Project Quality Management

Introduction

- Project quality management includes the process required to ensure that the project satisfies the needs for which it is undertaken.

- PQM includes all the activities of the overall management function that determine the quality policy, objectives, and responsibilities and implement them within the quality system.

What Is Quality?

- The International Organization for Standardization (ISO) defines **quality** as "the degree to which a set of inherent/natural characteristics fulfils requirements" (ISO9000:2000).

- Other experts define quality based on:

  - **Conformance to requirements**: The project's processes and products meet written specifications.

  - **Fitness for use**: A product can be used as it was intended/planned.

Who's Responsible for the Quality of Projects?

- Project managers are ultimately responsible for quality management on their projects.

- Several organizations and references can help project managers and their teams understand quality.

  - International Organization for Standardization (www.iso.org)

  - IEEE (www.ieee.org)

Common understanding

Quality management should complement modern project management as they both recognize the importance of :

4 Pillars of Quality Management:

1. Customer satisfaction,

2. Prevention over inspection,

3. Management responsibility,

4. Continuous Improvement.

   (plan – do –check – act cycle)

What Is Project Quality Management?

Project quality management ensures that the project will satisfy the needs for which it was undertaken.

| Plan Quality | → | Perform Quality Assurance | → | Perform Quality Control |

- Processes include:
  - **Quality planning**: Identifying which quality standards are relevant to the project and how to satisfy them.
  - **Quality assurance**: Periodically/time to time evaluating overall project performance to ensure the project will satisfy the relevant quality standards.
  - **Quality control**: Monitoring specific project results to ensure that they fulfill with the relevant quality standards.

PROJECT QUALITY MANAGEMENT

QUALIT PLANNING

1- INPUTS

-Quality policy

-Scope statement

-Product description

-Standards and regulations

-Other process outputs

2- TOOLS AND TECH.

-benefit/ cost analysis

-Benchmarking

-Flowcharting

-Design of experiments

3- OUTPUTS

-Quality management plan

-Operational definitions

-checklists

-Inputs to other processes

QUALITY ASSURANCE

1- INPUTS

-Quality management plan

-result of quality control measurements

-Operational definitions

2- TOOLS AND TECH.

-Quality planning tools and techniques

-Quality audits

3- OUTPUTS

-Quality improvement

QUALITY CONTROL

1- INPUTS

-work results

-quality management plan

-Operational definitions

-checklists

2- TOOLS AND TECH.

-inspection

-Control charts

-Pareto diagrams

-Statistical sampling

-flowcharting

-Trend analysis

3- OUTPUTS

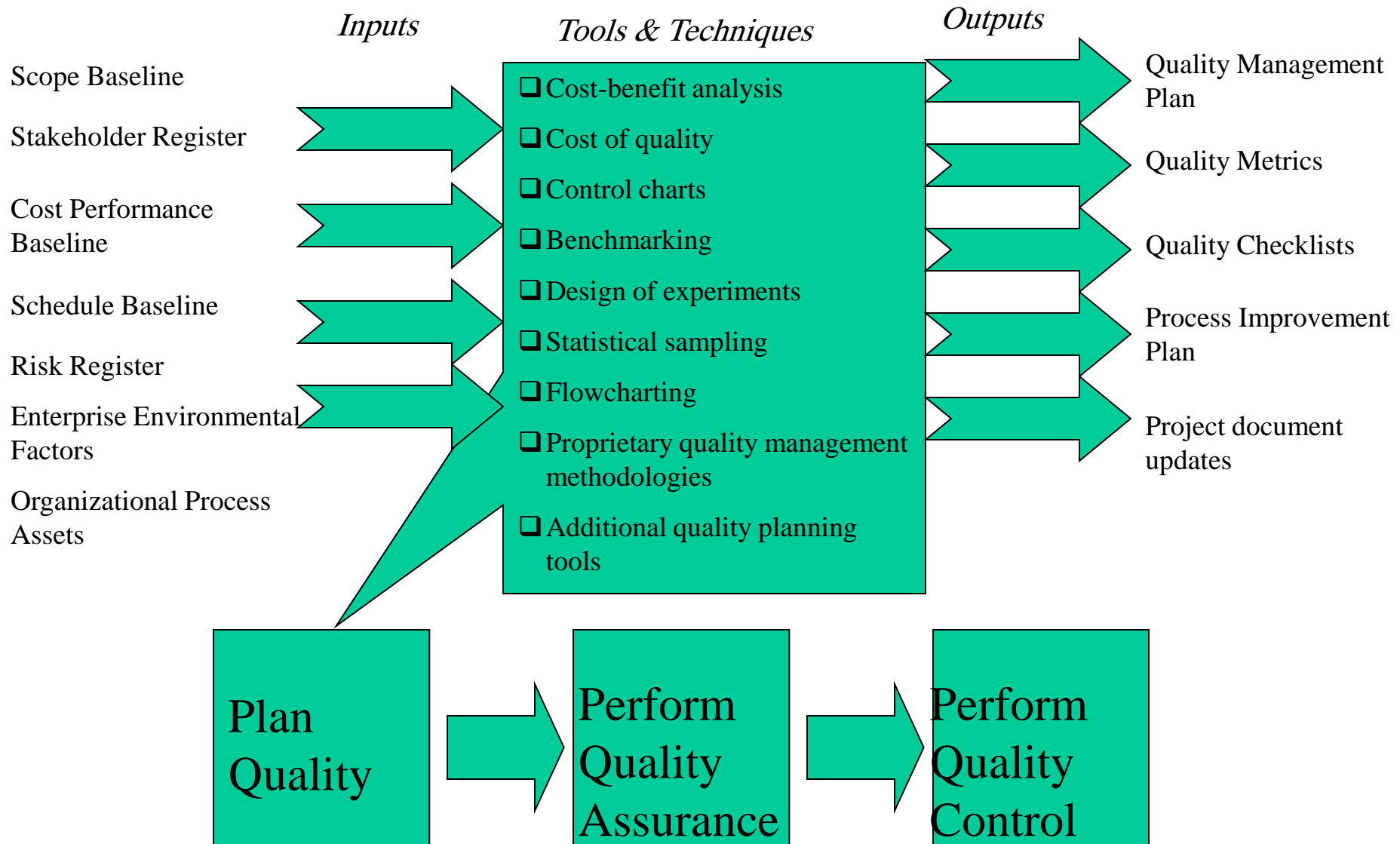-Quality improvement

-Acceptance decisions

-rework

-Completed checklist

-Process adjustment

Quality Planning

- Involves the ability to anticipate situations and prepare actions to bring about the desired outcome.

- Important to prevent defects by:

  – Selecting proper materials.

  – Training and programs people in quality.

  – Planning a process that ensures the appropriate outcome.

Plan Quality

Inputs

Tools & Techniques

Outputs

Scope Baseline

Stakeholder Register

Cost Performance Baseline

Schedule Baseline

Risk Register

Enterprise Environmental Factors

Organizational Process Assets

❑ Cost-benefit analysis

❑ Cost of quality

❑ Control charts

❑ Benchmarking

❑ Design of experiments

❑ Statistical sampling

❑ Flowcharting

❑ Proprietary quality management methodologies

❑ Additional quality planning tools

Quality Management Plan

Quality Metrics

Quality Checklists

Process Improvement Plan

Project document updates
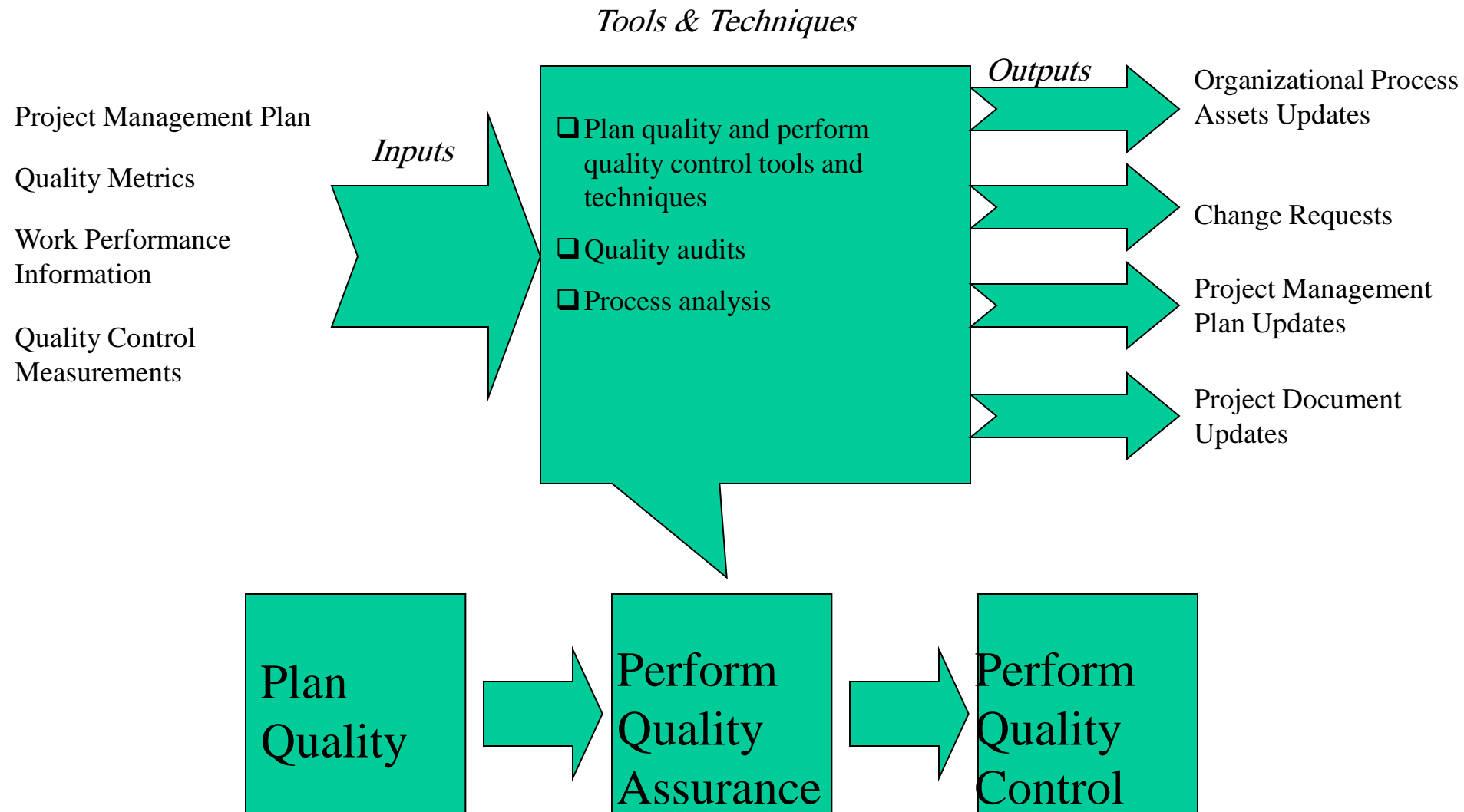
Plan Quality

Perform Quality Assurance

Perform Quality Control

Quality Assurance

- Quality assurance includes all the activities related to satisfying the relevant quality standards for a project.

- Another goal of quality assurance is continuous quality improvement.

- **Benchmarking** generates ideas for quality improvements by comparing specific project practices or product characteristics to those of other projects or products within or outside the performing organization.

- A **quality audit** is a structured review of specific quality management activities that help identify lessons learned that could improve performance on current or future projects.
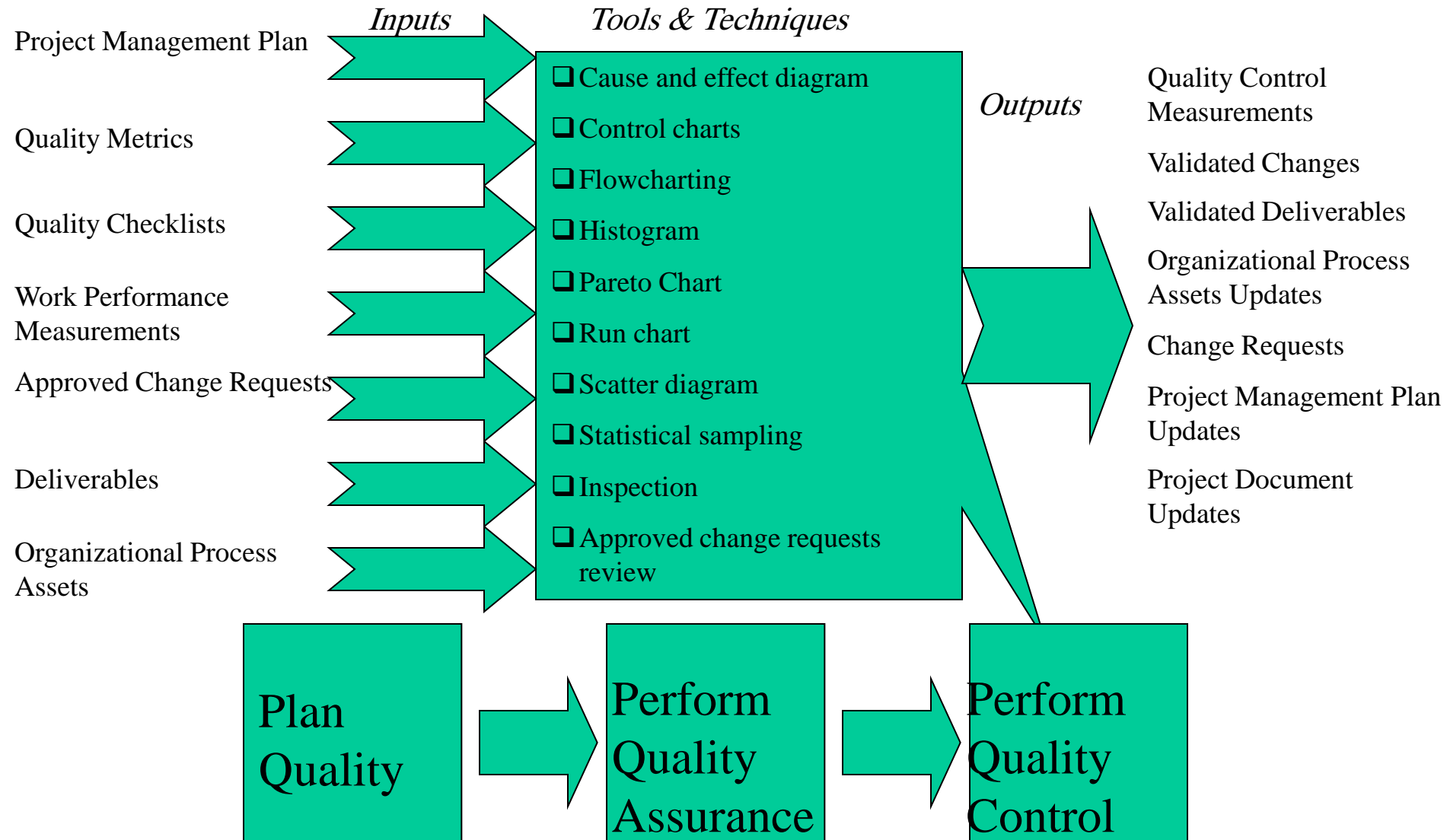
Perform Quality Assurance

Tools & Techniques

Project Management Plan

Quality Metrics

Work Performance
Information

Quality Control
Measurements

Inputs

Outputs

- ❑ Plan quality and perform quality control tools and techniques
- ❑ Quality audits
- ❑ Process analysis

Organizational Process
Assets Updates

Change Requests

Project Management
Plan Updates

Project Document
Updates

Plan
Quality

Perform
Quality
Assurance

Perform
Quality
Control

Quality Control

- The main outputs of quality control are:
  - Acceptance decisions
  - Rework
  - Process adjustments
- Some tools and techniques include:
  - Pareto analysis
  - Statistical sampling
  - Six Sigma
  - Quality control charts

Perform Quality Control

Inputs

Tools & Techniques

Outputs

Project Management Plan

Quality Metrics

Quality Checklists

Work Performance Measurements

Approved Change Requests

Deliverables

Organizational Process Assets

❑ Cause and effect diagram

❑ Control charts

❑ Flowcharting

❑ Histogram

❑ Pareto Chart

❑ Run chart

❑ Scatter diagram

❑ Statistical sampling

❑ Inspection

❑ Approved change requests review

Quality Control Measurements

Validated Changes

Validated Deliverables

Organizational Process Assets Updates

Change Requests

Project Management Plan Updates

Project Document Updates

Plan Quality → Perform Quality Assurance → Perform Quality Control

Pareto Analysis

- **Pareto analysis** involves identifying the vital few contributors that account for the most quality problems in a system.

- Also called the 80/20 rule, meaning that 80 % of your problems will come from 20% of your work!

Statistical Sampling and Standard Deviation

- **Statistical sampling** involves choosing part of a population of interest for inspection.

- The size of a sample depends on how representative you want the sample to be.

- Be sure to consult with an expert when using statistical analysis.

Six Sigma

- **Six Sigma** is "a comprehensive and flexible system for achieving, sustaining, and maximizing business success. Six Sigma is 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."*

Total Quality Management (TQM)

- A philosophy that encourages companies and their employees to focus on finding ways to continuously improve the quality of their business practices and products

Impact of poor Quality

- If you have poor quality, you have
- increased costs
- low morale
- lower customer satisfaction
- increased risk

Increases in quality

- result in increased productivity and cost effectiveness and decreased cost risk.

Improving IT Project Quality

- Several suggestions for improving quality for IT projects include:

    - Establish leadership that promotes quality.

    - Understand the cost of quality.

    - Focus on organizational influences and workplace factors that affect quality.

    - Follow maturity models.

- *Cost of Quality – Evaluating the cost of conformance with the cost of nonconformance to reach a balance. Includes;*
  - *Prevention Costs*
  - *Appraisal Costs*
  - *Failure Costs*

Deming's Costs of Quality

Cost of Conformance	Cost of Non Conformance
Quality training	Rework
Studies	Scrap
Surveys	Inventory Costs
	Warranty Costs

The Cost of Quality

- The **cost of quality** is the cost of conformance plus the cost of nonconformance.

  - **Conformance** means delivering products that meet requirements and fitness for use.
  - **Cost of nonconformance** means taking responsibility for failures or not meeting quality expectations.

Five Cost Categories Related to Quality

- **Prevention cost**: Cost of planning and executing a project so it is error-free or within an acceptable error range.

- **Appraisal cost**: Cost of evaluating processes and their outputs to ensure quality.

- **Internal failure cost**: Cost incurred to correct an identified defect before the customer receives the product.

- **External failure cost**: Cost that relates to all errors not detected and corrected before delivery to the customer.

- **Measurement and test equipment costs**: Capital cost of equipment used to perform prevention and appraisal activities.