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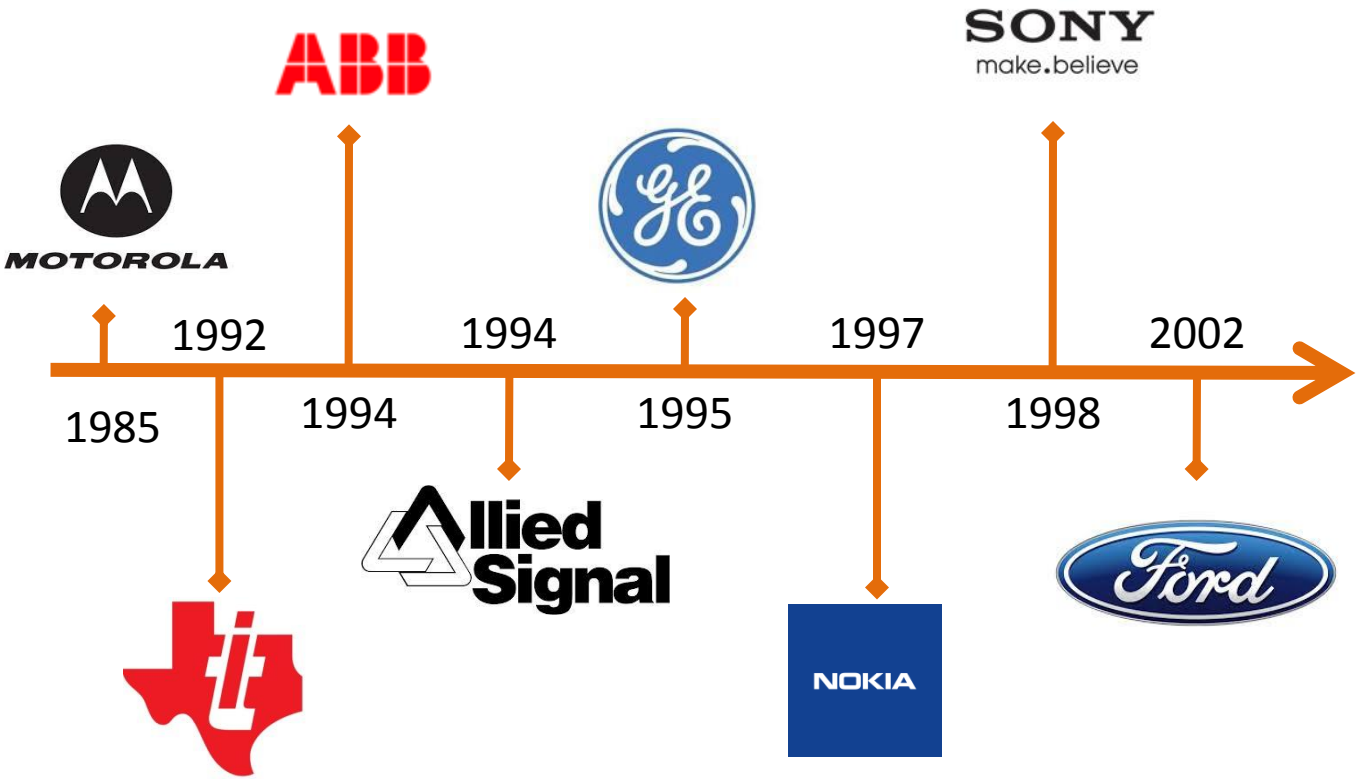
Introduction to Six Sigma

Objectives

- Understanding brief history of six sigma
- Definitions of six sigma
- Sigma levels and number of defects
- Understanding roles and responsibility of six sigma belts
- Overview of six sigma approach
- Benefits of six sigma

History of Six Sigma



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The History Of Six Sigma

- Developed by Motorola in 1986 in response to quality problems and as a means of organizing their Malcolm Baldrige initiative
- Attributed to a Motorola engineer, Bill Smith.
- Jack Welch adopted in 1994 and implemented within GE and helped save $2 Billion over 5 years because of Six Sigma projects
- Six Sigma is largely based on the works of pioneers like Shewart, Deming, Juran, Ishikawa, Taguchi and others.
- Applied in service, transactional, government, health care and manufacturing.

Definition of Six Sigma

- Six Sigma is a process improvement approach, which uses the integrated DMAIC methodology to improve business goals.
- Six Sigma is a data driven management approach, against which all the performance can be measured.
- Six Sigma is business improvement strategy, with the help of various set of tools and technique creates a continuous improvement culture in the organization.
- Six Sigma is
  - Philosophy
  - Methodology
  - Metric

Six Sigma: Philosophy

To reduce variation in the business processes and to make customer focused and data driven decisions.

Six Sigma: Methodology

- Six Sigma is a process improvement methodology based on ‘Statistical Thinking’.

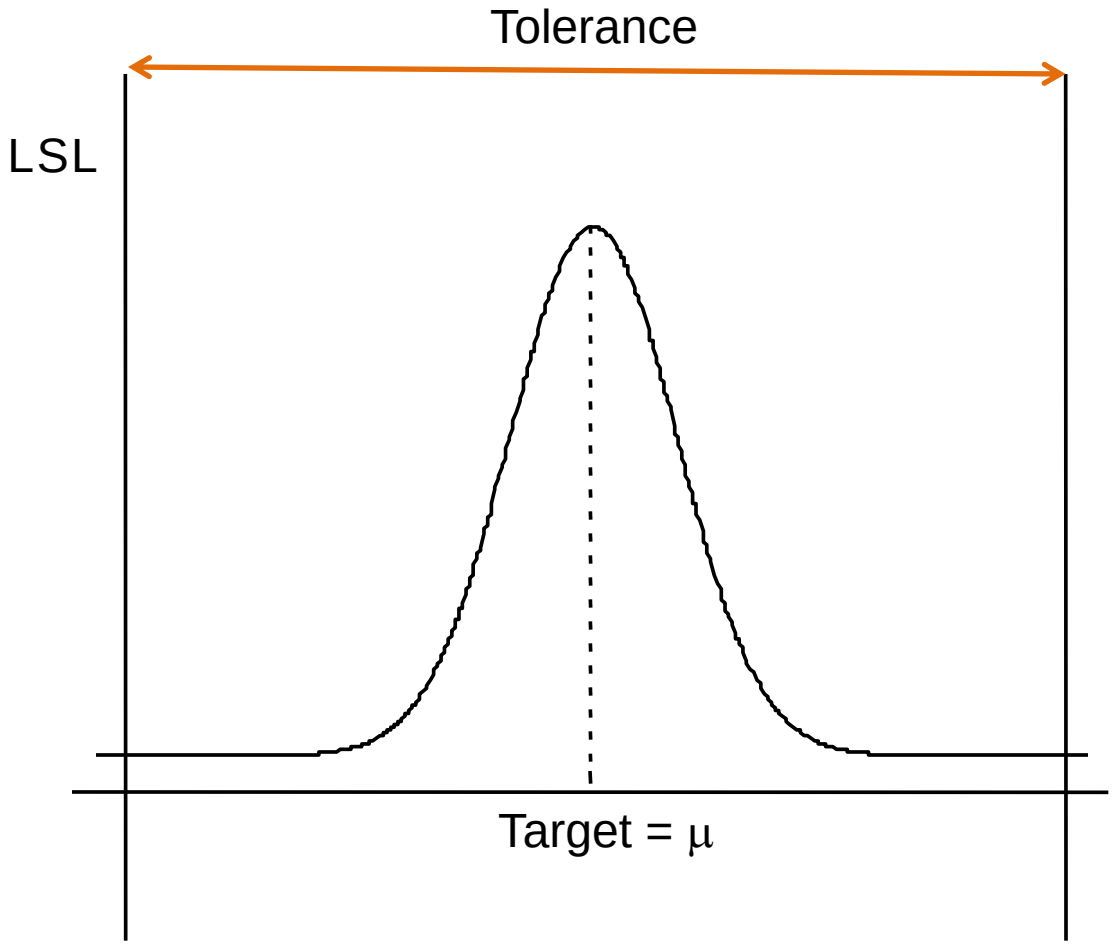
Statistical thinking

- A tool for process analysis

Basic principles are:

- All work occurs in a system of interconnected processes.
- Variation exists in all processes
- Understanding and reducing variation are keys to success.

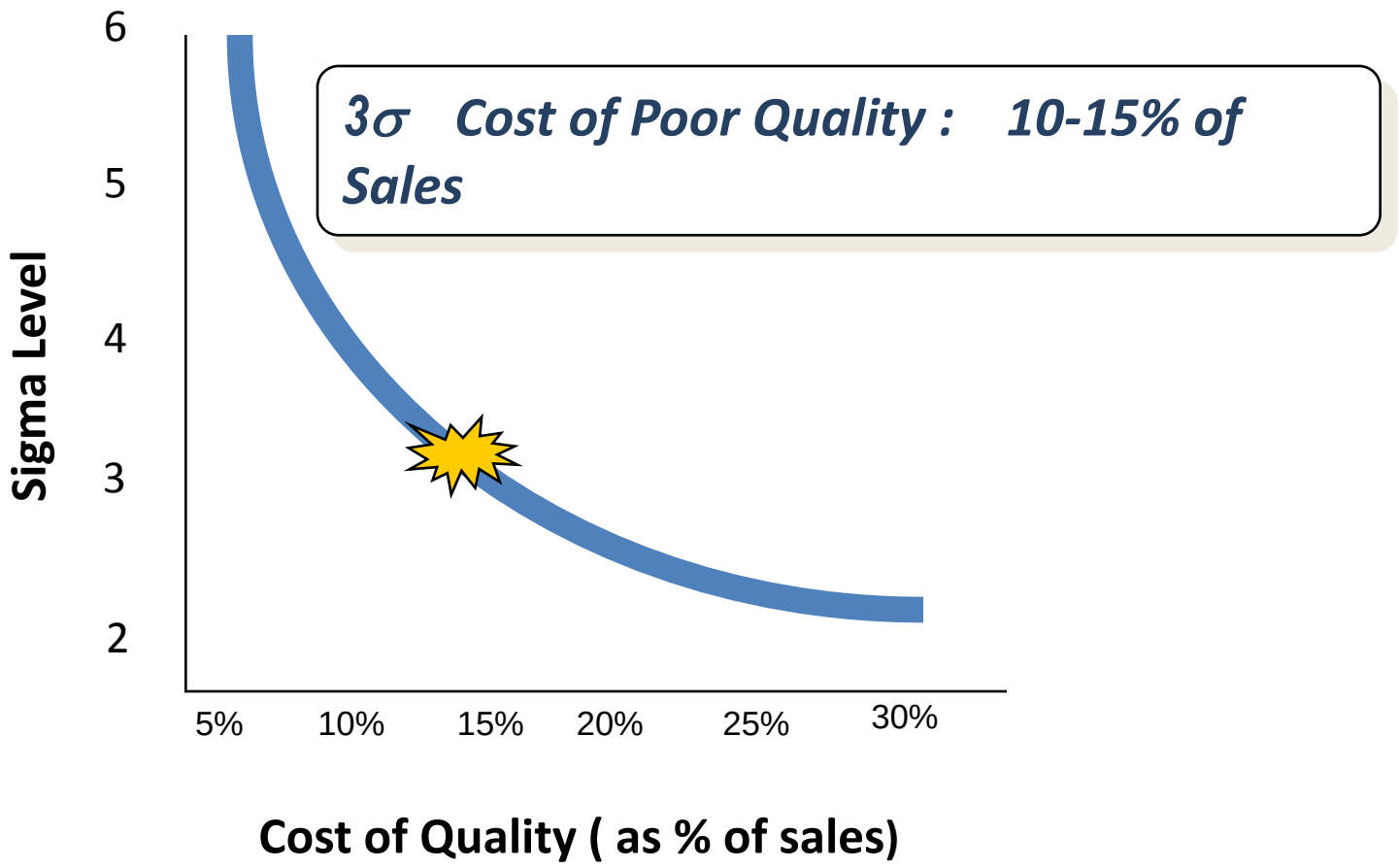
Six Sigma as metric



Sigma Levels

Sigma Level	DPMO	Yield
6	3.4	99.99966
5	233	99.9767
4	6210	99.3790
3	66,807	93.3
2	308,537	69
1	691, 462	31

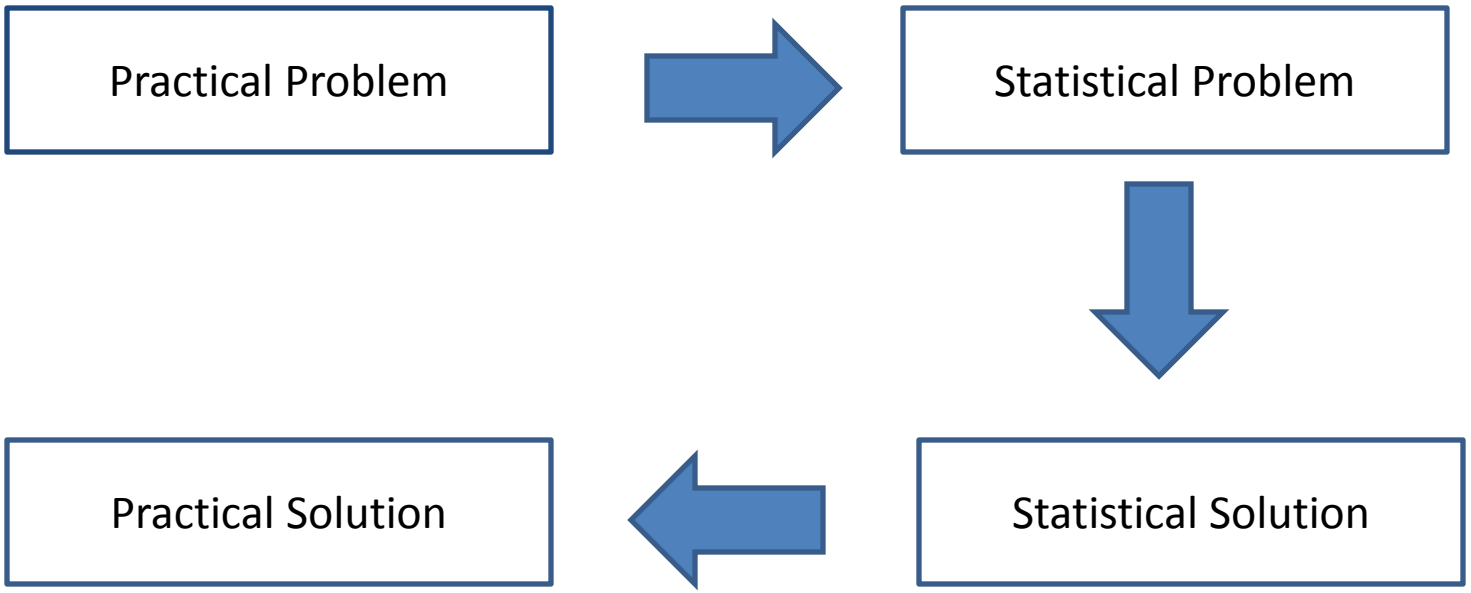
Sigma Level and Cost of Poor Quality



3 Sigma v/s 6 Sigma

3 Sigma	6 Sigma
20, 000 lost articles mails every hour	7 lost articles mails every hour
15 mins of unsafe drinking water every day	1 min of unsafe drinking water every seven month
5000 wrong surgical operation every week	2 wrong surgical operation every week
No electricity for almost 7 hours each month	1 hour without electricity per 34 years
2 unsafe landings at most major airports each day	1 unsafe landings at most major airports every five years.

Overall Approach



Building Resources

Green Belts

Black Belts

Master Black Belts

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Six Sigma Belts

- **Green Belt:**
  - Provide leadership for Six Sigma Project Teams operating under guidance of Black Belts

- **Black Belt:**
  - Focus on Six Sigma project execution and special leadership on special tasks
  - Must have comprehensive knowledge of statistical techniques, quality management systems and project management techniques

Six Sigma Belts

- **Master Black Belt:**
  - A full time Six Sigma expert
  - Provides mentoring and training of Black Belts and Green Belts
  - Helps to prioritize, select and charter high impact projects and ensures the successful implementation of Six Sigma

- **Champion:**
  - Organizational executive Responsible for sponsoring and launching Six Sigma Projects
  - Involved in project tollgate reviews

Six Sigma: Approach

- **DMAIC (Also known as Operational Six Sigma)**
  - Define, Measure, Analyze, Improve, Control:
  - Used for projects that are focused on improving an existing product or an existing process

- **CDOV (Also know as DFSS – Design for Six Sigma)**
  - Concept, Design, Optimize, Verify:
  - Used for projects aimed at creating new products or a new process

DMAIC

- **Step I : Define**
  - Identify the gap in meeting the business objective
  - State the problem and define SMART Goals
  - Establish the scope and boundaries
  - Develop Project charter and identify leader & team members
- **Step 2: Measure**
  - Evaluate / implement a data collection process
  - Validate the data
  - Carry out Process mapping, FMEA, Measurement R&R studies
  - Establish baseline for the process

DMAIC

- **Step 3 : Analyze**
  - Analyze the input and output process variables
  - Understand the critical input variables
  - Establish hypothesis and identify root cause
  - Use Pareto Charts, C &E Analysis, Brain Storming, Multivari charts, SPC, Correlation, Process analysis to identify wastes
  - Validate hypothesis

- **Step 4: Improve**
  - Confirm the key process variables through experimentation
  - Conduct trial solutions
  - Implement Solutions

DMAIC

- **Step 5 : Control**
  - Verify the process improvement and establish plan to monitor and maintain the process
  - Update documentation to ensure compliance with Quality Management System requirement
  - Update Inspection Plan, Product Prints, Quality Specifications, Standard Work, Workmanship Documentation, FMEA
  - Handoff to Process Owner

Some Benefits of Six Sigma

- Cost Reduction
- Productivity Improvement
- Market Share Growth
- Customer Retention
- Cycle Time Reduction
- Reduction in Errors / Defects
- Culture Change
- Improved Product and Service Development

Summary

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