

Six Sigma and the Bottom Line

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Many companies have gone down the path of continuous improvement only to be discouraged by the lack of “breakthrough” results. All of the texts on Total Quality harp on the need for strong commitment from senior management for these initiatives to be successful. What is it that motivates these business leaders? The answer is straightforward; Business Leaders are motivated and driven to achieve bottom line results and increase value to shareholders. Six Sigma provides a structured and rigorous approach with a customer focus that drives benefits to the bottom line.

❑ What is Six Sigma?

- *A Program that follows a Structured and Rigorous Approach to Process Improvement*
 - ✧ Production Processes
 - ✧ Service Processes
 - ✧ Basically, applicable to all Business Processes
- *Where Projects are Identified and Prioritized Based upon “Bang for the Buck”*
 - ✧ Outwardly Customer Focused
 - ✧ Bottom Line Impact Potential is the Key Driver
 - ✧ Facilitates allocation of a business’s “scarce” resources to the projects with significant business importance
 - ✧ Separates the “Vital Few” from the “Trivial Many”
- *Where Specific Targets for Improvement are Base lined and Monitored*
 - ✧ Cost (hard, soft, and cash flow)
 - ✧ Cycle Time
 - ✧ Non-Value Adding Activities
 - ✧ Rework
 - ✧ Failures
 - ✧ Defects
- *The Structured and Rigorous Improvement Process is called **D M A I C** and is comprised of the following five phases.*
 - ✧ **Define**
 - ◆ In this first phase the projects purpose and scope are defined as well as the initial pass at a business case. Process and Customer information is collected to identify how well the process is meeting customer requirements.
 - ✧ **Measure**
 - ◆ The goals of the Measure phase are to establish baseline process performance, narrow the focus of the project scope and problem statement, and increase the accuracy of the business case. The output from this phase provides the data necessary for the analyze phase.
 - ✧ **Analyze**
 - ◆ The goals of the Analyze phase are to identify potential root causes of process issues that directly effect critical to quality customer requirements. Theories are tested and validated with data. The output from this phase is verified causes that lead to solution development in the next phase.

- ✧ **Improve**
 - ◆ The goals of the Improve phase are to develop and pilot proposed solutions, validate that they address the root causes of the process issues, and achieve or exceed the expected benefits. Once validated, plans are developed for full-scale implementation of solutions.
 - ✧ **Control**
 - ◆ The goals of the Control phase are to evaluate the new process performance and compare it to the baseline. The business case is updated with the quantified benefits and booked by finance. Standards, documentation, and training in the new process are completed. Process controls are institutionalized to maintain the gains and identify further opportunities for continued improvement.
- *Teams utilizing the five phases of DMAIC can deliver breakthrough improvements to business processes. This is the road to the Six Sigma stretch goal of 3.4 defects per million opportunities.*

❑ How Do Six Sigma Efforts Impact the Bottom Line?

- *Income Statement Elements affected:*
 - ✧ Reduces Cost of Goods Sold
 - ◆ Increases Gross Margin
 - ✧ Reduces Operating Expenses
 - ◆ Increases Net Income
 - ✧ Positive Impact on Profitability Ratios
 - ◆ Increases Return on Sales
 - ◆ Increases Return on Investment
- *Balance Sheet Elements affected:*
 - ✧ After Processes are Improved and Stabilized
 - ◆ Inventory Reductions Become Possible
 - ◆ Impacts Activity and Efficiency Ratios
 - Increases Asset Turnover
 - Increases Inventory Turnover
 - Decreases Inventory on Hand
- *Reductions of 10%-30% in both Cost of Goods Sold and Operating Expenses are common, with most companies averaging 20% reductions.*
 - ✧ Consider this example:
 - ◆ \$200M Sales
 - ◆ \$100M Cost of Goods Sold
 - ◆ \$90M Operating Expenses
 - ◆ \$5M Depreciation and Interest
 - ◆ Return on Sales ratio of 2.5%
 - ◆ \$100M Total Assets
 - ◆ Asset Turnover Ratio is 2.0
 - ✧ Given a conservative reduction of 10% in both COGS and OE from a Six Sigma implementation the Return on Sales increases from 2.5% to 12%.
 - ✧ Without any balance sheet improvements the Return on Investment Ratio increases from 5% to 24%.
 - ◆ Inventory is generally addressed after processes have been improved and the need to carry excess inventory to meet customer demand has been reduced.

- ◆ A project to reduce the cycle time on the accounts receivable process is often addressed early on in six sigma implementations.

□ How Do Six Sigma Efforts Do It?

➤ *The key to Six Sigma successes at achieving bottom line improvements is following a Structured and Rigorous Improvement Process that is Customer Focused.*

➤ The **DMAIC** Process comprises the following:

✧ **Define** Elements

- ◆ Project Charter and Business Case
- ◆ High Level Process Map called a **S I P O C**
 - **S**uppliers to the process
 - **I**nputs to the process
 - **P**rocess steps (5-7 at this level of detail)
 - **O**utputs from the process steps
 - **C**ustomers of the process outputs
- ◆ Voice of the Customer information
 - Needs
 - Drivers
 - CTQs (Critical to Quality Requirements)

✧ **Measure** Elements

- ◆ Data Collection Plan
- ◆ Sampling Strategy for Collecting the Data
- ◆ Measurement System Analysis
- ◆ Data Collection
- ◆ Graphically Assessing Patterns in the Data
- ◆ Establishing the Baselines from which to Measure Improvements
 - Business Case Metrics
 - Process Sigma Levels

✧ **Analyze** Elements

- ◆ Organize potential root causes using:
 - Affinity Diagrams
 - Cause & Effect Diagrams
- ◆ Process Analysis
 - Analyze Cycle Time
 - Identify Value Added and Non-Value Added activities
- ◆ Data Analysis
 - Identify variation over time
 - Identify relationships between process inputs and outputs
- ◆ Hypothesis Testing (Theory Testing)
 - Does one or more of the potential root causes actually make a difference?
 - Here is where we answer those questions.
- ◆ Regression Analysis of Historical Data
 - Identify the process variables that if controlled, allow us to predict with great certainty the outcome of the process.
 - For example, what is the time (+/- some number of minutes) and the temperature (+/- some number of degrees) that will cook the perfect pizza

based upon historical customer feedback of their critical to quality preferences?

- ◆ Design of Experiments
 - Testing that is designed to specifically identify which process variables affect process outputs and is conducted in a controlled fashion.
 - Provides the ability to test many variables where historical data may not have existed, or was not collected in a manner allowing analysis.

- ◇ **Improve** Elements
 - ◆ Develop potential solutions using Brainstorming and Advanced Creativity methods.
 - ◆ Conduct FMEA (Failure Mode and Effects Analysis) to assess risks and potential failures of the proposed solutions. Try to understand and determine what could go wrong?
 - Rate the severity of a potential failure.
 - Rate the Occurrence of a potential failure.
 - Rate the ability to detect the existence of the failure.
 - Identify the best solutions to minimize failures, or defects.
 - ◆ Test the best possible solutions in a pilot implementation.
 - Using the Analyze phase tools answer the question, “Is there a difference with the new method versus the old method?”
 - Select the solutions that actually make a difference.
 - ◆ Plan for full-scale implementation.
 - ◆ Implement the solutions on a full-scale basis.

- ◇ **Control** Elements
 - ◆ Determine and implement process controls.
 - ◆ Develop, Document, and Implement Standards.
 - Procedures
 - Policies
 - Operational Definitions
 - ◆ Monitor process performance metrics.
 - ◆ Evaluate the improvement from the baseline to the current improved state.
 - ◆ Determine and quantify the improvement in terms of cost, cost avoidance, revenue enhancement, cycle time, and customer satisfaction.
 - ◆ Close the project and celebrate a job well done by the Six Sigma team.

Six Sigma is not just another “Quality” program like TQM, or Quality Circles, but one that has teeth rooted in the financials of the business. Projects are only undertaken if they meet strict business case guidelines set by the senior management team. Not all projects make the cut. Some typical minimum thresholds for a green belt project are \$150k cost or expense reduction, \$500k cost avoidance, or \$1000k cash flow depending on the nature of the business process. The first wave of 5 to 7 projects, completed within 12 to 14 weeks after green belt training, should yield \$1 to \$2 Million in annualized benefits. That’s bottom line “breakthrough” results.

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