

# SIX SIGMA

## *Introduction to Six Sigma*

# Overview

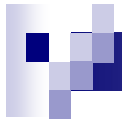
- What is Six Sigma?
- Why Six Sigma?
- Six Sigma Roles
- Six Sigma Methods



# What is Six Sigma?

- A goal of near-perfection in meeting customer requirements.
- A sweeping culture change effort to position a company for greater customer satisfaction, profitability and competitiveness.
- A comprehensive and flexible system for achieving, sustaining and maximizing business success; uniquely driven by close understanding of customer needs, disciplined use of facts, data, and statistical analysis, and diligent attention to managing, improving and reinventing business processes.

Source: *The Six Sigma Way* by Pande, Neuman and Cavanagh



# What is Six Sigma?

- Six Ingredients of Six Sigma:
  - Genuine focus on the customer.
  - Data- and fact-driven management.
  - Process focus, management, and improvement.
  - Proactive management.
  - Boundary-less collaboration.
  - Drive for perfection, tolerate failure.

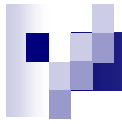
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# Six Sigma Quality

**The objective of Six Sigma quality is 3.4 defects per million opportunities!**

<b>Sigma Level</b>	<b>Defects Per Million Opportunities (DPMO)</b>	<b>Error Free Rate</b>
Six Sigma	3.4	99.9997%
Five Sigma	233	99.977%
Four Sigma	6,210	99.4%
Three Sigma	66,810	93%
Two Sigma	308,500	69%
One Sigma	691,500	31%

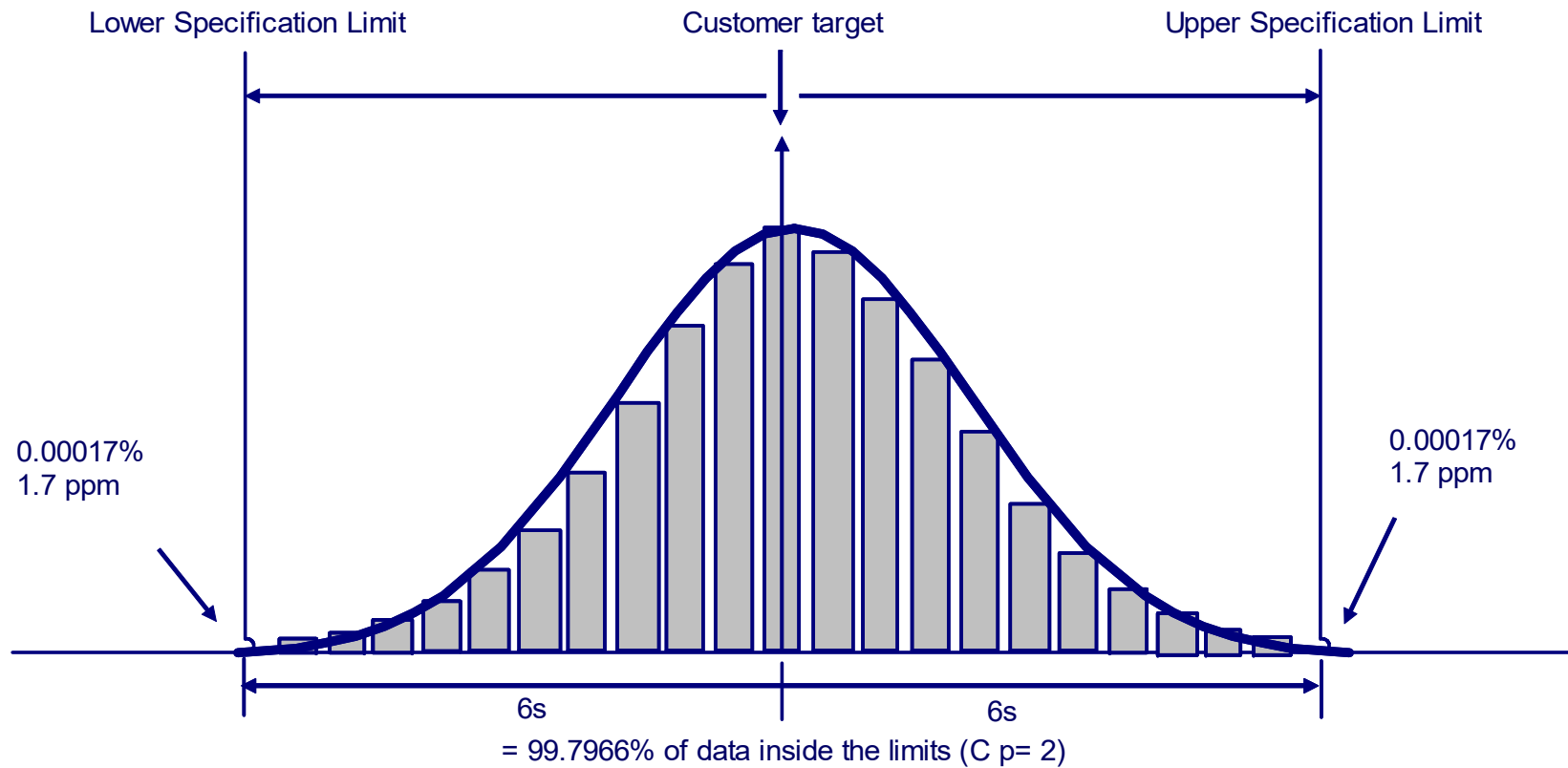


# Putting Six Sigma in Perspective!

- If you played 100 rounds of golf per year, and played at:
  - 2 sigma - you'd miss 6 putts per round
  - 3 sigma - you'd miss 1 putt per round
  - 4 sigma - you'd miss 1 putt every 9 rounds
  - 5 sigma - you'd miss 1 putt every 2.33 years
  - 6 sigma - you'd miss 1 putt every 163 years!



# A 6 Sigma Process



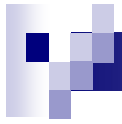
0.00034% of points will be outside of the specification limits - i.e. Defects (= 3.4 parts per million out of spec.)



# Why Six Sigma?

- Reasons for considering Six Sigma include:
  - Realize full potential of the business
  - Improve Customer Service and Satisfaction
  - Reduce supplier quality issues
  - Lower production rework rates and scrap
  - Eliminate customer returns and warrantee charges





# Six Sigma Roles

- Typical Roles in a Six Sigma Organization:
  - The Leadership Group / Council
  - Project Sponsors and Champions
  - The Implementation Leader
  - The Six Sigma Coach (Master Black Belt)
  - The Team Leader (Black Belt or Green Belt)
  - Team Members
  - The Process Owner

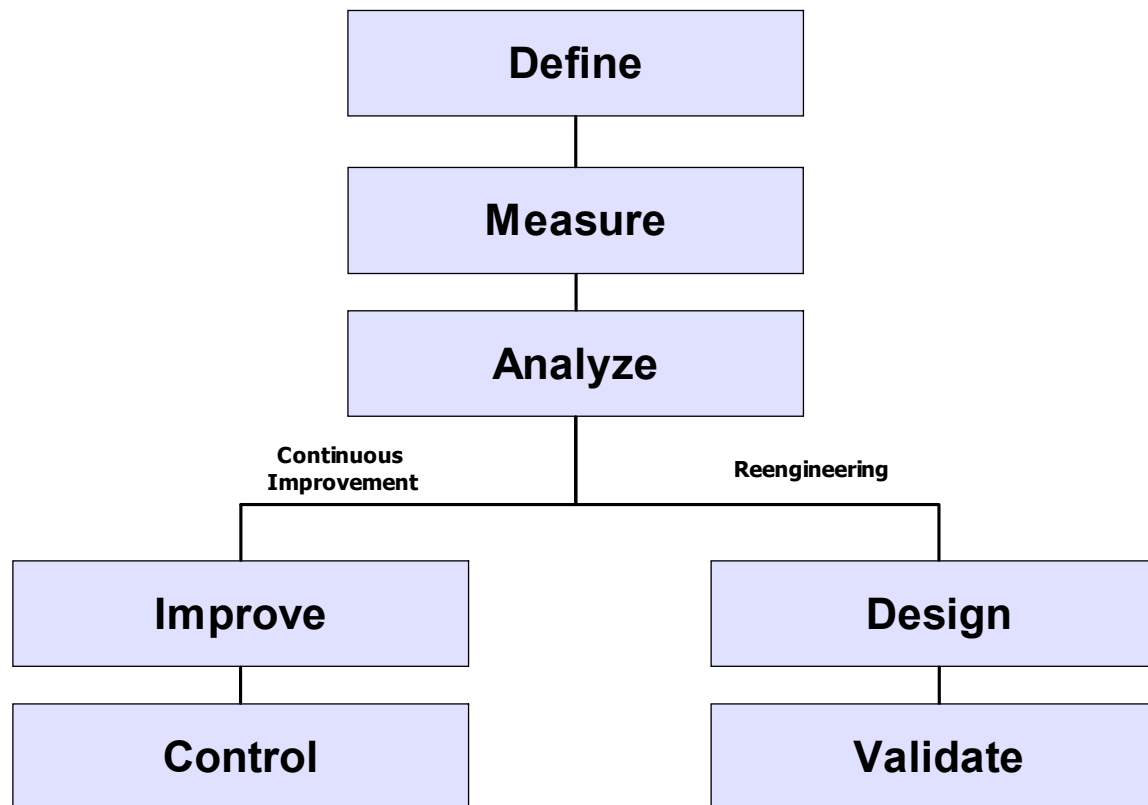
# Six Sigma Roles

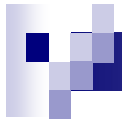
- **Oversee/Guide Project(s)**
  - Sponsor/Champion
  - Master Black Belts
  
- **Coach/Support Project Leader**
  - Master Black Belt
  - Black Belt
  
- **Lead Project to Success**
  - Black Belt
  - Green Belts
  - Team Leader
  
- **Analyse & Implement Improvement**
  - Improvement Team



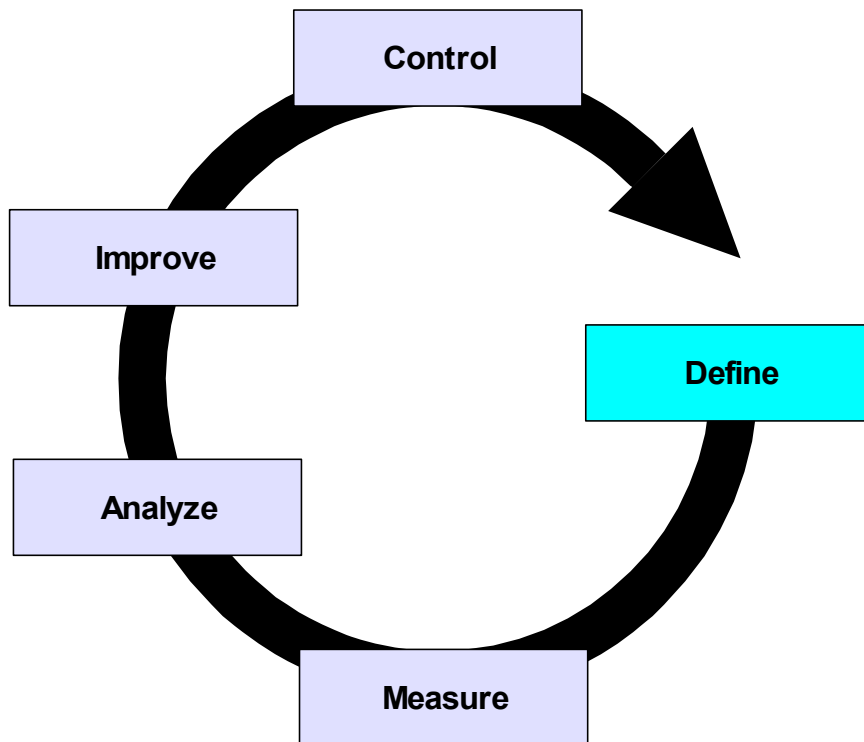
# Six Sigma Improvement Methods

## DMAIC vs. DMADV





# Six Sigma DMAIC Process - Define

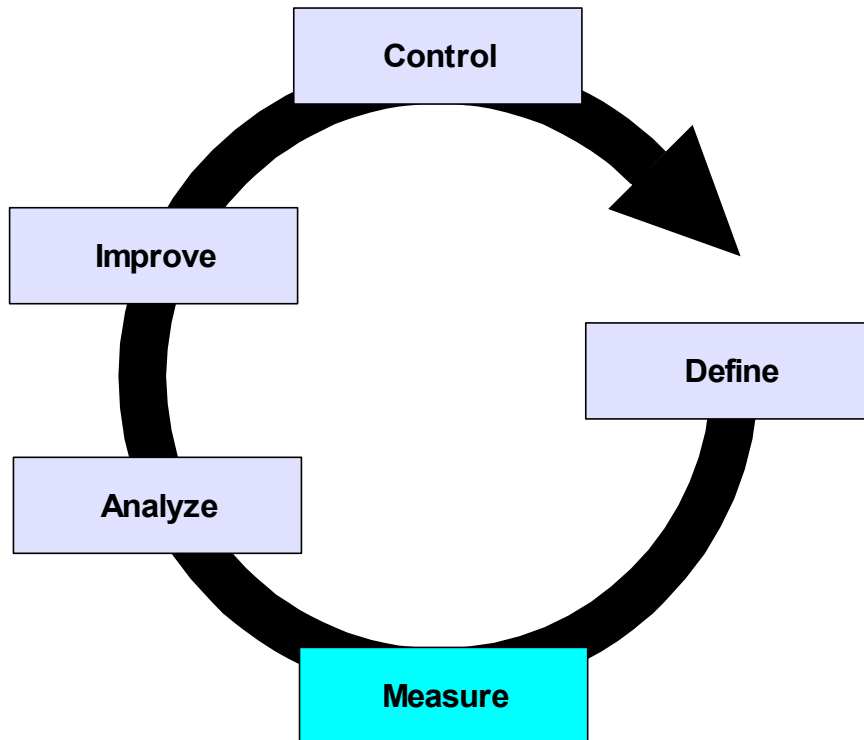


## Typical Activities

- Identify the Business Gap
- Document the Process
- Collect and Translate the Voice of the Customer
- Define Metrics and Defects
- Establish preliminary baseline and Entitlement
- Develop Problem and Objective Statements
- Estimate Financial Benefit
- Confirm Improvement Methodology
- Define Project Roles and Responsibilities
- ID Project Risks
- Establish Project Timeline
- Create Communication Plan



# Six Sigma DMAIC Process - Measure

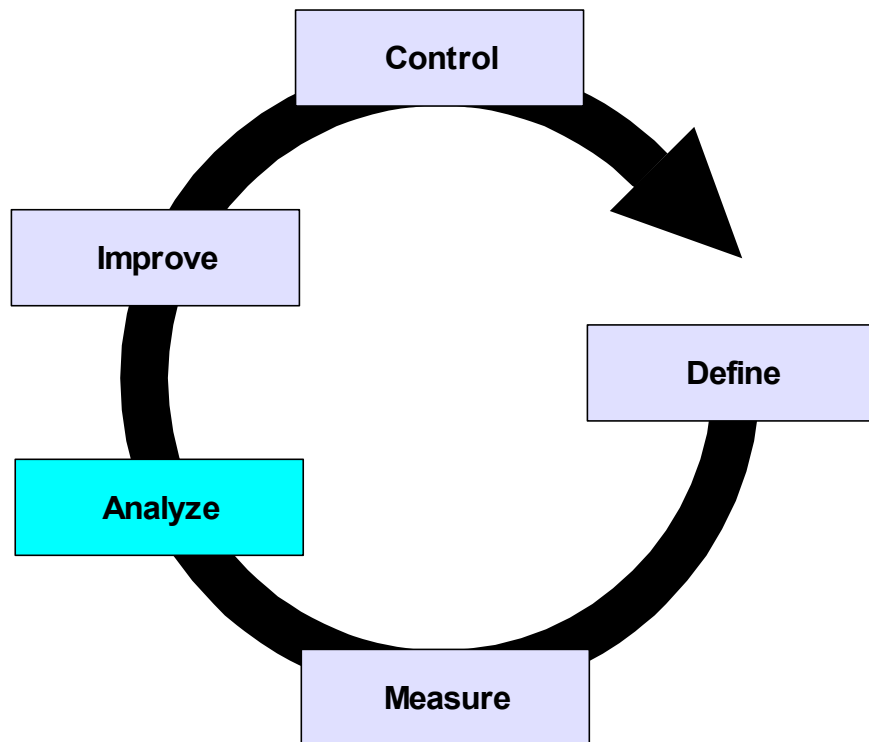


## Typical Activities

- Analyze Measurement Systems
- Improve Measurement Systems (if needed)
- Collect Data (Y's)
- Examine Process Stability
- Perform Capability Analysis



# Six Sigma DMAIC Process- Analyze

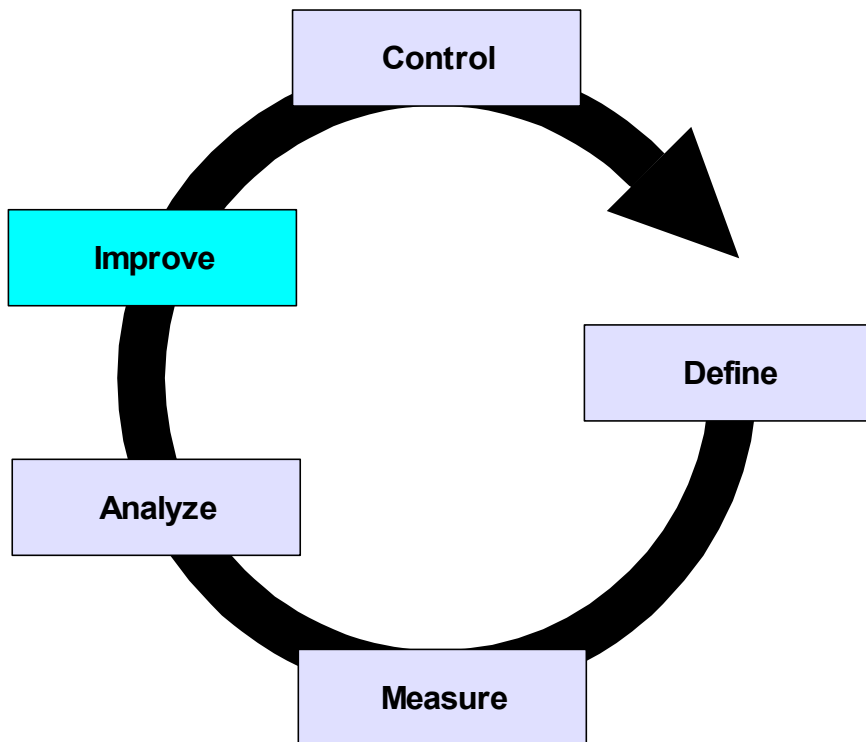


## Typical Activities

- Develop List of Potential Causes (x's)
- Narrow-down List of Potential Causes (x's)
- Collect Data on x's
- Perform Graphical Analysis
- Perform Statistical Analysis
- Evaluate the Impact of the x's on Y
- State Preliminary  $Y=f(x's)$



# Six Sigma DMAIC Process - Improve

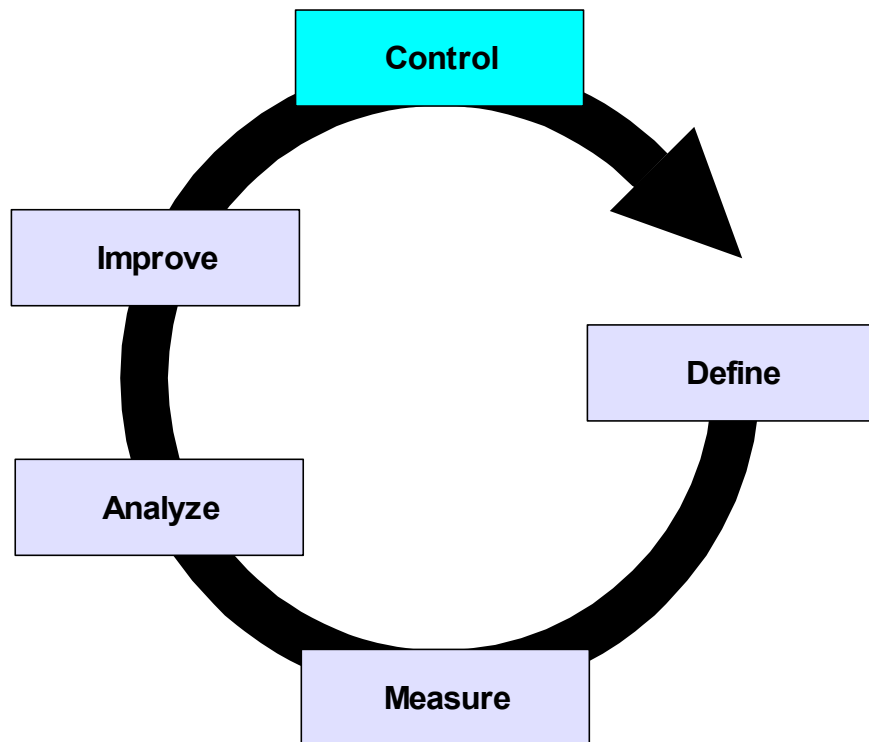


## Typical Activities

- Generate Potential Solutions
- Evaluate Potential Solution
- State  $y=f(x's)$
- Develop Implementation Plan



# Six Sigma DMAIC Process - Control



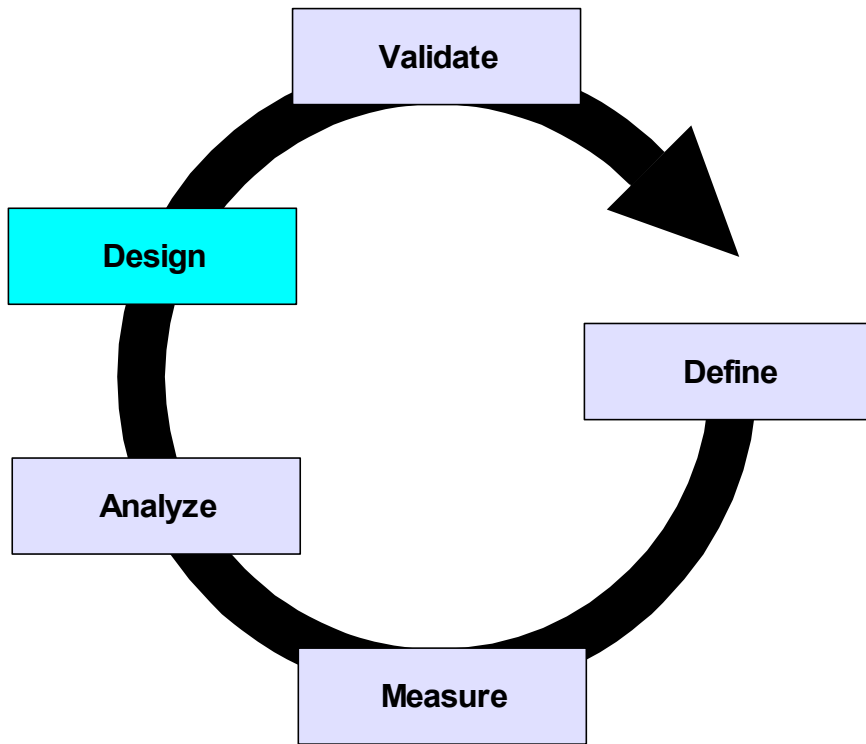
## Typical Activities

- Mistake Proof the Process
- Determine the x's to Control and Methods
- Complete MSA on Critical x's
- Determine Y's to Monitor and Report
- Revise/Develop Process Documentation
- Implement Solution
- Evaluate Implementation
- Develop Transition Plan
- Handoff to Process Owner
- Capture Lessons Learned
- Write Final Report/Presentation





# Six Sigma DMADV Process- Design

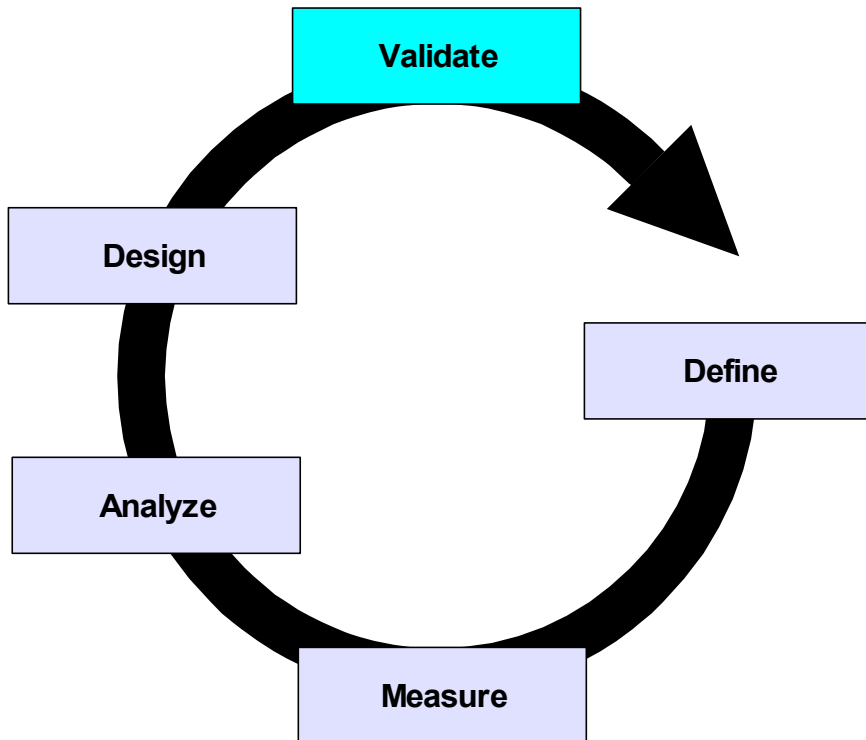


## Typical Activities

- Develop detailed design for new process.
- Determine and evaluate enabling elements.
- Create control and testing plan for new design.
- Use tools such as simulation, benchmarking, DOE, Quality Function Deployment (QFD), FMEA, and cost/benefit analysis.



# Six Sigma DMADV Process - Validate



## Typical Activities

- Test detailed design with a pilot implementation.
- If successful, develop and execute a full-scale implementation.
- Tools in this step include: planning tools, flowcharts/other process management techniques, and work documentation.

## Contact Us

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