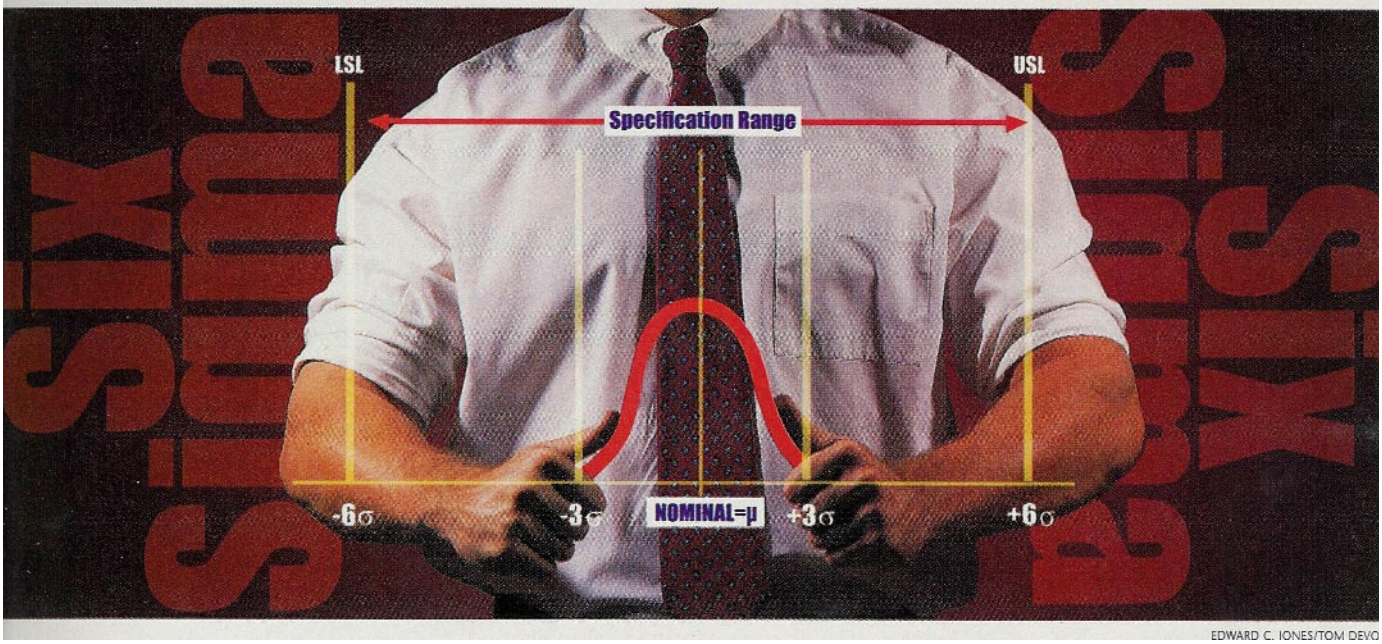
Six Sigma Strategies: Creating Excellence in the Workplace

by Mario Perez-Wilson



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During the last decade, numerous articles have explained the Six Sigma quality program but few have proposed a standard, systemic approach for implementing it. Yet the program's benefits are substantial and worth pursuing.

A gauge of quality and efficiency, Six Sigma is also a measure of excellence. Embarking on a Six Sigma program means delivering top-quality service and products while virtually eliminating all internal in efficiencies.

A true Six Sigma organization produces not only excellent product but also maintains highly efficient production and administrative systems that work effectively with the company's other service processes. However, not every organization takes this holistic approach. A manufacturer, for instance, may concentrate instead on implementing Six Sigma for outgoing product quality—through 100 percent final inspection, for example— thereby assuring that quality level for its customers. But production processes still may run at low yields with high scrap ratios and defects.

That is the typical scenario. A better strategy optimizes the production process, bringing it to Six Sigma (i.e., plus or minus six standard deviations within specifications) and assuring high yields with little or no scrap or defects. Any product made by such a process also will fall within specification limits.

Thus, implementing a Six Sigma program in manufacturing means more than delivering defect-free product after final test or inspection. It also entails concurrently maintaining in-process yields around 99.9999998 percent, defective rates below 0.002 parts per million and virtually eradicating defects, rework and scrap.

Other Six Sigma characteristics include operating processes under statistical control, controlling input process variables—rather than the usual output product variables—maximizing equipment uptime and optimizing cycle time.

In administrative processes, Six Sigma may mean not only the obvious reduction of cycle time during production but, more importantly, optimizing response time to inquiries, maximizing the speed and accuracy with which inventory and materials are supplied, and foolproofing such support processes from errors, inaccuracies and inefficiency.

Because Six Sigma in essence means overall excellence, implementing it requires more than simply explaining what Six Sigma means and expecting everyone to begin doing it immediately. Such an approach leaves numerous questions unanswered, directions undefined and everybody—particularly those inexperienced with the concept—scrambling to invent their own version of the program. The inevitable free-for-all that ensues yields all too few successes, lowers the program's acceptance rate and endangers its very existence.

Obviously, a strategy outlining the necessary elements for a successful Six Sigma quality program would be preferable. The following approach will help organizations interested in implementing such a program.

The Six Sigma challenge

Once an organization decides to implement a Six Sigma program, it must impart the challenge to every employee. This includes not only people close to production—where indexes and measurements are relatively easy to implement on physical processes—but also administrative and service providers.

Through an executive directive, the organization establishes its Six Sigma challenge, vision, customer satisfaction promise, goal and new measurement indexes. The directive distinguishes between former business policies and the new challenge of working toward excellence. It establishes a common goal for all employees in the organization: reduce variability (i.e., standard deviation) in everything they do. The directive requires all employees to participate in a day-long course outlining the "Five W's" of Six Sigma. This course explains the who, what, where, why and when of the organization's new way of doing business.

In a Six Sigma organization, employees assess their job functions with respect to how they improve the organization. They define their goals, or the ideal of excellence in their roles, and quantify where they are currently—their status quo—with respect to these ideals. Then they work to minimize the gap and achieve Six Sigma by a certain date.

Individuals in the finance department, mail room, human resources, purchasing and

everywhere else also are challenged to achieve Six Sigma in everything they do, cumulatively bringing excellence to the organization as they achieve individual excellence in their jobs.

For an organization to reach Six Sigma successfully, the program must define a standard approach. If the approach is left undefined, too many individuals will spend too much time engineering and reengineering it. Standardizing a methodology to achieve Six Sigma allows individuals to focus on reducing the standard deviation within their individual projects rather than obsessing over method. It also establishes a common approach that speeds up the execution of all Six Sigma improvement projects.

This standardization creates a common language and a common cause among all employees. Many organizations implementing quality programs become mired in arguments and disagreements over methods and never move forward. A Six Sigma program, by contrast, focuses on reducing variability and reaching excellence.

Establishing a quality goal

An important aspect of the Six Sigma program is total process characterization, which involves optimizing all manufacturing processes to a very high Cp and Cpk value (see sidebar on page 6). M/PCpS is a systematic approach for characterizing, optimizing and controlling a process; achieving a high Cp and Cpk value marks a team's success in reaching Six Sigma.

An organization must establish a Cp and Cpk goal. It should be tied with the organization's quality goal, which is established throughout the organization by an executive directive.

The quality goal should not be zero defects, by default an impossibility and simply unreasonable. Rather, the organization should set a value, such as 0.002 parts-per-million defective (plus or minus six sigma), 3.4 parts-per-million defective (4.5 sigma shifted) or some other challenging but achievable value. A Six Sigma quality goal strives for a stringent but achievable Cp and Cpk value equal to 2.0. This value would bring considerable profit to an organization. Motorola, for example, established a quality goal of 3.4 parts-per million defective (Cp=2.0, Cpk=1.5).

It usually takes a team working a few hours a week for a few months to characterize a machine or process. Characterizing all processes in a manufacturing site usually takes continuous effort for a few years. During that period, an organization must invest its resources, time and money. A five-year plan mapping the organization's progress from its present state to Six Sigma is necessary.

To keep the program focused, scheduled and running in a timely manner, the five-year plan should identify teams and their members as well as schedule processes and machines. The five-year plan itself should be reviewed annually. At this stage, it may prove helpful to hire a consultant. This person would train, facilitate, coach and guide organizations as they develop a Six Sigma program; assist in planning and managing process characterization studies; and oversee the program's implementation.

When deciding the order in which process steps or operations should be scheduled for process characterization, it helps to rank the steps according to their impact on the product's final characteristics. Such a process might proceed as follows:

o Form a team of process and product engi-

neers, as well as product managers.
o Identify all the process steps for a particular product line.
o Review each process step, starting with the first one.
o Identify all the response variables within each process step.
o Classify each step as critical (c), major (M) or minor (m) with respect to its impact on the product's final characteristics.

Once all the process steps are classified, schedule them into the five-year plan, first scheduling the critical, then the major and, finally, the minor process steps.

Team Presentations and documentation

A Six Sigma program requires a review, as well as an audit, to make sure everything progresses as planned. During a presentation held each month, teams report on the progress of their process characterizations and/or improvement studies. Teams follow standard formats for quick, direct and efficient presentations. The presentations should emphasize data, which is as important as the teams' conclusions. Teams should describe their progress, roadblocks, milestones, needs and findings.

External and internal organization experts are invited to attend these presentations. The team shares the knowledge it acquired with attendees, which enhances learning and experimenting. Managers provide support and commitment, keeping the team focused on the organization's objectives. After hearing attendees' comments, the team decides on a project's direction.

A Six Sigma process improvement book also is kept in the production area. As the projects progress, documentation of all efforts related to the process is archived here. The archives, available for use by other teams as they study similar processes, also can fulfill documentation requirements of ISO 9000 and QS-9000.

The consultant should request bimonthly reports from each team to track and report their efforts to management. This bimonthly reporting avoids any surprises during the monthly presentations concerning a team's lack of progress. The reports note progress toward Six Sigma and compare that progress with goals established in the five-year plan. The consultant measures and tracks actual vs. scheduled times to keep the whole program in focus and in motion.

Award recognition and M/PCpS competition

To recognize teams and promote interest in the quality goal, management should present an award to each team member who successfully completes a process' full characterization (i.e., achieves Six Sigma). The award comprises three things: a plaque and attachment, a pin and nomination in the M/PCpS competition. The award plaque should be designed so that attachments for each completed project can be added.

Once a year, all teams whose projects have achieved Six Sigma participate in the M/PCpS competition. Teams present their projects, their approaches and their improvements. Judges from within the organization assess the teams' roles and improvements to ensure they meet evaluation criteria. Through a process of elimination, they select a winning team.

In this event, employees see firsthand the organization's commitment to quality, improvement and efficiency. The M/PCpS competition encourages empowerment

through demonstration and action. The winning team becomes that year's M/PCpS competition winner and receives some form of compensation, such as an extra week of paid vacation.

Creating company-wide excellence

Nontechnical processes within, say, the purchasing or finance departments, are considered invisible processes because their elements are not physical or tangible like those in production. Due to their intangibility, nontechnical processes are difficult to define, measure, quantify and optimize to Six Sigma levels.

Nevertheless, a methodology for optimizing nontechnical processes to Six Sigma levels also should be standardized throughout the organization. This methodology should include process delineation, index measurement generation, data collection for quantifying the process, a structured gap-minimization strategy for performing statistical analysis (most likely, using nonparametric statistics) and to demonstrate significant improvement toward Six Sigma.

The Six Sigma quality program has a rightful place in the overall organization, but particularly in manufacturing. When properly implemented, the program reduces inefficiencies and produces very high yields and returns. This requires proper planning and implementation. All too often, with resources limited and attention to detail lacking, the organization's vision falls short of expectations, and the program stumbles along or is summarily terminated.

Given the substantial investment—and the potentially substantial rewards—a Six Sigma program warrants a long-term vision and commensurate attention and resources. Developing a cohesive and comprehensive strategy for implementing Six Sigma only increases the likelihood of a company achieving this worthwhile goal.

About the author

Mario Perez-Wilson is the founder and principal consultant of Advanced Systems Consultants based in Scottsdale, Arizona. He has over 23 years of industrial experience in engineering, quality and process improvement and has served at the executive level as Corporate Vice President of Quality for Flextronics International.

One of the original architects of Six Sigma, he served as a Division Statistical Methods Engineering Manager at Motorola. During his tenure, he institutionalised and standardised the application of statistical methods and Six Sigma in Motorola's worldwide manufacturing, production and engineering operations. His proprietary M/PCpS™ Methodology for characterizing processes has received global recognition as the first methodology to achieve and sustain Six Sigma. He can be reach at 480-423-0081 (www.mpcps.com).