



# Управление на качеството



## Лекция 7

Курс “Управление на проекти ”

# Основни теми

---

- Измерения на управлението на качеството
- Управление на качеството
  - качество на продукта
  - качество на управленските процеси
  - план за качеството
- Планиране на качеството
- Осигуряване на качество
- Контрол на качеството

# Измерения на управлението на качеството

---

Управлението на качеството в проектна среда има две измерения:

1. методи за осигуряване и контрол на:
  - непосредствените резултати от проекта (машини, съоръжения, методики и т.н.)
  - крайния резултат от проекта, получен вследствие използването на непосредствените резултати от проекта (краен продукт или услуга)
2. методи за управление на качеството на управленските процеси

# Проектна среда и качество

---

- Едно от условията за успешно приключване на проекта е той да бъде завършен в срок, в границите на предвидените разходи и удовлетворяващ изискванията за качество.
- Доброто качество е свързано със задоволяване изискванията на определен кръг потребители за желани спецификации на определени цени и с предсказуема степен на надеждност.
- Основни елементи:
  - съпоставяне "добро-високо" качество
  - качество, отговарящо на предназначението
  - удовлетворяване изискванията на потребителя (предварителни спецификации)

# Тотално управление на качеството (TQM)

---

- *“обединяване на всички ресурси за постигане на нулеви дефекти (т.е. непрекъснато удовлетворяване изискванията на потребителя) при възможно минимални разходи”*
- **Основни елементи на качеството:**
  - качество на продукта – основна цел
  - качество на управленските процеси
  - осигуряване на качеството – превантивна стратегия
  - контрол на качеството – корективна стратегия
  - цялостна нагласа в организацията (фирмата) за постигане на нулеви дефекти

# Quality management and project management

Modern quality management complements project management and recognize the importance of:

- **Customer satisfaction.** Understanding, evaluating, defining, and managing expectations so that customer requirements are met. This requires a combination of conformance to requirements (to ensure the project produces what it was aimed to produce) and fitness for use (the product or service must satisfy real needs).
- **Prevention over inspection.** One of the fundamental principle of modern quality management states that quality is planned, designed, and built in. The cost of preventing mistakes is generally much less than the cost of correcting them when they are found by inspection.
- **Continuous improvement.** The plan-do-check-act cycle is the basis for quality improvement. In addition, quality improvement initiatives undertaken by the performing organization, such as TQM and Six Sigma, should improve the quality of the project management as well as the quality of the project product. Process improvement models include Malcolm Baldrige, Organizational Project Management Maturity Model, and Capability Maturity Model Integrated.
- **Management Responsibility.** Success requires the participation of all members of the project team, but remains the responsibility of management to provide the resources needed to succeed.

# Качество на продукта

## ■ Необходими условия за качеството на продукта:

- ясни спецификации
- използване на известни стандарти
- опит
- квалифицирани човешки ресурси
- независима външна оценка на проекта
- схема за контрол на параметрите в спецификацията

## ■ Контрол на качеството на продукта - чрез диагностика и корекция на етапа на внедряване

- планиране на ресурси
- тестване по предварително определена методика
- архивиране - запазване на резултатите, за планиране при бъдещи проекти и като база за анализ и прогнозиране
- анализиране - определяне причините за отклоненията и възможностите за елиминиране, а също за прогнозиране на потенциалните бъдещи проблеми.

# Качество на управлението

---

- Осигуряването на качеството на управленските процеси включва наличието на набор от дефинирани процедури за управлението на проектите
- Тези процедури определят процеса на управление от съответните квалифицирани човешки ресурси, като са съгласувани или определени на база стандарти (или добра дългогодишна практика)
- Ефективните управленски процедури изискват адекватна нагласа към управление на качеството на ръководителите от всички нива
- Контрол на качеството на управленските процеси се извършва чрез:
  - наблюдението им и съответствието на определени стандарти
  - външни оценяващи агенти



# План за качеството

---

## Включва:

- как ще се постигне желаното качество
  - как управленските процедури, използвани в организацията ще се прилагат за конкретния проект
  - как ще се осигурява и контролира качеството.
- евентуално може да включва планирани семинари, необходима документация, механизми за отчет, връзки с потребителите и др., както и детайлен план на дейностите и необходимите ресурси

# Основни теми

---

- Измерения на управлението на качеството
- Управление на качеството
  - качество на продукта
  - качество на управленските процеси
  - план за качеството
- Планиране на качеството
- Осигуряване на качество
- Контрол на качеството

# Project Quality Management processes

---

- **Plan Quality:** The process of identifying quality requirements and/or standards for the project and product, and documenting how the project will demonstrate compliance.
- **Perform Quality Assurance:** The process of auditing the quality requirements and the results from quality control measurements to ensure appropriate quality standards and operational definitions.
- **Perform Quality Control:** The process of monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes.
- These processes interact with each other.
  - Each process can involve effort from one or more persons or groups based on the project requirements.
  - Each process occurs at least once in every project and occurs in one or more of the project phases.
  - Although the processes are presented here as discrete elements with well-defined interfaces, in practice they may overlap and interact in ways not detailed here.

## **Project Quality Management Overview**

### **8.1 Plan Quality**

- .1 Inputs
  - .1 Scope baseline
  - .2 Stakeholder register
  - .3 Cost performance baseline
  - .4 Schedule baseline
  - .5 Risk register
  - .6 Enterprise environmental factors
  - .7 Organizational process assets
- .2 Tools & Techniques
  - .1 Cost-benefit analysis
  - .2 Cost of quality
  - .3 Control charts
  - .4 Benchmarking
  - .5 Design of experiments
  - .6 Statistical sampling
  - .7 Flowcharting
  - .8 Proprietary quality management methodologies
  - .9 Additional quality planning tools
- .3 Outputs
  - .1 Quality management plan
  - .2 Quality metrics
  - .3 Quality checklists
  - .4 Process improvement plan
  - .5 Project document updates

### **8.2 Perform Quality Assurance**

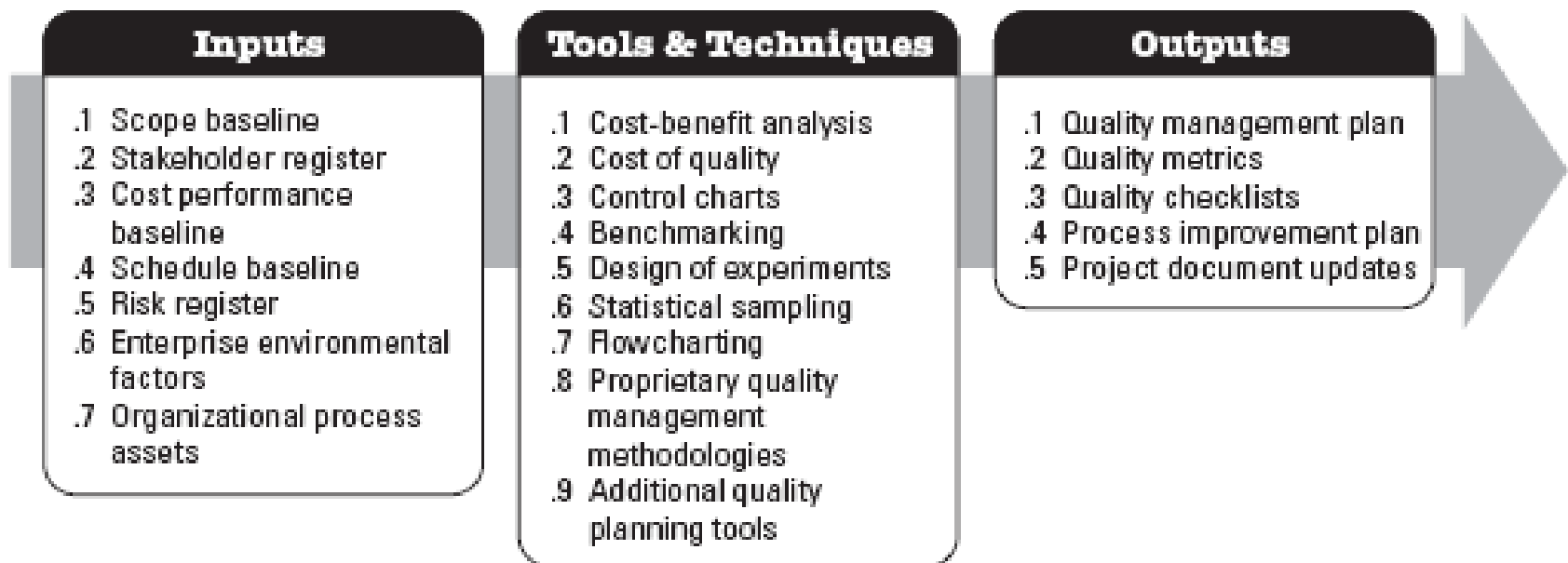
- .1 Inputs
  - .1 Project management plan
  - .2 Quality metrics
  - .3 Work performance information
  - .4 Quality control measurements
- .2 Tools & Techniques
  - .1 Plan Quality and Perform Quality Control tools and techniques
  - .2 Quality audits
  - .3 Process analysis
- .3 Outputs
  - .1 Organizational process asset updates
  - .2 Change requests
  - .3 Project management plan updates
  - .4 Project document updates

### **8.3 Perform Quality Control**

- .1 Inputs
  - .1 Project management plan
  - .2 Quality metrics
  - .3 Quality checklists
  - .4 Work performance measurements
  - .5 Approved change requests
  - .6 Deliverables
  - .7 Organizational process assets
- .2 Tools & Techniques
  - .1 Cause and effect diagrams
  - .2 Control charts
  - .3 Flowcharting
  - .4 Histogram
  - .5 Pareto chart
  - .6 Run chart
  - .7 Scatter diagram
  - .8 Statistical sampling
  - .9 Inspection
  - .10 Approved change requests review
- .3 Outputs
  - .1 Quality control measurements
  - .2 Validated changes
  - .3 Validated deliverables
  - .4 Organizational process assets updates
  - .5 Change requests
  - .6 Project management plan updates
  - .7 Project document updates

# Plan Quality

- Plan Quality is the process of identifying quality requirements and/or standards for the project and product, and documenting how the project will demonstrate compliance.
- Quality planning should be performed in parallel with the other project planning processes.
  - For example, proposed changes in the product to meet identified quality standards may require cost or schedule adjustments and a detailed risk analysis of the impact to plans.



# Plan Quality: Inputs

---

## ■ **Scope baseline**

- **Scope statement:** contains the project description, major project deliverables, and acceptance criteria. The product scope description will often contain details of technical issues and other concerns that can affect quality planning. The definition of acceptance criteria can significantly increase or decrease project costs and quality costs. Satisfying all acceptance criteria implies the needs of the customer have been met.
- **Work breakdown structure (WBS):** identifies the deliverables, the work packages and the control accounts used to measure project performance
- **WBS Dictionary:** defines technical information for WBS elements

- **Stakeholder Register:** identifies stakeholders with a particular interest in, or impact on, quality
- **Cost Performance Baseline:** documents the accepted time phase used to measure cost performance
- **Schedule Baseline:** documents the accepted schedule performance measures including start and finish dates

# Plan Quality: Inputs

---

- **Risk Register:** contains information on threats and opportunities that may impact quality requirements
- **Enterprise Environmental Factors:** influence the Plan Quality process include:
  - Governmental agency regulations
  - Rules, standards, and guidelines specific to the application area
  - Working/operating conditions of the project/product which may affect project quality, etc.
- **Organizational Process Assets:** influence the Plan Quality process include:
  - Organizational quality policies, procedures, and guidelines
  - Historical databases
  - Lessons learned from previous projects
  - Quality policy, as endorsed by senior management, which sets the intended direction of a performing organization with regard to quality. The PM team must ensure that the project stakeholders are fully aware of the policy used for the project through the appropriate distribution of information.

# Plan Quality: Tools and Techniques

---

- Cost-Benefit Analysis
- Cost of Quality (COQ)
- Benchmarking
- Design of Experiments
- Statistical Sampling
- Flowcharts
- Proprietary Quality Management Methodologies



# Plan Quality: Tools and Techniques

---

- **Cost-Benefit Analysis:** The primary benefits of meeting quality requirements can include less rework, higher productivity, lower costs, and increased stakeholder satisfaction. A business case for each quality activity compares the cost of the quality step to the expected benefit.
- **Cost of Quality (COQ):** Cost of quality includes all costs incurred over the life of the product
  - by investment in preventing nonconformance to requirements
  - appraising the product or service for conformance to requirements
  - failing to meet requirements (rework)
  - Failure costs are often categorized into internal (found by the project) and external (found by the customer). Failure costs are also called cost of poor quality.

# Considerations for Cost of Quality

## Cost of Conformance

### Prevention Costs

(Build a quality product)

- Training
- Document processes
- Equipment
- Time to do it right

### Appraisal Costs

(Assess the quality)

- Testing
- Destructive testing loss
- Inspections

Money spent during the project  
**to avoid failures**

## Cost of Nonconformance

### Internal Failure Costs

(Failures found by the project)

- Rework
- Scrap

### External Failure Costs

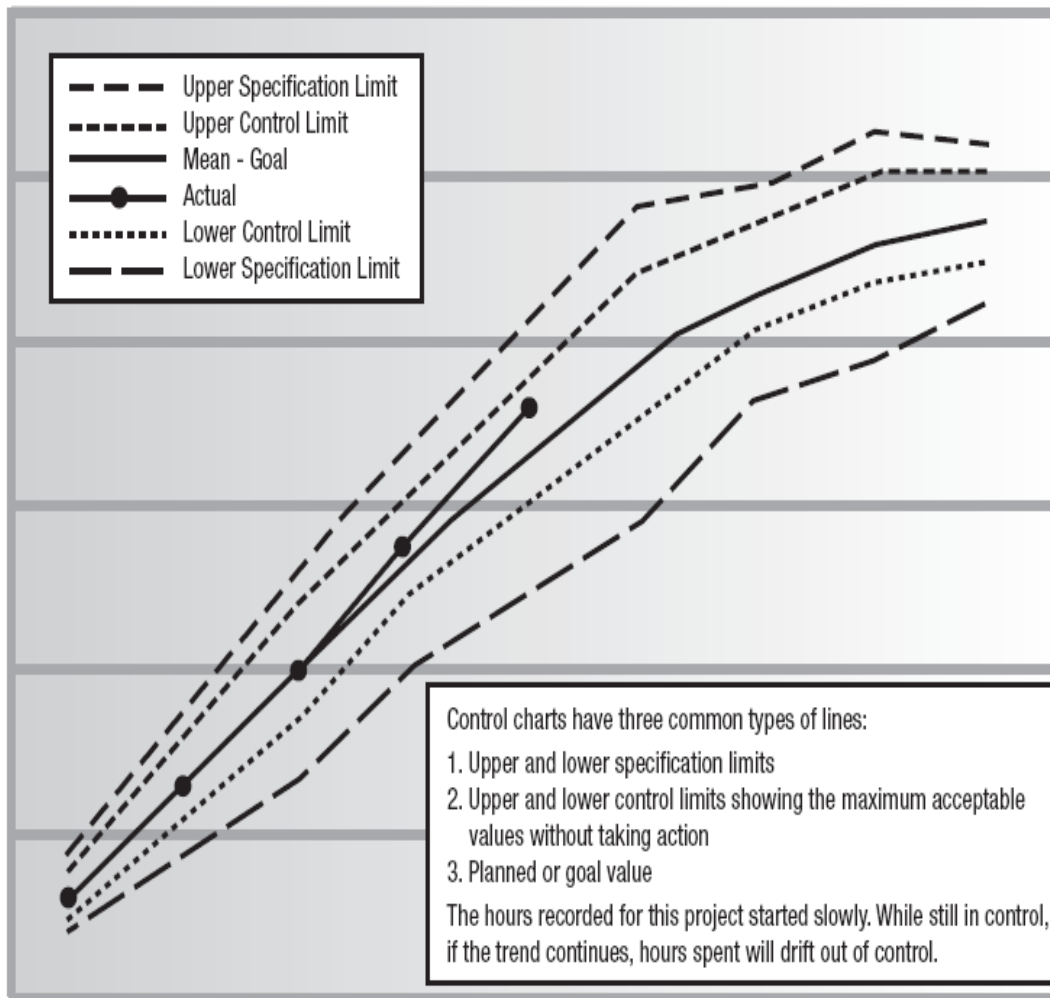
(Failures found by the customer)

- Liabilities
- Warranty work
- Lost business

Money spent during and after  
the project **because of failures**

# Control chart

Sample Control Chart



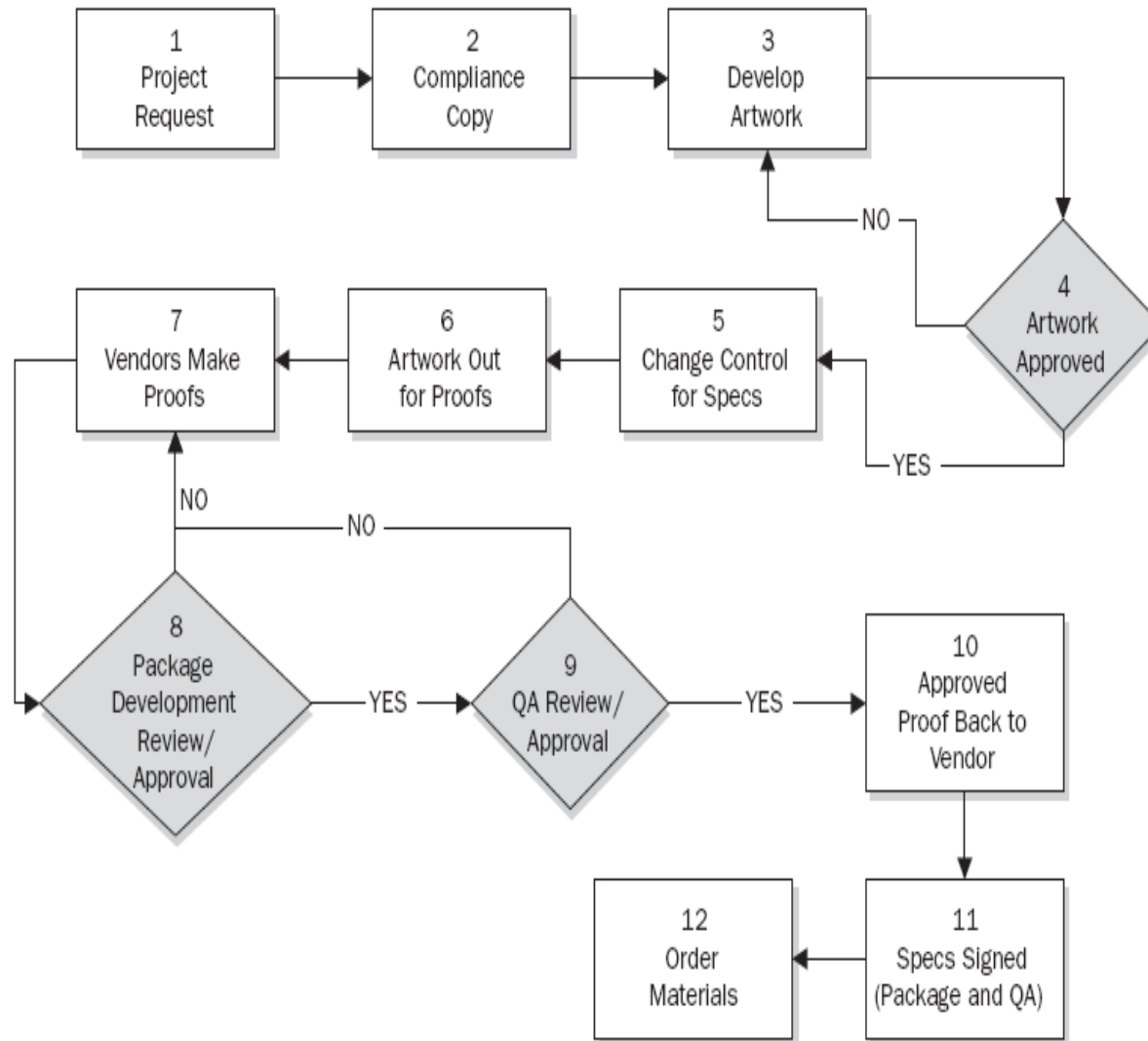
## ■ Control Charts:

- determine whether or not a process is stable or has predictable performance
  - Control charts can be used to monitor various types of output variables: cost and schedule variances, volume, and frequency of scope changes, or other management results to help determine if the PM processes are in control.
- **Upper and lower specification limits** are based on requirements of the contract, and reflect the maximum and minimum values allowed. There may be penalties associated with exceeding the specification limits.
- **Upper and lower control limits** are set by the PM and appropriate stakeholders to reflect the points at which corrective action will be taken to prevent exceeding specification limits.
- A process is considered out of control when a data point exceeds a control limit or if seven consecutive points are above or below the mean.

# Plan Quality: Tools and Techniques

- **Benchmarking:** involves comparing actual or planned project practices to those of comparable projects to identify best practices, generate ideas for improvement, and provide a basis for measuring performance.
- **Design of Experiments:** a statistical method for identifying which factors may influence specific variables of a product or process under development or in production.
  - should be used during the Plan Quality process to determine the number and type of tests and their impact on cost of quality
  - plays a role in the optimization of products or processes
  - can be used to reduce the sensitivity of product performance to sources of variations caused by environmental or manufacturing differences
  - provides a statistical framework for systematically changing all of the important factors, rather than changing the factors one at a time
  - Analysis of the experimental data should provide the optimal conditions for the product or process, highlight the factors that influence the results, and reveal the presence of interactions and synergy among the factors.
- **Statistical Sampling:** involves choosing part of a population of interest for inspection
  - Sample frequency and sizes should be determined during the Plan Quality process so the cost of quality will include the number of tests, expected scrap, etc.
  - In some application areas it may be necessary for the PM team to be familiar with a variety of sampling techniques to assure the sample selected actually represents the population of interest.

# Process Flowchart



## Flowcharting:

- a graphical representation of a
- process showing the relationships among process steps
- all process flowcharts show activities, decision points, and the order of processing
- can help the project team anticipate quality problems that might occur

An awareness of potential problems can result in the development of test procedures or approaches for dealing with them.

# Plan Quality: Tools and Techniques

- **Proprietary Quality Management Methodologies:** include Six Sigma, Lean Six Sigma, Quality Function Deployment, CMMI, etc.
- **Additional Quality Planning Tools:** used to better define the quality requirements and plan effective quality management activities, e.g.:
  - **Brainstorming**
  - **Affinity diagrams**, used to visually identify logical groupings based on natural relationships
  - **Force field analysis**, which are diagrams of the forces for and against change
  - **Nominal group techniques**, to allow ideas to be brainstormed in small groups and then reviewed by a larger group
  - **Matrix diagrams**, which include two, three, or four groups of information and show relationships between factors, causes, and objectives. Data in a matrix is organized in rows and columns with intersecting cells that can be filled with information that describes the demonstrated relationship between the items located in the row and column
  - **Prioritization matrices**, which provide a way of ranking a diverse set of problems and/or issues (usually generated through brainstorming) by their importance

# Plan Quality: Outputs

- **Quality Management Plan:** describes how the PM team will implement the performing organization's quality policy. It is a component or a subsidiary plan of the PM plan.
  - provides input to the overall PM plan and includes quality control, quality assurance, and continuous process improvement approaches for the project.
  - may be formal or informal, highly detailed, or broadly framed.
  - The style and detail are determined by the requirements of the project.
  - should be reviewed early in the project to ensure that decisions are based on accurate information.
- **Quality Metrics:** describe, in very specific terms, a project or product attribute and how the quality control process will measure it
  - A measurement is an actual value
  - The **tolerance** defines the allowable variations on the metrics.
    - For example, a metric related to the quality objective of staying within the approved budget by  $\pm 10\%$  could be to measure the cost of every deliverable and determine the percent variance from the approved budget for that deliverable.
  - Quality metrics are used in the quality assurance and quality control processes.
  - Some examples of quality metrics include on-time performance, budget control, defect frequency, failure rate, availability, reliability, and test coverage.

# Plan Quality: Outputs

- **Quality Checklists:** a structured tool, usually component-specific, used to verify that a set of required steps has been performed.
  - range from simple to complex based on project requirements and practice
  - Many organizations have standardized checklists available to ensure consistency in frequently performed tasks.
  - In some application areas, checklists are also available from professional associations or commercial service providers.
  - used in the quality control process.
- **Process Improvement Plan:** a subsidiary of the PM plan, which details the steps for analyzing processes to identify activities which enhance their value.
- Areas to consider include:
  - **Process boundaries.** Describes the purpose of processes, their start and end, their inputs/ outputs, the data required, the owner, and the stakeholders.
  - **Process configuration.** A graphic depiction of processes, with interfaces identified, used to facilitate analysis.
  - **Process metrics.** Along with control limits, allows analysis of process efficiency.
  - **Targets for improved performance.** Guides the process improvement activities.
- **Project Document Updates:** may include:
  - Stakeholder register
  - Responsibility Assignment Matrix, etc.

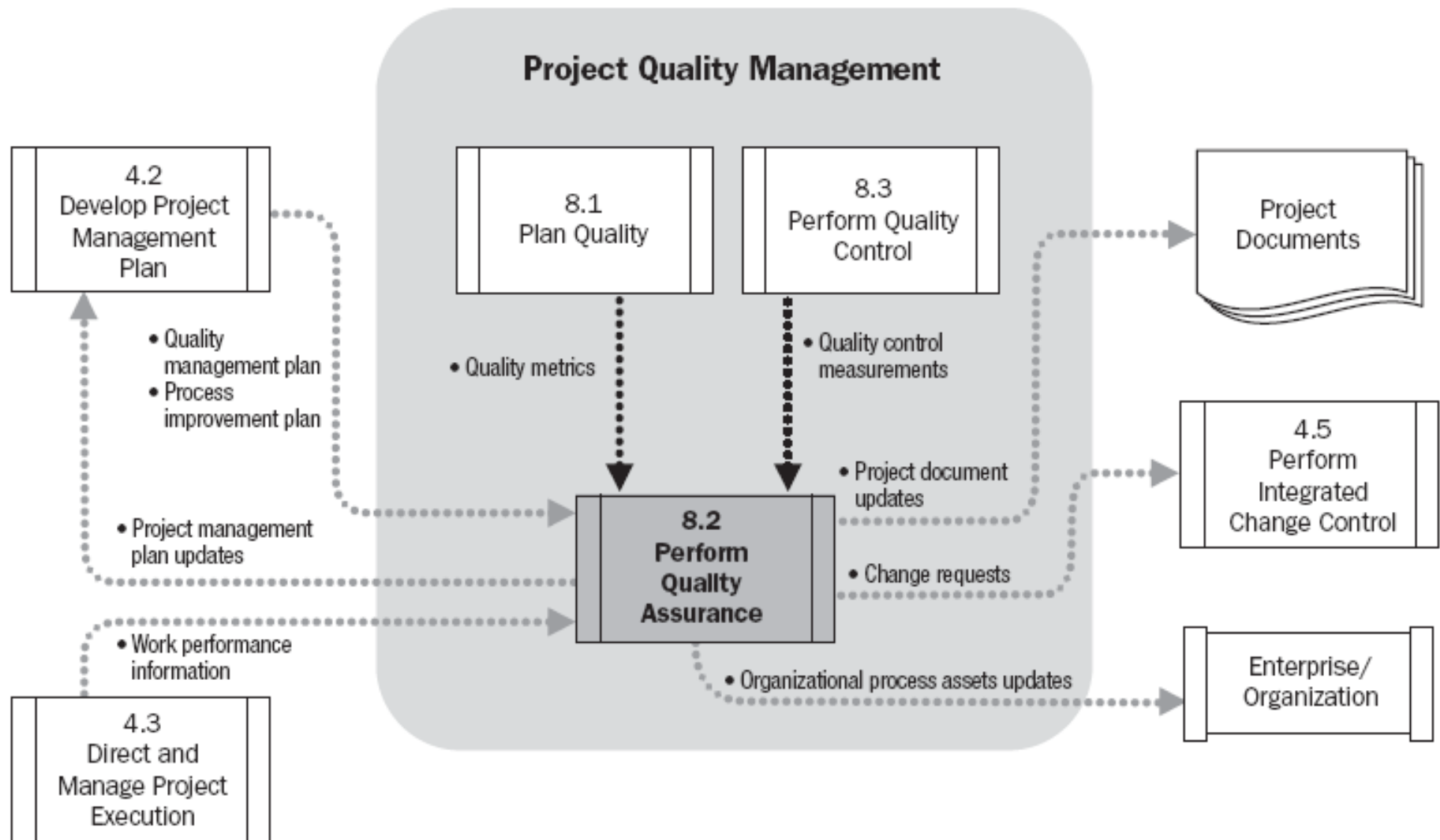


# Quality Assurance

- **Perform Quality Assurance:** process of auditing the quality requirements and the results from quality control measurements to ensure appropriate quality standards and operational definitions are used.
  - an execution process that uses data created during Perform Quality Control
  - provides an umbrella for continuous process improvement, which is an iterative means for improving the quality of all processes.
  - Continuous process improvement reduces waste and eliminates activities that do not add value. This allows processes to operate at increased levels of effectiveness.
  - Quality assurance support may be provided to the project team, the management of the performing organization, the customer or sponsor, as well as other stakeholders not actively involved in the work of the project.



# Quality Assurance: Data Flow Diagram



# Perform Quality Assurance: Inputs

- **Project Management Plan:** contains the following information that is used to assure quality:
  - **Quality management plan.** The quality management plan describes how quality assurance will be performed within the project.
  - **Process improvement plan.** The process improvement plan details the steps for analyzing processes to identify activities which enhance their value.
- **Quality Metrics:** describes, in very specific terms, a project or product attribute and how the quality control process will measure it
- **Work Performance Information:** Performance information from project activities is routinely collected as the project progresses.
- Performance results which may support the audit process include:
  - Technical performance measures
  - Project deliverables status
  - Schedule progress
  - Costs incurred
- **Quality Control Measurements:** the results of quality control activities. They are used to analyze and evaluate the quality standards and processes of the performing organization

# Perform Quality Assurance: Tools and Techniques

- **Plan Quality and Perform Quality Control Tools and Techniques**
- **Quality Audits:** a structured, independent review to determine whether project activities comply with organizational and project policies, processes, and procedures.  
The objectives of a quality audit are:
  - Identify all the good/best practices being implemented
  - Identify all the gaps/shortcomings
  - Share the good practices introduced or implemented in similar projects in the organization and/ or industry
  - Proactively offer assistance in a positive manner to improve implementation of processes to help the team raise productivity
  - Highlight contributions of each audit in the lessons learned repository of the organization. The subsequent effort to correct any deficiencies should result in a reduced cost of quality and an increase in sponsor or customer acceptance of the project's product. Quality audits may be scheduled or random and may be conducted by internal or external auditors.
- Quality audits can confirm the implementation of approved change requests including corrective actions, defect repairs, and preventive actions.
- **Process Analysis:** follows the steps outlined in the process improvement plan to identify needed improvements. This analysis also examines problems experienced, constraints experienced, and non-value-added activities identified during process operation. Process analysis includes root cause analysis—a specific technique to identify a problem, discover the underlying causes that lead to it, and develop preventive actions.

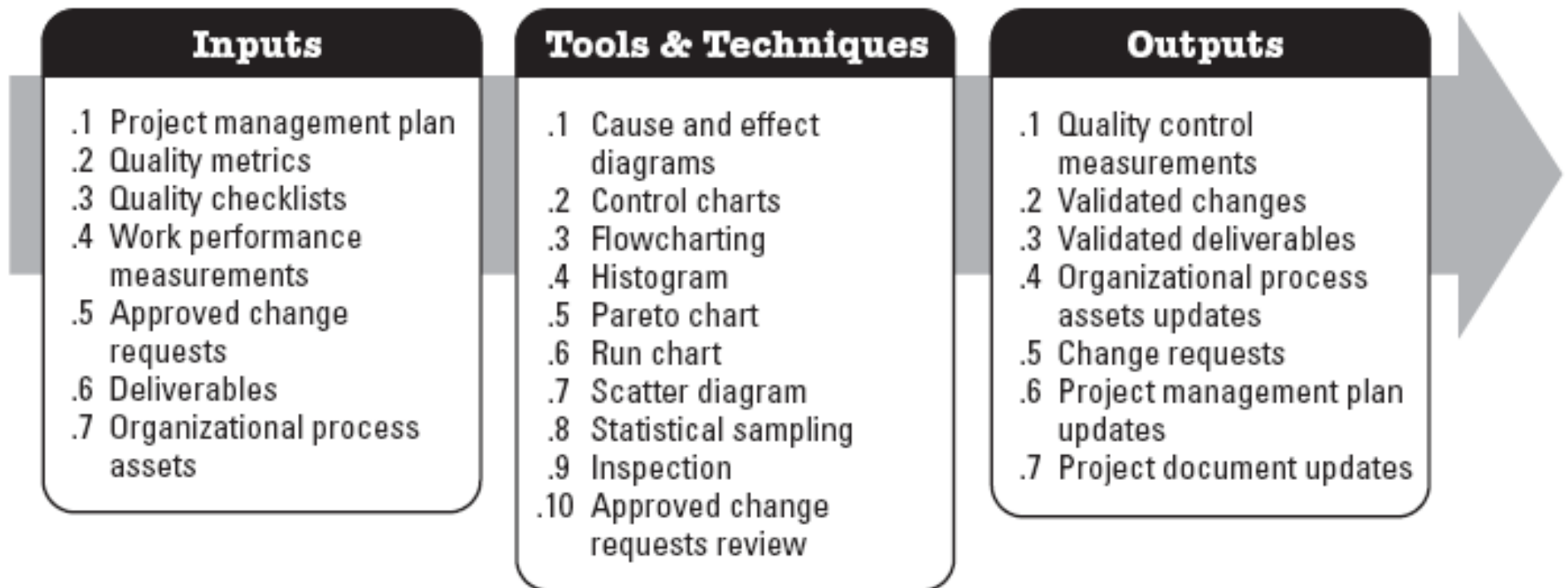
# Perform Quality Assurance: Outputs

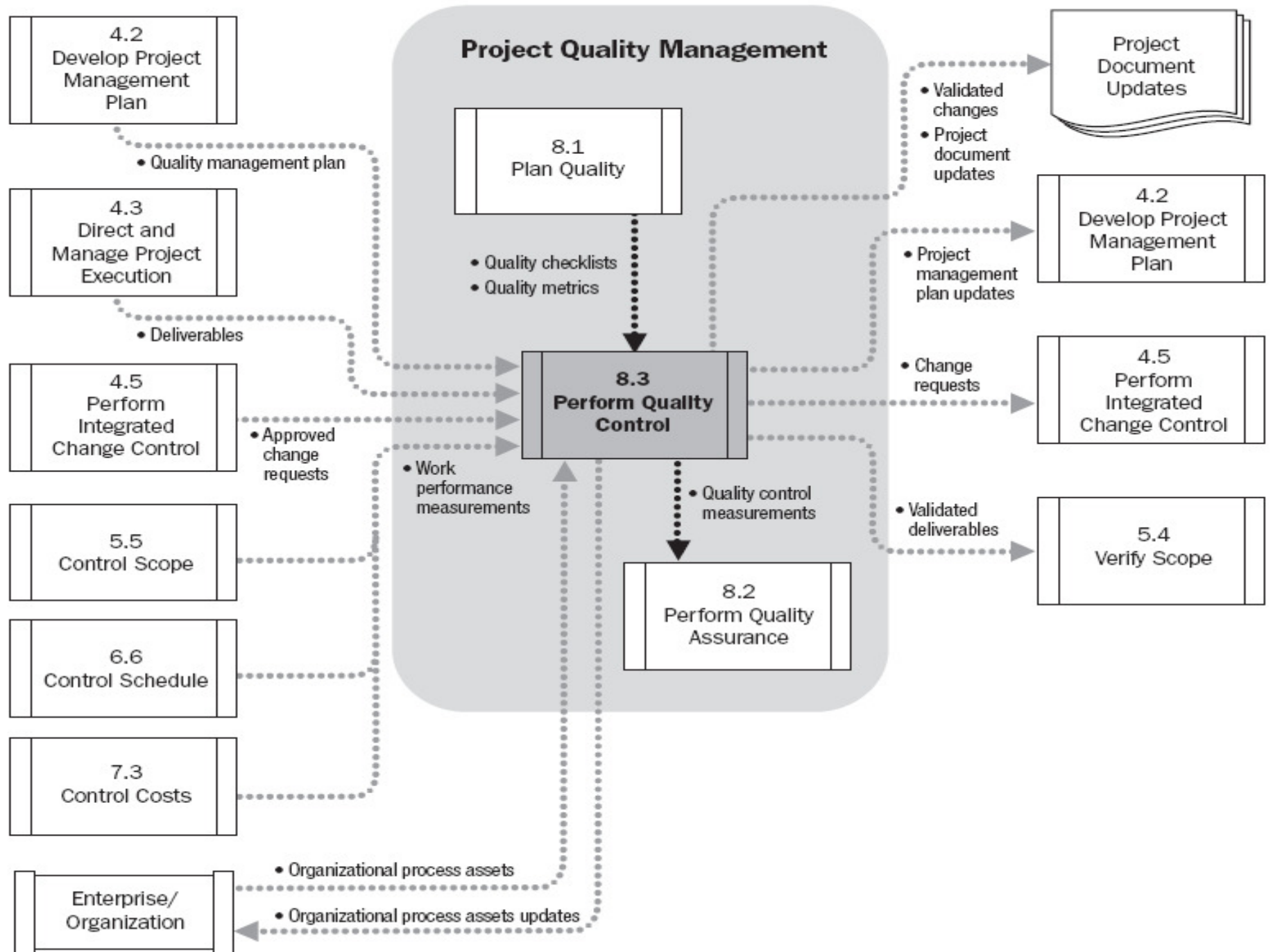
- **Organizational Process Assets Updates:** Elements of the organizational process assets that may be updated include, but are not limited to, the quality standards.
- **Change Requests:** Quality improvement includes taking action to increase the effectiveness and/or efficiency of the policies, processes, and procedures of the performing organization. Change requests are created and used as input into the Perform Integrated Change Control process to allow full consideration of the recommended improvements. Change requests can be used to take corrective action or preventive action or to perform defect repair.
- **Project Management Plan Updates:** Elements of the project management plan that may be updated include, but are not limited to:
  - Quality management plan
  - Schedule management plan
  - Cost management plan
- **Project Document Updates:** Project documents that may be updated include, but are not limited to:
  - Quality audits reports
  - Training plans
  - Process documentation

# Perform Quality Control

- **Perform Quality Control** is the process of monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes.
- Quality control is performed throughout the project.
- Quality standards include project processes and product goals. Project results include deliverables and project management results, such as cost and schedule performance.
- Quality control is often performed by a quality control department or similarly titled organizational unit. Quality control activities identify causes of poor process or product quality and recommend and/or take action to eliminate them.
- The project management team should have a working knowledge of statistical quality control, especially sampling and probability, to help evaluate quality control outputs. Among other subjects, the team may find it useful to know the differences between the following pairs of terms:
  - Prevention (keeping errors out of the process) and inspection (keeping errors out of the hands of the customer).
  - Attribute sampling (the result either conforms or does not conform) and variables sampling (the result is rated on a continuous scale that measures the degree of conformity).
  - Tolerances (specified range of acceptable results) and control limits (thresholds, which can indicate whether the process is out of control).

# Perform Quality Control





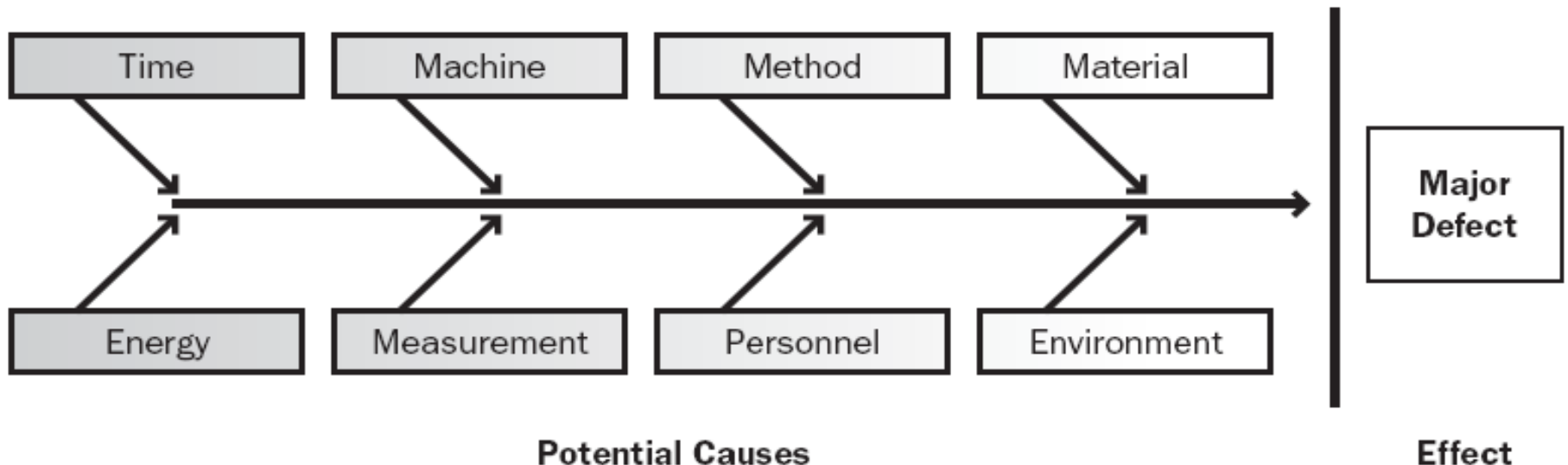


# Perform Quality Control: Inputs

- **Project Management Plan:** contains the quality management plan, which is used to control quality. The quality management plan describes how quality control will be performed within the project.
- **Quality Metrics**
- **Quality Checklists**
- **Work Performance Measurements:** used to produce project activity metrics to evaluate actual progress as compared to planned progress. These metrics include, but are not limited to:
  - Planned vs. actual technical performance,
  - Planned vs. actual schedule performance, and
  - Planned vs. actual cost performance.
- **Approved Change Requests:** As part of the Perform Integrated Change Control process a change control status update will indicate that some changes are approved and some are not. Approved change requests can include modifications such as defect repairs, revised work methods and revised schedule. The timely implementation of approved changes needs to be verified.
- **Deliverables**
- **Organizational Process Assets:** can influence the Perform Quality Control process include, but are not limited to:
  - Quality standards and policies,
  - Standard work guidelines, and
  - Issue and defect reporting procedures and communication policies.

# Perform Quality Control: Tools and Techniques

- **Cause and Effect Diagrams:** also called Ishikawa diagrams or fishbone diagrams
  - illustrate how various factors might be linked to potential problems or effects.
  - A possible root cause can be uncovered by continuing to ask “why” or “how” along one of the lines. “Why-Why” and “How-How” diagrams may be used in root cause analysis.
  - Cause and effect diagrams are also used in risk analysis

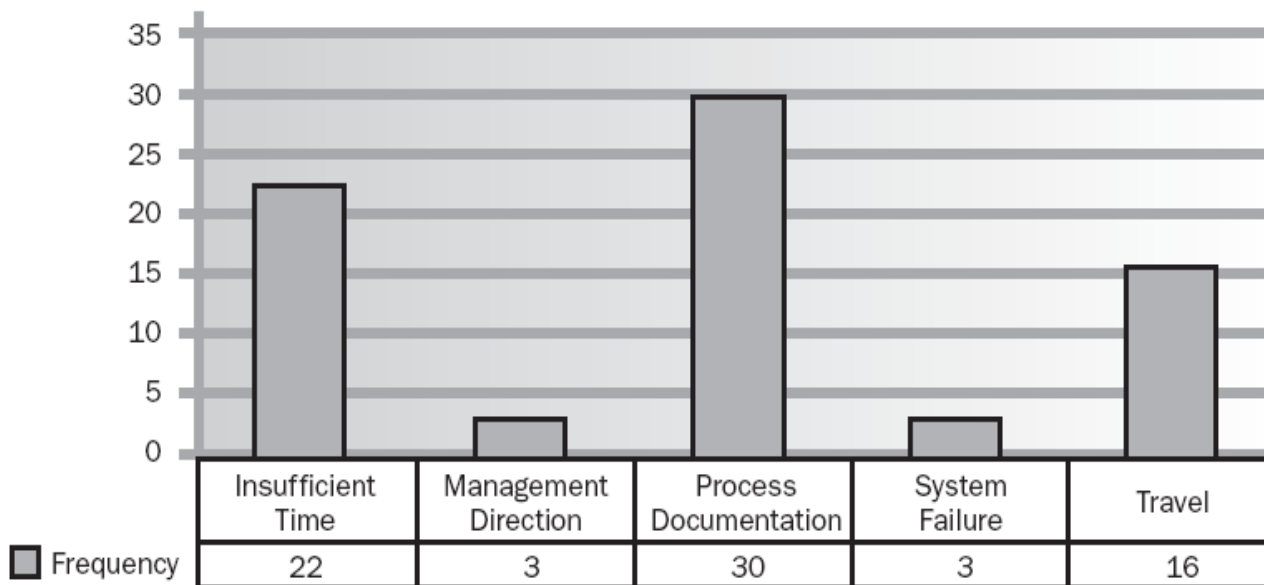


# Perform Quality Control: Tools and Techniques

- **Control Charts:** In this tool, the appropriate data is collected and analyzed to indicate the quality status of project processes and products.
  - illustrate how a process behaves over time and when a process is subject to special cause variation, resulting in an out-of-control condition.
  - graphically answer the question: “Is this process variance within acceptable limits?”
  - The pattern of data points on a control chart may reveal random fluctuating values, sudden process jumps, or a gradual trend in increased variation.
  - By monitoring the output of a process over time, a control chart can help assess whether the application of process changes resulted in the desired improvements.
  - When a process is within acceptable limits it is in control and does not need to be adjusted. Conversely, when a process is outside acceptable limits, the process should be adjusted.
  - Seven consecutive points above or below the central line indicate a process that is out of control. The upper control limit and lower control limit are usually set at  $\pm 3\sigma$ , where  $1\sigma$  is one standard deviation.
- **Flowcharting:** used during Perform Quality Control to determine a failing process step(s) and identify potential process improvement opportunities. Flowcharting is also used in risk analysis

# Perform Quality Control: Tools and Techniques

Causes of Late Time Entry

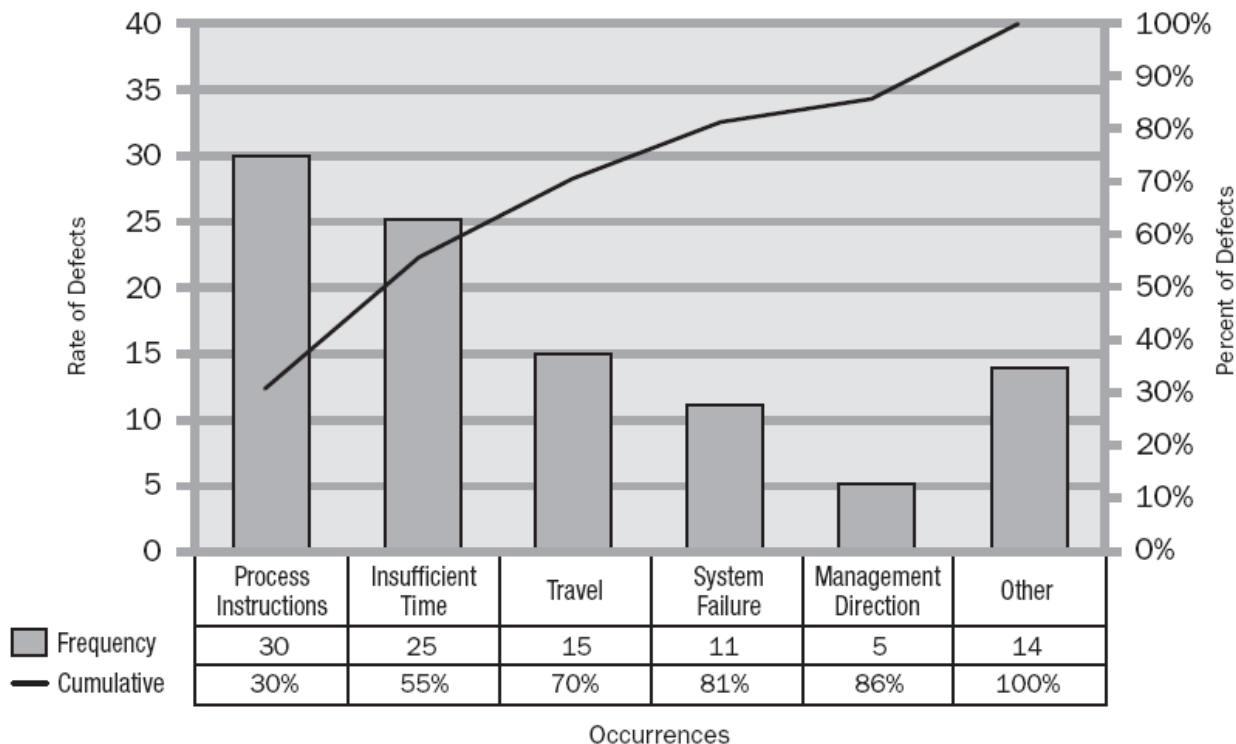


**Histogram:** a vertical bar chart showing how often a particular variable state occurred.

- Each column represents an attribute or characteristic of a problem/situation.
- The height of each column represents the relative frequency of the characteristic.
- This tool helps illustrate the most common cause of problems in a process by the number and relative heights of the bars.

# Perform Quality Control: Tools and Techniques

Pareto Diagram of Causes of Late Time Entries



**Pareto Chart:** also referred to as a Pareto diagram

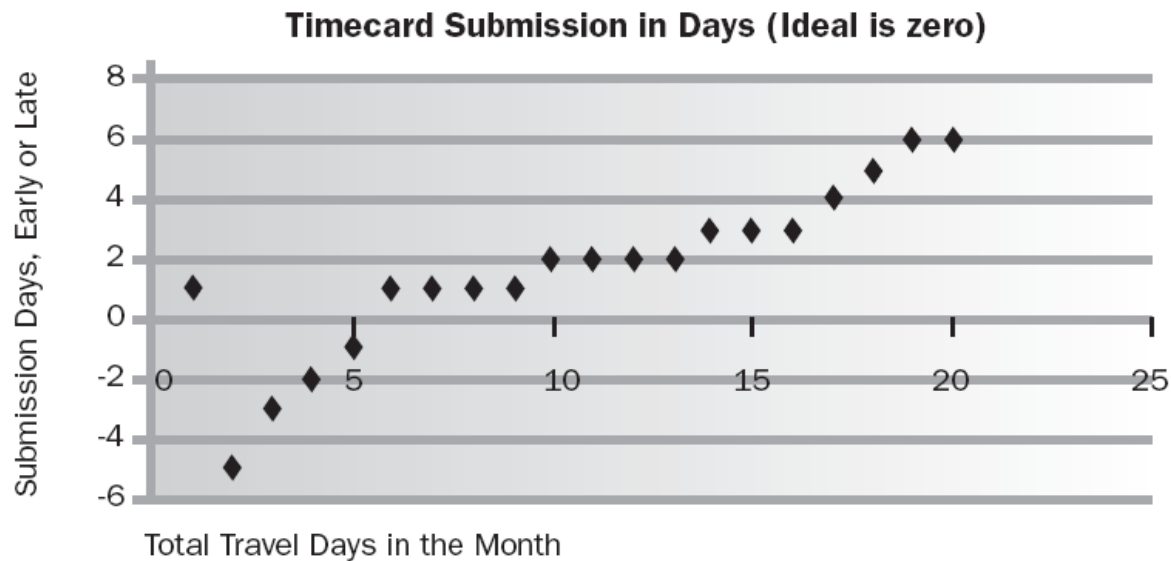
- a specific type of histogram, ordered by frequency of occurrence
- shows how many defects were generated by type or category of identified cause
- Rank ordering is used to focus corrective action
- The project team should address the causes creating the greatest number of defects first
- Pareto diagrams are conceptually related to Pareto's Law, which holds that a relatively small number of causes will typically produce a majority of the problems or defects. This is commonly referred to as the 80/20 principle, where 80% of the problems are due to 20% of the causes.
- Pareto diagrams can also be used to summarize various types of data for 80/20 analyses.

# Perform Quality Control: Tools and Techniques

---

- **Run Chart:** Similar to a control chart without displayed limits, a run chart shows the history and pattern of variation.
  - a line graph that shows data points plotted in the order in which they occur
  - show trends in a process over time, variation over time, or declines or improvements in a process over time
  - trend analysis is performed using run charts and involves mathematical techniques to forecast future outcomes based on historical results. Trend analysis is often used to monitor:
    - **Technical performance.** How many errors or defects have been identified, and how many remain uncorrected?
    - **Cost and schedule performance.** How many activities per period were completed with significant variances?

# Perform Quality Control: Tools and Techniques



correlation between the timecard submission date and the number of days traveling per month

**Scatter Diagram:** shows the relationship between two variables.

- allows the quality team to study and identify the possible relationship between changes observed in two variables.
- Dependent variables versus independent variables are plotted.
- The closer the points are to a diagonal line, the more closely they are related.

# Perform Quality Control: Tools and Techniques

---

- **Statistical Sampling:** Samples are selected and tested as defined in the quality plan.
- **Inspection:** examination of a work product to determine whether it conforms to documented standards.
  - The results of an inspection generally include measurements and may be conducted at any level.
  - For example, the results of a single activity can be inspected, or the final product of the project can be inspected.
  - Inspections may be called reviews, peer reviews, audits, or walkthroughs. In some application areas, these terms have narrow and specific meanings. Inspections are also used to validate defect repairs.
- **Approved Change Requests Review:** All approved change requests should be reviewed to verify that they were implemented as approved.



# Perform Quality Control: Outputs

- **Quality Control Measurements:** documented results of quality control activities in the format specified during quality planning.
- **Validated Changes:** Any changed or repaired items are inspected and will be either accepted or rejected before notification of the decision is provided. Rejected items may require rework.
- **Validated Deliverables:** A goal of quality control is to determine the correctness of deliverables. The results of the execution quality control processes are validated deliverables. Validated deliverables are an input to Verify Scope for formalized acceptance.
- **Organizational Process Assets Updates:** include, but are not limited to:
  - **Completed checklists.** When checklists are used, the completed checklists become part of the project's records
  - **Lessons learned documentation.** The causes of variances, the reasoning behind the corrective action chosen, and other types of lessons learned from quality control are documented so they become part of the historical database for both the project and the performing organization. Lessons learned are documented throughout the project life cycle, but at a minimum, during project closure.
- **Change Requests:** If the recommended corrective or preventive actions or a defect repair requires a change to the project management plan, a change request should be initiated in accordance with the defined Perform Integrated Change Control process.
- **Project Management Plan Updates:** include, but are not limited to:
  - Quality management plan
  - Process improvement plan.
- **Project Document Updates:** Project documents that may be updated include, but are not limited to, quality standards.

# Perform Quality Control: Outputs

- **Quality Control Measurements:** the documented results of quality control activities in the format specified during quality planning
- **Validated Changes:** Any changed or repaired items are inspected and will be either accepted or rejected before notification of the decision is provided. Rejected items may require rework
- **Validated Deliverables:** A goal of quality control is to determine the correctness of deliverables. The results of the execution quality control processes are validated deliverables. Validated deliverables are an input to Verify Scope for formalized acceptance.
- **Organizational Process Assets Updates:** Elements of the organizational process assets that may be updated include:
  - **Completed checklists.** When checklists are used, the completed checklists become part of the project's records
  - **Lessons learned documentation.** The causes of variances, the reasoning behind the corrective action chosen, and other types of lessons learned from quality control are documented so they become part of the historical database for both the project and the performing organization. Lessons learned are documented throughout the project life cycle, but at a minimum, during project closure.

# Да се запомни

- Някои общи постановки относно управлението на качеството в контекста на проекта, независимо от различните възможни подходи са:
  - *Организацията трябва да има нагласа за усъвършенстване на качеството и подкрепа от всички ръководни нива*
  - *Всяка фирма трябва да определи своите специфични критични проблеми на качеството, а ръководството да осигури условия и ръководи решаването им*
  - *За всеки известен процес трябва да се определят факторите, определящи доброто качество и по този начин процесът да е измерим*
  - *Качеството трябва да се постига чрез разбиране и усъвършенстване на процесите - главно чрез създаване на условия (превенция), а не чрез инспектиране и контрол*
  - *По степен на готовност фирмите трябва да разработват и използват количествени методи за оценка, моделиране и решаване на проблемите.*



Въпроси?

За контакти:  
[elis@fmi.uni-sofia.bg](mailto:elis@fmi.uni-sofia.bg)