



# SLIIT

*Discover Your Future*

# Agile Software Project Management

# Who is a Project Manager?

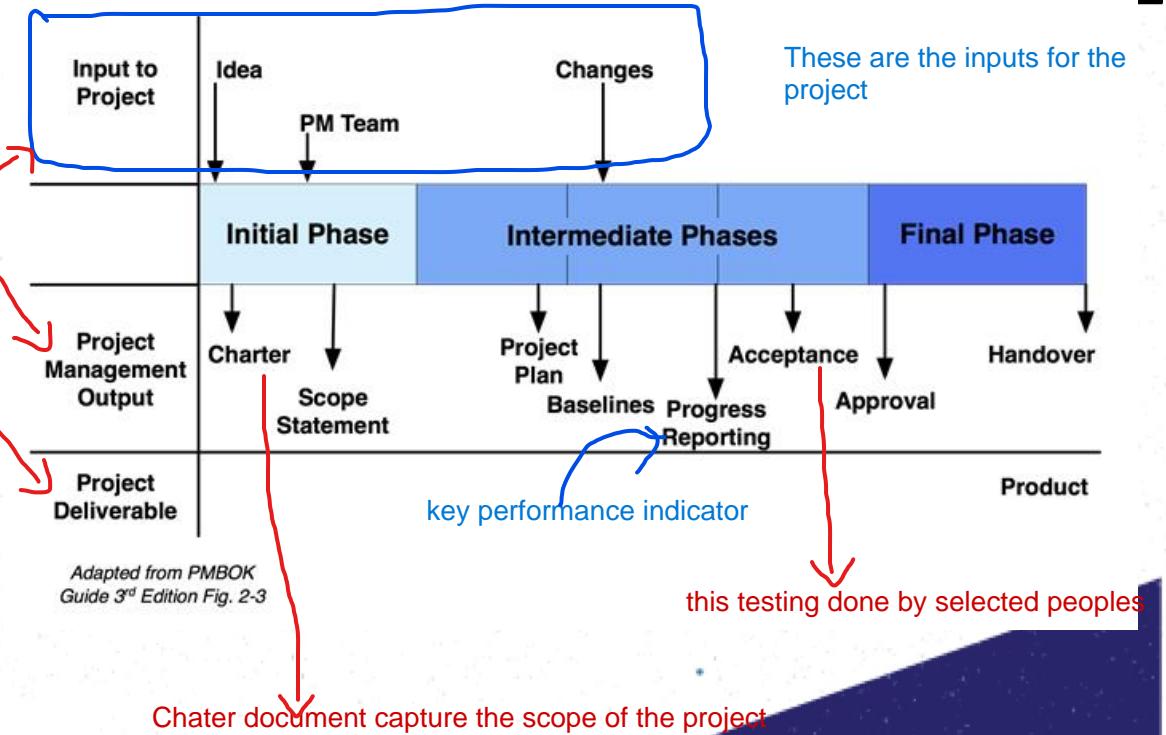
- Planning
- Scheduling
- Coordinating
- Working with people

# Phases In a Project Life Cycle

The completion & approval of one or more deliverables defines a project phase

In iterative systems development, new phase can start without closing the previous phase.

A phase can be closed without initiating subsequent phases.



# Organizational Structures

## Functional

Engineering, Marketing, Design, etc  
P&L from production

## Projectized

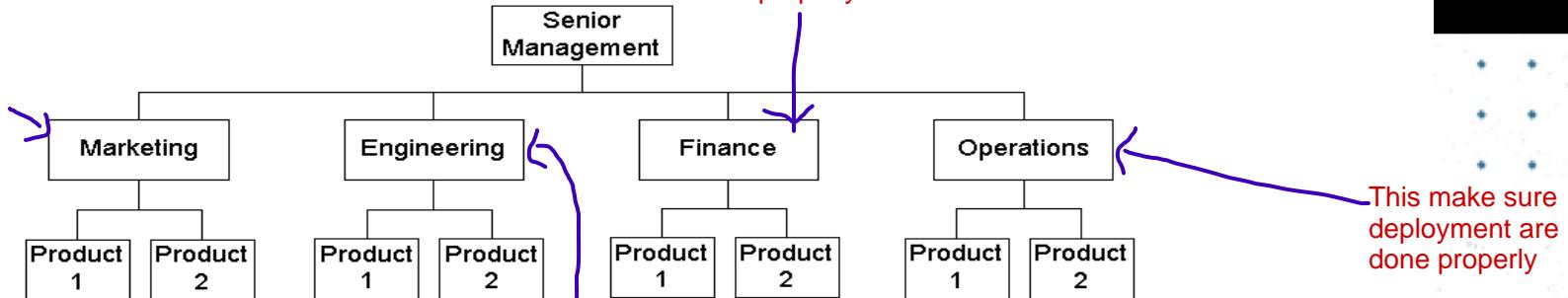
Project A, Project B  
Income from projects  
PM has P&L responsibility

## Matrix      combination of both

Functional and Project based  
Program Mgmt. Model  
Shorter cycles, need for rapid development process

# Functional Organization

this make sure marketing aspect of the product being handle



## Pros advantages

- Clear definition of authority
- Eliminates duplication
- Encourages specialization
- Clear career paths

Engineering team will have it developer

This make sure budgeting and the resources are utilize properly

This make sure deployment are done properly

## Cons disadvantage

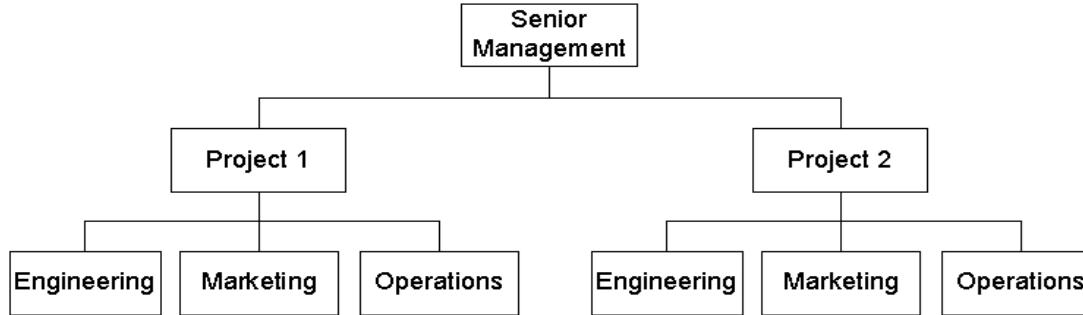
- “Walls”: can lack customer orientation
- “Silos” create longer decisions cycles
- Conflicts across functional areas
- Project leaders have little power

have to work with multiple customers. so they doesn't have proper idea

create islands. stick to particular areas. marketing don't know engineering likewise

engineer not do marketing, financial not do developing. not duplicate

# Projectized Organization



## Pros

- Unity of command
- Effective intra-project communication

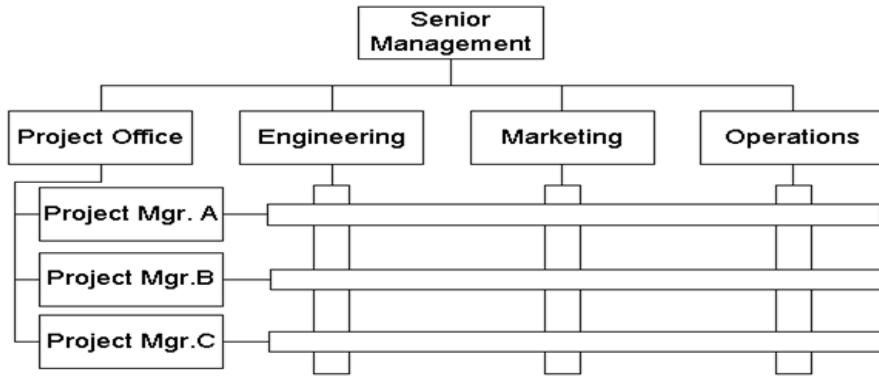
## Cons

- Duplication of facilities
- Career path

teams get duplicated. in here two ops teams for two projects likewise

Examples: defense avionics, construction

# Matrix Organization



## Pros

- Project integration across functional lines
- Efficient use of resources
- Retains functional teams

## Cons

- Two bosses for personnel
- Complexity
- Resource & priority conflicts

# Matrix Forms

**Weak, Strong, Balanced**

**Degree of relative power**

Weak: functional-centric

Strong: project-centric

# Organizational Structure – Influences on Projects

| Organization Type<br>Project Characteristics                                      | Functional                             | Matrix                                 |                                     |                                     | Projectized                         |
|---|--|--|-------------------------------------|-------------------------------------|-------------------------------------|
|   |  | Weak Matrix                            | Balanced Matrix                     | Strong Matrix                       |                                     |
| Project Manager's Authority   | Little or None                         | Limited                                | Low to Moderate                     | Moderate To High                    | High to Almost Total                |
| Percent of Performing Organization's Personnel Assigned Full-time to Project Work | Virtually None                         | 0-25%                                  | 15-60%                              | 50-95%                              | 85-100%                             |
| Project Manager's Role  | Part-time                              | Part-time                              | Full-time                           | Full-time                           | Full-time                           |
| Common Title for Project Manager's Role   | Project Coordinator/<br>Project Leader | Project Coordinator/<br>Project Leader | Project Manager/<br>Project Officer | Project Manager/<br>Program Manager | Project Manager/<br>Program Manager |
| Project Management Administrative Staff   | Part-time                              | Part-time                              | Part-time                           | Full-time                           | Full-time                           |

# Agile Transformation

<http://www.michele-joy.com/blog/2018/7/11/taking-the-leap>

# Agile Manifesto

Agile manifesto has primary set of discipline that need to be followed in agile project. eva tama metn idn  
pallehatta tiyenne

this is first principle

## Individuals & Interactions Over Tools & Processes

Agile team is very small that's why individuals & interaction over tools & process

# Agile Manifesto

this is second principle

## **Working Software Over Comprehensive Documentation**

no need to complete a whole documentation for the system. instead of that in agile we only need to do a document for the working part. like if we are working on login we only need to complete a document for that part.

# Agile Manifesto

## **Customer Collaboration Over Contract Negotiation**

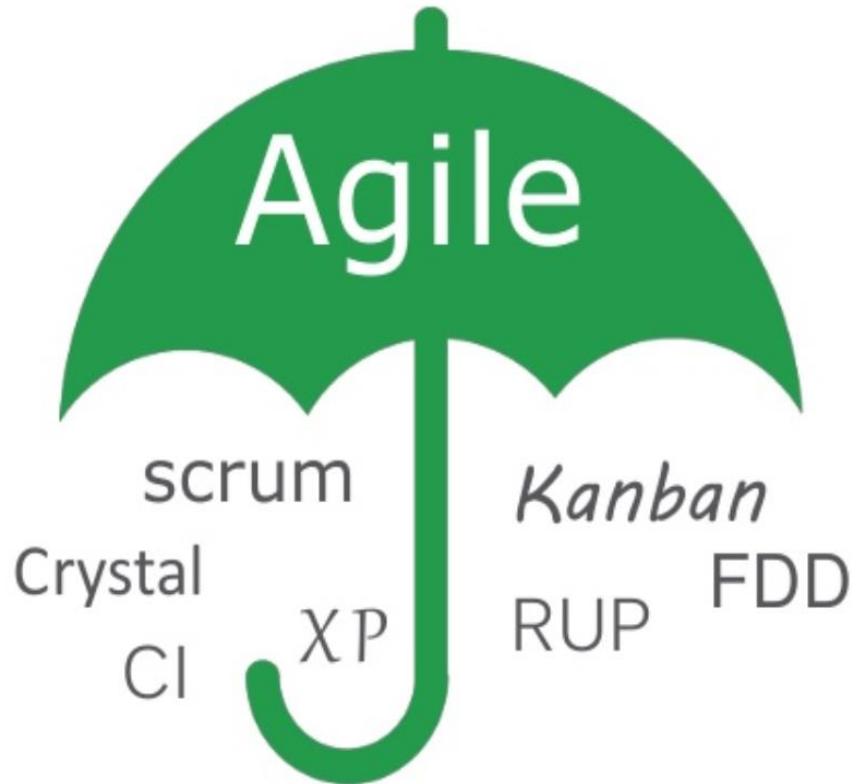
always contact customer to get their thoughts about the developing product. then we can know if the product is correctly done or not.

# Agile Manifesto

**Respond to Change  
Over  
Following a Plan**

customerta one unoth monawahari change ekak kragnā mēken ape project eka  
aniwa flexible wenna one. mokada ehema nathi unoth eka awl.

# Agile Methodologies



# Agile Methodologies

Prescriptive vs. Adaptive

*The Sweet Spot*



More Adaptive  
fewer rules to follow



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# SCRUM Master

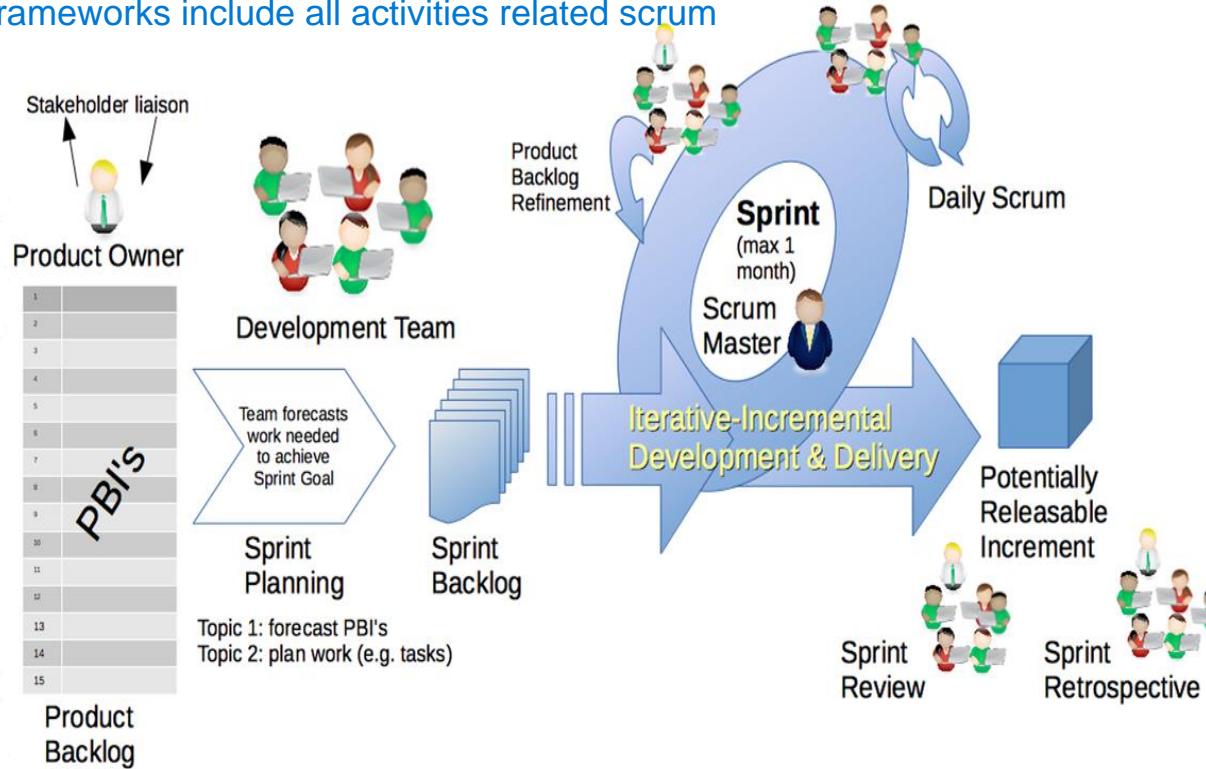
**Servant Leader  
Resolves blockers  
Guardian of the Project!**

# SCRUM Master



# SCRUM Framework

scrum frameworks include all activities related scrum



# Writing User-stories/Epics

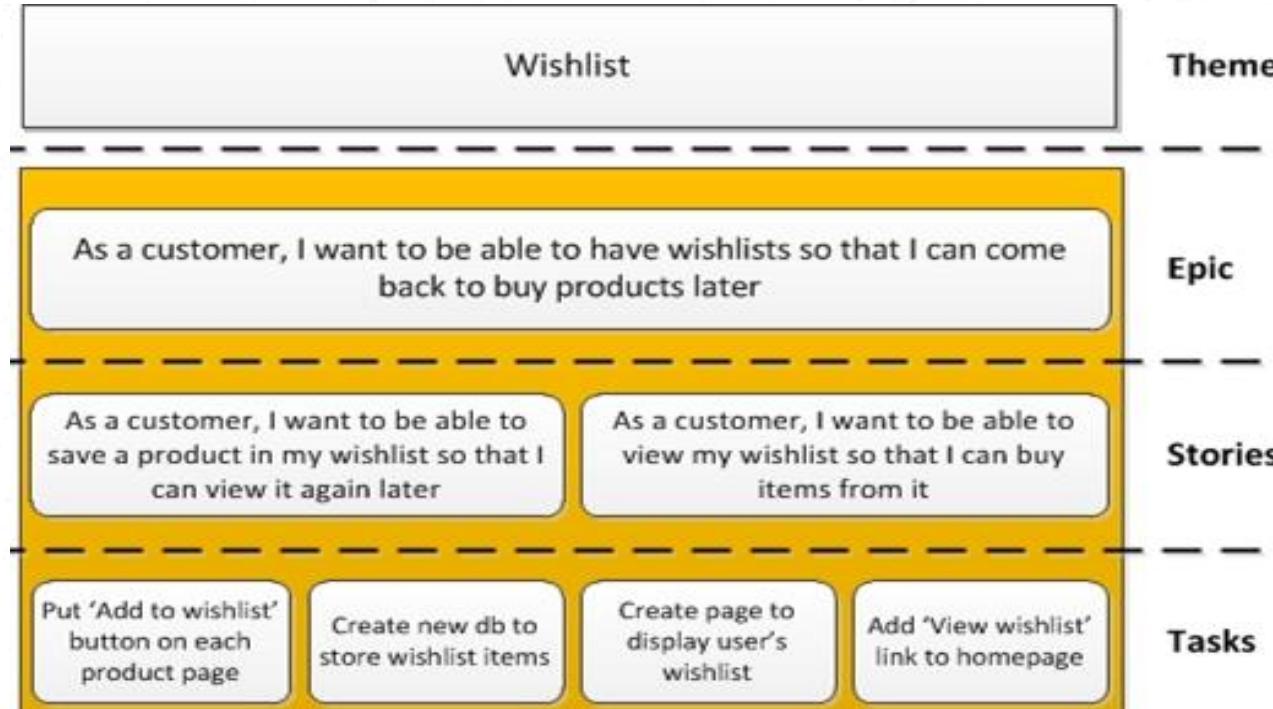
As <persona>,

Each of product backlog are created as user stories

I want <what?>

so that <why?>.

# Writing User-stories/Epics



# Backlog Grooming

- Removing user stories that no longer appear relevant
- Creating new user stories in response to newly discovered needs
- Re-assessing the relative priority of stories
- Assigning estimates to stories which have yet to receive one
- Correcting estimates in light of newly discovered information
- Splitting user stories which are high priority but too coarse grained to fit in an upcoming iteration

# Backlog Grooming

**How its Done!**  
**(Video)**

# Scrum Estimation

<http://www.michele-joy.com/blog/2018/7/11/taking-the-leap>

# Planning Poker



## Agile Planning Poker Cards

Sam Carton Tools

★★★★★ 17

34

This app is compatible with some of your devices.

Installed

| Standard | Fibonacci | T-shirt |
|----------|-----------|---------|
| 0        | 1/2       | 1       |
| 3        | 5         | 8       |
| 20       | 40        | 100     |
| ∞        |           | ∞       |
| ?        | ?         | ?       |
|          | ?         | ?       |



| Standard | Fibonacci | T-shirt |
|----------|-----------|---------|
| 0        | 1         | 2       |
| 5        | 8         | 13      |
| 21       |           |         |
| 34       | 55        | 89      |
| 144      |           |         |
| ∞        | ?         | ?       |
|          | ?         | ?       |



<https://play.google.com/store/apps/details?id=com.samcarton.planningpoker&hl=en>

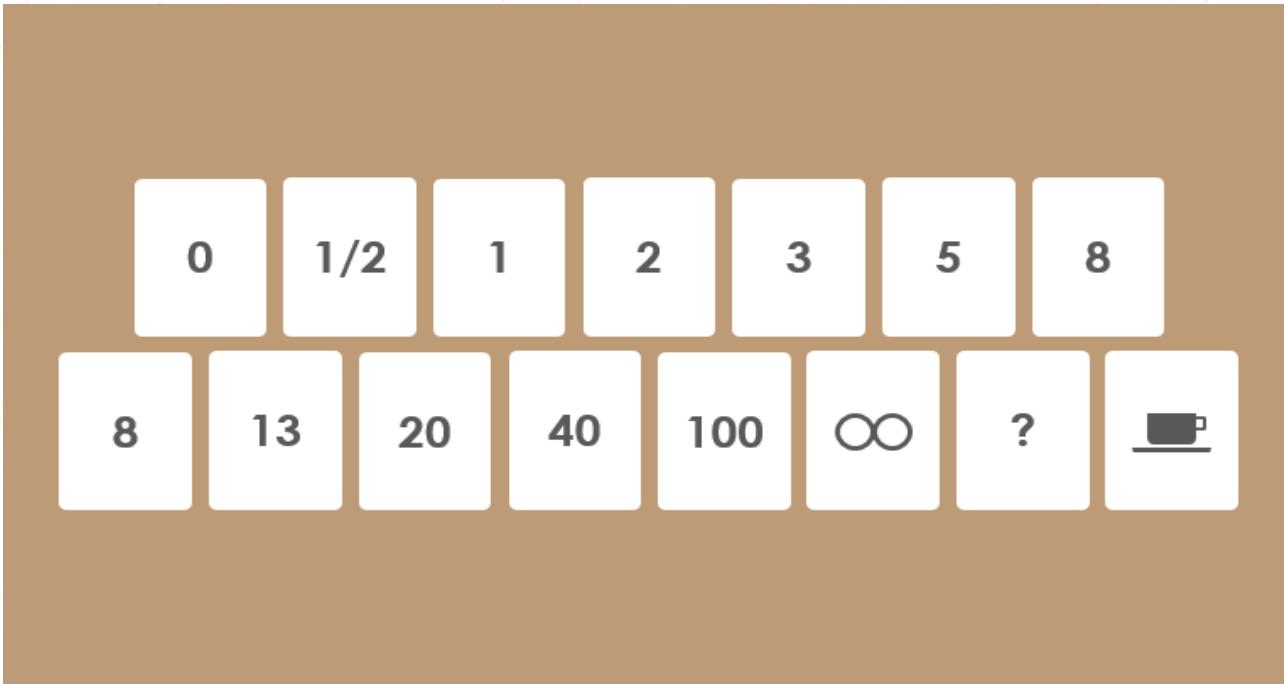
# Planning Poker - Steps

1. The entire scrum team gathers with planning poker cards or a planning poker mobile application.
2. Scrum master takes each item in the product backlog and discusses it with the team.
3. Each team member individually selects a value from the cards or from the mobile application. It is not revealed to anyone yet.
4. When the scrum master gives the signal, everyone reveals the estimated values.

# Planning Poker - Steps

5. After looking at all the values, the members with the largest values and the smallest values explain the reasons behind their estimations. Everyone listens to the explanations and if needed others can add their comments as well.
6. Next, they go for another round in the same manner.
7. This is performed until the estimates converge to a closer number or majority of the team members votes for the same value.
8. The next backlog item is selected, and the same process is performed.
9. This is done until the team feels that they have estimated sufficient items to fill in for a new sprint.

# Planning Poker



# Planning Poker

**How its Done!**  
**(Video)**

# Daily Scrum

**What did you do yesterday?**  
**What are you going to do today?**  
**What are your Impediments?**

# Daily Scrum

**How its Done!**  
**(Video)**

# Thank You



# SLIIT

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# Project Selection

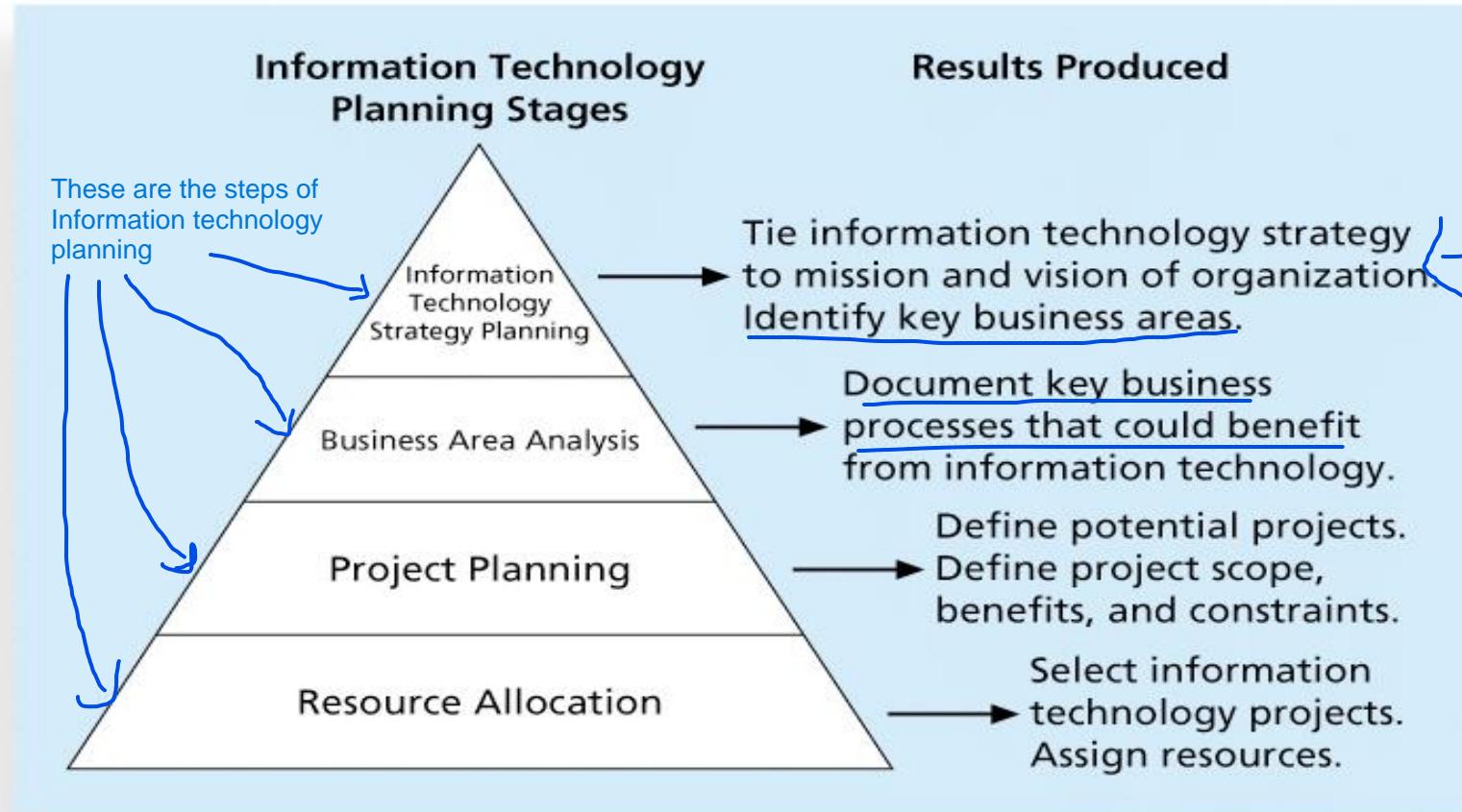
# Strategic Planning & Project Selection

- Strategic planning involves determining long-term objectives, predicting future trends, and projecting the need for new products and services.
- Organizations often perform a SWOT analysis
  - Analyzing Strengths, Weaknesses, Opportunities, and Threats
- As part of strategic planning, organizations
  - Identify potential projects
  - Use realistic methods to select which projects to work on
  - Formalize project initiation by issuing a project charter

strength

SWOT analysis is basically done for organization.

# Information Technology Planning Process



# Methods for Selecting Projects

- There are usually more projects than available time and resources to implement them.
- Methods for selecting projects include:
  - focusing on broad organizational needs
  - categorizing information technology projects
  - performing net present value or other financial analyses
  - using a weighted scoring model
  - implementing a balanced scorecard

# Focusing on Broad Organizational Needs

- It is often difficult to provide strong justification for many IT projects, but everyone agrees they have a high value.
- “It is better to measure gold roughly than to count pennies precisely”
- Three important criteria for projects:
  - There is a need for the project
  - There are funds available
  - There’s a strong will to make the project succeed

# Categorizing IT Projects

- One categorization is whether the project addresses
  - A problem
  - An opportunity, or
  - A directive
- Another categorization is how long it will take to do and when it is needed.
- Another is the overall priority of the project.

# Financial Analysis of Projects

- Financial considerations are often an important consideration in selecting projects.
- Three primary methods for determining the projected financial value of projects:
  - Net present value (NPV) analysis
  - Return on investment (ROI)
  - Payback analysis

# Net Present Value Analysis

- Net present value (NPV) analysis is a method of calculating the expected net monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present point in time.
- Projects with a positive NPV should be considered if financial value is a key criterion.
- The higher the NPV, the better

# Net Present Value Example

|    | A                | B                        | C       | D       | E       | F       | G              |
|----|------------------|--------------------------|---------|---------|---------|---------|----------------|
| 1  | Discount rate    | 10%                      |         |         |         |         |                |
| 2  |                  |                          |         |         |         |         |                |
| 3  | <b>PROJECT 1</b> | YEAR 1                   | YEAR 2  | YEAR 3  | YEAR 4  | YEAR 5  | <b>TOTAL</b>   |
| 4  | Benefits         | \$0                      | \$2,000 | \$3,000 | \$4,000 | \$5,000 | \$14,000       |
| 5  | Costs            | \$5,000                  | \$1,000 | \$1,000 | \$1,000 | \$1,000 | \$9,000        |
| 6  | Cash flow        | (\$5,000)                | \$1,000 | \$2,000 | \$3,000 | \$4,000 | <b>\$5,000</b> |
| 7  | NPV              | →\$2,316                 |         |         |         |         |                |
| 8  |                  | Formula =npv(b1,b6:f6)   |         |         |         |         |                |
| 9  |                  |                          |         |         |         |         |                |
| 10 | <b>PROJECT 2</b> | YEAR 1                   | YEAR 2  | YEAR 3  | YEAR 4  | YEAR 5  | <b>TOTAL</b>   |
| 11 | Benefits         | \$1,000                  | \$2,000 | \$4,000 | \$4,000 | \$4,000 | \$15,000       |
| 12 | Costs            | \$2,000                  | \$2,000 | \$2,000 | \$2,000 | \$2,000 | \$10,000       |
| 13 | Cash flow        | (\$1,000)                | \$0     | \$2,000 | \$2,000 | \$2,000 | <b>\$5,000</b> |
| 14 | NPV              | →\$3,201                 |         |         |         |         |                |
| 15 |                  | Formula =npv(b1,b13:f13) |         |         |         |         |                |
| 16 |                  |                          |         |         |         |         |                |
| 17 |                  |                          |         |         |         |         |                |

Note that totals are equal, but NPVs are not because of the time value of money

# NPV Calculations

- Determine estimated costs and benefits for the life of the project and the products it produces.
- Determine the discount rate (check with your organization on what to use).
- Calculate the NPV
- Notes: Some organizations consider the investment year as year 0, while others start in year 1. Some people entered costs as negative numbers, while others do not.
- Check with your organization for their preferences

# Return on Investment

- Return on investment (ROI) is calculated by subtracting the project costs from the benefits and then dividing by the costs
    - $\text{ROI} = (\text{total discounted benefits} - \text{total discounted costs}) / \text{discounted costs}$
  - The higher the ROI, the better.
  - Many organizations have a required rate of return or minimum acceptable rate of return on investment for projects.
  - Internal rate of return (IRR) can be calculated by finding the discount rate that makes the NPV equal to zero.
- ROI and NPV are the best things to identify that whether the project is successful or not



This used to check how long it take for us to recoup

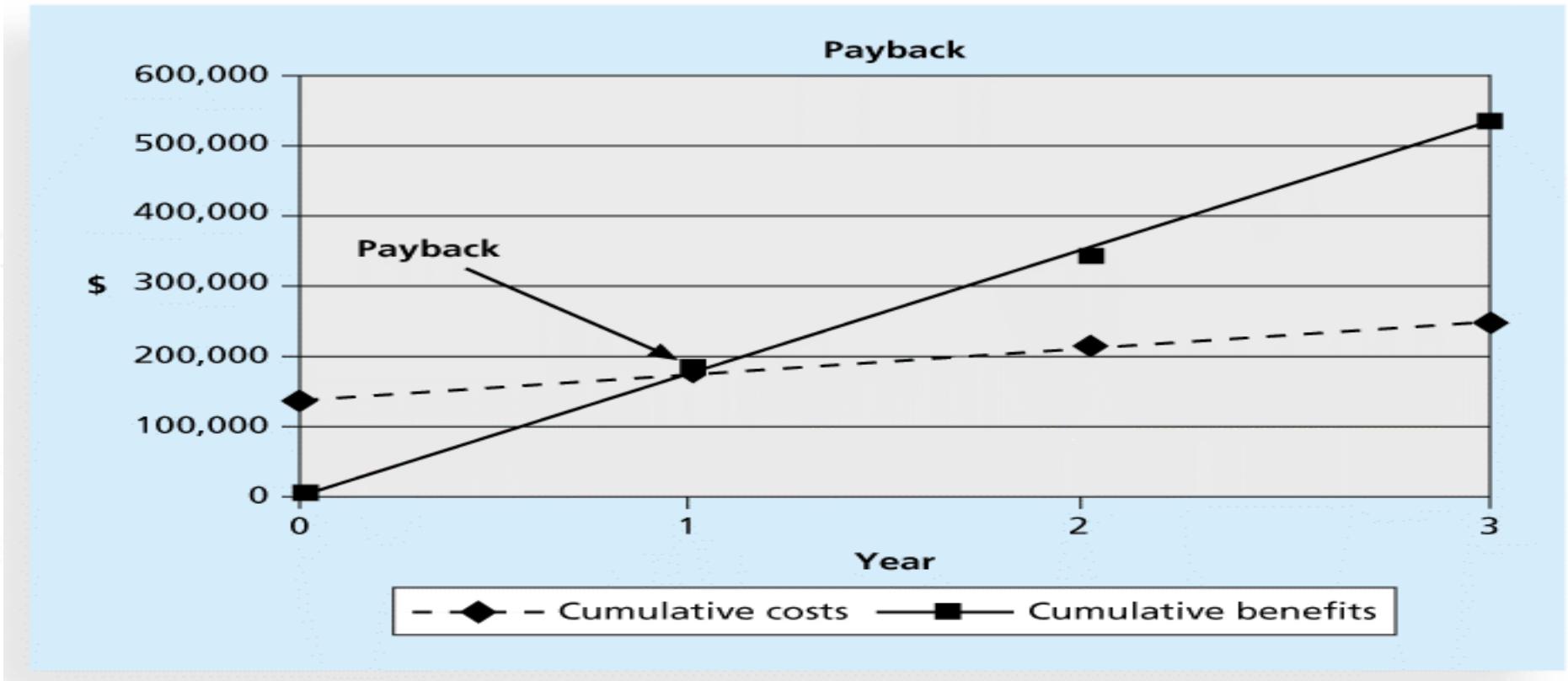
# Payback Analysis

Anit okkogema higher value ek better meke lower value ek better

- Another important financial consideration is payback analysis.
- The payback period is the amount of time it will take to recoup, in the form of net cash inflows, the total dollars invested in a project.
- Payback occurs when the net cumulative discounted benefits equals the costs.
- Many organizations want IT projects to have a fairly short payback period.

# NPV Example

# Charting the Payback Period



# Weighted Scoring Model

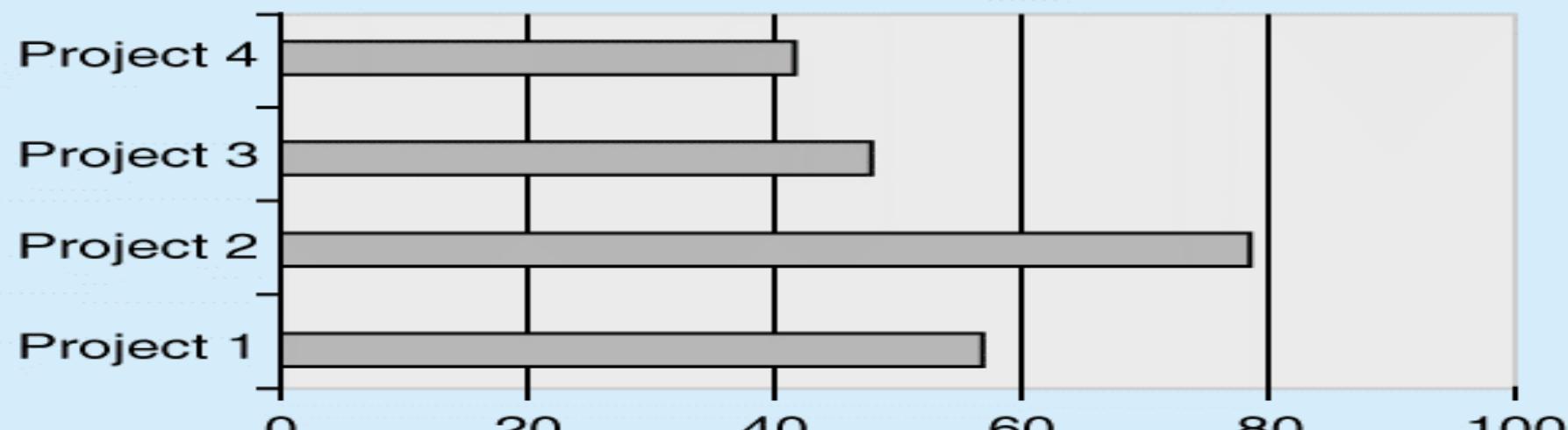
- A weighted scoring model is a tool that provides a systematic process for selecting projects based on many criteria
  - Identify criteria important to the project selection process
  - Assign weights (percentages) to each criterion so they add up to 100%
  - Assign scores to each criterion for each project
  - Multiply the scores by the weights and get the total weighted scores
- The higher the weighted score, the better.

# Sample Weighted Scoring Model for Project Selection

|    | A   | B      | C         | D         | E         | F         |
|----|---|--------|-----------|-----------|-----------|-----------|
| 1  | Criteria  | Weight | Project 1 | Project 2 | Project 3 | Project 4 |
| 2  | Supports key business objectives                    | 25%    | 90        | 90        | 50        | 20        |
| 3  | Has strong internal sponsor                         | 15%    | 70        | 90        | 50        | 20        |
| 4  | Has strong customer support                         | 15%    | 50        | 90        | 50        | 20        |
| 5  | Uses realistic level of technology                  | 10%    | 25        | 90        | 50        | 70        |
| 6  | Can be implemented in one year or less              | 5%     | 20        | 20        | 50        | 90        |
| 7  | Provides positive NPV                               | 20%    | 50        | 70        | 50        | 50        |
| 8  | Has low risk in meeting scope, time, and cost goals | 10%    | 20        | 50        | 50        | 90        |
| 9  | Weighted Project Scores                             | 100%   | 56        | 78.5      | 50        | 41.5      |
| 10 |   |        |           |           |           |           |

90\*25% + yatat okkoma = 56

**Weighted Score by Project**



# Implementing a Balanced Scorecard

- Drs. Robert Kaplan and David Norton developed this approach to help select and manage projects that align with business strategy.
- A balanced scorecard
  - Is a methodology that converts an organization's value drivers, such as customer service, innovation, operational efficiency, and financial performance, to a series of defined metrics.

# Balanced Scorecard Example

**Mission:** Provide responsive, professional finance and accounting services for the people who defend America

**Vision:**  
Best Value to our customers

- World-class provider of finance and accounting services
- Trusted, innovative financial partner
- One Organization, One Identity
- Employer of choice, providing a progressive and professional work environment

## Goals

- Fully satisfy customer requirements and aggressively resolve problems to deliver best value services
- Use performance metrics to drive best business practices and achieve high quality results
- Optimize the mix of our military, civilian, and contractor workforce
- Establish consultative relationships with leaders
- Deliver business intelligence to enable better decisions
- Ensure everyone is working towards the same vision and can connect what they're doing to make that vision a reality
- Embrace continuous learning for our workforce to ensure critical, high quality skill sets
- Develop the next generation of DFAS leadership

### CUSTOMER PERSPECTIVE

- Improve client/customer satisfaction

### FINANCIAL PERSPECTIVE

- Reduce cost to the client/customer
- Expand the use of competitive sourcing

### INTERNAL PERSPECTIVE

- Improve and leverage quality
- Encourage innovation
- Deliver system solutions

### GROWTH & LEARNING PERSPECTIVE

- Enhance employee competence
- Increase employee satisfaction
- Enhance ability to recruit and retain DFAS talent
- Develop climate for action

# The Key to Overall Project Success: Good Project Integration Management

- Project managers must coordinate all of the other knowledge areas throughout a project's life cycle.
- Many new project managers have trouble looking at the “big picture” and want to focus on too many details.
- Project integration management is not the same thing as software integration

# Project Integration Management Processes

1. Developing the project charter involves working with stakeholders to create the document that formally authorizes a project—the charter.
2. Developing the project management plan involves coordinating all planning efforts to create a consistent, coherent document—the project management plan.
3. Directing and managing project work involves carrying out the project management plan by performing the activities included in it.

# Project Integration Management Processes (cont'd)

4. Monitoring and controlling project work involves overseeing activities to meet the performance objectives of the project
5. Performing integrated change control involves identifying, evaluating, and managing changes throughout the project life cycle.
6. Closing the project or phase involves finalizing all activities to formally close the project or phase.

# Project Integration Management Summary

## Initiating

Process: **Develop project charter**

Output: Project charter

## Planning

Process: **Develop project management plan**

Output: Project management plan

## Executing

Process: **Direct and manage project work**

Outputs: Deliverables, work performance data, change requests, project management plan updates, project documents updates

## Monitoring and Controlling

Process: **Monitor and control project work**

Outputs: Change requests, project management plan updates, project documents updates

Process: **Perform integrated change control**

Outputs: Approved change requests, change log, project management plan updates, project documents updates

## Closing

Process: **Close project or phase**

Outputs: Final product, service, or result transition; organizational process assets updates

**Project Start**

**Project Finish**

# Performing Integrated Change Control

- Three main objectives are:
  - Influencing the factors that create changes to ensure that changes are beneficial
  - Determining that a change has occurred
  - Managing actual changes as they occur

# Change Control on Information Technology Projects

- **Former view:** The project team should strive to do exactly what was planned on time and within budget.
- **Problem:** Stakeholders rarely agreed up-front on the project scope, and time and cost estimates were inaccurate.
- **Modern view:** Project management is a process of constant communication and negotiation.
- **Solution:** Changes are often beneficial, and the project team should plan for them.

# Change Control System

- A change control system is a formal, documented process that describes when and how official project documents and work may be changed.
- Describes who is authorized to make changes and how to make them

# Change Control Board (CCB)

- A change control board is a formal group of people responsible for approving or rejecting changes on a project.
- CCBs provide guidelines for preparing change requests, evaluate change requests, and manage the implementation of approved changes.
- Includes stakeholders from the entire organization.

# Making Timely Changes

- Some CCBs only meet occasionally, so it may take too long for changes to occur.
- Some organizations have policies in place for time-sensitive changes:
  - “48-hour policy” allows project team members to make decisions, then they have 48 hours to reverse the decision pending senior management approval
  - Delegate changes to the lowest level possible, but keep everyone informed of changes

# Configuration Management

- Configuration management ensures that the descriptions of the project's products are correct and complete.
- Involves identifying and controlling the functional and physical design characteristics of products and their support documentation.
- Configuration management specialists identify and document configuration requirements, control changes, record and report changes, and audit the products to verify conformance to requirements.

# Suggestions for Performing Integrated Change Control

View project management as a process of constant communication and negotiation.

Plan for change.

- Establish a formal change control system, including a change control board (CCB).
- Use effective configuration management.
- Define procedures for making timely decisions on smaller changes.
- Use written and oral performance reports to help identify and manage change.
- Use project management and other software to help manage and communicate changes.

Focus on leading the project team and meeting overall project goals and expectations.

# Project Cost Management

# Learning Objectives

- Understand the importance of project cost management.
- Explain basic project cost management principles, concepts, and terms.
- Describe the process of planning cost management.
- Discuss different types of cost estimates and methods for preparing them.

# Learning Objectives

- Understand the processes of determining a budget and preparing a cost estimate for an information technology (IT) project.
- Understand the benefits of earned value management.

# The Importance of Project Cost Management

- IT projects have a poor track record for meeting budget goals.
- The CHAOS studies found the average cost overrun (the additional percentage or dollar amount by which actual costs exceed estimates) ranged from 180 percent in 1994 to 45 percent in 2001.
- A 2011 Harvard Business Review study reported an average cost overrun of 27 percent. The most important finding was the discovery of a large number of gigantic overages or “black swans”.

# What is Cost and Project Cost Management?

- Cost is a resource sacrificed or foregone to achieve a specific objective or something given up in exchange.
- Costs are usually measured in monetary units like dollars.
- Project cost management includes the processes required to ensure that the project is completed within an approved budget.

# Project Cost Management Processes

- **Planning cost management:** Determining the policies, procedures, and documentation that will be used for planning, executing, and controlling project cost.
- • •
- **Estimating costs:** Developing an approximation or estimate of the costs of the resources needed to complete a project.
- • •
- **Determining the budget:** Allocating the overall cost estimate to individual work items to establish a baseline for measuring performance.
- **Controlling costs:** Controlling changes to the project budget.

# Project Cost Management Summary

## Planning

Process: **Plan cost management**

Outputs: Cost management plan

Process: **Estimate costs**

Outputs: Activity cost estimates, basis of estimates, project documents updates

Process: **Determine budget**

Outputs: Cost baseline, project funding requirements, project documents updates

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## Monitoring and Controlling

Process: **Control costs**

Outputs: Work performance information, cost forecasts, change requests, project management plan updates, project documents updates, organizational process assets updates

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Project Start

Project Finish

# Basic Principles of Cost Management

- Most members of an executive board better understand and are more interested in financial terms than IT terms, so IT project managers must speak their language:
  - Profits are revenues minus expenditures
  - Profit margin is the ratio of revenues to profits
  - Life cycle costing considers the total cost of ownership, or development plus support costs, for a project
  - Cash flow analysis determines the estimated annual costs and benefits for a project and the resulting annual cash flow

# Types of Costs and Benefits

- **Tangible costs** or benefits are those costs or benefits that an organization can easily measure in dollars.
- **Intangible costs** or benefits are costs or benefits that are difficult to measure in monetary terms.
- **Direct costs** are costs that can be directly related to producing the products and services of the project.
- **Indirect costs** are costs that are not directly related to the products or services of the project but are indirectly related to performing the project.
- **Sunk cost** is money that has been spent in the past; when deciding what projects to invest in or continue, you should not include sunk costs.

# More Basic Principles of Cost Management

- Learning curve theory states that when many items are produced repetitively, the unit cost of those items decreases in a regular pattern as more units are produced.
- Reserves are dollars included in a cost estimate to mitigate cost risk by allowing for future situations that are difficult to predict:
  - Contingency reserves allow for future situations that may be partially planned for (sometimes called known unknowns) and are included in the project cost baseline.
  - Management reserves allow for future situations that are unpredictable (sometimes called unknown unknowns).

# Planning Cost Management

- The project team uses expert judgment, analytical techniques, and meetings to develop the cost management plan.
- A cost management plan includes:
  - Level of accuracy and units of measure
  - Organizational procedure links
  - Control thresholds
  - Rules of performance measurement
  - Reporting formats
  - Process descriptions

# Estimating Costs

- Project managers must take cost estimates seriously if they want to complete projects within budget constraints.
- It's important to know the types of cost estimates, how to prepare cost estimates, and typical problems associated with IT cost estimates.

# Types of Cost Estimates

| Type of Estimate               | When Done   | Why Done   | How Accurate         |
|--------------------------------|---|--|----------------------|
| Rough Order of Magnitude (ROM) | Very early in the project life cycle, often 3–5 years before project completion | Provides estimate of cost for selection decisions      | <u>-50% to +100%</u> |
| Budgetary                      | Early, 1–2 years out  | Puts dollars in the budget plans                       | <u>-10% to +25%</u>  |
| Definitive                     | Later in the project, less than 1 year out                                      | Provides details for purchases, estimates actual costs | <u>-5% to +10%</u>   |

# Cost Estimation Tools and Techniques

- Basic tools and techniques for cost estimates:
  - **Analogous or top-down estimates:** use the actual cost of a previous, similar project as the basis for estimating the cost of the current project.
  - **Bottom-up estimates:** involve estimating individual work items or activities and summing them to get a project total.
  - Parametric modeling uses project characteristics (parameters) in a mathematical model to estimate project costs.

# Typical Problems with IT Cost Estimates

cost estimation vala tiyn aula meke kata krnne

- Estimates are done too quickly.
- People lack estimating experience.
- Human beings are biased toward underestimation.
- Management desires accuracy.

# Determining the Budget

- Cost budgeting involves allocating the project cost estimate to individual work items over time.
- The WBS is a required input to the cost budgeting process since it defines the work items.
- Important goal is to produce a cost baseline:
  - A time-phased budget that project managers use to measure and monitor cost performance.

# Controlling Costs

- Project cost control includes:

- Monitoring cost performance.
- Ensuring that only appropriate project changes are included in a revised cost baseline.
- Informing project stakeholders of authorized changes to the project that will affect costs.

- Many organizations around the globe have problems with cost control.

# Earned Value Management (EVM)

- **Earned value management (EVM)** is a methodology that combines scope, schedule, and resource measurements to assess project performance and progress.

Assume api project ekk baragannv eke main items 5k tynva. then api kbynva value of each of these tasks is 100\$. So, then PV = 500\$.

Earned value is assume after one month we have completed 3 tasks. EV = 300\$  
But to complete that 3 tasks i have spent 1000\$

- **Planned value (PV)** is the authorized budget assigned to scheduled work.
- **Earned value (EV)** is a measure of work performed expressed in terms of the budget authorized for that work.
- **Actual cost (AC)** is the realized cost incurred for the work performed on an activity during a specific time period.

# Variance Calculations

- **Schedule Variance (SV)** is a measure of schedule performance expressed as the difference between the earned value and the planned value.

SV = 300 - 500 = -200

$$\boxed{SV = EV - PV}$$

SV value is minus means, we are lacking behind. its mean we are behind the schedule

- It is the amount by which the project is ahead or behind the planned delivery date, at a given point in time. It is a measure of schedule performance on a project.

# Variance Calculations cont..

this mean how much of budget shortage do we have

- **Cost variance (CV)** is the amount of budget shortage or excess at a given point in time, expressed as the **difference between earned value and the actual cost**.

$$CV = 300 - 1000 = -700\$$$

$$\boxed{CV = EV - AC}$$

CV has minus value mean, having huge variance interns of cost. its mean i havent any profit. im lost

- It is a measure of cost performance on a project.
- Budget at Completion (BAC) is the total approved budget for the project.
- Therefore, Variance at Completion (VAC) is:  
$$VAC = BAC - AC$$
, where AC is the total amount spent for the project

# Performance Calculations

- **Schedule Performance Index (SPI)** is a measure of the schedule efficiency expressed as the ratio of earned value to planned value. It measures how efficiently the project team is using its time.

SPI = 300 /500

$$\boxed{\mathbf{SPI = EV / PV}}$$

its value is less than one means we are going behind schedule. its = 1 mean we are going with schedule and its > 1 mean we faster than schedule

# Performance Calculations cont..

- **Cost Performance Index (CPI)** is a measure of the cost efficiency of budgeted resources, expressed as a ratio of earned value to actual cost.

$$\text{CPI} = \text{EV} / \text{AC}$$

CPI is minus value mean we actually lost

$$\text{CPI} = 300/1000$$

- It is considered the most critical EVM metric and measures the cost efficiency for the work completed.

# Forecasting

- As the project progresses, the project team may develop a forecast for the **Estimate at Completion (EAC)** that may differ from the **Budget at Completion (BAC)** based on the project performance.

$$\text{EAC} = \text{AC} + \text{ETC}$$

Where ETC is estimate to complete

# Forecasting cont..

- EAC forecast for ETC work performed at the budgeted rate:

$$\text{EAC} = \text{AC} + (\text{BAC} - \text{EV})$$

- EAC forecast for ETC work performed at the present CPI:

$$\text{EAC} = \text{BAC} / \text{CPI}$$

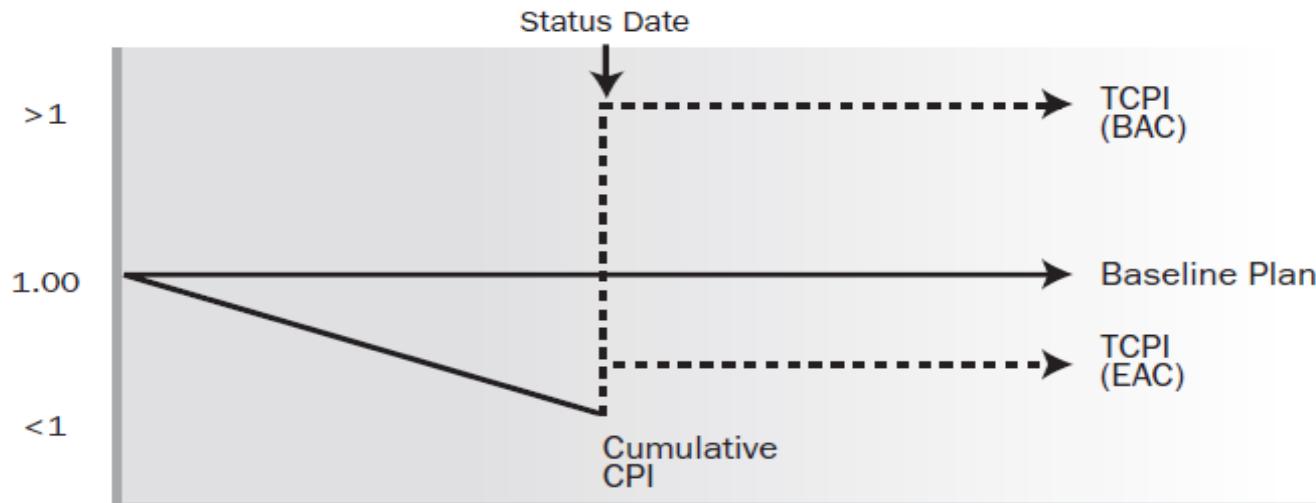
- EAC forecast for ETC work considering both SPI and CPI factors:

$$\text{EAC} = \text{AC} + [(\text{BAC} - \text{EV}) / (\text{CPI} \times \text{SPI})]$$

# Forecasting cont..

- **To-Complete Performance Index (TCPI)** is a measure of the cost performance that is required to be achieved with the remaining resources in order to meet a specified management goal, expressed as the ratio of the cost to finish the outstanding work to the remaining budget.

**TCPI = Work Remaining/ Funds Remaining**



Formula:

$$\frac{\text{Work Remaining (BAC-EV)}}{\text{Funds Remaining (BAC-AC) or (EAC-AC)}} = \text{TCPI}$$

## Forecasting cont..

- A TCPI value equal to 1.0 means you are right on budget, and as long as you maintain the present cost performance index (CPI), you should not exceed the project budget.
- A TCPI value greater than 1.0 means you need to take a stricter cost management approach, or you will exceed your budget at completion (BAC).
- A TCPI value less than 1.0 indicates you are within your budget and have done an excellent job of managing project costs.
- **Estimated Duration to Complete:**

**Estimated Duration to Complete = Original Duration / SPI**

# Exercise

- An organization has spent a total expenditure to date of 15,000,000 from its total budget of 100,000,000. They have completed 40% of the work till now. The budgeted cost of the work scheduled for the current date is 10,000,000.
- Find the following:
  - Cost Variance (CV)
  - Schedule Variance (SV)
  - Variance at Completion (VAC)
  - Estimate at Completion (EAC)

# Exercise - Solution

- According to the given data, the project has an earned value of 40% out of the entire budget at completion(BAC). Thus;

$$EV = 40\% * BAC.$$

$$EV = 0.4 * 100,000,000$$

$$EV = 40,000,000$$

- They have spent 15,000,000 of an Actual Cost (AC) to complete this 40% of work. Thus;

$$CV = EV - AC$$

$$CV = 40,000,000 - 15,000,000$$

$$CV = 25,000,000$$

# Exercise – Solution cont..

- The Planned Value is the budgeted scheduled cost for the current date which has been given as 10,000,000. Thus;
  - $SV = EV - PV$   
 $SV = 40,000,000 - 10,000,000 = 30,000,000$
  - $VAC = BAC - AC$   
 $VAC = 100,000,000 - 15,000,000 = 85,000,000$
  - $EAC = AC + (BAC - EV)$   
 $EAC = 15,000,000 + (100,000,000 - 40,000,000) = 75,000,000$

# Chapter Summary

- Project cost management is a traditionally weak area of IT projects, and project managers must work to improve their ability to deliver projects within approved budgets.
- Main processes include:
  - Plan cost management
  - Estimate costs
  - Determine the budget
  - Control costs



# SLIIT

*Discover Your Future*

# Project Quality Management

# Learning Objectives

- Understand the importance of project quality management for information technology (IT) products and services.
- Define project quality management and understand how quality relates to various aspects of IT projects.
- Describe quality management planning and how quality and scope management are related.

# Learning Objectives

- Discuss the importance of quality assurance.
- Explain the main outputs of the quality control process.
- Understand the tools and techniques for quality control, such as the Seven Basic Tools of Quality, statistical sampling, Six Sigma, and testing.

# Learning Objectives

- Summarize the contributions of noteworthy quality experts to modern quality management.
- Describe how leadership, the cost of quality, organizational influences, expectations, cultural differences, and maturity models relate to improving quality in IT projects.

# What Went Wrong?

- In 1986, two hospital patients died after receiving fatal doses of radiation from a Therac 25 machine after a software problem caused the machine to ignore calibration data.
- In one of the biggest software errors in banking history, Chemical Bank mistakenly deducted about \$15 million from more than 100,000 customer accounts

# What Went Wrong?

- In August 2008, the Privacy Rights Clearinghouse stated that more than 236 million data records of U.S. residents have been exposed due to security breaches since January 2005.
- In March 2012, Consumer Reports listed several recalls on its Web site in less than 10 days, including LED lights overheating, five different models of cars having problems

# What Is Project Quality?

- The International Organization for Standardization (ISO) defines quality as “**the degree to which a set of inherent 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

# What Is Project Quality Management?

- Project quality management ensures that the project will satisfy the needs for which it was undertaken.
- Processes include:
  - Planning quality management: Identifying which quality standards are relevant to the project and how to satisfy them; a metric is a standard of measurement
  - Performing quality assurance: Periodically evaluating overall project performance to ensure the project will satisfy the relevant quality standards
  - Performing quality control: Monitoring specific project results to ensure that they comply with the relevant quality standards

# Project Quality Management Summary

## Planning

Process: **Plan quality management**

Outputs: Quality management plan, process improvement plan, quality metrics, quality checklists, and project documents updates

---

## Executing

Process: **Perform quality assurance**

Outputs: Change requests, project management plan updates, project documents updates, and organizational process asset updates

---

## Monitoring and Controlling

Process: **Perform quality control**

Outputs: Quality control measurements, validated changes, validated deliverables, work performance information, change requests, project management plan updates, project documents updates, and organizational process asset updates

---

Project Start

Project Finish

# Planning Quality

- Implies the ability to anticipate situations and prepare actions to bring about the desired outcome.
- Important to prevent defects by:
  - Selecting proper materials
  - Training and indoctrinating people in quality
  - Planning a process that ensures the appropriate outcome

# Scope Aspects of IT Projects

- Functionality is the degree to which a system performs its intended function.
- Features are the system's special characteristics that appeal to users.
- System outputs are the screens and reports the system generates

# Scope Aspects of IT Projects

- Performance addresses how well a product or service performs the customer's intended use.
- Reliability is the ability of a product or service to perform as expected under normal conditions.
- Maintainability addresses the ease of performing maintenance on a product

# Controlling Quality

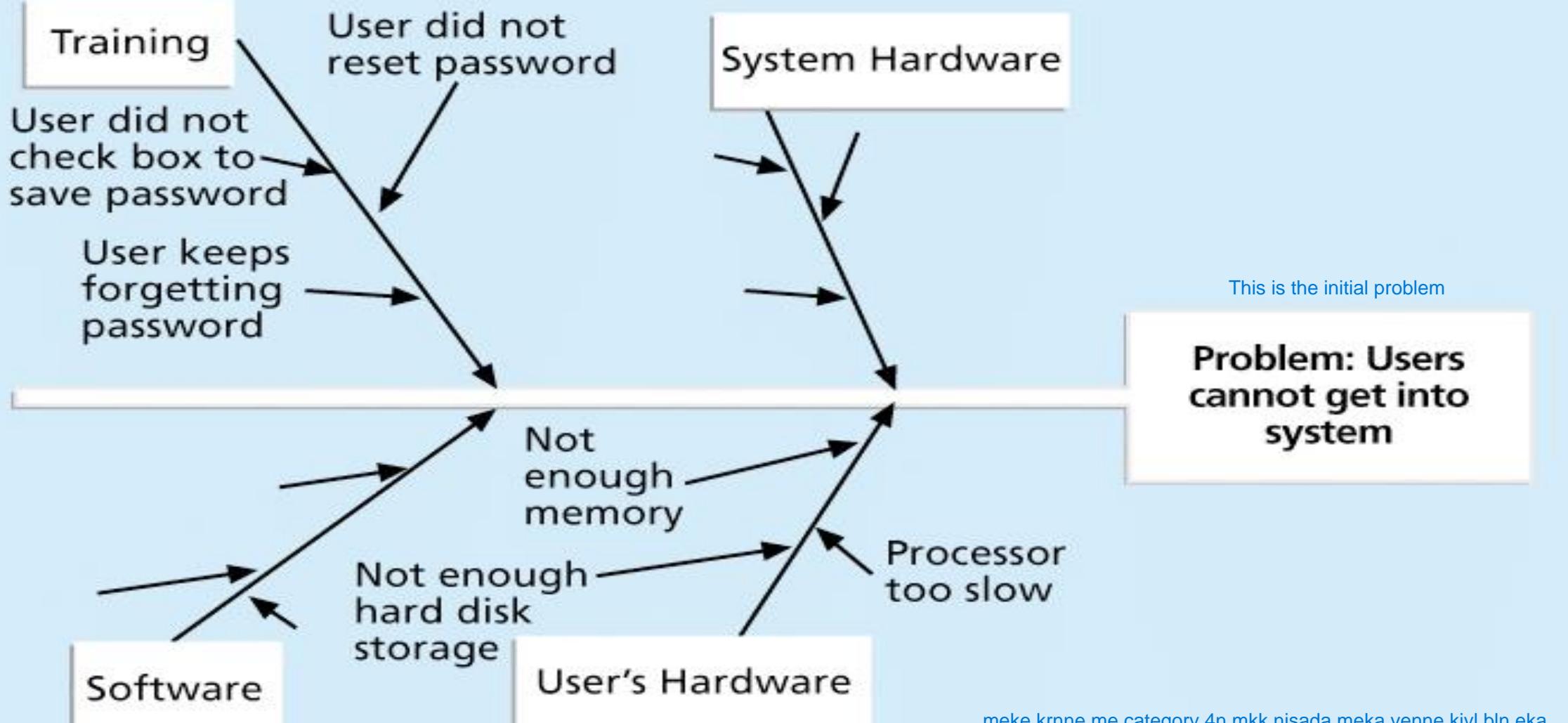
- The main outputs of quality control are:
  - Acceptance decisions
  - Rework
  - Process adjustments
- There are Seven Basic Tools of Quality that help in performing quality control

Palleha pink color eken dala tiyenne e 7

# Cause-and-Effect Diagrams

- Cause-and-effect diagrams trace complaints about quality problems back to the responsible production operations.
- They help you find the root cause of a problem.
- Also known as fishbone or Ishikawa diagrams.
- Can also use the 5 whys technique where you repeatedly ask the question “Why” (five is a good rule of thumb) to peel away the layers of symptoms that can lead to the root cause

# Sample Cause-and-Effect Diagram



This is the initial problem

**Problem:** Users cannot get into system

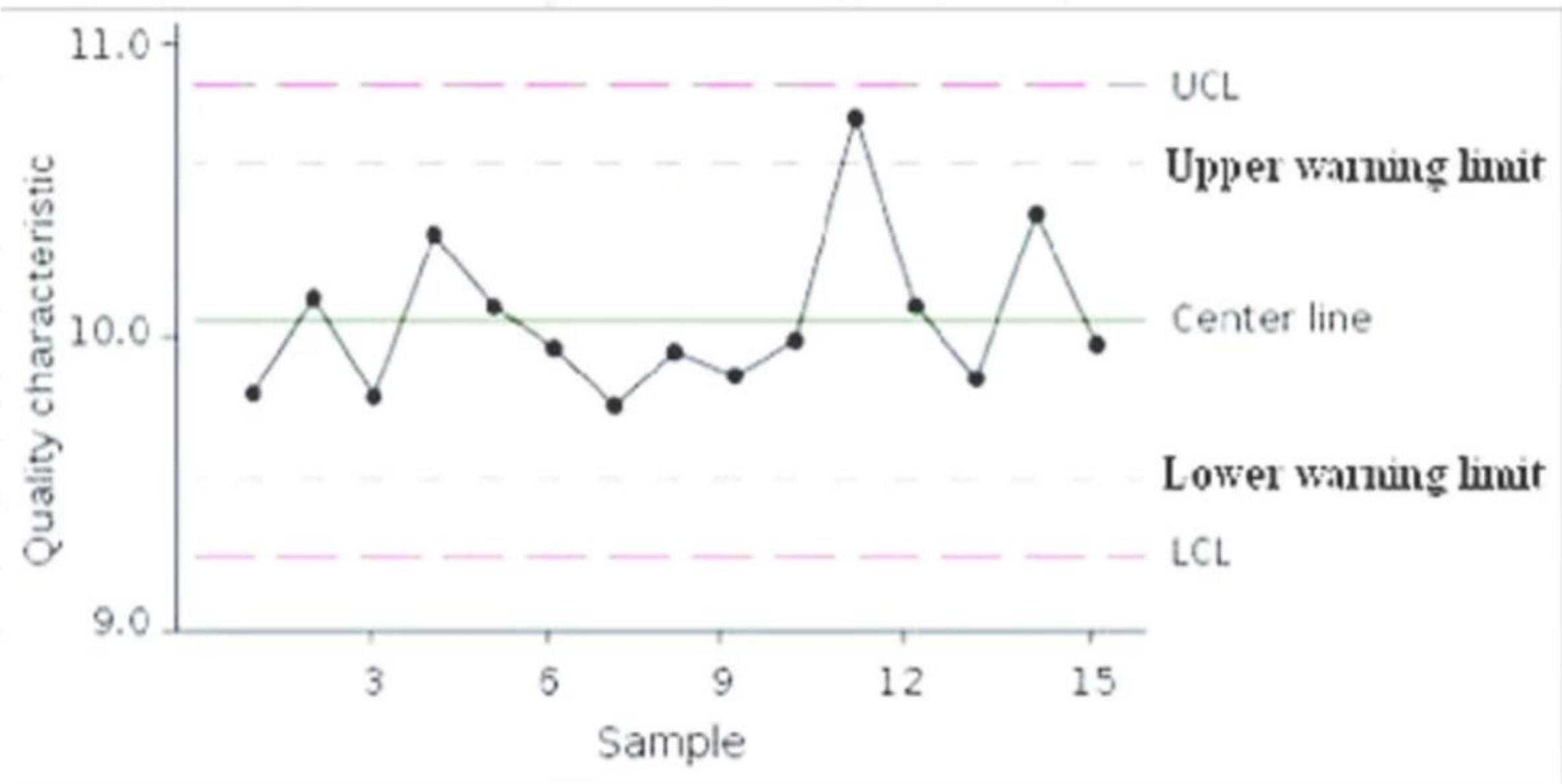
# Quality Control Charts

- A control chart is a graphic display of data that illustrates the results of a process over time.
- The main use of control charts is to prevent defects, rather than to detect or reject them.

# Quality Control Charts

- Quality control charts allow you to determine whether a process is in control or out of control
  - When a process is in control, any variations in the results of the process are created by random events; processes that are in control do not need to be adjusted
  - When a process is out of control, variations in the results of the process are caused by non-random events; you need to identify the causes of those non-random events and adjust the process to correct or eliminate them

# Quality Control Chart



# Checksheet

- A checksheet is used to collect and analyze data
- It is sometimes called a tally sheet or checklist, depending on its format
- In the example, most complaints arrive via text message, and there are more complaints on Monday and Tuesday than on other days of the week
- This information might be useful in improving the process for handling complaints

# Sample Checksheet

System Complaints

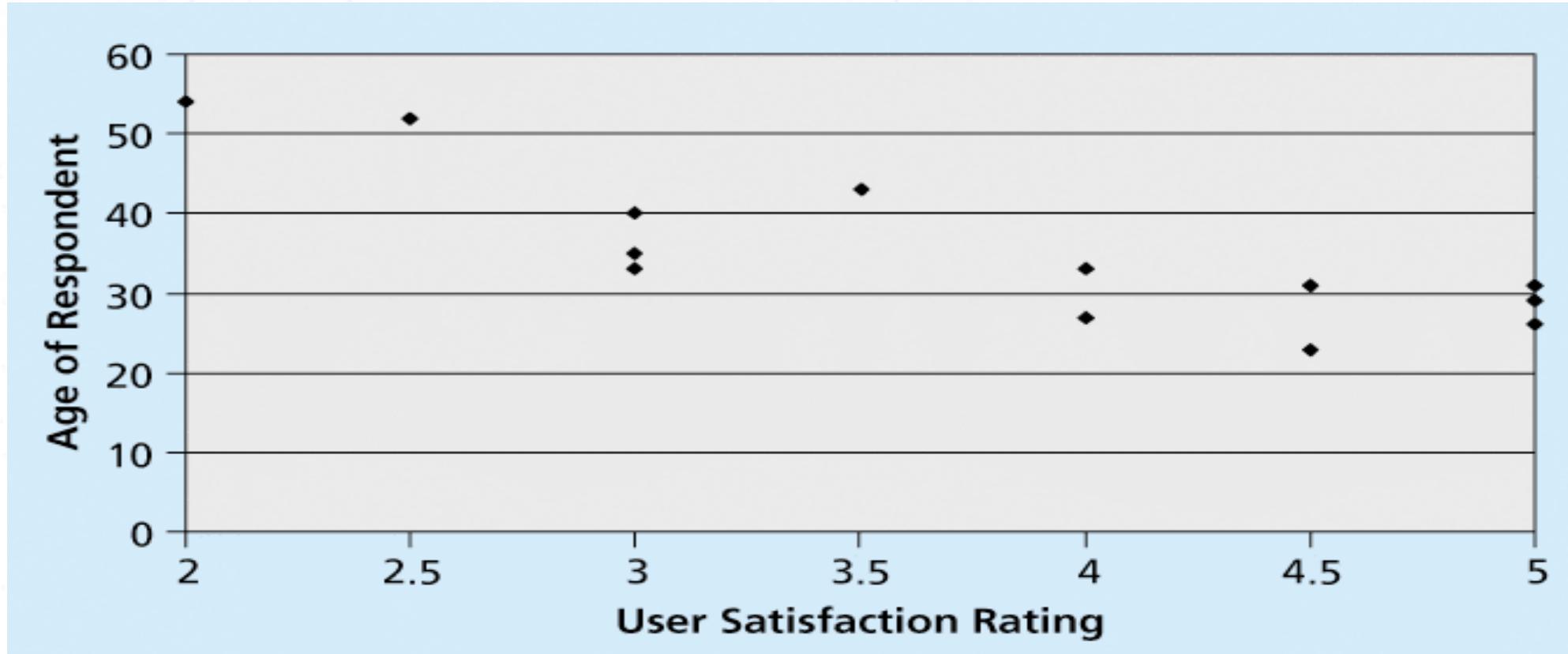
| Source     | Day    |         |           |          |        |          |        | Total |
|------------|--------|---------|-----------|----------|--------|----------|--------|-------|
|            | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |       |
| Email      |        |         |           |          |        |          |        | 12    |
| Text       |        |         |           |          |        |          |        | 29    |
| Phone call |        |         |           |          |        |          |        | 8     |
| Total      | 11     | 10      | 8         | 6        | 7      | 3        | 4      | 49    |

# Scatter Diagram

- A scatter diagram helps to show if there is a relationship between two variables.
- The closer data points are to a diagonal line, the more closely the two variables are related.

# Sample Scatter Diagram

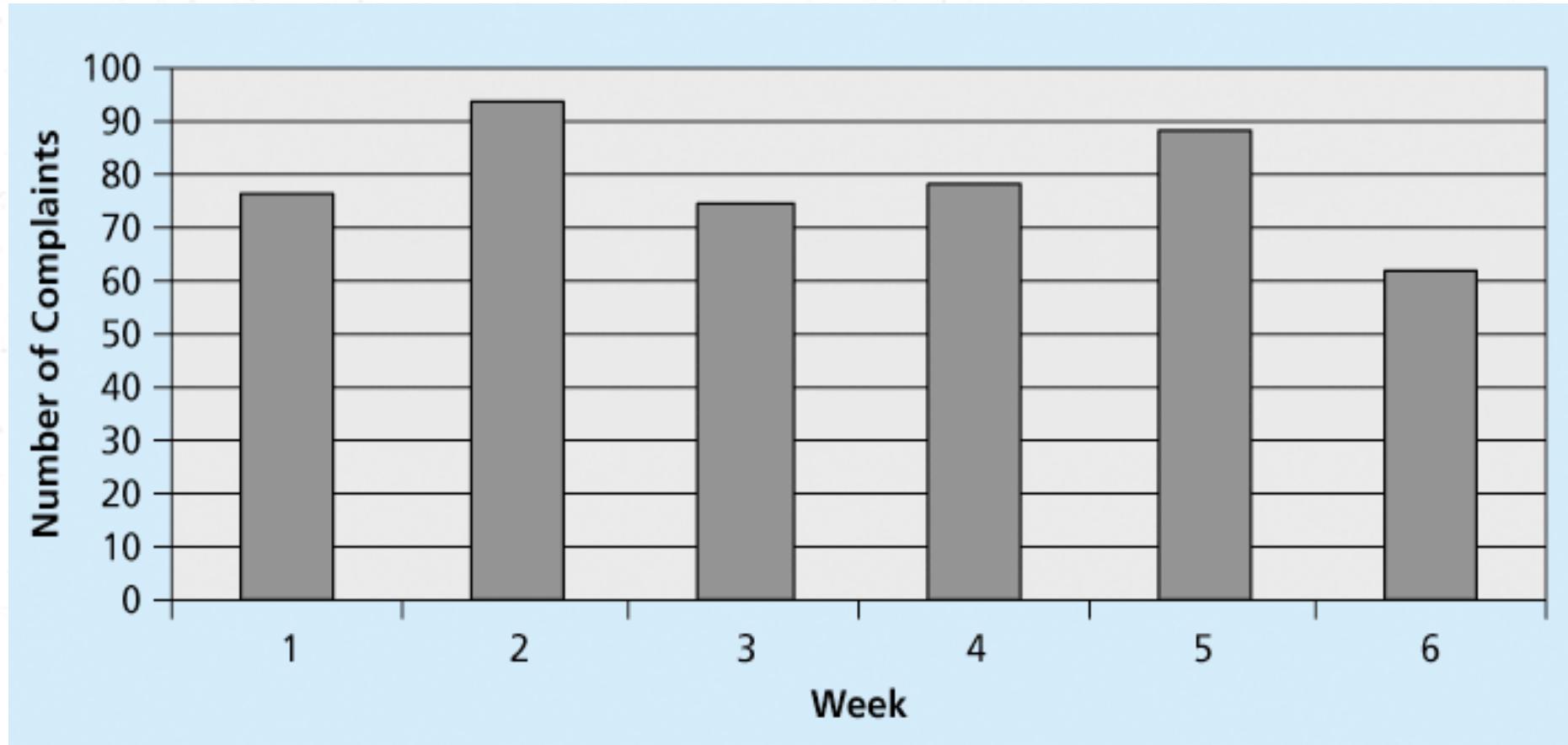
me diagram ekt anuva 50t vadi kattya me system ekt vadiya kamati na vge. mekt vadiyenm kamati 20-30 atara vge kttiya. 30t vadi tk adenekut innva 30-40 atara



# Histograms

- A histogram is a bar graph of a distribution of variables.
- Each bar represents an attribute or characteristic of a problem or situation, and the height of the bar represents its frequency.

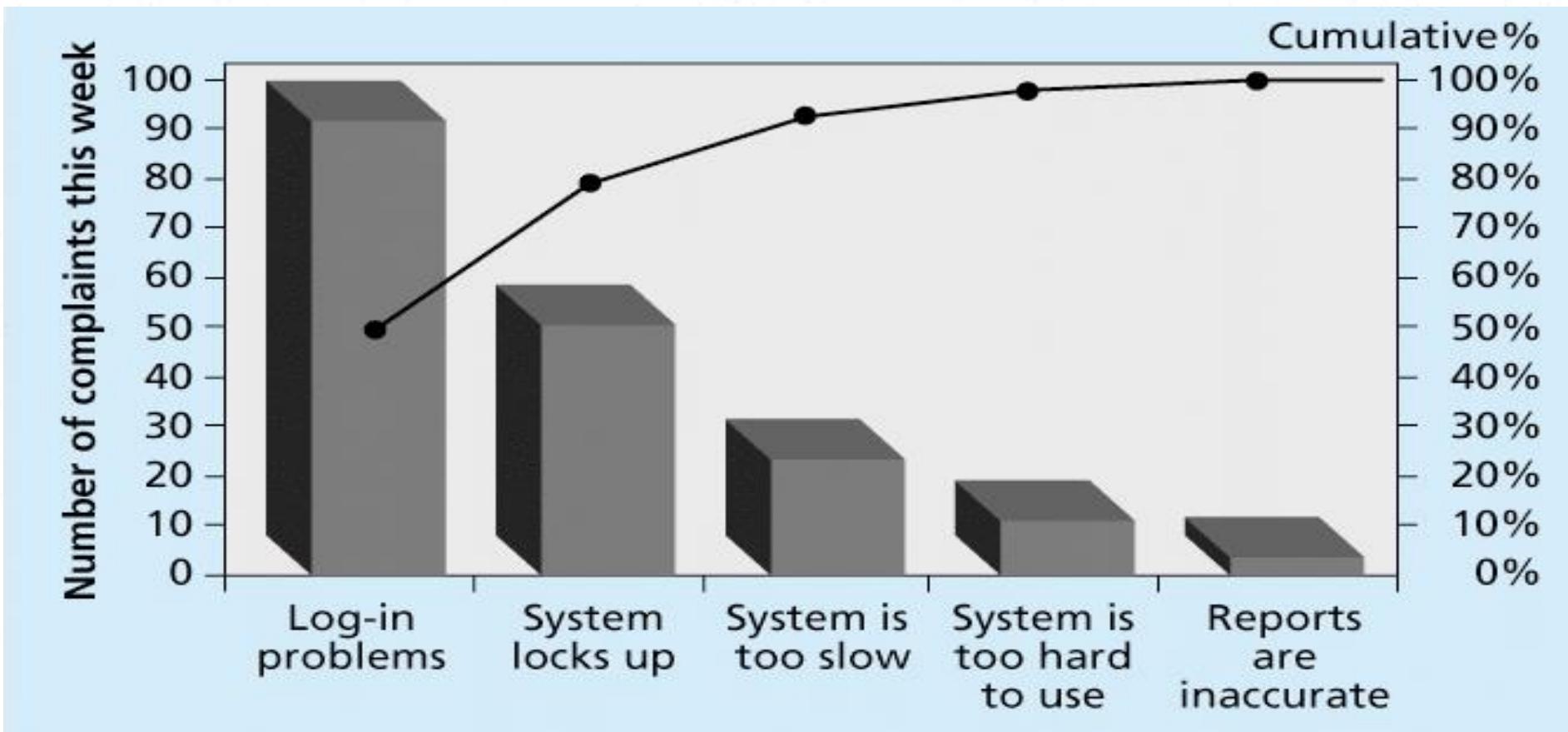
# Sample Histogram



# Pareto Charts

- A Pareto chart is a histogram that can help you identify and prioritize problem areas.
- Pareto analysis is also called the 80-20 rule, meaning that 80 percent of problems are often due to 20 percent of the causes

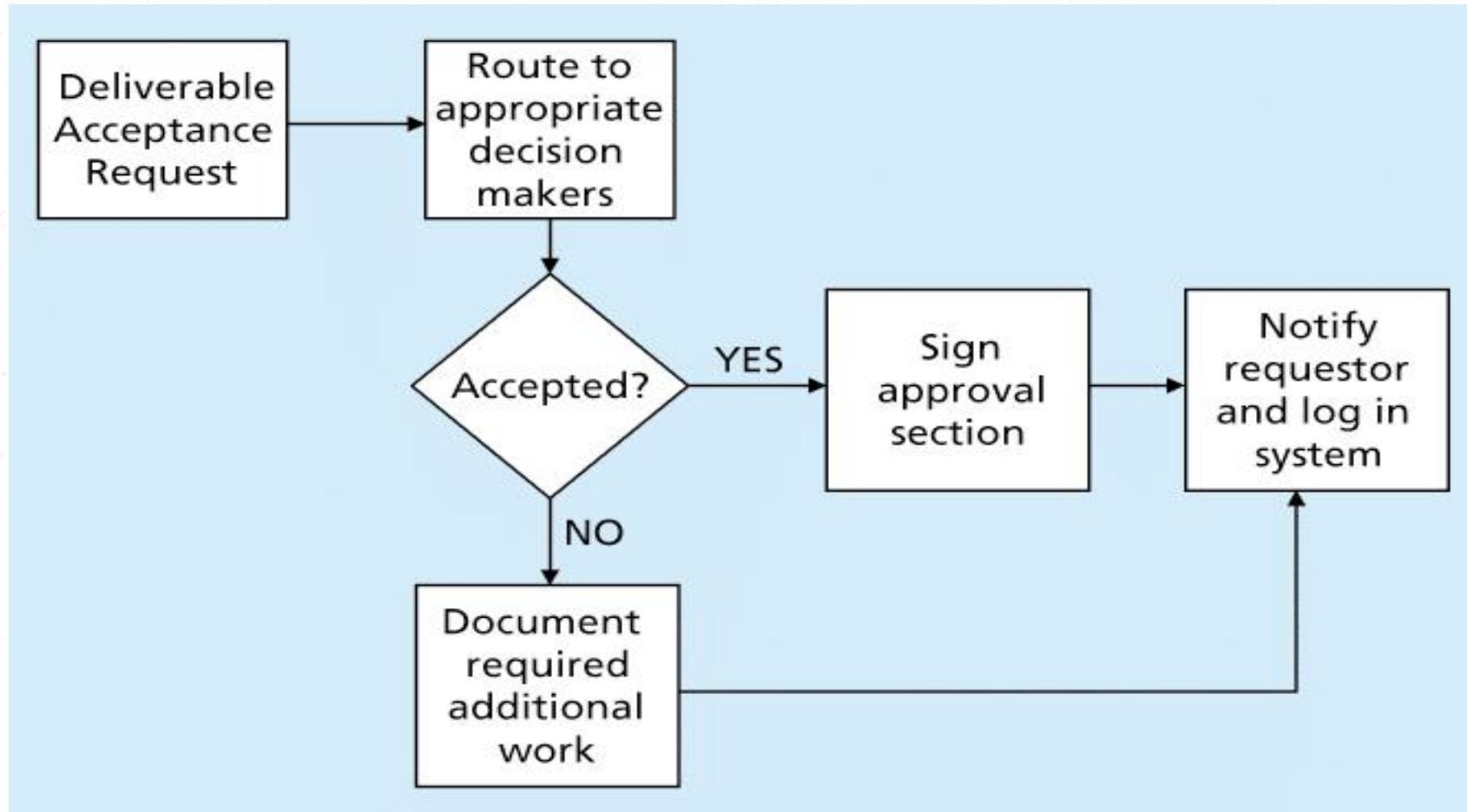
# Sample Pareto Chart



# Flowcharts

- Flowcharts are graphic displays of the logic and flow of processes that help you analyze how problems occur and how processes can be improved.
- They show activities, decision points, and the order of how information is processed

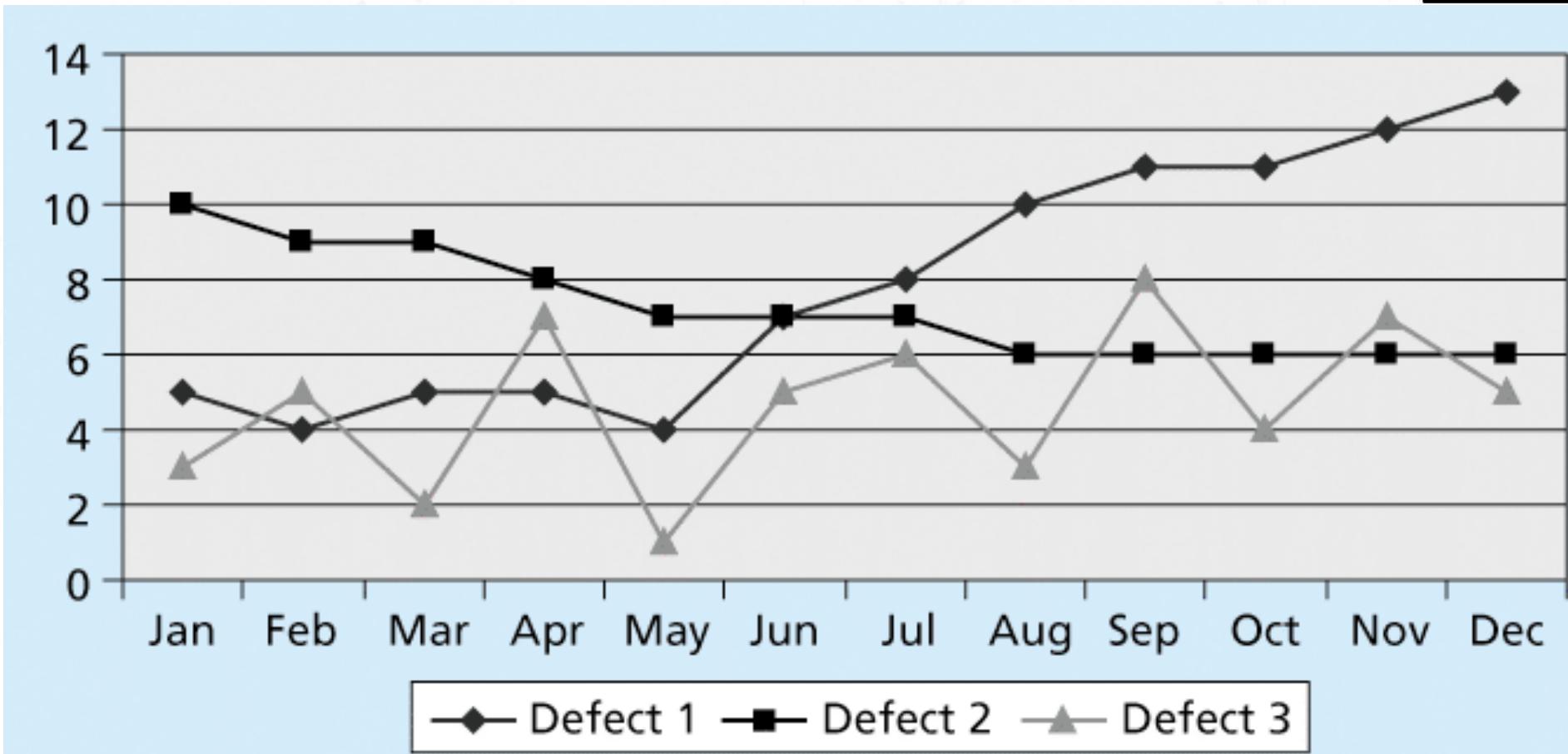
# Sample Flowchart



# Run Charts

- In addition to flowcharts, run charts are also used for stratification, a technique that shows data from a variety of sources to see if a pattern emerges.
- A run chart displays the history and pattern of variation of a process over time.
- You can use run charts to perform trend analysis and forecast future outcomes based on historical results.

# Sample Run Chart



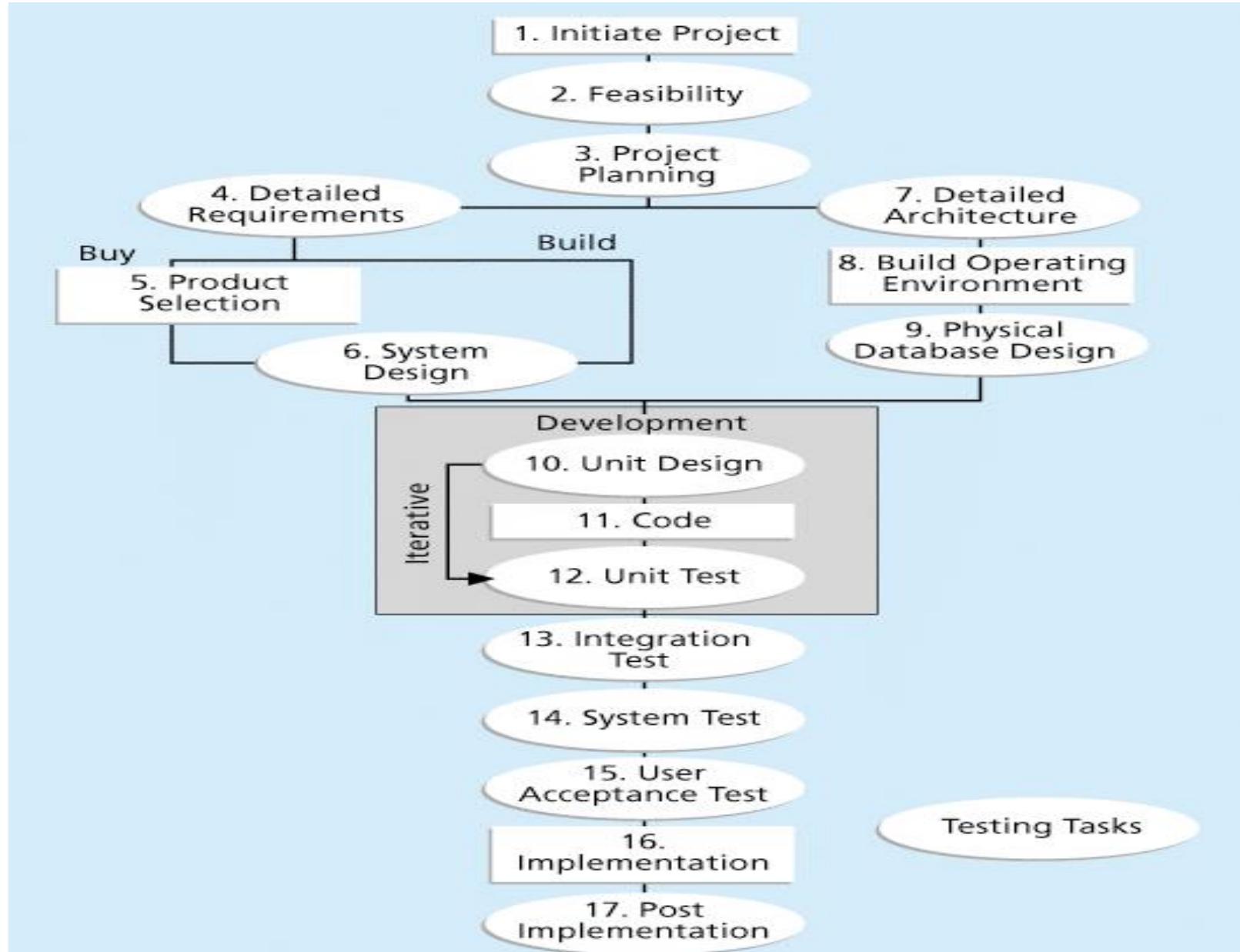
# Statistical Sampling

- 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

# Testing

- Many IT professionals think of testing as a stage that comes near the end of IT product development.
- Testing should be done during almost every phase of the IT product development life cycle

# Testing Tasks in the Software Development Life Cycle



# ISO Standards

- ISO 9000 is a quality system standard that:
  - Is a three-part, continuous cycle of planning, controlling, and documenting quality in an organization.
  - Provides minimum requirements needed for an organization to meet its quality certification standards.
  - Helps organizations around the world reduce costs and improve customer satisfaction

# Improving Information Technology 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

# Leadership

- As Joseph M. Juran said in 1945, “It is most important that top management be quality-minded. In the absence of sincere manifestation of interest at the top, little will happen below”\*
- A large percentage of quality problems are associated with management, not technical issues.
  - \*American Society for Quality (ASQ),  
[www.asqc.org/about/history/juran.html](http://www.asqc.org/about/history/juran.html).

# 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
- A study reported that software bugs cost the U.S. economy \$59.6 billion each year and that one third of the bugs could be eliminated by an improved testing infrastructure.

# Five Cost Categories Related to Quality

Preventing bug on happening in the first that's what we trying to do in prevention cost

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

We should make sure our processors are inline and spend sufficient money in order to improve the processors and make sure our processors will be resulting quality output than it was before

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

internal defect that we should encounter before end user see it. QA engineer will find these issues and then we will go head and fixed them

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

# Five Cost Categories Related to Quality

End customer sees the issue and report back u saint its not working as expected

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

capital cost of used to perform prevention and appraisal activities

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

## Organizational Influences, Workplace Factors, and Quality

- Study by DeMarco and Lister showed that organizational issues had a much greater influence on programmer productivity than the technical environment or programming languages.
- Programmer productivity varied by a factor of one to ten across organizations, but only by 21 percent within the same organization.
- Study found no correlation between productivity and programming language, years of experience, or salary.
- A dedicated workspace and a quiet work environment were key factors to improving programmer productivity

# Chapter Summary

- Project quality management ensures that the project will satisfy the needs for which it was undertaken.
- Main processes include:
  - Plan quality
  - Perform quality assurance
  - Perform quality control

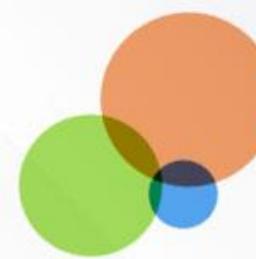


# **Project Stakeholder Management**



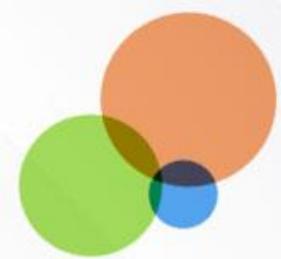
# Learning Objectives

- Understand the importance of project stakeholder management throughout the life of a project.
- Discuss the process of identifying stakeholders, how to create a stakeholder register, and how to perform a stakeholder analysis.
- Describe the contents of a stakeholder management plan.
- Understand the process of managing stakeholder engagement and how to use an issue log effectively.
- Explain methods for controlling stakeholder engagement.



# Project Stakeholder Management Processes

- **Identifying stakeholders:** Identifying everyone involved in the project or affected by it and determining the best ways to manage relationships with them.
- **Planning stakeholder management:** Determining strategies to effectively engage stakeholders.
- **Managing stakeholder engagement:** Communicating and working with project stakeholders to satisfy their needs and expectations, resolving issues, and fostering engagement in project decisions and activities.
- **Controlling stakeholder engagement:** Monitoring stakeholder relationships and adjusting plans and strategies for engaging stakeholders as needed.



# Stakeholder Engagement Process

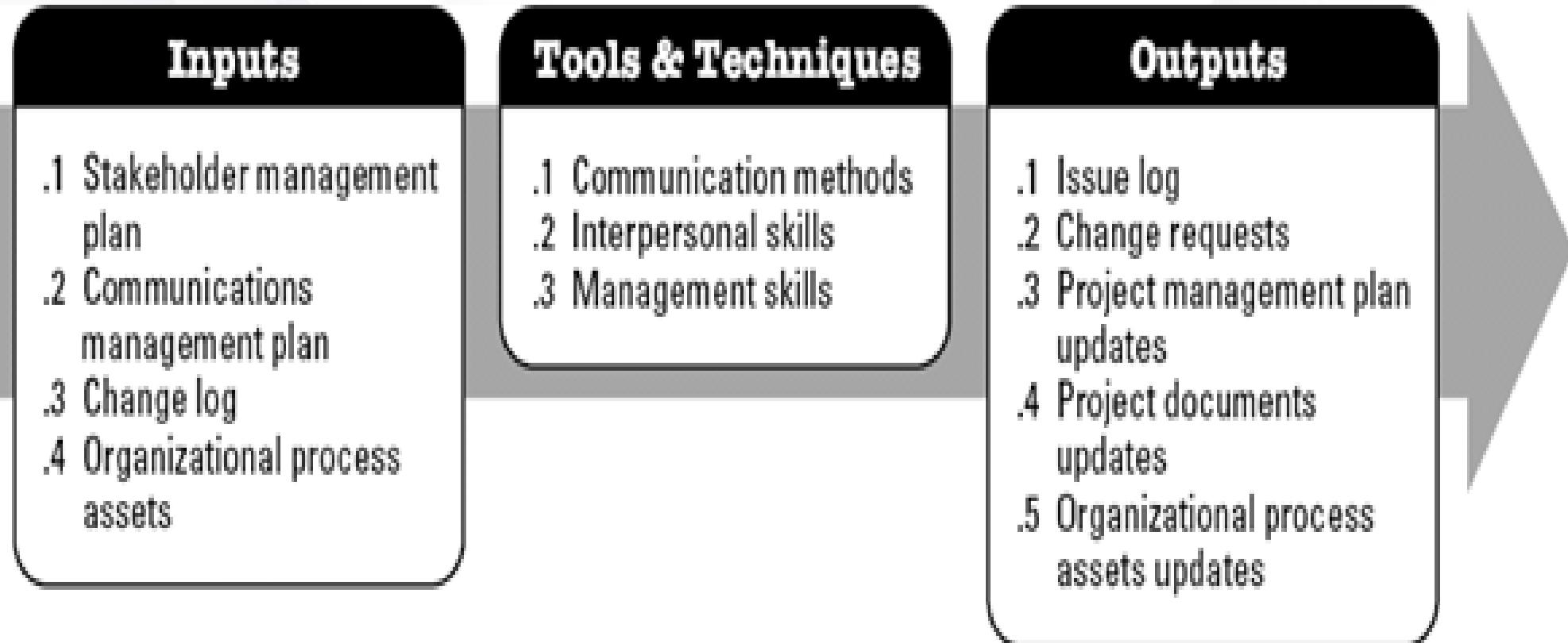
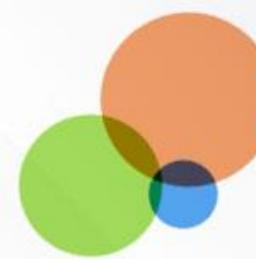


Figure 13-8. Manage Stakeholder Engagement: Inputs, Tools & Techniques, and Outputs



# Project Stakeholder Management Summary

## Initiating

Process: **Identify stakeholders**

Outputs: Stakeholder register

## Planning

Process: **Plan stakeholder management**

Outputs: Stakeholder management plan, project documents updates

## Executing

Process: **Manage stakeholder engagement**

Outputs: Issue log, change requests, project management plan updates, project documents updates, organizational process assets updates

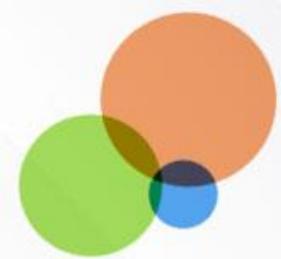
## Monitoring and Controlling

Process: **Control stakeholder engagement**

Outputs: Work performance information, change requests, project documents updates, organizational process assets updates

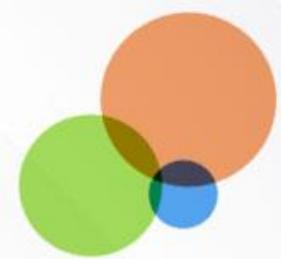
Project Start

Project Finish



# Identifying Stakeholders

- ***Internal project stakeholders*** generally include the project sponsor, project team, support staff, and internal customers for the project. Other internal stakeholders include top management, other functional managers, and other project managers because organizations have limited resources.
- ***External project stakeholders*** include the project's customers (if they are external to the organization), competitors, suppliers, and other external groups that are potentially involved in the project or affected by it, such as government officials and concerned citizens.

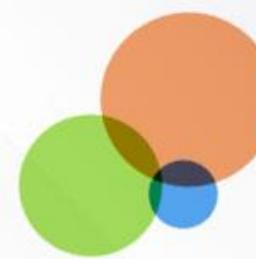


# Stakeholder Register

- A stakeholder register includes basic information on stakeholders:
  - **Identification information:** The stakeholders' names, positions, locations, roles in the project, and contact information.
  - **Assessment information:** The stakeholders' major requirements and expectations, potential influences, and phases of the project in which stakeholders have the most interest.
  - **Stakeholder classification:** Is the stakeholder internal or external to the organization? Is the stakeholder a supporter of the project or resistant to it?

# Sample Stakeholder Register

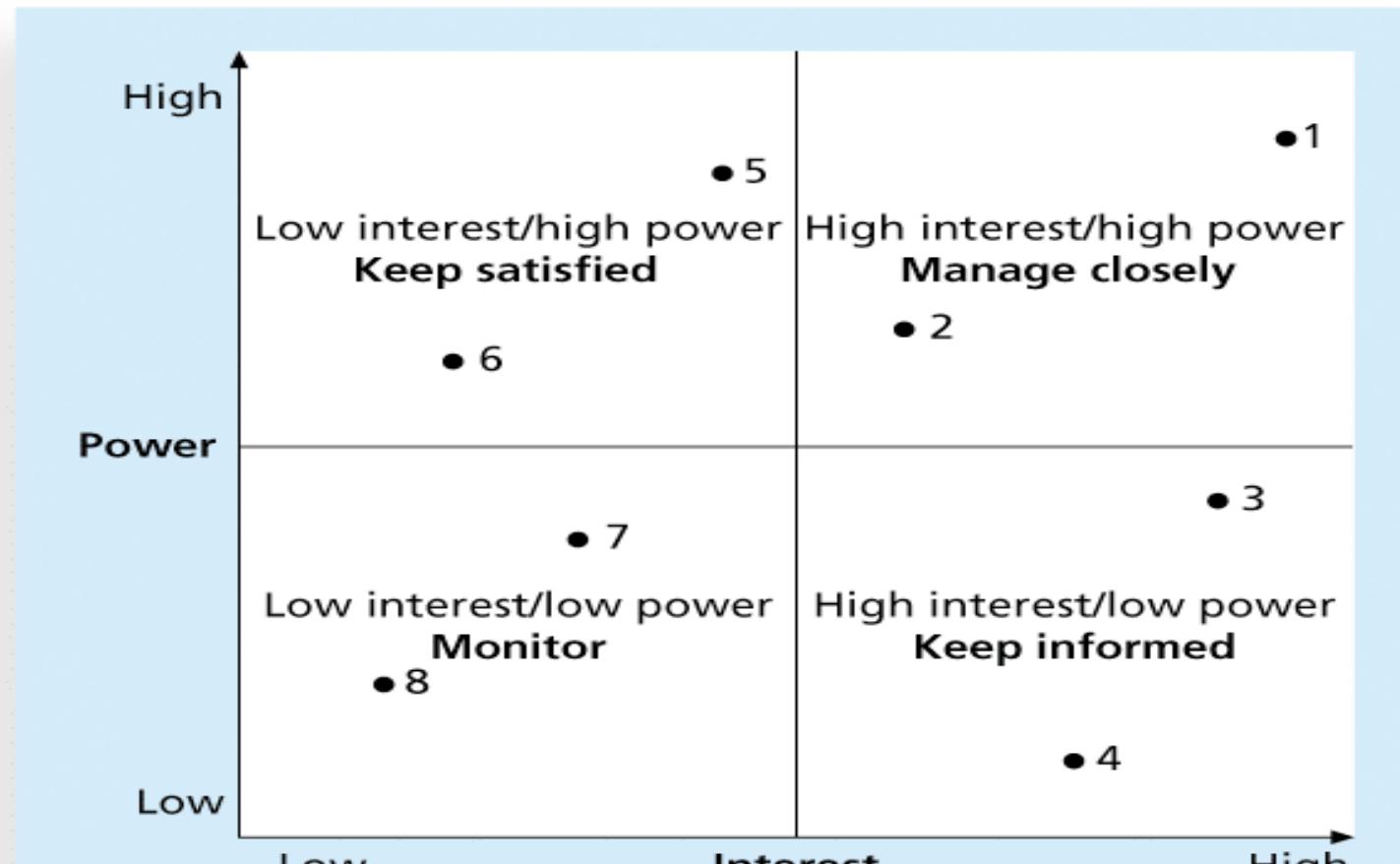
| Name      | Position             | Internal/<br>External | Project Role                       | Contact Information   |
|-----------|----------------------|-----------------------|------------------------------------|-----------------------|
| Stephen   | VP of Operations     | Internal              | Project sponsor                    | stephen@globaloil.com |
| Betsy     | CFO                  | Internal              | Senior manager, approves funds     | betsy@globaloil.com   |
| Chien     | CIO                  | Internal              | Senior manager, PM's boss          | chien@globaloil.com   |
| Ryan      | IT analyst           | Internal              | Team member                        | ryan@globaloil.com    |
| Lori      | Director, Accounting | Internal              | Senior manager                     | lori@globaloil.com    |
| Sanjay    | Director, Refineries | Internal              | Senior manager of largest refinery | sanjay@globaloil.com  |
| Debra     | Consultant           | External              | Project manager                    | debra@gmail.com       |
| Suppliers | Suppliers            | External              | Supply software                    | suppliers@gmail.com   |

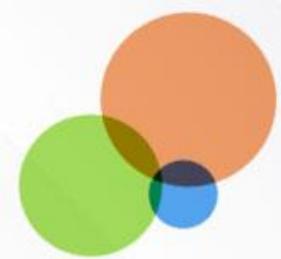


# Classifying Stakeholders

- After identifying key project stakeholders, you can use different classification models to determine an approach for managing stakeholder relationships.
- A **power/interest grid** can be used to group stakeholders based on their level of authority (power) and their level of concern (interest) for project outcomes.

# Power/Interest Grid



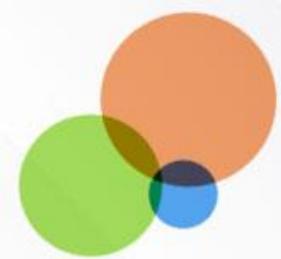


# Planning Stakeholder Management

- After identifying and analyzing stakeholders, project teams should develop a plan for management them.
- The stakeholder management plan can include:
  - Current and desired engagement levels
  - Interrelationships between stakeholders
  - Communication requirements
  - Potential management strategies for each stakeholders
  - Methods for updating the stakeholder management plan

# Sample Stakeholder Analysis

| Name    | Power/<br>Interest | Current<br>Engagement | Potential Management Strategies   |
|---------|--------------------|-----------------------|---|
| Stephen | High/high          | Leading               | Stephen can seem intimidating due to his physical stature and deep voice, but he has a great personality and sense of humor. He previously led a similar refinery upgrade program at another company and knows what he wants. Manage closely and ask for his advice as needed. He likes short, frequent updates in person.  |
| Chien   | High/<br>medium    | Resistant             | Chien is a very organized yet hardheaded man. He has been pushing corporate IT standards, and the system the PM and sponsor (Debra and Stephen) like best goes against those standards, even though it's the best solution for this project and the company as a whole. Need to convince him that this is okay and that people still respect his work and position. |
| Ryan    | Medium/<br>high    | Supportive            | Ryan has been with the company for several years and is well respected, but he feels threatened by Debra. He also resents her getting paid more than he does. He wants to please his boss, Chien, first and foremost. Need to convince him that the suggested solution is in everyone's best interest.  |
| Betsy   | High/low           | Neutral               | Very professional, logical person. Gets along well with Chien. She has supported Debra in approving past projects with strong business cases. Provide detailed financial justification for the suggested solution to keep her satisfied. Also ask her to talk to Chien on Debra's behalf.   |

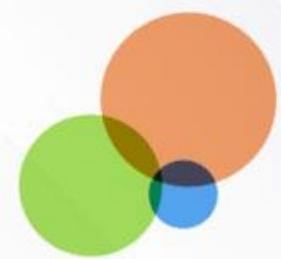


# Managing Stakeholder Engagement

- Project success is often measured in terms of customer/sponsor satisfaction.
- Project sponsors often rank scope, time, and cost goals in order of importance and provide guidelines on how to balance the triple constraint.
- This ranking can be shown in an expectations management matrix to help clarify expectations.

# Expectations Management Matrix

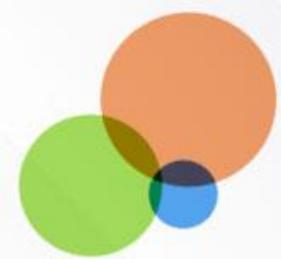
| Measure of Success   | Priority | Expectations   | Guidelines  |
|----------------------|----------|--|---|
| Scope                | 1        | The scope statement clearly defines mandatory requirements and optional requirements.  | Focus on meeting mandatory requirements before considering optional ones. In this case, following corporate IT standards is optional.                                 |
| Time                 | 1        | There is little give in the project completion date. The schedule is very realistic.   | The project sponsor must be alerted if any issues might affect meeting schedule goals.  |
| Cost                 | 3        | This project is crucial to the organization. If you can clearly justify the need for more funds, they can be made available.                     | There are strict rules for project expenditures and escalation procedures. Cost is very important, but it takes a back seat to meeting schedule and then scope goals. |
| Technology/standards | 2        | There are several potential solutions available, but only one that meets all of the sponsor's technical requirements, especially for accounting. | While corporate IT standards are important, an exception makes sense in this case.  |



# Issue Logs

- Understanding the stakeholders' expectations can help in managing issues.
- Issues should be documented in an **issue log**, a tool used to document, monitor, and track issues that need resolution.
- Unresolved issues can be a major source of conflict and result in stakeholder expectations not being met.
- Issue logs can address other knowledge areas as well.

# Sample Issue Log



# Controlling Stakeholder Engagement

- You cannot control stakeholders, but you can control their level of engagement.
- Engagement involves a dialogue in which people seek understanding and solutions to issues of mutual concern.
- It is important to set the proper tone at the start of a project.



# Chapter Summary

- Managing stakeholders is now the tenth knowledge management area.
- Processes include:
  - Identify stakeholders
  - Plan stakeholder management
  - Manage stakeholder engagement
  - Control stakeholder engagement



# **Project Risk Management**



# Learning Objectives

- Understand risk and the importance of good project risk management.
- Discuss the elements of planning risk management and the contents of a risk management plan.
- List common sources of risks on information technology (IT) projects.
- Describe the process of identifying risks and create a risk register.



# Learning Objectives (cont'd)

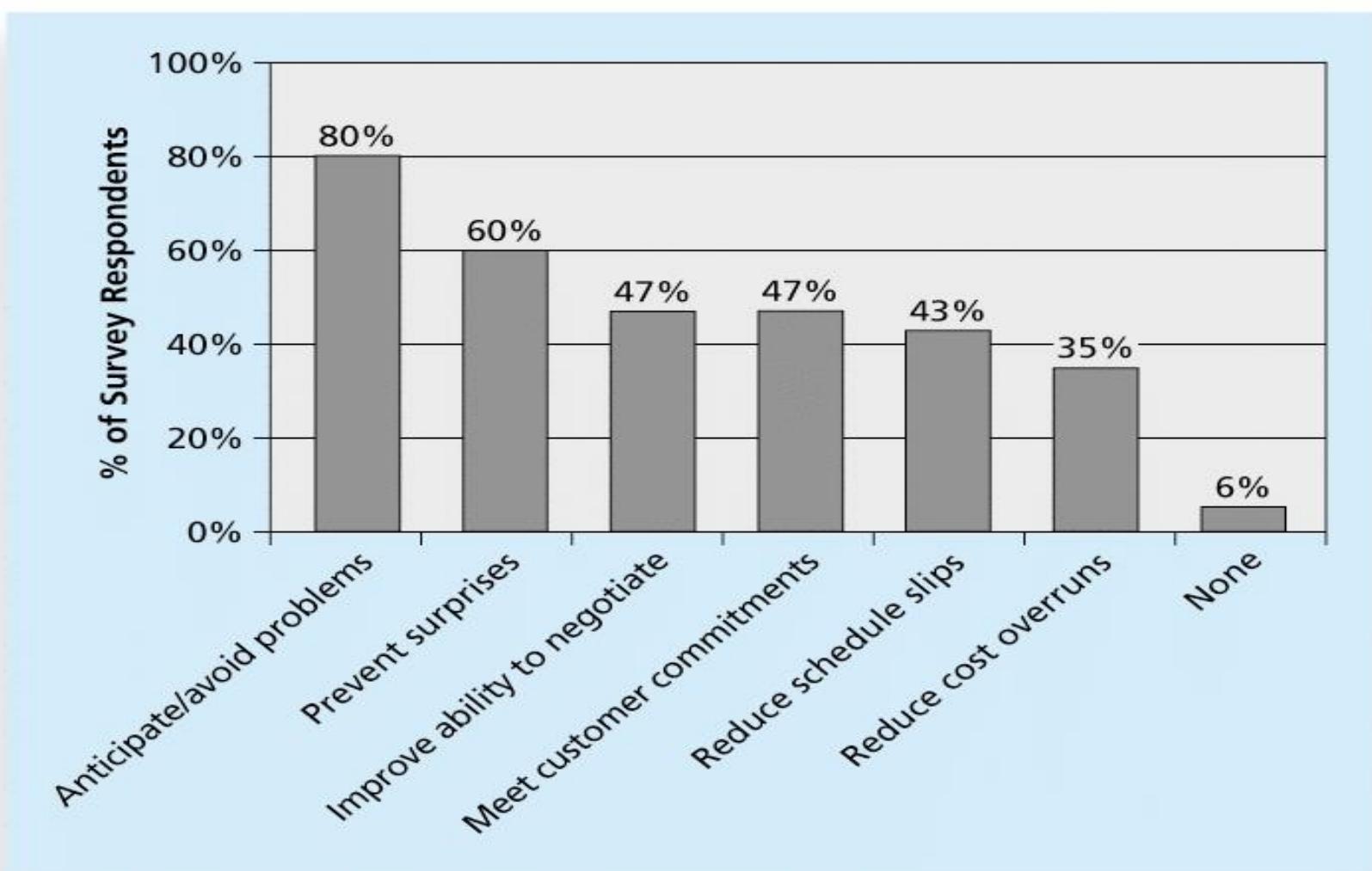
- Discuss qualitative risk analysis and explain how to calculate risk factors, create probability/impact matrixes, and apply the Top Ten Risk Item Tracking technique to rank risks.
- Explain quantitative risk analysis and how to apply decision trees, simulation, and sensitivity analysis to quantify risks.
- Provide examples of using different risk response planning strategies to address both negative and positive risks.
- Discuss how to control risks.



# The Importance of Project Risk Management

- Project risk management is the art and science of identifying, analyzing, and responding to risk throughout the life of a project and in the best interests of meeting project objectives.
- Risk management is often overlooked in projects, but it can help improve project success by helping select good projects, determining project scope, and developing realistic estimates.

# Benefits from Software Risk Management Practices\*



\*Source: Kulik and Weber, KLCI Research Group



# Negative Risk

- A dictionary definition of risk is “the possibility of loss or injury”.
- Negative risk involves understanding potential problems that might occur in the project and how they might impede project success.
- Negative risk management is like a form of insurance; it is an investment.



# Risk Can Be Positive

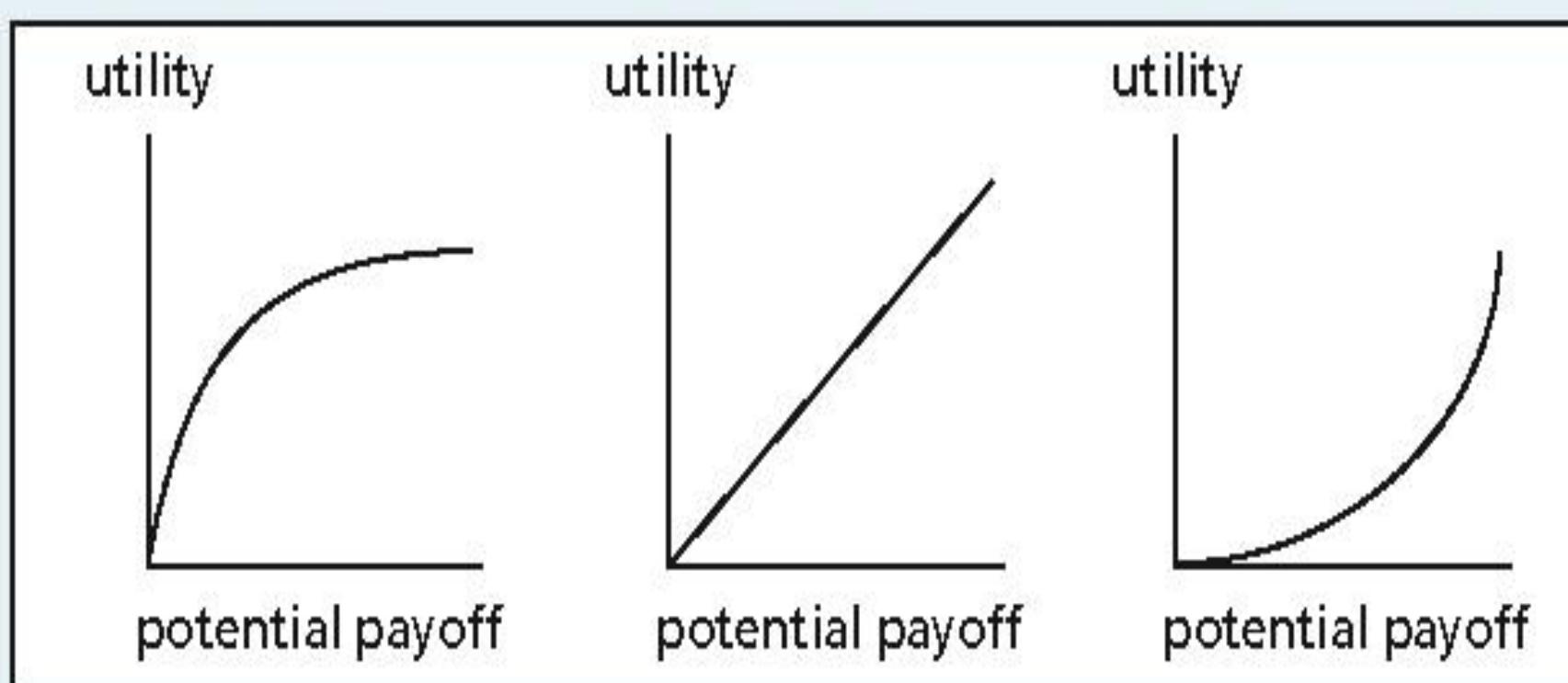
- Positive risks are risks that result in good things happening; sometimes called opportunities.
- A general definition of project risk is an uncertainty that can have a negative or positive effect on meeting project objectives.
- The goal of project risk management is to minimize potential negative risks while maximizing potential positive risks.



# Risk Utility

- **Risk utility or risk tolerance** is the amount of satisfaction or pleasure received from a potential payoff
  - Utility rises at a decreasing rate for people who are risk-averse.
  - Those who are risk-seeking have a higher tolerance for risk and their satisfaction increases when more payoff is at stake.
  - The risk-neutral approach achieves a balance between risk and payoff.

# Risk Utility Function and Risk Preference





# Project Risk Management Processes

- **Planning risk management** : Deciding how to approach and plan the risk management activities for the project.
- **Identifying risks**: Determining which risks are likely to affect a project and documenting the characteristics of each.
- **Performing qualitative risk analysis**: Prioritizing risks based on their probability and impact of occurrence.



# Project Risk Management Processes (cont'd)

- **Performing quantitative risk analysis:** Numerically estimating the effects of risks on project objectives.
- **Planning risk responses:** Taking steps to enhance opportunities and reduce threats to meeting project objectives.
- **Controlling risk:** Monitoring identified and residual risks, identifying new risks, carrying out risk response plans, and evaluating the effectiveness of risk strategies throughout the life of the project.

# Project Risk Management Summary

## Planning

Process: **Plan risk management**

Outputs: Risk management plan

Process: **Identify risks**

Outputs: Risk register

Process: **Perform qualitative risk analysis**

Outputs: Project documents updates

Process: **Perform quantitative risk analysis**

Outputs: Project documents updates

Process: **Plan risk responses**

Outputs: Project management plan updates, project documents updates

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## Monitoring and Controlling

Process: **Control risks**

Outputs: Work performance information, change requests, project management plan updates, project documents updates, organizational process assets updates

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Project Start

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Project Finish



# Planning Risk Management

- The main output of this process is a **risk management plan**—a plan that documents the procedures for managing risk throughout a project.
- The project team should review project documents and understand the organization's and the sponsor's approaches to risk.
- The level of detail will vary with the needs of the project.



# Topics Addressed in a Risk Management Plan

- Methodology
- Roles and responsibilities
- Budget and schedule
- Risk categories
- Risk probability and impact
- Revised stakeholders' tolerances
- Tracking
- Risk documentation



# Contingency, Fallback Plans & Contingency Reserves

- **Contingency plans** are predefined actions that the project team will take if an identified risk event occurs.
- **Fallback plans** are developed for risks that have a high impact on meeting project objectives and are put into effect if attempts to reduce the risk are not effective.
- **Contingency reserves or allowances** are provisions held by the project sponsor or organization to reduce the risk of cost or schedule overruns to an acceptable level; **management reserves** are funds held for unknown risks.

# IT Success Potential Scoring Sheet

| Success Criterion               | Relative Importance |
|---------------------------------|---------------------|
| User Involvement                | 19                  |
| Executive Management support    | 16                  |
| Clear Statement of Requirements | 15                  |
| Proper Planning                 | 11                  |
| Realistic Expectations          | 10                  |
| Smaller Project Milestones      | 9                   |
| Competent Staff                 | 8                   |
| Ownership                       | 6                   |
| Clear Visions and Objectives    | 3                   |
| Hard-Working, Focused Staff     | 3                   |
| <b>Total</b>                    | <b>100</b>          |



# Broad Categories of Risk

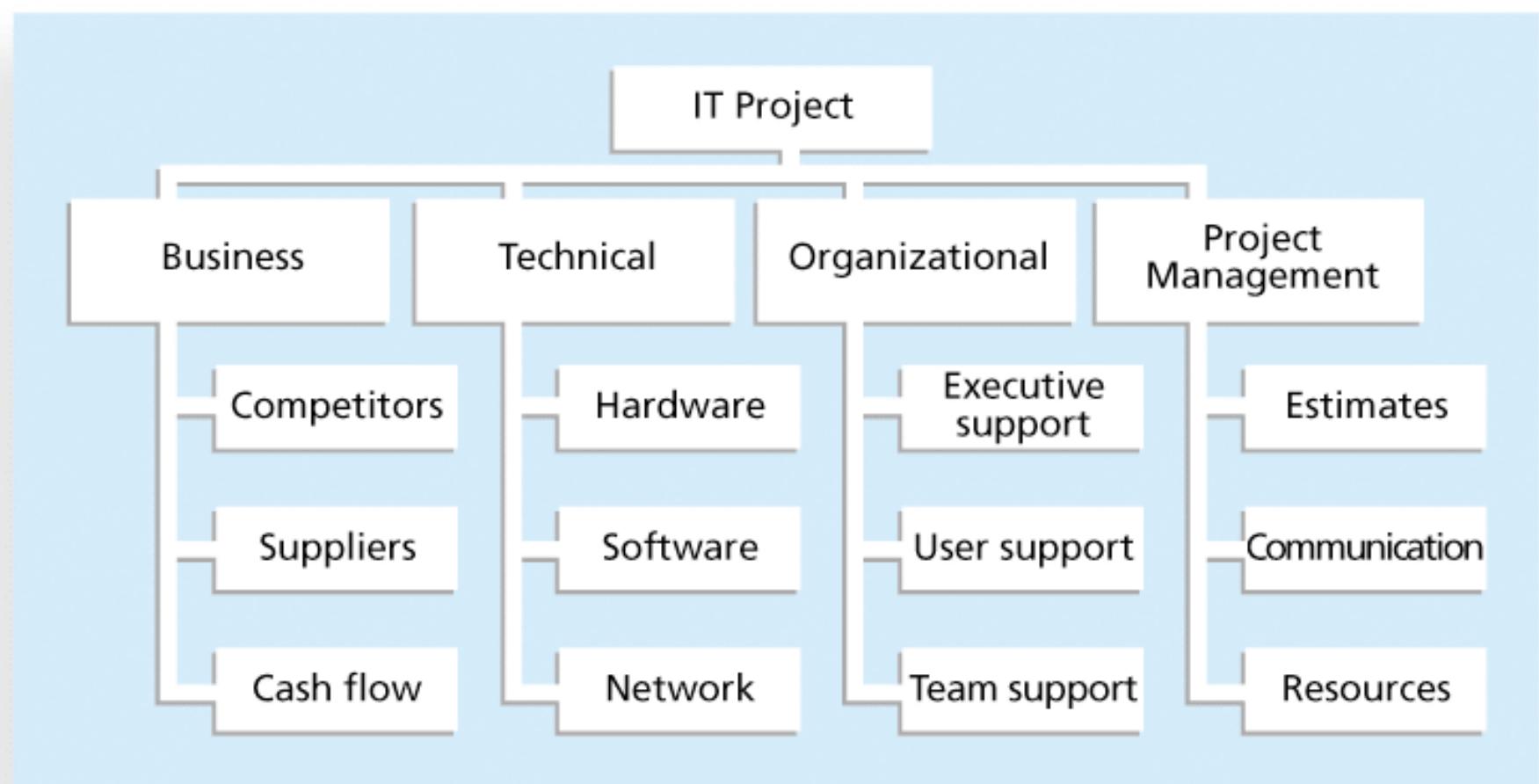
- Market risk
- Financial risk
- Technology risk
- People risk
- Structure/process risk



# Risk Breakdown Structure

- A **risk breakdown structure** is a hierarchy of potential risk categories for a project.
- Similar to a work breakdown structure but used to identify and categorize risks.

# Sample Risk Breakdown Structure





# Identifying Risks

- Identifying risks is the process of understanding what potential events might hurt or enhance a particular project.
- Another consideration is the likelihood of advanced discovery.
- Risk identification tools and techniques include:
  - Brainstorming
  - The Delphi Technique
  - Interviewing
  - SWOT analysis



# Brainstorming

- **Brainstorming** is a technique by which a group attempts to generate ideas or find a solution for a specific problem by amassing ideas spontaneously and without judgment.
- An experienced facilitator should run the brainstorming session.
- Be careful not to overuse or misuse brainstorming:
  - Psychology literature shows that individuals produce a greater number of ideas working alone than they do through brainstorming in small, face-to-face groups.
  - Group effects often inhibit idea generation.



# Delphi Technique

- The **Delphi Technique** is used to derive a consensus among a panel of experts who make predictions about future developments.
- Provides independent and anonymous input regarding future events.
- Uses repeated rounds of questioning and written responses and avoids the biasing effects possible in oral methods, such as brainstorming.



# Interviewing

- **Interviewing** is a fact-finding technique for collecting information in face-to-face, phone, e-mail, or instant-messaging discussions.
- Interviewing people with similar project experience is an important tool for identifying potential risks.



# SWOT Analysis

- SWOT analysis (strengths, weaknesses, opportunities, and threats) can also be used during risk identification.
- Helps identify the broad negative and positive risks that apply to a project.



# Risk Register

- The main output of the risk identification process is a list of identified risks and other information needed to begin creating a risk register.
- A **risk register** is:
  - A document that contains the results of various risk management processes and that is often displayed in a table or spreadsheet format.
  - A tool for documenting potential risk events and related information.
- **Risk events** refer to specific, uncertain events that may occur to the detriment or enhancement of the project.



# Risk Register Contents

- An identification number for each risk event
- A rank for each risk event
- The name of each risk event
- A description of each risk event
- The category under which each risk event falls
- The root cause of each risk



# Risk Register Contents (cont'd)

- Triggers for each risk; **triggers** are indicators or symptoms of actual risk events.
- Potential responses to each risk.
- The **risk owner** or person who will own or take responsibility for each risk.
- The probability and impact of each risk occurring.
- The status of each risk.



# Performing Qualitative Risk Analysis

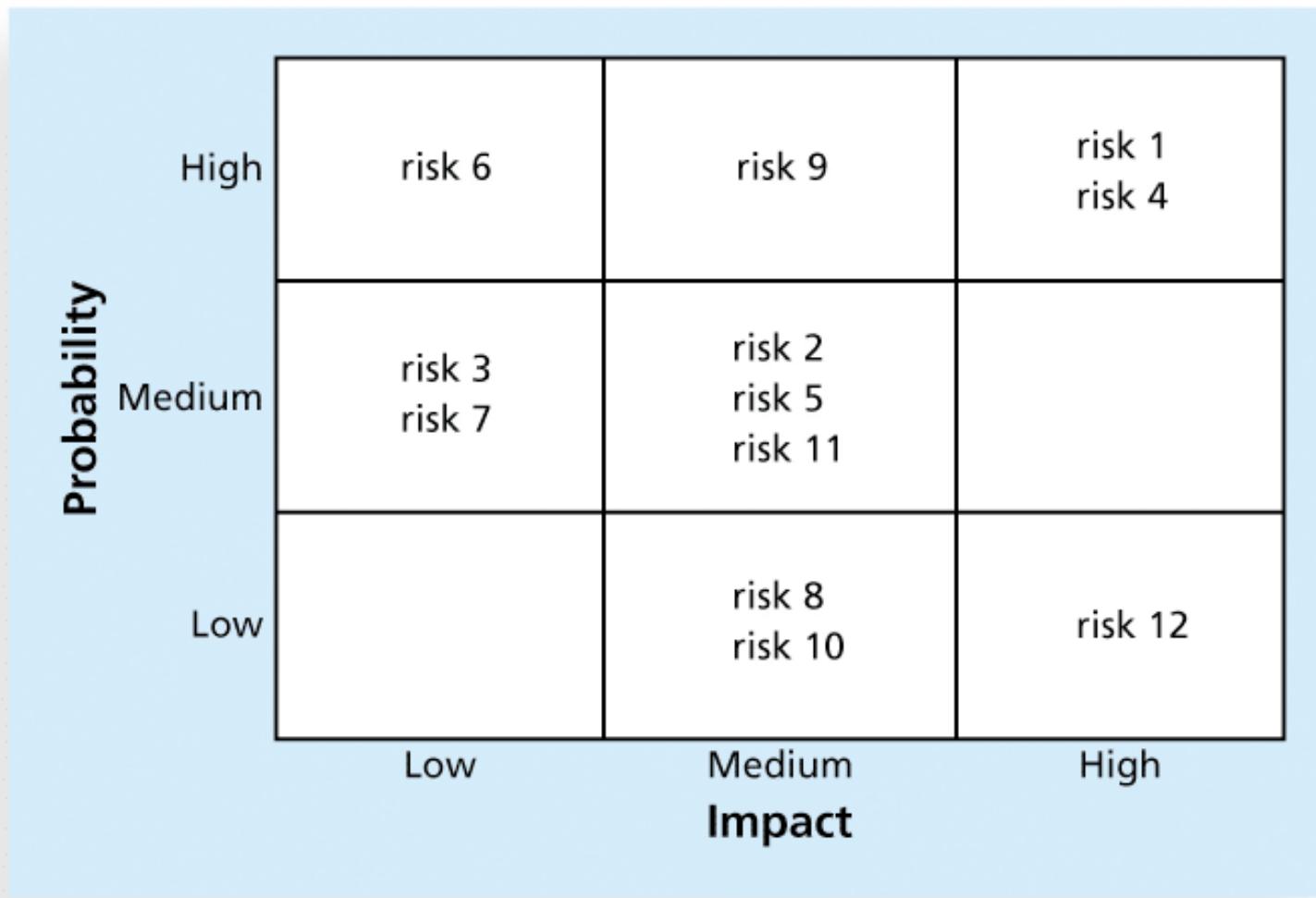
- Assess the likelihood and impact of identified risks to determine their magnitude and priority.
- Risk quantification tools and techniques include:
  - Probability/impact matrixes
  - The Top Ten Risk Item Tracking
  - Expert judgment



# Probability/Impact Matrix

- A **probability/impact matrix** or **chart** lists the relative probability of a risk occurring on one side of a matrix or axis on a chart and the relative impact of the risk occurring on the other.
- List the risks and then label each one as high, medium, or low in terms of its probability of occurrence and its impact if it did occur.
- Can also calculate **risk factors**:
  - Numbers that represent the overall risk of specific events based on their probability of occurring and the consequences to the project if they do occur.

# Sample Probability/Impact Matrix





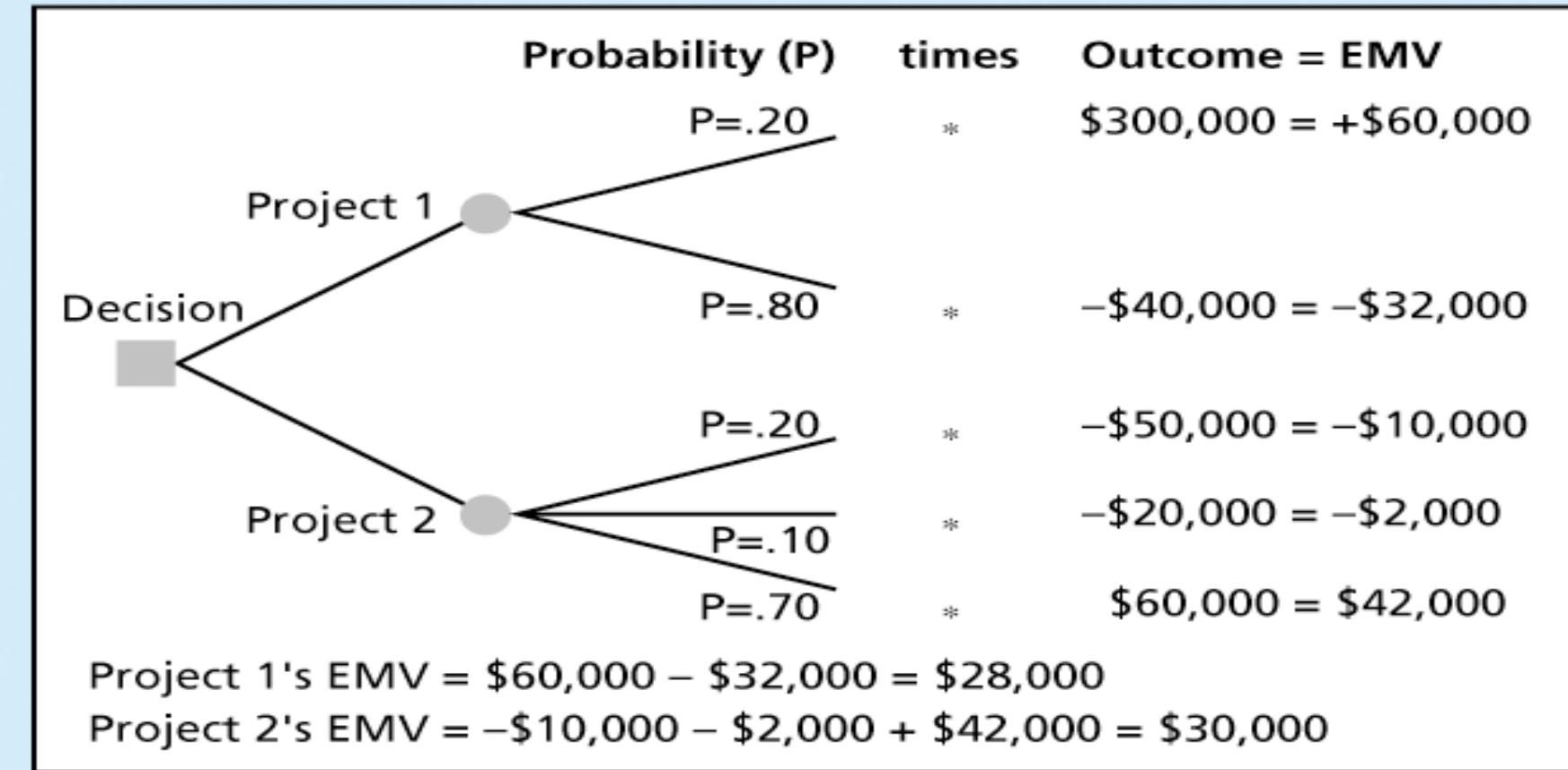
# Performing Quantitative Risk Analysis

- Often follows qualitative risk analysis, but both can be done together.
- Large, complex projects involving leading edge technologies often require extensive quantitative risk analysis.
- Main techniques include:
  - Decision tree analysis
  - Simulation
  - Sensitivity analysis

# Decision Trees and Expected Monetary Value (EMV)

- A **decision tree** is a diagramming analysis technique used to help select the best course of action in situations in which future outcomes are uncertain.
- **Estimated monetary value (EMV)** is the product of a risk event probability and the risk event's monetary value.
- You can draw a decision tree to help find the EMV .

# Expected Monetary Value (EMV) Example





# Planning Risk Responses

- After identifying and quantifying risks, you must decide how to respond to them.
- Four main response strategies for negative risks:
  - Risk avoidance
  - Risk acceptance
  - Risk transference
  - Risk mitigation



# Response Strategies for Positive Risks

- Risk exploitation
- Risk sharing
- Risk enhancement
- Risk acceptance



# Residual and Secondary Risks

- It's also important to identify residual and secondary risks.
- **Residual risks** are risks that remain after all of the response strategies have been implemented.
- **Secondary risks** are a direct result of implementing a risk response.



# Controlling Risks

- Involves executing the risk management process to respond to risk events and ensuring that risk awareness is an ongoing activity performed by the entire project team throughout the entire project.
- **Workarounds** are unplanned responses to risk events that must be done when there are no contingency plans.
- Main outputs of risk control are:
  - Work performance information
  - Change requests
  - Updates to the project management plan, other project documents, and organizational process assets



# Chapter Summary

- Project risk management is the art and science of identifying, analyzing, and responding to risk throughout the life of a project and in the best interests of meeting project objectives.
- Main processes include:
  - Plan risk management
  - Identify risks
  - Perform qualitative risk analysis
  - Perform quantitative risk analysis
  - Plan risk responses
  - Control risks

# Project Communication Management

# Learning Objectives

- Understand the importance of good communications on projects and the need to develop soft skills, especially for IT project managers and their teams.
- Explain the elements of planning project communications and how to create a communications management plan.
- Describe how to manage communications, including communication technologies, media, and performance reporting.

# Learning Objectives (cont'd)

- Discuss methods for controlling communications to ensure that information needs are met throughout the life of the project.
- List various methods for improving project communications, such as running effective meetings, using various technologies effectively, and using templates.

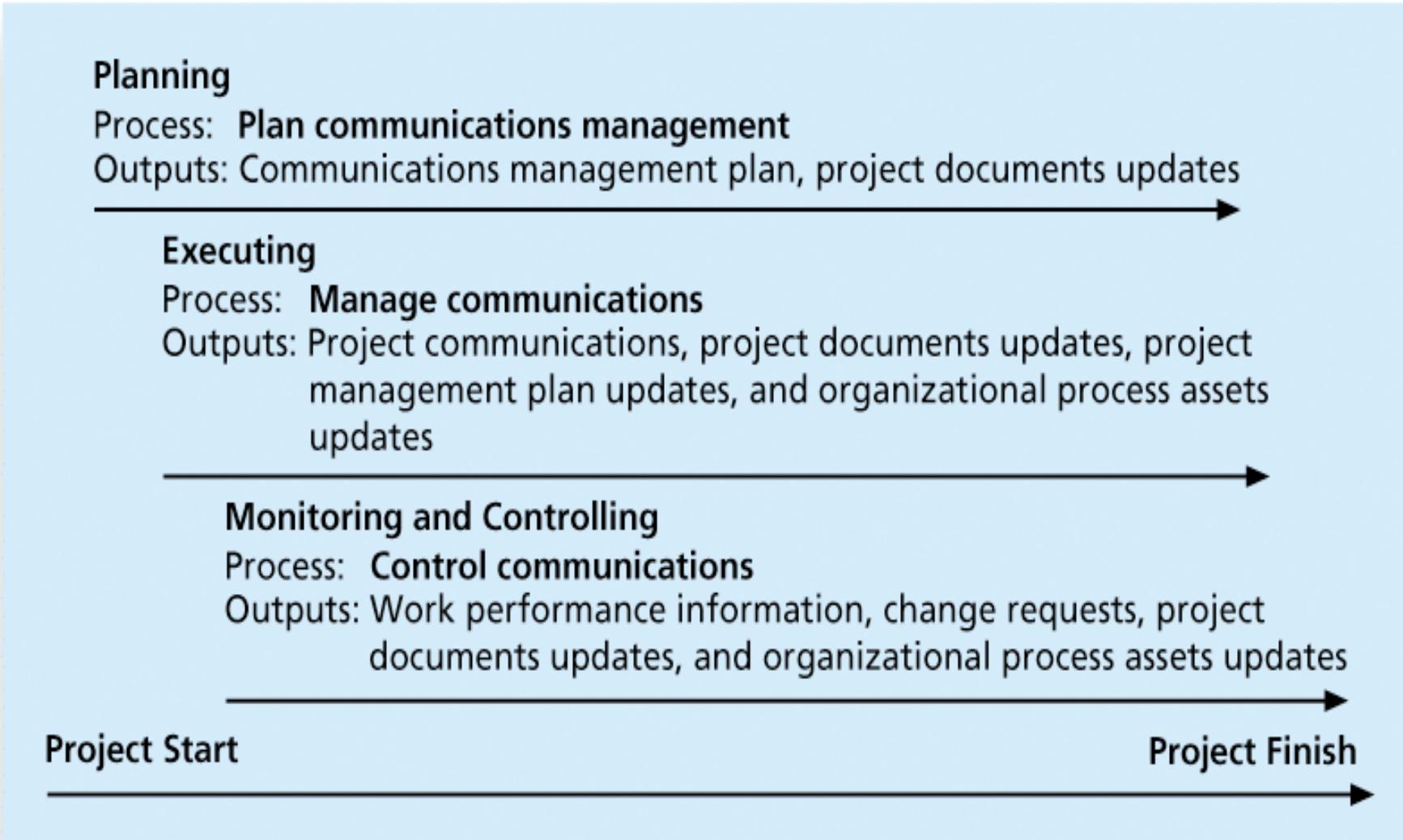
# Importance of Good Communications

- The greatest threat to many projects is a failure to communicate.
- Our culture does not portray IT professionals as being good communicators.
- Research shows that IT professionals must be able to communicate effectively to succeed in their positions.
- Strong verbal and non-technical skills are a key factor in career advancement for IT professionals.

# Project Communications Management Processes

- **Planning communications management:** Determining the information and communications needs of the stakeholders.
- **Managing communications:** Creating, distributing, storing, retrieving, and disposing of project communications based on the communications management plan.
- **Controlling communications:** Monitoring and controlling project communications to ensure that stakeholder communication needs are met.

# Project Communications Management Summary



# Importance of Face-to-Face Communication

- Research says that in a face-to-face interaction:
  - 58 percent of communication is through body language.
  - 35 percent of communication is through how the words are said.
  - 7 percent of communication is through the content or words that are spoken.
- Pay attention to more than just the actual words someone is saying.
- A person's tone of voice and body language say a lot about how he or she really feels.

# Encouraging More Face-to-Face Interactions

- Short, frequent meetings are often very effective in IT projects.
- Stand-up meetings force people to focus on what they really need to communicate.
- Some companies have policies preventing the use of e-mail between certain hours or even entire days of the week.

# Distributing Information in an Effective and Timely Manner

- Don't bury crucial information.
- Don't be afraid to report bad information.
- Oral communication via meetings and informal talks helps bring important information—good and bad—out into the open.

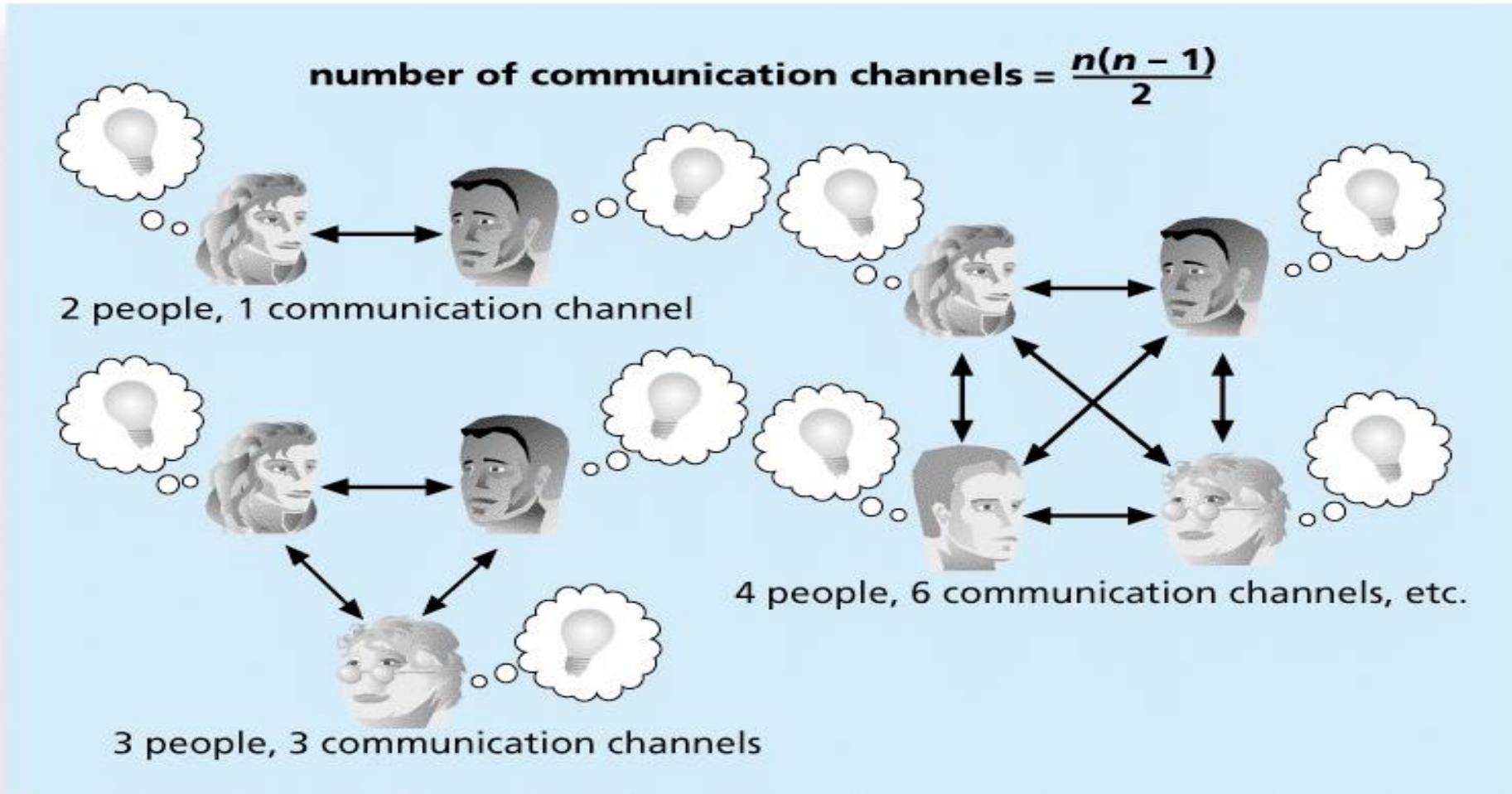
# Other Communication Considerations

- Rarely does the receiver interpret a message exactly as the sender intended.  
these are affected to communication
- Geographic location and cultural background affect the complexity of project communications:
  - Different working hours
  - Language barriers
  - Different cultural norms

# Determining the Number of Communications Channels

- As the number of people involved increases, the complexity of communications increases because there are more communications channels or pathways through which people can communicate.
- Number of communications channels =  $n(n-1)/2$   
where  $n$  is the number of people involved

# The Impact of the Number of People on Communications Channels



# Planning Communications Management

- Every project should include some type of **communications management** plan, a document that guides project communications.
- The communications management plan varies with the needs of the project, but some type of written plan should always be prepared.
- For small projects, the communications management plan can be part of the team contract.
- For large projects, it should be a separate document.

# Communications Management Plan Contents

1. Stakeholder communications requirements
2. Information to be communicated, including format, content, and level of detail
3. Who will receive the information and who will produce it
4. Suggested methods or technologies for conveying the information
5. Frequency of communication
6. Escalation procedures for resolving issues
7. Revision procedures for updating the communications management plan
8. A glossary of common terminology

# Sample Stakeholder Analysis for Project Communications

| Stakeholders                          | Document Name                | Document Format       | Contact Person                | Due            |
|---------------------------------------|------------------------------|-----------------------|-------------------------------|----------------|
| Customer management                   | Monthly status report        | Hard copy and meeting | Tina Erndt, Tom Silva         | First of month |
| Customer business staff               | Monthly status report        | Hard copy             | Julie Grant, Sergey Cristobal | First of month |
| Customer technical staff              | Monthly status report        | E-mail                | Li Chau, Nancy Michaels       | First of month |
| Internal management                   | Monthly status report        | Hard copy and meeting | Bob Thomson                   | First of month |
| Internal business and technical staff | Monthly status report        | Intranet              | Angie Liu                     | First of month |
| Training subcontractor                | Training plan                | Hard copy             | Jonathan Kraus                | November 1     |
| Software subcontractor                | Software implementation plan | E-mail                | Najwa Gates                   | June 1         |

Comments: Put the titles and dates of documents in e-mail headings and have recipients acknowledge receipt.

# Managing Communications

- Managing communications is a large part of a project manager's job.
- Getting project information to the right people at the right time and in a useful format is just as important as developing the information in the first place.
- Important considerations include the use of technology, the appropriate methods and media to use, and performance reporting.

# Reporting Performance

Performance reporting keeps stakeholders informed about how resources are being used to achieve project objectives:

- **Status reports** describe where the project stands at a specific point in time.  
here mentions the status of project. like InProgress, done etc
- **Progress reports** describe what the project team has accomplished during a certain period of time.  
here mention within some specific time period wht u have done
- **Forecasts** predict future project status and progress based on past information and trends.  
this is helpful to predict the status of the future project. based on the current project information

# Controlling Communications

- The main goal of controlling communications is to ensure the optimal flow of information throughout the entire project life cycle.
- The project manager and project team should use their various reporting systems, expert judgment, and meetings to assess how well communications are working. If problems exist, the project manager and team need to take action, which often requires changes to the earlier processes of planning and managing project communications.
- It is often beneficial to have a facilitator from outside the project team assess how well communications are working.

# Chapter Summary

- The goal of project communications management is to ensure timely and appropriate generation, collection, dissemination, storage, and disposition of project information.
- Main process include:
  - Plan communications management
  - Manage communications
  - Control communications

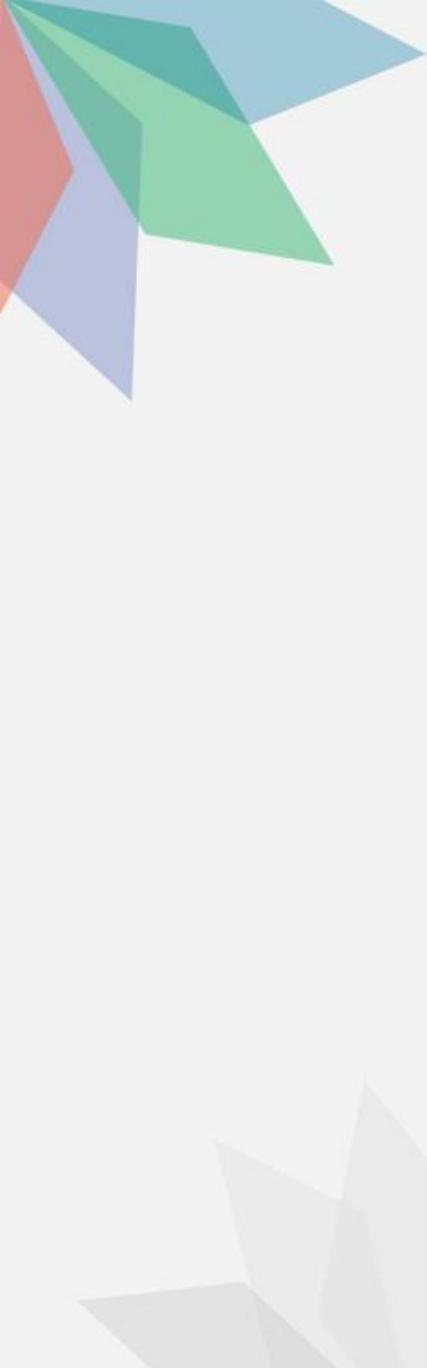
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# **Project Human Resource Management**



# Learning Objectives

- Explain the importance of good human resource management on projects, including the current state of the global IT workforce and future implications for it.
- Define project human resource management and understand its processes.
- Summarize key concepts for managing people by understanding the theories.



# Learning Objectives (cont'd)

- Discuss human resource management planning and be able to create a human resource plan, project organizational chart, responsibility assignment matrix, and resource histogram.
- Understand important issues involved in project staff acquisition and explain the concepts of resource assignments, resource loading, and resource leveling.
- Assist in team development with training, team-building activities, and reward systems.



# The Importance of Human Resource Management

- Many corporate executives have said, “People are our most important asset”.
- People determine the success and failure of organizations and projects.



# What is Project Human Resource Management?

- Making the most effective use of the people involved with a project.
- Human Resource Management processes include:
  - **Planning human resource management:** identifying and documenting project roles, responsibilities, and reporting relationships
  - **Acquiring the project team:** getting the needed personnel assigned to and working on the project
  - **Developing the project team:** building individual and group skills to enhance project performance
  - **Managing the project team:** tracking team member performance, motivating team members, providing timely feedback, resolving issues and conflicts, and coordinating changes to help enhance project performance



# Project Human Resource Management Summary

## Planning

Process: **Plan human resource management**

Output: Human resource plan

## Executing

Process: **Acquire project team**

Outputs: Project staff assignments, resource calendars, project management plan updates

Process: **Develop project team**

Outputs: Team performance assessments, enterprise environmental factors updates

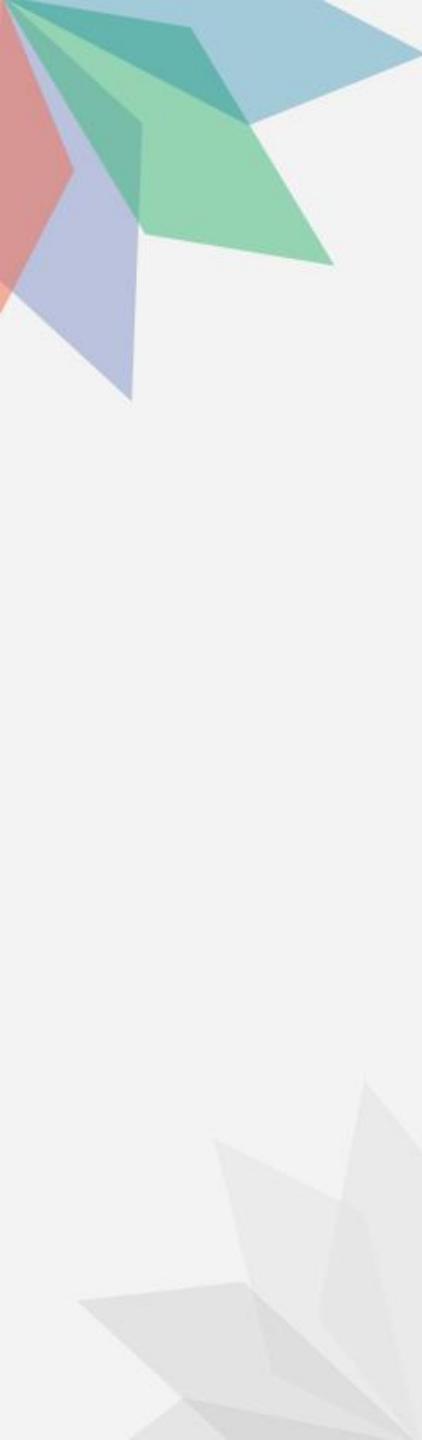
## Monitoring and Controlling

Process: **Manage project team**

Outputs: Change requests, project management plan updates, project documents updates, enterprise environmental factors updates, and organizational process assets updates

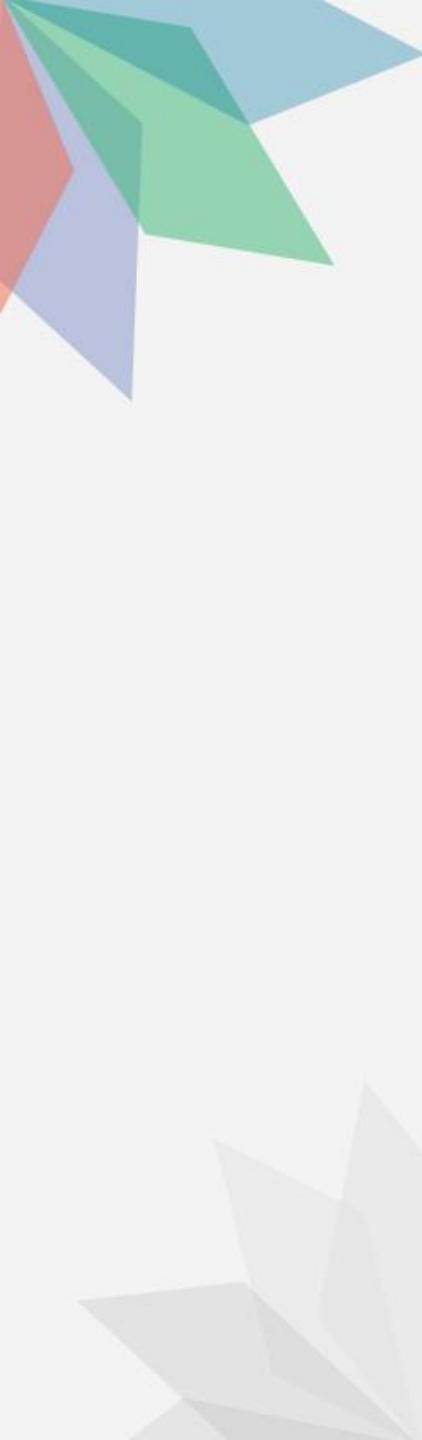
Project Start

Project Finish



# Keys to Managing People

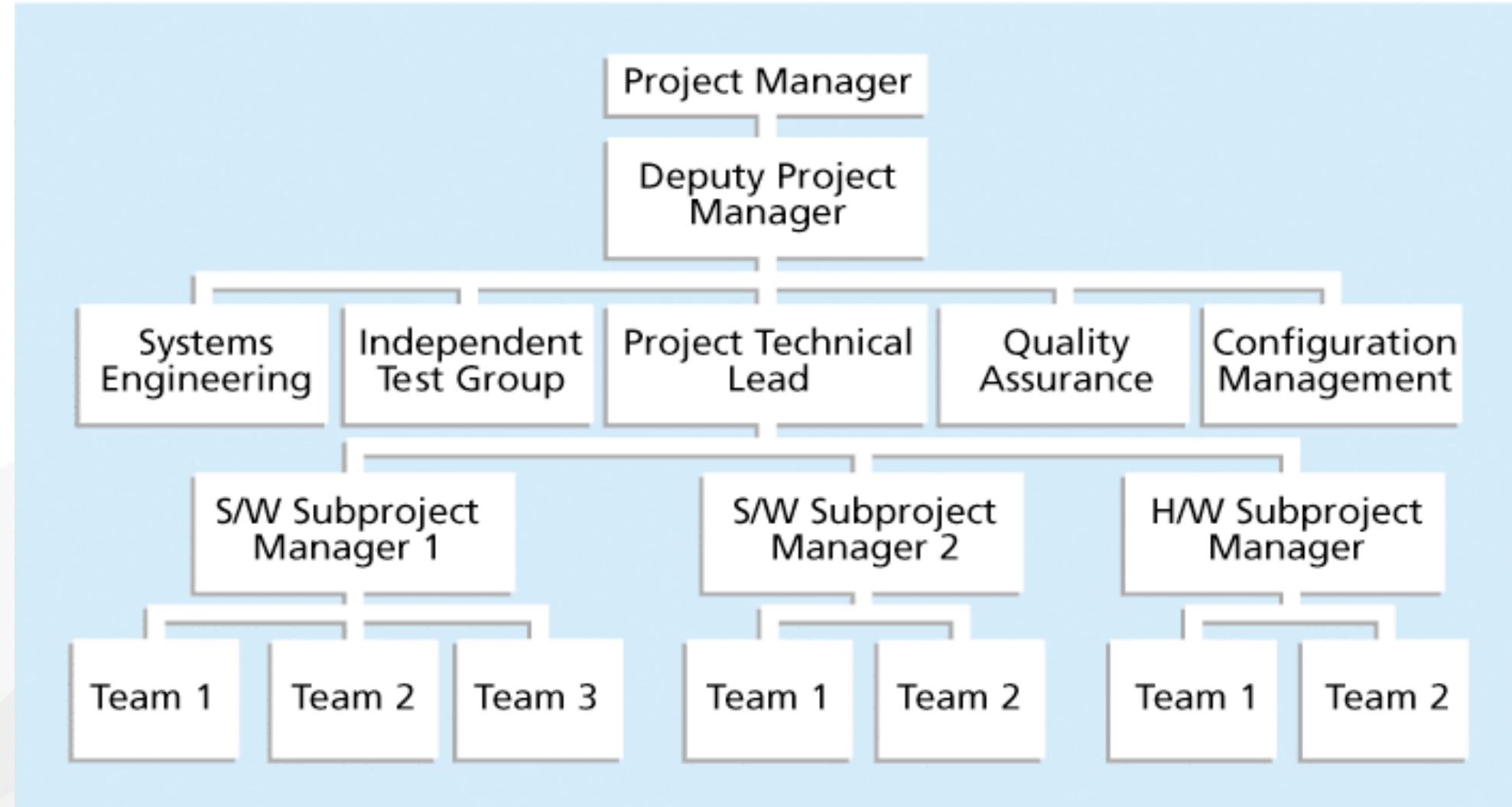
- Psychologists and management theorists have devoted much research and thought to the field of managing people at work.
- Important areas related to managing people include:
  - Motivation theories
  - Influence and power
  - Effectiveness



# Developing the Human Resource Plan

- Involves identifying and documenting project roles, responsibilities, and reporting relationships.
- Contents include:
  - Project organizational charts
  - Staffing management plan
  - Responsibility assignment matrixes
  - Resource histograms

# Sample Organizational Chart for a Large IT Project





# Responsibility Assignment Matrices

- A **Responsibility Assignment Matrix (RAM)** is a matrix that maps the work of the project as described in the Work Breakdown Structure (WBS) to the people responsible for performing the work as described in the OBS.
- Can be created in different ways to meet unique project needs.



# Sample Responsibility Assignment Matrix (RAM)

| OBS units                    | WBS activities → |       |       |       |       |       |       |       |
|------------------------------|------------------|-------|-------|-------|-------|-------|-------|-------|
|                              | 1.1.1            | 1.1.2 | 1.1.3 | 1.1.4 | 1.1.5 | 1.1.6 | 1.1.7 | 1.1.8 |
| Systems Engineering          | R                | R P   |       |       |       |       | R     |       |
| Software Development         |                  |       | R P   |       |       |       |       |       |
| Hardware Development         |                  |       |       | R P   |       |       |       |       |
| Test Engineering             | P                |       |       |       |       |       |       |       |
| Quality Assurance            |                  |       |       |       | R P   |       |       |       |
| Configuration Management     |                  |       |       |       |       | R P   |       |       |
| Integrated Logistics Support |                  |       |       |       |       |       | P     |       |
| Training                     |                  |       |       |       |       |       |       | R P   |

R = Responsible organizational unit

P = Performing organizational unit



# Sample RACI Chart

|                      | Group A | Group B | Group C | Group D | Group E |
|----------------------|---------|---------|---------|---------|---------|
| Test Plans           | R       | A       | C       | C       | I       |
| Unit Test            | C       | I       | R       | A       | I       |
| Integration Test     | A       | R       | I       | C       | C       |
| System Test          | I       | C       | A       | I       | R       |
| User Acceptance Test | R       | I       | C       | R       | A       |

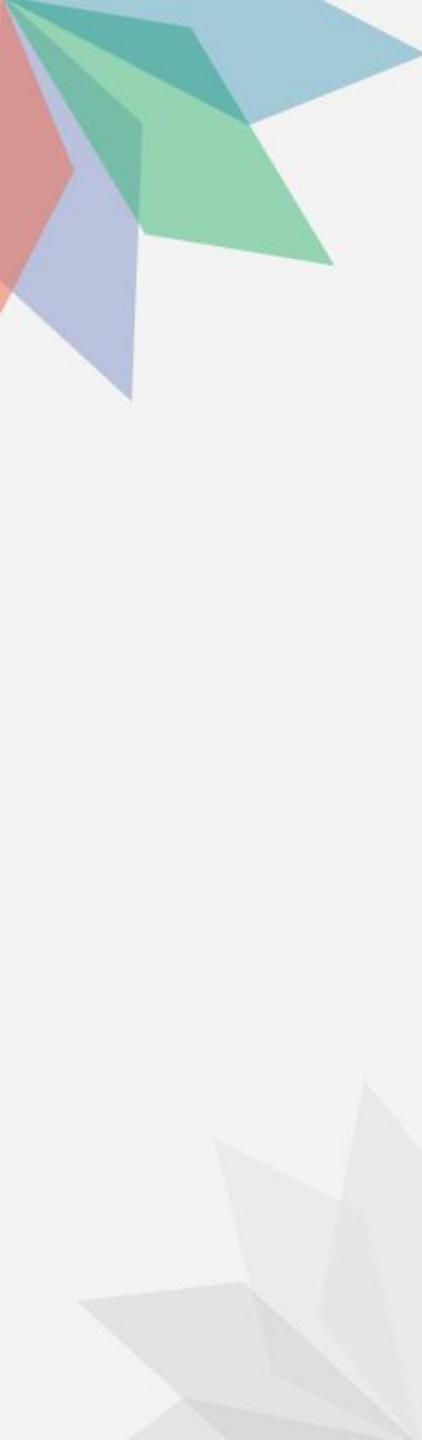
R = Responsibility

A = Accountability, only one A per task

C = Consultation

I = Informed

Note that some people reverse the definitions of responsibility and accountability.



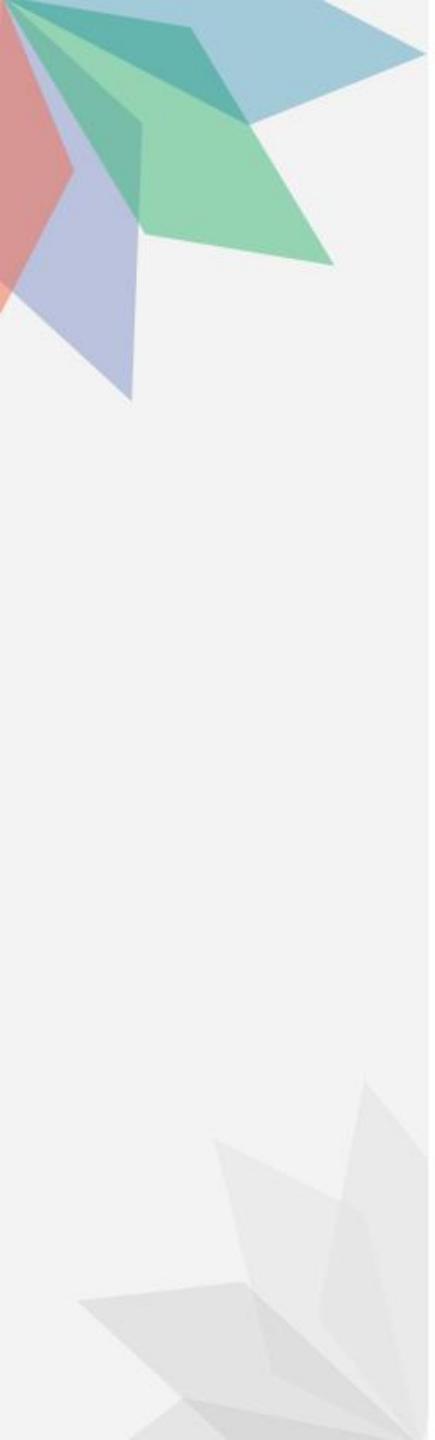
# Acquiring the Project Team

- Acquiring qualified people for teams is crucial.
- The project manager who is the smartest person on the team has done a poor job of recruiting!
- It's important to assign the appropriate type and number of people to work on projects at the appropriate times.



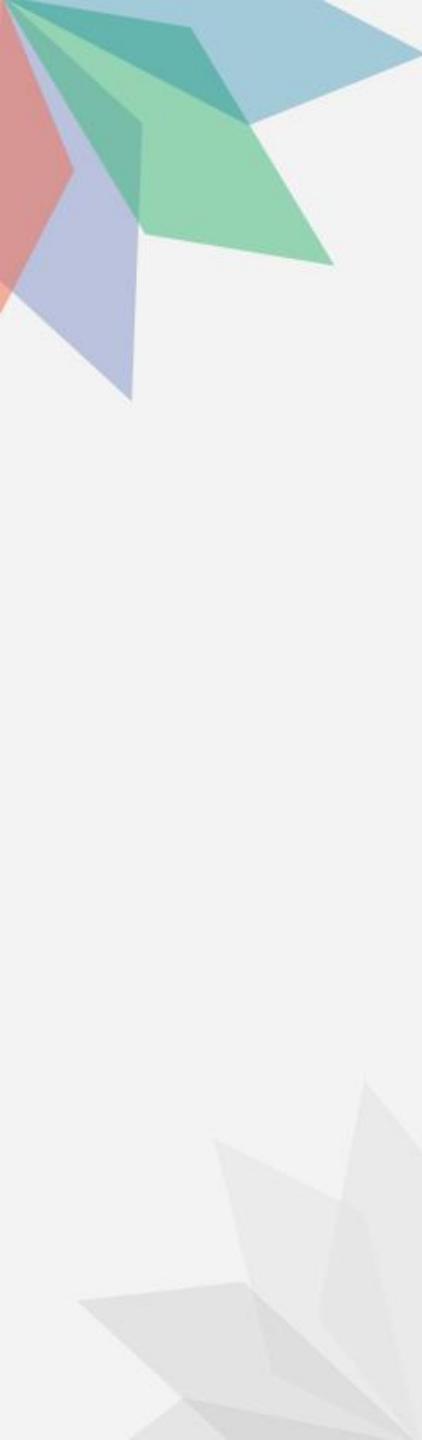
# Developing the Project Team

- The main goal of **team development** is to help people work together more effectively to improve project performance.
- It takes teamwork to successfully complete most projects.



# Tuckman Model of Team Development

- Forming
- Storming
- Norming
- Performing
- Adjourning



# Managing the Project Team

- Project managers must lead their teams in performing various project activities.
  
- After assessing team performance and related information, the project manager must decide:
  - If changes should be requested to the project.
  - If corrective or preventive actions should be recommended.
  - If updates are needed to the project management plan or organizational process assets.



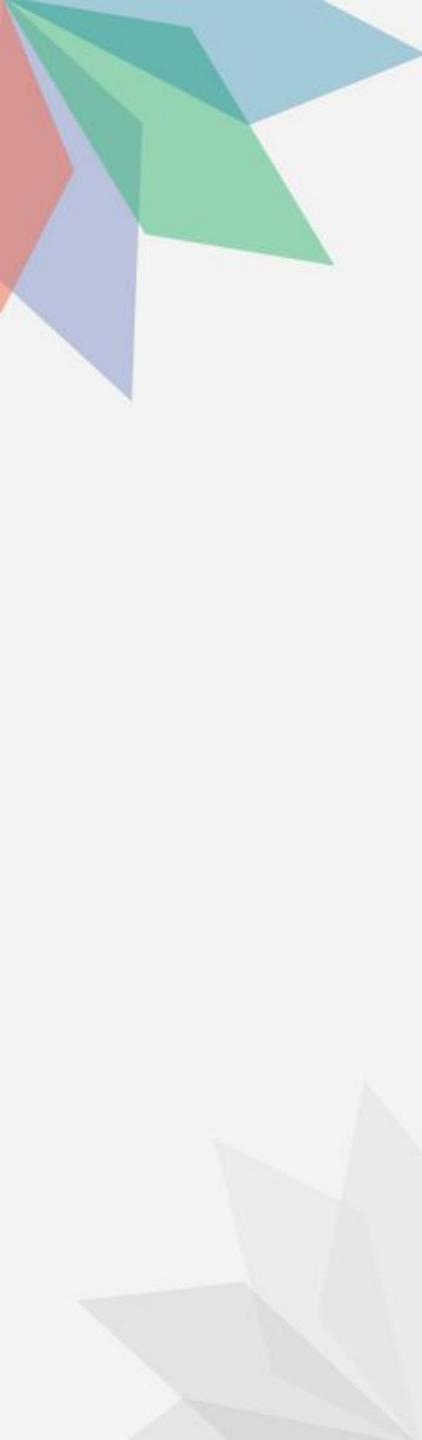
# Tools and Techniques for Managing Project Teams

- Observation and conversation
  - Project performance appraisals
  - Interpersonal skills
  - Conflict management
- 

# Conflict Handling Modes



1. **Confrontation:** Directly face a conflict using a problem-solving approach
2. **Compromise:** Use a give-and-take approach
3. **Smoothing:** De-emphasize areas of difference and emphasize areas of agreement
4. **Forcing:** The win-lose approach
5. **Withdrawal:** Retreat or withdraw from an actual or potential disagreement
6. **Collaborating:** Decision makers incorporate different viewpoints and insights to develop consensus and commitment



# Chapter Summary

- Project human resource management includes the processes required to make the most effective use of the people involved with a project.
- Main processes include:
  - Plan human resource management
  - Acquire project team
  - Develop project team
  - Manage project team