td>✔ There is one way of doing business, thereby increasing familiarity and commitment.</td>
</tr>
<tr>
<td>✔ Everyone can see the results…reconciled to the “bottom line.”</td>
</tr>
<tr>
<td>✔ Significant resources are saved or redeployed to more value-added purposes.</td>
</tr>
<tr>
<td>✔ 6 Sigma is a “win/win” proposition because employees are rewarded for their success.</td>
</tr>
</tbody>
</table>