

SIX SIGMA BASICS

Six Sigma for the Small Company

BY PETER J. SHERMAN

While the majority of Fortune 500 companies use Six Sigma, few companies with revenues less than \$25 million or fewer than 100 employees utilize it, according to research by iSixSigma. Those organizations are missing a great opportunity because Six Sigma offers a practical way for small and medium-sized companies to better evaluate and manage their operations. With only a reasonable amount of time and resources plus some key tools, a small company can see big results.

The objective of Six Sigma is to deliver high performance, reliability and value to the end customer by analyzing and improving work processes and eliminating variation and defects. Achieving 6 sigma translates into generating only 3.4 defects per million opportunities (DPMO). Don't think of faulty widgets on a production line – think of in-house errors common to bringing on new clients and serving existing ones. Any small company can apply Six Sigma thinking to improve their processes.

Action Plan

Step 1: Understand the customers' needs by identifying the key factors critical to customer satisfaction, such as consistent and reliable customer service or timely deliverables. Talking directly with customers and individuals who regularly interact with customers can provide insights.

Step 2: Lay out and understand the company's end-to-end business process to identify gaps, bottlenecks and redundancies. It can be as simple as this process flow: marketing » sales » delivery » support » billing.

Step 3: Determine which parts of the process are the best candidates for Six Sigma projects.

- **Standardized processes** such as account processing, maintenance, billing, inventory, accounts payable and payroll are great candidates because the return on investment (ROI) is usually high, according to "Six Sigma Meets the Service Economy," an article by Jim Biolos in the *Harvard Management Update*.
- **Mass-customized processes** such as web-based marketing and customer support are good candidates,

too, if the volume of activity is high enough.

- **Highly customized processes** such as complex information technology systems are generally poor candidates because of cost, time and low ROI.

The most important message is to focus on specific, achievable projects. Table 1 gives examples.

Table 1: How Six Sigma Can Be Applied

Key Activities	Application of Six Sigma
Marketing	<ul style="list-style-type: none"> • Increase pipeline of prospective customers
Sales	<ul style="list-style-type: none"> • Reduce sales cycle times
Fulfillment and delivery	<ul style="list-style-type: none"> • Improve on-time delivery of products • Improve accuracy of orders (i.e., reduce returns)
Support	<ul style="list-style-type: none"> • Improve first-contact resolution • Shorten handling time for calls
Billing	<ul style="list-style-type: none"> • Improve accuracy of invoices • Shorten accounts receivable days outstanding

Step 4: Measure key activities over time. Without data, it is impossible to perform the kind of analysis that will lead to good decisions.

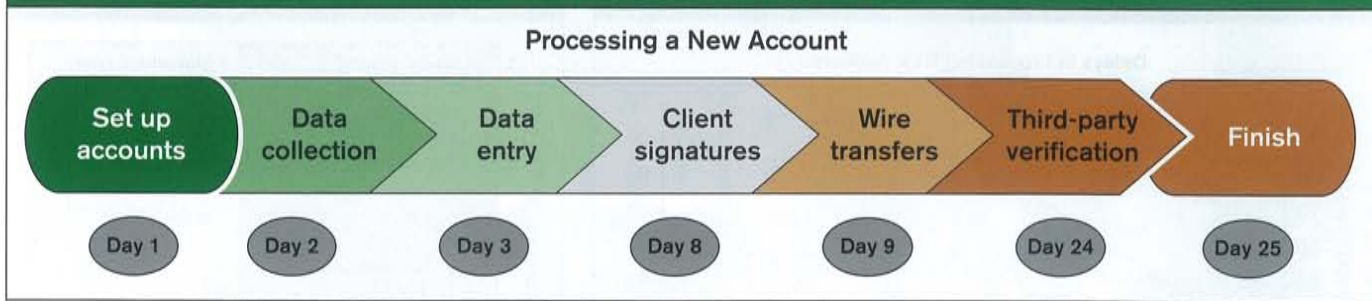
Step 5: Follow the DMAIC roadmap (Define, Measure, Analyze, Improve, Control) to conduct specific process improvement activities.

The Tools in Action

A company does not need to initiate a full-blown Six Sigma project to make use of the tools. Consider how the DMAIC framework and Six Sigma tools were applied in a half-day workshop at a mid-sized financial advisory services firm. The participants, or team members, were the firm's two certified financial planners and six supporting analysts.

Define – In the first phase, a project team defines what it is trying to improve and by how much. Typically, the

Figure 1: High-level Process Map



team develops a project charter that includes the project's scope, the objective (quantifiable improvements), the team members, the benefits to customers (internal or external), and a schedule of milestones. For the certified financial planning (CFP) firm, the scope of the project was the cycle time for processing new accounts and the objective was to reduce the time from 25 days to 19 days in order to increase capacity of the analysts.

Process mapping is a key activity performed during this stage. Figure 1 shows the flow of processing a new account.

Another tool that clarifies a business process is the SIPOC (suppliers, inputs, process, outputs, customers) diagram. It helps to identify all relevant elements of a process improvement project before work begins.

Measure – This phase involves gathering performance data. Historical data can generally be measured in terms of time or defects. It is best to obtain as much data as possible to capture a statistically valid sample size. For the CFP firm, data on the days to process new accounts was gathered prior to conducting the workshop.

The most important measurement tool is the control chart, which shows the amount and type of variation in a process. The \bar{X} control chart in Figure 2 indicates a process with significant variation. Moreover, the process is clearly “out-of-control” (i.e., special causes exist) as reflected by the many data points exceeding the upper control limit (UCL) and lower control limit (LCL). The control limits are set by the process/data itself.

In addition to cycle time, the number of defects in the new-account process was measured. Defects were defined as accounts with errors due to missing or wrong data. Of the 212 accounts opened in 21 months, 55 percent had defects, which translated into 550,000 DPMO, or a sigma level of only 1.35.

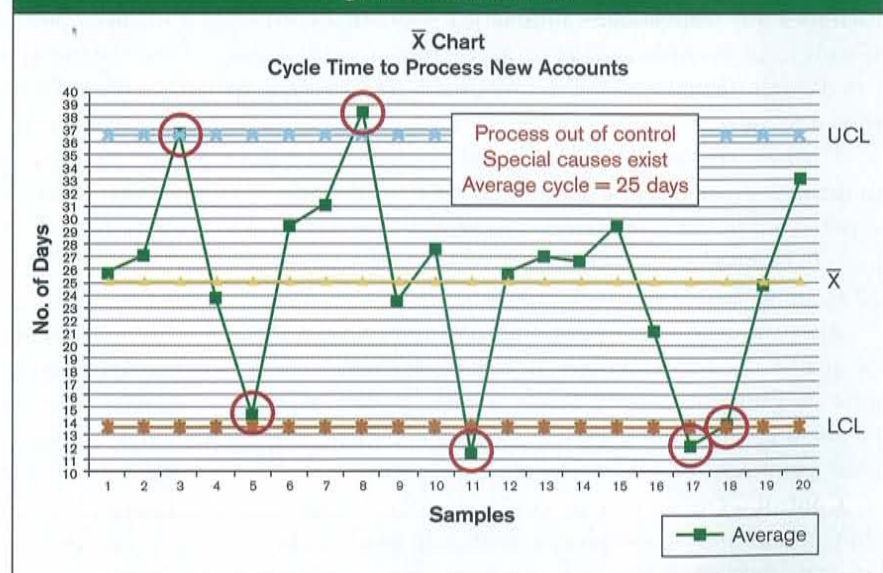
Analyze – Mean, mode, median, range

and standard deviation are commonly used in analyzing process data to identify key root causes of defects and variation. Another easy-to-use tool for brainstorming causes is a cause-and-effect, or fishbone, diagram, so called because causes are organized in the shape of a fish skeleton.

Still another technique is a Pareto analysis, which uses a table or bar chart to show the frequency of problems. The Pareto principle states that 80 percent of the impact of a problem will show up in 20 percent of the causes. The Pareto chart in Figure 3 on page 18 illustrates what causes delays in processing new accounts. In this case, the causes with the highest frequency were third parties, customer signatures and data entry/gathering. The team decided to focus on those three causes.

Improve – During this stage, the team generally brainstorms and lists as many improvement ideas as possible before judging their viability. Then the team evaluates each idea based on some criteria. It can be as simple as placing each particular idea in the proper quadrant of the cost-benefit grid in Figure 4 on page 18. Improvements that are low cost, high benefit are optimal.

Figure 2: Control Chart



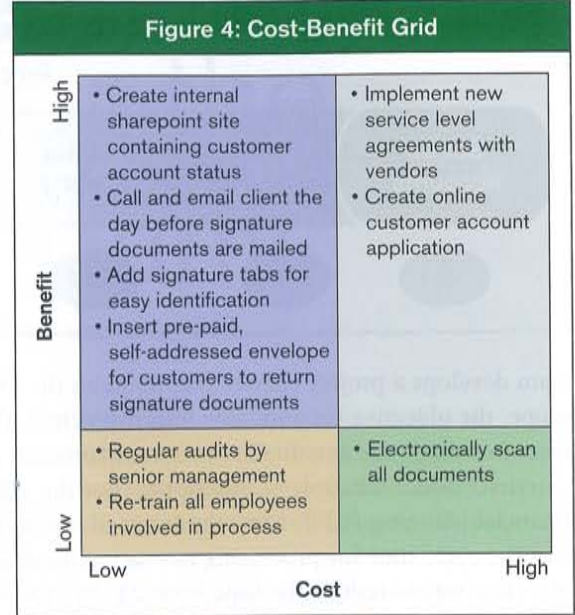
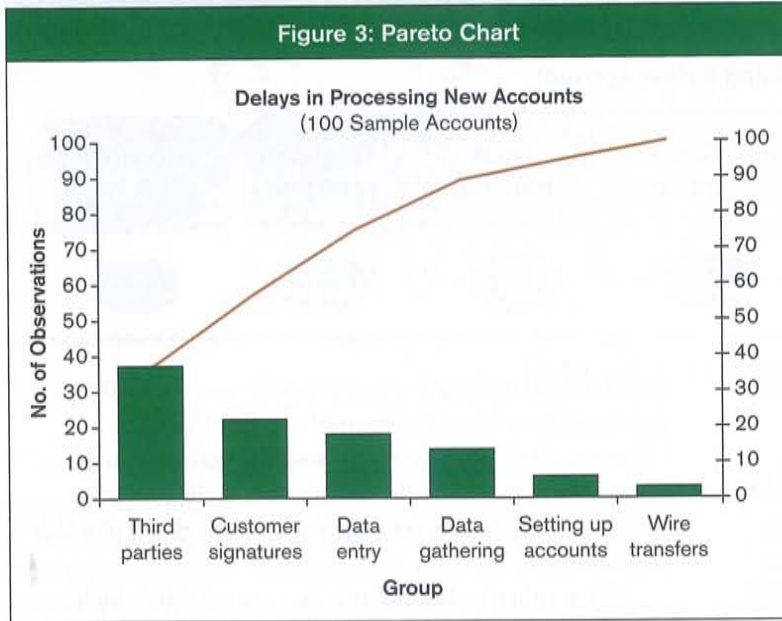


Table 2: Project Evaluation Criteria Matrix

Factor	Effectiveness (Generate Revenue)	Time to Implement	Cost	Customer Satisfaction	Weighted Average	Comments
Weight →	40%	25%	20%	15%		Scores range from 1 (lowest) to 10 (highest)
Sharepoint site for internal staff and third-party vendors	9	6	7	10	8.0	A relatively easy application to develop. Would require administrator with edit privileges.

A more detailed approach is to select three or four criteria, such as cost or customer satisfaction, with different weightings depending on the nature of the project. For each idea, the team assigns a numerical score that corresponds to each criterion. The team can prioritize the ideas based on those with the highest weighted average score, as shown in Table 2.

The next step is to execute the solutions and transition to the new process. For example, the CFP firm would conduct a pilot with the selected improvements over a four- to eight-week period, during which approximately 20 accounts would be processed using the new process.

After conducting the pilot, the team would use statistical analysis and criteria such as “reduction in processing time” to gauge the results. When testing the new improvements, it is important to isolate which factors have the most significant impact on the project objective.

Control – Once a new process is in place, the goal shifts to monitoring the process to sustain results. The optimal approach is to assign one or two dedicated indi-

viduals to monitor and measure results on a regular basis and report back to the team and upper management. For the CFP firm, it was recommended that one certified financial planner and one analyst meet once a week during the initial six weeks and every two weeks thereafter.

With the rudiments of Six Sigma, after just half a day, the team at the CFP firm was able to map the process for completing a new account, identify major gaps and bottlenecks, isolate key root causes, and develop a game plan to improve the operations. ♦

Peter J. Sherman, a certified Black Belt and certified quality engineer, has more than 20 years of experience, including serving as senior Black Belt for AT&T's product development group. He has a master's degree in engineering from the Massachusetts Institute of Technology and an MBA from Georgia State University. Mr. Sherman is a member of the International Society of Six Sigma Professionals and American Society for Quality.