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Evaluation of Six Sigma Implementation with DMAIC

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Introduction:

Six Sigma has proven to be one of the most emerging business strategies in the 21st Century for accelerating innovation and continuous improvement activities in both manufacturing and service environments for achieving both operational and business excellence. It is initiative launched by Motorola in 1987, focusing on reducing variation and continuously improving process. It is a next step to be a logical in the evaluation of continuous improvement programs.

What is Six Sigma ?

Sigma is a letter in the Greek Alphabet "σ".Six sigma is the measure of Quality that strives for near perfection is a disciplined, data driven methodology focused on eliminating defects. Six Sigma is intense competitive pressures-especially for rapid growth. It is one of the most potent strategies ever developed to accelerate improvement processes, product and services. And reduces manufacturing or administrative costs and improve quality. It achieves this by relentlessly focusing on eliminating waste and reducing defects and variations.

Six sigma is a quality improvement program me with a goal to reduce the number of defects to as low as 3.4 parts per million. It relies on the use of Normal Distribution to predict defective rates.

Business Definition

A break through strategy to significantly improve customer satisfaction and shareholder value by reducing variability in every aspects of business.

Technical Definition

Six sigma is,

- A statistical measurement , which helps us establish our course and gauge our pace in the range of total customer satisfaction.
- A way of thinking about work and customer value
- A way of giving higher yield.
- A statistical measurement of reduction of costs
- A business strategy to accelerate improvements in its processes, products and services.
- It is one of the Quality management techniques

Sigma level	Defect rate(PPM)	Yield in %	Cost of poor Quality (% of Scales)	Competitive Levels
6 σ	3.4	99.99	< 10	World class
5 σ	233	99.97	10 to 15	
4 σ	6210	99.37	15 to 20	Industry Average
3 σ	66807	93.32	20 to 30	
2 σ	308,537	69.15	30 to 40	Non- competative
1 σ	690,000		74	

Why six Sigma

Intense Competitive Pressure –Especially from Rapid Globalization Greater Consumer Demand for high Quality Products and services littlie tolerance for failures of any type. Top Management (and stockholder) recognition of high costs of poor Quality

The availability and accessibility of large data bases and the increasing ability to explore, understand and use the data.

How is Six Sigma Different

A clear focus on achieving measurable and quantifiable financial returns from any six sigma project. An increased emphasis on strong and passionate management leadership and support.

A clear commitment to making decisions on the basis of verifiable data, rather then assumption and guess work. The term " six Sigma" is derived from statistics known as process capability study. It refers to the ability of process to produce a very high proportion of output within specification. Process that operates with " Six Sigma Quality" over the short term is assumed to produce long term defect levels below 3.4 defects per million opportunities (DPMO) Six sigma's implicit goal is to improve all processes to that level of quality or better.

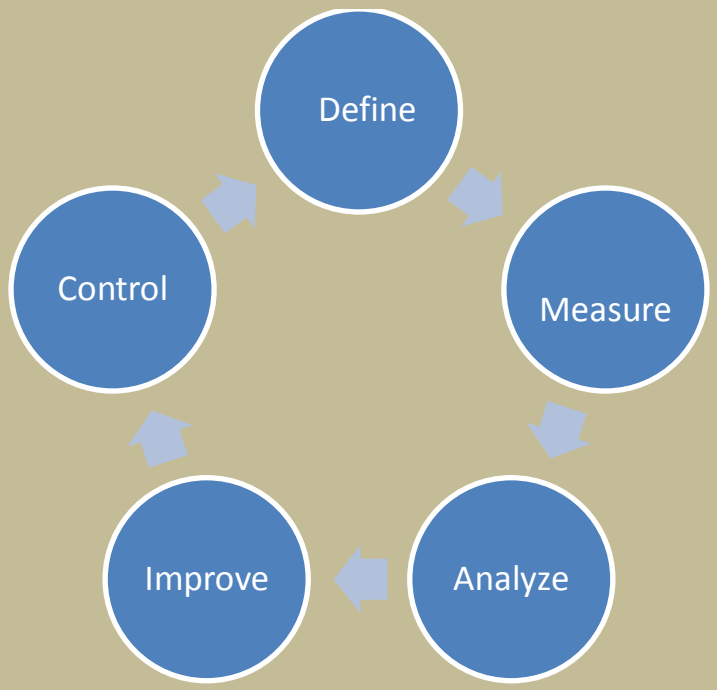
Six Sigma Methodology

Six Sigma has DMAIC and DMADV Methodologies DMAIC is used to improve existing Business process.

DMAIC

IT is described in Five steps

Where D----- Define , M------ Measure, A -------- Analyze, I ------- Improve,
C ----- Control



1.Define :

It is the first step of DMAIC.

The definition identifies core activities and Quality Tools.

- Define Activities
- Identify Projects, champion and project owner
- Determine customer requirements and CTQs

- Define Problems,objective,goals and benefits.
- Define stakeholder/resources analysis
- Map the process
- Develop the project plan
- Define quality Tools
- Project charter and plan
- Effort/impact analysis
- Process Mapping
- Tree diagram

2.Measure

The measurement step enables to qualify and benchmark the process using actual data.

- Measure activities
- Determine project critical Xs and Ys
- Determine the operational definitions.
- Establish performance standards
- Develop data collection and sampling plan
- Validate the measurement
- Measurement system analysis
- Determine process capability and baseline
- Measure quality tools
- Quality functions deployment (QFD)
- Measurement system analysis (MSA)
- Check Sheet
- Process Capability

3) Analyze

Once the product is understood, it is necessary to analyze the process, applying statistical tools.

- Analyze activities
- Benchmark the process or product
- Establish the casual relationship using data
- Analysis of the process map
- Determine the root cause(s) using data
- Analyze the quality tools
- Statistical analysis of data
- Cause and effects or event diagram
- Histogram
- Run Chart
- Scatter Graph
- Pai Diagram

4) Improve

The improve step is important for fixing and preventing problems by designing creative Solution.

- Improvement activities

- Develop Solution alternatives
- Assess risks and benefit s of solution Alternatives
- Validate solution using a pilot
- Implement solution
- Determine solution effectiveness using data
- Improve quality tools
- Design of experiments
- Brainstorming
- FMEA(Failure Mode Effect Analysis)
- Risk assessment

5) Control

Success in the control step depends on all the previous steps. In this step tools are put in place so that process improvement gains are maintained.

- Control activities
- Determine Needed Controls (Measurement, Design , Etc)
- Implement and validate controls
- Develop transfer plans
- Realize benefits of implementing solution
- Close projects and communicate results
- Control quality tools
- Statistical process control
- Out of control action plan (OCAP)
- Design changes to eliminate the defect

DMADV (also known as DFSS- Design for Six Sigma)

The Basic methodology consists of the following five steps.

- Define design goals that are consistent with customer demands and enterprise strategy.
- Measure and identify CTQS (Characteristics that are critical to Quality) Product capabilities, production process capability, and risks.
- Analyze to develop and design alternatives, create a high level design and evaluate design capability to select the best design.
- Design details, optimize the design, and plan for design verification. This phase may require simulation.
- Verify the design , set up pilot runs, implement the production process and hand it over to the process owners.

Six Sigma benefits

- Help organization to produce and service better, faster and Cheaper.
- Remove wastage
- Maximize customer satisfaction
- Develop Close to zero defect Quality
- Increase sales
- Increase overall organizational productivity
- Save costs
- Make the organization a Data –driven Organization

- Faster cycle time.

Conclusion

India, a fast growing economy, cannot afford to compromise on the quality of product ad services delivered. The demand for enhanced quality and reduced cost of goods and services has coaxed many companies to introduced the Six Sigma system irrespective to which industry it belongs. In India Wipro was one of the first to introduce Six sigma in 1997 to every business from software development to Hardware, FMCG, BPO.Which help to completes its project 91% complete on time, When compare to Industrial Advantage 55 %. Which helps the Company to Sustain SEI CMM level 5?

Steel Industries like TISCO use the technique to minimize the inadequacy in the design ,imperfect product etc. In 1998 the Forbes magazine applauded the Mumbai Dabbawalla for there way of functioning with just one error in every 8 Million. Know we see Logistics, Insurance, call centre all embrace the Six Sigma Technique For improving the quality of Service Provided by them. Six Sigma is the tool that all savvy business people should learn to keep ahead of the game. Many people are learning about Six Sigma and putting it to use in their companies because of it high success rate. It will take a company – wide acceptance to implement this new and existing plan. The Six sigma Concepts can be applied to just about every department. It has been successfully used on Production ,Sales ,Marketing, Design & Administration and service. Six Sigma is used in most often to help Irradiate Company defects through its used of Business ,Statistics and Engineering Principles.

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