Process Improvement with Six Sigma

Dr. N. Abdolvand

Business Process Reengineering

1396

Outline

- Six Sigma
- The Six Sigma Concept
- The Six Sigma Approach to Process Improvement
- Six Sigma Teams
- Phases in a Six Sigma Improvement Project
- Lean

Six Sigma

- Six Sigma originated as a set of statistical techniques that managers could use to measure process performance.
- Using the techniques, a manager could then make changes in the process to see if it improved the process.
- Six Sigma is very good at describing
  - how to think about measuring process and activity outcomes, and
  - about how to use statistical techniques to analyze the outcomes and decide on corrective action.

Six Sigma three types of process change

- (1) process management (in our term: process architecture)
  - means developing an overview of the company's processes, linking it with corporate strategy, and using it to prioritize process interventions.
- (2) process improvement
  - refers to a set of techniques used to incrementally improve and maintain process quality
- (3) process redesign.
  - refers to major changes in a process.

The Six Sigma Concept

- Six Sigma is a name derived from concepts associated with a standard bell shaped curve or Gaussian curve

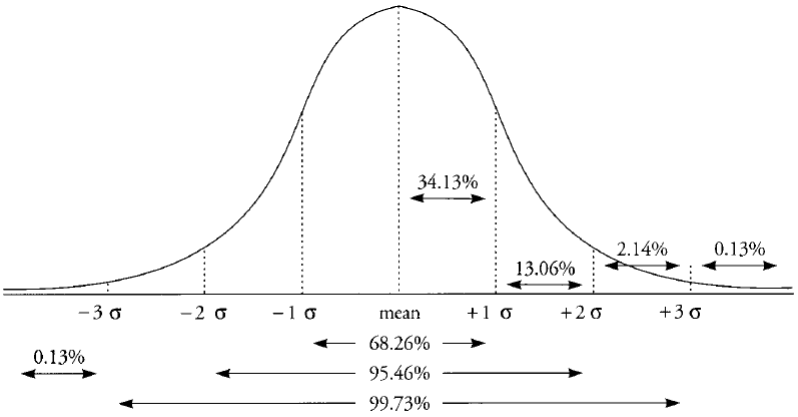

Figure 12.1 The properties of a standard bell-shaped curve.

The Six Sigma Approach to Process Improvement

- Most Six Sigma projects focus on monitoring two or three measures
- Measuring an entire value chain or business process with two or three measures is a reasonable thing for a process manager to do.
- Measures on large processes usually only provide early warning signals that a more detailed study needs to be initiated.
- Six Sigma projects are not launched to improve large-scale business processes; they are launched to improve subprocesses or activities.
- Importantly, however, Six Sigma always stresses that measures at any level should be tied back to higher-level processes and eventually to strategic goals.

Six Sigma Teams

- if the leader is especially knowledgeable in Six Sigma projects, he or she is called a *black belt.*
- If the leader is a manager who has full-time responsibilities elsewhere and is slightly less qualified, he or she is referred to as a *green belt.*
- The team is often assigned an internal or external consultant who is a specialist in Six Sigma, and especially skilled in the use of the statistical tools that Six Sigma depends on. This consultant is usually called a *master black belt.*

Phases in a Six Sigma Improvement Project: *DMAIC*

- *Define customer requirements for the process or service.*
- *Measure existing performance and compare with customer requirements.*
- *Analyze existing process.*
- *Improve the process design and implement it.*
- *Control the results and maintain the new performance.*

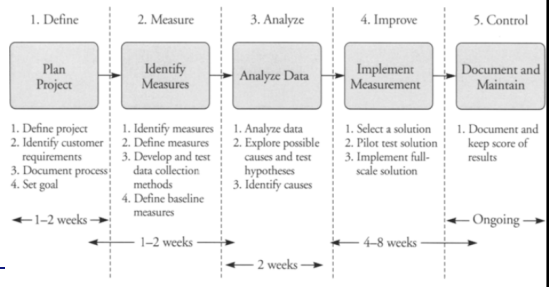

Figure 12.3 An overview of a Six Sigma project.

Dr. N. Abdolvand

Define

- In the first phase, a draft charter is usually provided by the project sponsor or team champion.
- The charter is a clear statement of what the team should accomplish.
- It should include a brief description of the process to be improved and the business case for improving it.
- It should also include some milestones and define the roles and responsibilities of the team members.
- One key to a good charter is a clear understanding of the process to be improved.
- The charter should specify who will do what, when.
- Dates, costs, and a clear statement of the expected results are all important.
- The charter should focus on defining the process to be improved and some initial measures that can be used to judge if the team succeeds

Dr. N. Abdolvand

SIPOC

- The Six Sigma approach to process definition is summed up in the acronym SIPOC, which emphasizes Supplier, Input, Process, Output, and Customer

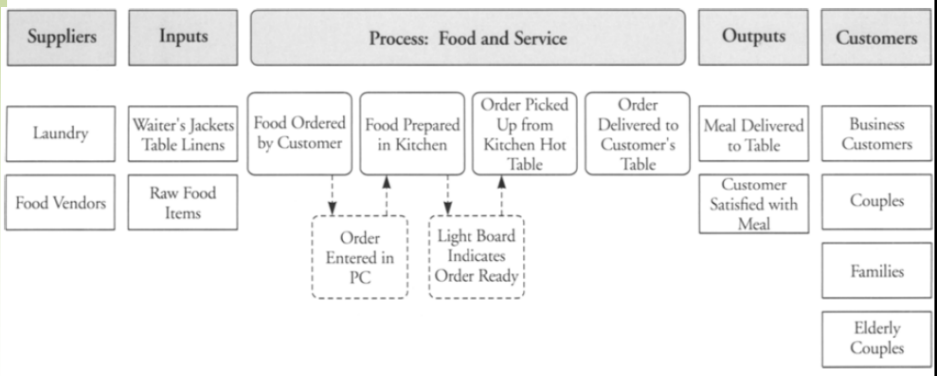

Figure 8.4 SF Seafood's food service process.

CTQ (Critical-To-Quality)

- After the team analyzed the process and customers, team turned their attention to ask what kinds of needs customers have.
- Teams usually list potential requirements on a chart called a CTQ (Critical-To-Quality) tree

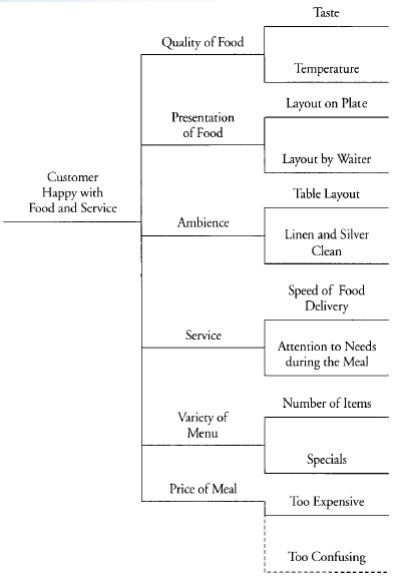

Figure 12.5 A CTQ tree for the SF Seafood meal satisfaction project.

Measure

- During the second phase of the project the team develops measures that will let them know how well each key requirement is being satisfied
- Since different types of data result in different types of curves, it's important that someone understand these things and thus know how to analyze the data and evaluate the results
- three measurement principles
  - Measure only what is important to the customer.
  - Only measure process outputs that you can improve.
  - Don't measure an output for which you have no history of customer dissatisfaction.

What should be measured

- *Inputs.*
  - *One can check what was delivered by the supplier to assure that problems* do not lie with the inputs to the process.
- *Process measures.*
  - *These measures typically include cost, cycle time, value, and* labor.
- *Outputs or measures of customer satisfaction.*
  - *we might stick* with a survey form that we gave to customers when they received the services

process measures and outcome measures.

- If the process or activity measure is:
  - process with a specific goal
  - quality of work in a specific activity
  - time a process takes
  - adequacy of staffing
  - adequate understanding of task
- Then an outcome you might measure is:
  - strategic goals achieved
  - level of customer satisfaction
  - on-time delivery
  - time to answer phone or produce unit
  - nature and number of defects produced

output measures and service measures.

- "service" refers to more subjective things having to do with how the customer expects to be treated and what kinds of things please the customer.
- "output" refers to features of the product or service you deliver,

Analyze

- In many cases the team members have a good idea of the cause of the problems in the process they analyze.
- They gather data to establish baselines and then want to jump to implementing a solution.
- any given task can be classified into one of three categories
  - The activity adds value that the customer, whether internal or the ultimate customer, is willing to pay for.
  - The activity is necessary to produce a value-added activity.
  - The activity doesn't add value
- One obvious way to analyze the process is to assign times to each of the tasks

Analyze -- continued

- Six Sigma project managers usually recommend a systematic analysis process
- Some Six Sigma practitioners talk about problem analysis as a three-stage process
  - *Open. Brainstorm to identify as many possible causes as possible.*
  - *Narrow. Use tools or vote to reduce the number of possible causes to a reasonable* number.
  - *Close. Design measures, gather data, and analyze it to determine which causes in* fact cause most of the deviation from the mean.

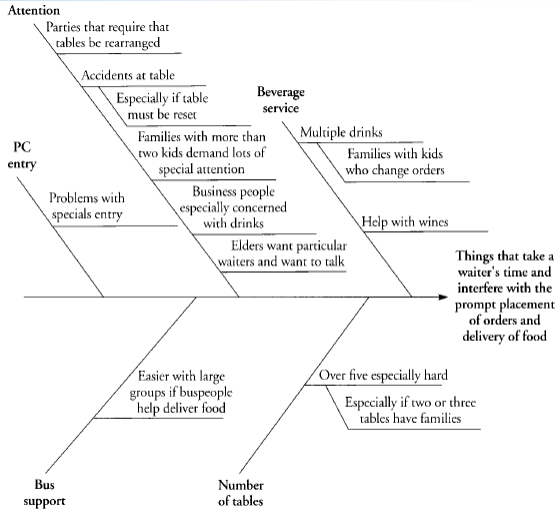

Figure 12.6 A cause-effect diagram developed by SF Seafood's Six Sigma team.

Improve

- As data is gathered and results accumulate, the team begins to think of ways to improve the process.
- In this case, they are guided by their prioritized list that tells which improvements are likely to result in the largest change.

Control

- The last phase usually results in a plan to maintain the gains and, sometimes, in new initiatives to improve the process further.
- Deming, and a wide variety of other experts, has observed that what gets measured gets done.
- One type of quality control costs money and is a necessary part of the process.


Questions?