



Project Management Professional (PMP)



Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager

Certified Project Managers Trainer

Whatsup: +966558411183

Welcome

- ☐ **Trainers** : Nasser Almohimeed
- ☐ **Course** : Project Management. Professional - PMP

Sessions		
04:15 – 05:45	06:15 – 8:00	08:00 – 09:45

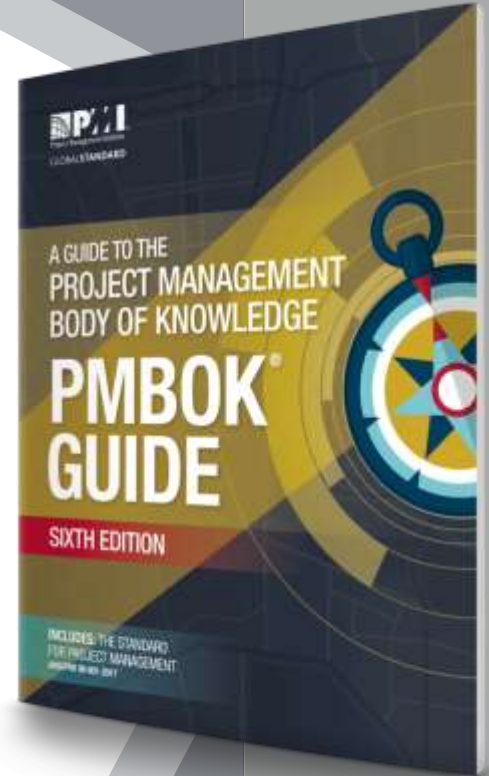
Project *Management* Certifications

Content is based on “A Guide To The Project Management Body Of Knowledge” Sixth Edition (PMBOK), and others sources.

The owner:

Project Management Institute (PMI)

- **Not-for-profit** professional association. primary goal is to advance the practice, science and profession of project management.
- Recognized since 1969 by working PMs.
- Headquartered in Pennsylvania USA.



Fact File

CERTIFICATIONS

Total Active Holders of:

CAPM [®] Certified Associate in Project Management	33,993
PMP [®] Project Management Professional	791,448
PfMP [®] Portfolio Management Professional	454
PgMP [®] Program Management Professional	2,009
PMI-RMP [®] PMI Risk Management Professional	4,197
PMI-SP [®] PMI Scheduling Professional	1,718
PMI-PBA [®] PMI Professional in Business Analysis	1,618
PMI-ACP [®] PMI Agile Certified Practitioner	16,929

PUBLISHING



5,641,938

Total copies of
all editions* of the
PMBOK[®] Guide
in circulation

*includes PMI-published
translations



PMP Exam

- 200 questions.
- To pass, you have to answer **106** graded questions correctly out of **175**. That translates to 61% *.
- There are 25 questions considered for use on future exams. However, they do not count toward your grade and you will not know which questions count and which don't.



Requirements to Apply

To be eligible for PMP Certification, you will need to demonstrate that you meet certain minimum criteria as below:

❑ University Degree,

- ✓ 4,500 hours of project management experience,
- ✓ 35 hours of project management education.

❑ High school diploma or equivalent

- ✓ 7,500 hours of project management experience,
- ✓ 35 hours of project management education.



Validity

- ❖ The credential is valid for 3 Years.
- ❖ Candidates must recertify every 3 years by earning 60 Professional Development Units (PDUs).
- ❖ How to earn 60 PDU?
 - Course or Training.
 - Work as a Practitioner.
 - Create Content.
 - Give a Presentation.
 - Organization Meetings.
 - Volunteer.
 - Read.
 - Share Knowledge.





1. INTRODUCTION

PROJECT MANAGEMENT



Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer

What is a **Project**

Project is a temporary endeavor undertaken to create a unique product, service, or result.

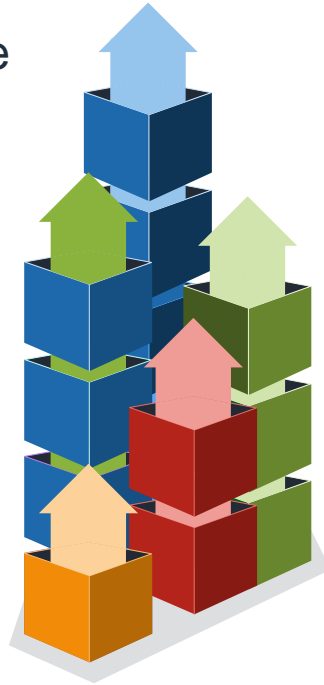
The end of the project is reached when

1. The project's objectives have been achieved.
2. The objectives will not or cannot be met.
3. Funding is exhausted.
4. The need for the project no longer.
5. Terminated for legal cause or convenience.



Fundamental elements of Project

- Projects drive change the project moving an organization from one state to another state.
- Projects enable business value creation **By** create benefits to Organization.
- Benefits my be tangible or intangible or both



Project Initiation Context.

- Meet legal, or social requirements;
- Satisfy stakeholder requests.
- Implement or change business or technological strategies.
- Create, improve, or fix products, processes, or services

Projects Vs. Operational Work

- Operations differ of:
 - Are ongoing.
 - Produce repetitive products, services, or results.
 - Operations work sustain the organization overtime.

Importance of Project management

Project management

Is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.



Project Management enables organizations to execute projects effectively and efficiently

Project

May be managed as a stand-alone project, within a program, or within a portfolio.

Portfolio

Is a projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives.

Program

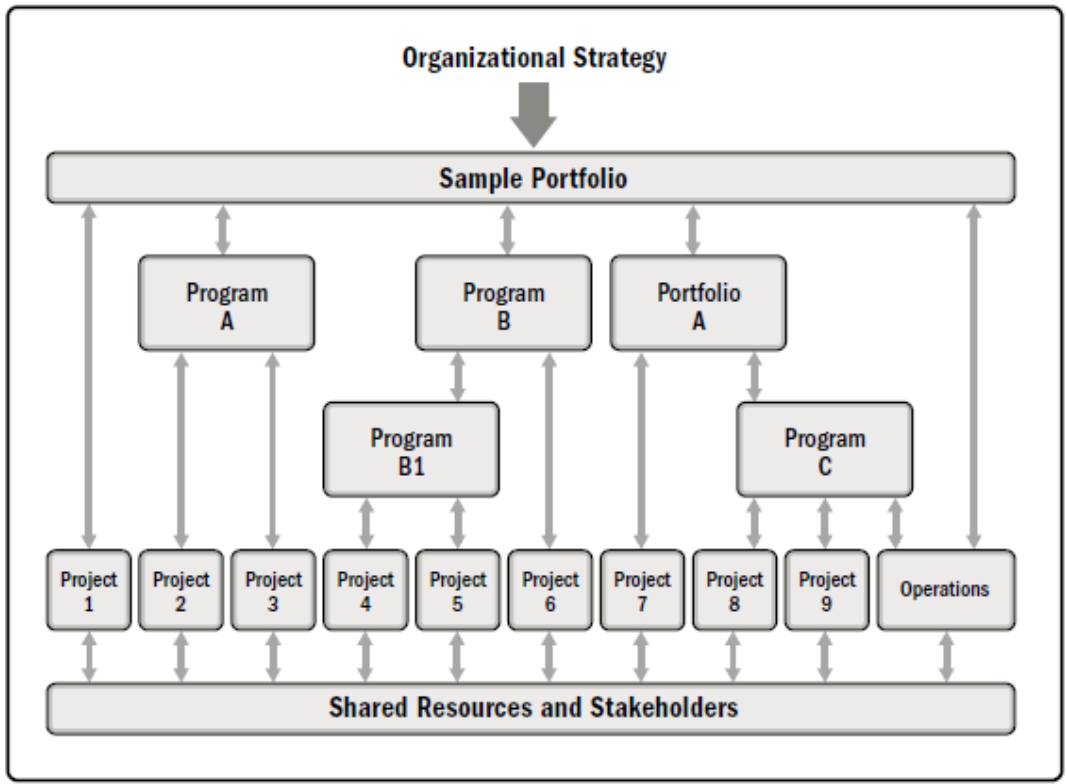
Group of related projects, subsidiary programs, and program activities managed in a coordinated manner to obtain benefits not available from managing them individually.

Relation between Project, Program, Portfolio, & Operations

- **Operations management** concerned with **ongoing** production of goods and/or services.
- **Program and project management** focus on doing programs and projects the **“right” way**.
- **Portfolio management** focuses on doing **the “right” programs and projects**.



Relation between Project, Program, Portfolio, & Operations



Relation between Project, Program, Portfolio,& Operations

Organizational Project Management (OPM).

Defined as a framework in which portfolio, program, and project management are **integrated** with organizational enablers in order to achieve strategic objectives.

Ensure that the organization undertakes the right projects. Allocates critical resources appropriately. Ensure that all levels in the organization understand the strategic vision, the initiatives that support the vision, the objectives, and the deliverables.

Relation between Project, Program, Portfolio, & Operations

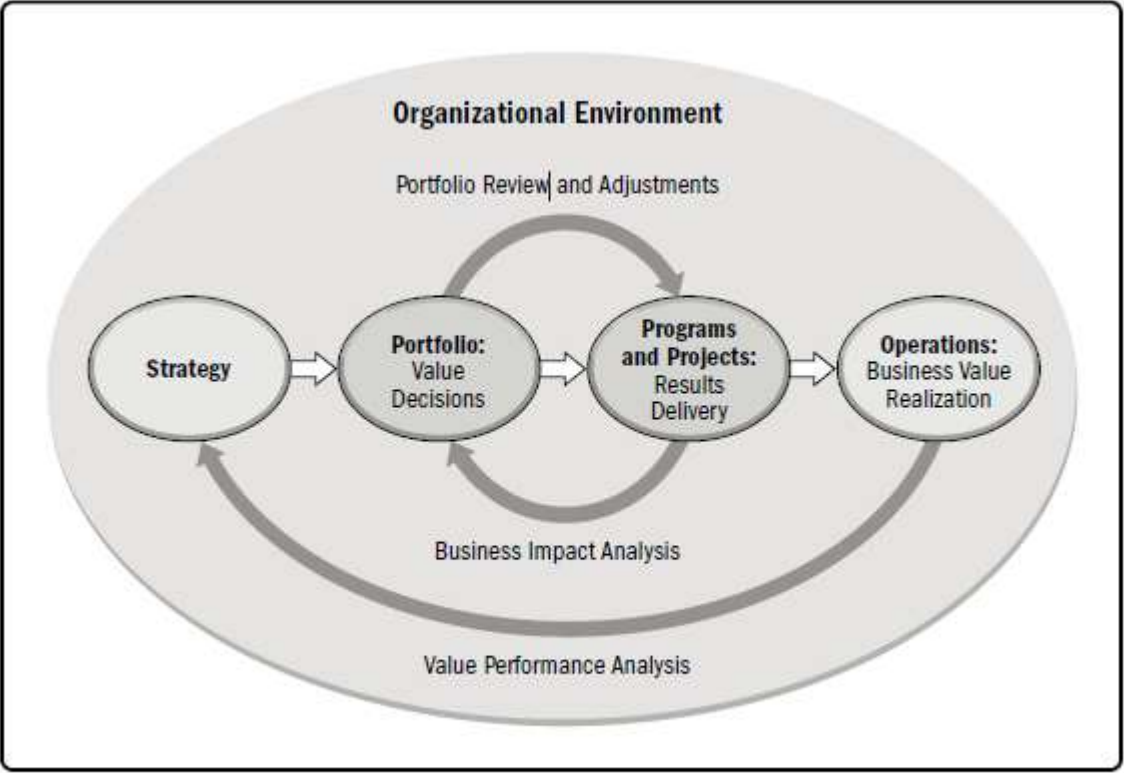


Figure 1-4. Organizational Project Management

Project Lifecycle

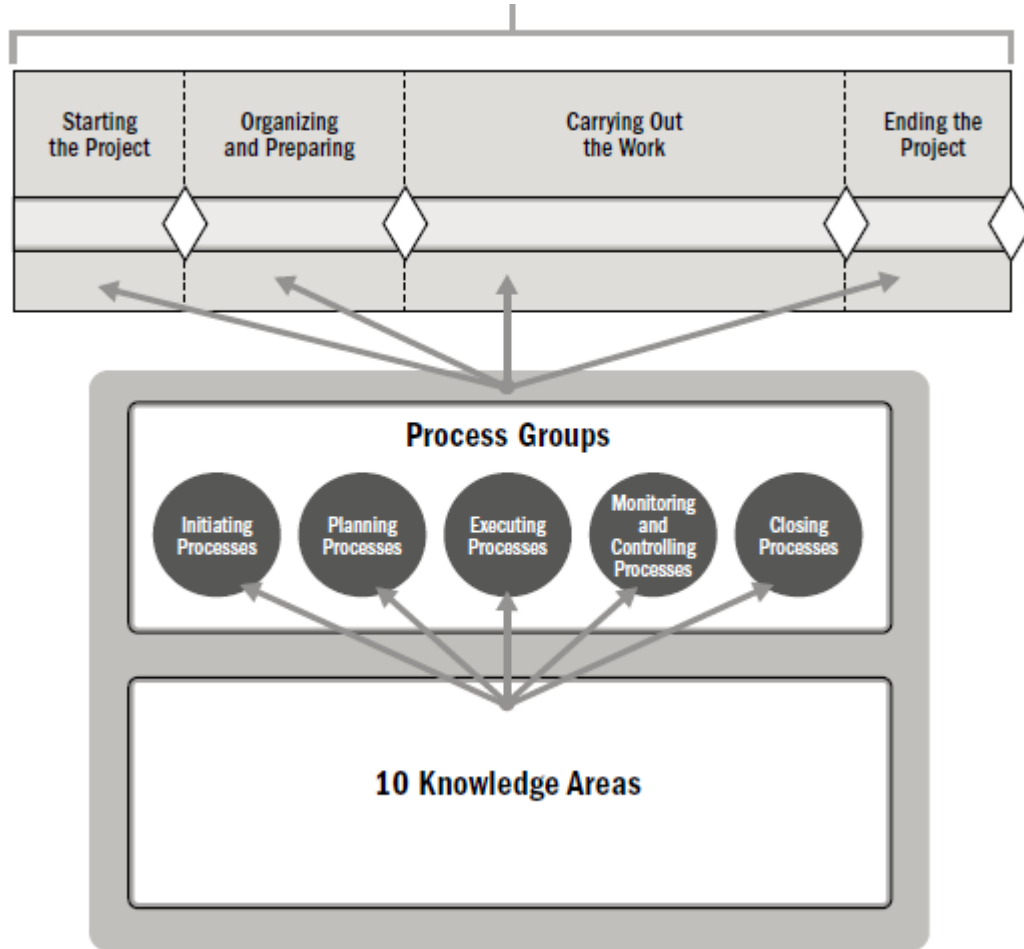
Project life cycle

Is the series of phases that a project passes through from its start to its completion. It provides the **basic framework** for managing the project.

- 💡 **Project life cycles** can be **predictive** or **adaptive** to accomplish the product.
- 💡 It is up to the project management team to determine the best life cycle for each project.



Project Lifecycle



Development Lifecycle



Development life cycles: one or more phases that are associated with the development. can be predictive, iterative, incremental, adaptive, or a hybrid model.

- **Predictive life cycle** (waterfall) scope, time, and cost are determined in the early phases.
- **Iterative life cycle**, the project scope is generally determined early, but time and cost estimates are routinely modified.
- **Incremental life cycle**, the deliverable is produced through a series of iterations that successively add functionality within a predetermined timeframe.
- **Adaptive life cycles** are agile or change-driven life cycles, iterative, or incremental. The detailed scope is defined and approved before the start of an iteration.
- **hybrid life cycle** is a combination of a predictive and an adaptive life cycle.



Development Lifecycle



Phase

Is a collection of logically related project activities described by attributes (Name, number, Duration, Resource requirements, etc.)

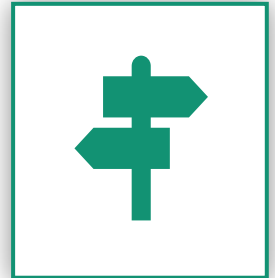


Phase Gate

A phase gate, is held at the end of a phase.

The project's performance and progress are compared to project and business documents (business case, Project charter, Project management plan ,Benefits management plan).

May be called (phase review, stage gate, kill point). A decision (e.g., go/no-go decision) is made Depending on the organization.

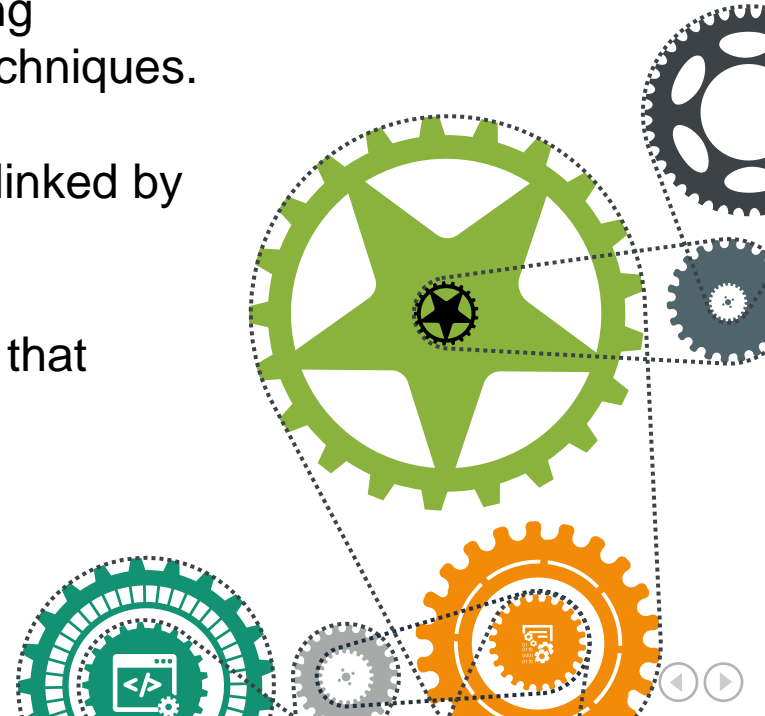


Project Management Processes



Project Management Processes

- Every project management process produces **one or more outputs** from **one or more inputs** by using appropriate project management tools and techniques.
- Project management processes are logically linked by the outputs they produce.
- Processes may contain **overlapping** activities that occur throughout the project.



Project Management Processes



Project Management Process Group is a logical grouping of project management processes to : Initiating - Planning - Executing - Monitoring and Controlling – And Closing Process Group.



Project management Knowledge Areas: Integration Management - Scope Management. - Schedule Management - Cost Management. - Quality Management - Resource Management. - Communications Management. - Risk Management - Procurement Management. - Stakeholder Management..



Processes generally fall into one of three categories:

- Used once or at predefined points in the project.
- Processes that are performed periodically as needed
- Processes that are performed continuously throughout the project.



Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Schedule Management		6.1 Plan Schedule 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule Management		6.6 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.4 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

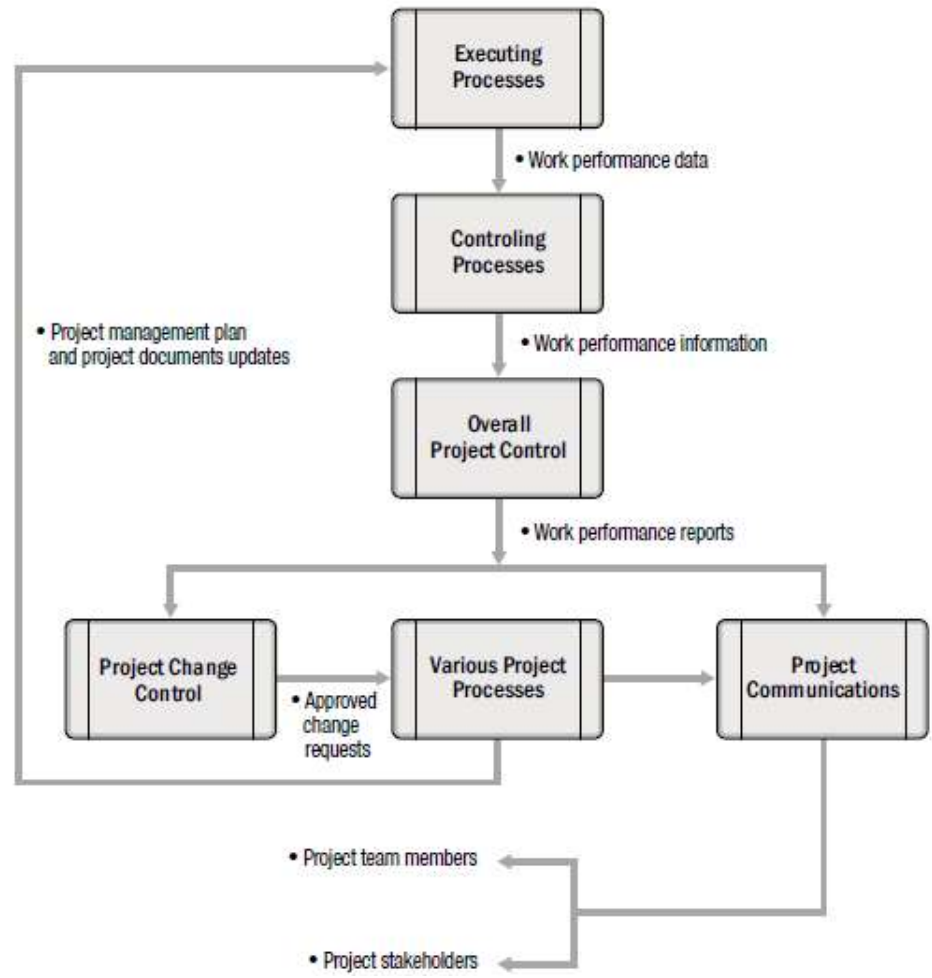


Project Management Data and Information

Project data are regularly collected and analyzed throughout the project life cycle

- **Work performance data.** The raw observations and measurements identified during activities performed to carry out the project work.
- **Work performance information.** The performance data collected from various controlling processes, analyzed in context and integrated based on relationships across areas
- **Work performance reports.** The physical or electronic representation of work performance information.





Project Management Processes

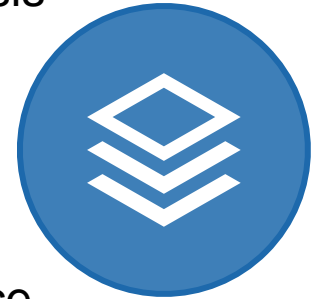
TAILORING is a selection of the appropriate project management processes, inputs, tools, techniques, outputs, and life cycle phases.

- Tailoring is necessary because each project is unique; not every process, tool, technique, input, or output identified.
- Tailoring should address the competing constraints of scope, schedule, cost, resources, quality, and risk.
- The project manager collaborates with the project team, sponsor, organizational management, or some combination thereof.



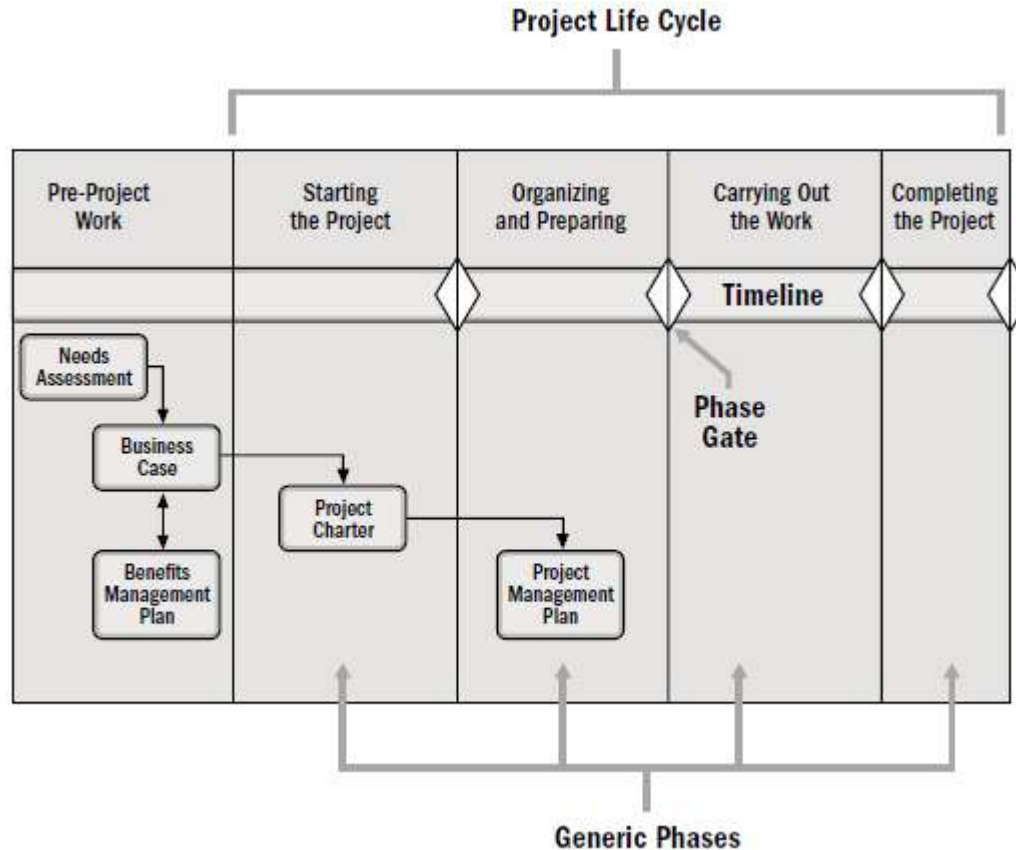
Project Business Documents

- **Project business case:** A documented economic feasibility study used to establish the validity of the benefits of a selected component lacking sufficient definition and that is used as a basis for the authorization of further project management activities.
- **Project benefits management plan:** Is the document that describes **how** and **when** the benefits of the project will be **delivered**, and describes the **mechanisms** that should be in place to **measure** those **benefits**.



A project benefit is defined as an **outcome** of actions, behaviors, products, services, or results that provide value to the sponsoring.

Assessment and Critical Business/Project Documents



Project Charter And Project Management Plan

The project charter

Is defined as a document issued by the project sponsor that formally **authorizes** the existence of a project and provides the project manager with the **authority** to apply organizational **resources** to project activities.

The project management plan

Is defined as the document that **describes how** the project will be executed, monitored, and controlled.



Project Management Business Documents

Project Success Measures

- Completing the project benefits management plan.
- Meeting the agreed-upon financial measures documented in the business case.
- Meeting business case nonfinancial objectives.
- Completing movement of an organization from its current state to the desired state.
- Fulfilling contract terms and conditions.
- Meeting organizational strategy, goals, and objectives.
- Achieving stakeholder satisfaction.
- Achieving agreed-upon quality of delivery.
- Meeting governance criteria.
- Achieving other agreed-upon success measures or criteria (e.g., process throughput).





2. THE ENVIRONMENT IN WHICH PROJECT OPERATE



Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer

Project Environment

Enterprise environmental factors

Refer to conditions, not under the control of the project team, that influence, constrain, or direct the project **positive or negative**.

Internal EEFs Examples:

- Resource availability.
- Employee capability.
- Infrastructure.
- Information technology software.
- Organizational culture, structure, and governance.
- Geographic distribution of facilities and resources.

External EEFs Examples:

- Marketplace conditions.
- Social and cultural influences and issues.
- Legal restrictions.
- Commercial databases.
- Government or industry standards.
- Financial considerations.
- Physical environmental elements.

Project Environment

Organizational process assets - OPA

Plans, processes, policies, procedures, and knowledge bases specific to and used by the performing organization.

- Processes, policies, and procedures
- Organizational knowledge bases



OPA- Processes, Policies, And Procedures

- 1 Related to Initiating and Planning
- 2 Executing, Monitoring, and Controlling:
- 3 Related to Closing
- 4 **OPA- Organizational knowledge bases**
 - Configuration management knowledge repositories.
 - Financial data repositories.
 - Historical information and lessons learned knowledge repositories
 - Issue and defect management data.
 - Data repositories for metrics and measurement.
 - Project files from previous projects.



Project Environment

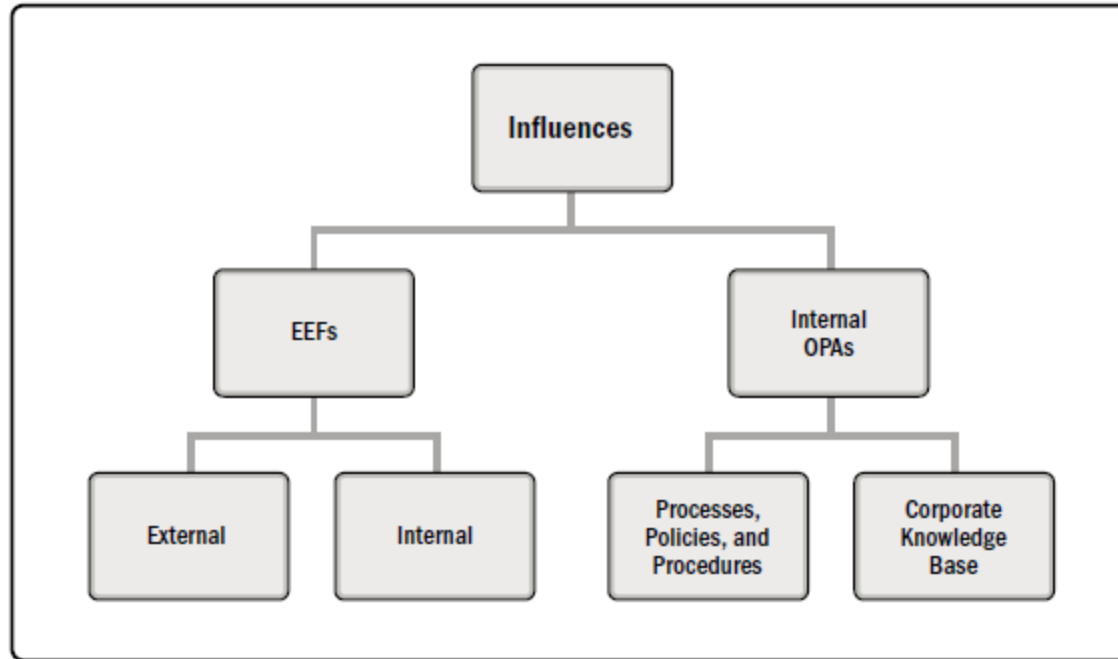


Figure 2-1. Project Influences

Organizational Governance

Refers to organizational or structural arrangements at all levels of an organization designed to determine and influence the behavior of the organization's members.

- Includes consideration of people, roles, structures, and policies.
- Requires providing direction and oversight through data and feedback.

Governance Framework

Includes but is not limited to:

- Rules.
- Relationships.
- Policies.
- Systems.
- Procedures.
- Processes.
- Norms.



Governance of Portfolios, Programs, and Projects

Project governance refers to the **framework**, **functions**, and **processes** that guide project management activities in order to create a unique product, service, or result to meet organizational, strategic, and operational goals.

A governance framework should be **tailored to the organizational culture, types of projects, and the needs of the organization** in order to be effective.



Organizational Structure type

Structure Type	PM Authority	PM Role	Resource Av.	Manages Budget	PM
Organic or Simple	L or none	Part-time; may or may not be a designated job role like coordinator	L or none	Owner	L or none
Functional	L or none	Part-time; may or may not be a designated job role like coordinator	L or none	FM	Part-time
Multi-divisional	L or none	Part-time; may or may not be a designated job role like coordinator	L or none	FM	Part-time
Matrix – strong	Moderate to high	Full-time designated job role	M to H	PM	Full-time
Matrix – weak	L	Part-time; done as part of another job and not a designated job role like coordinator	L	FM	Part-time
Matrix – balanced	L to moderate	Part-time; embedded in the functions as a skill and may not be a designated job role like coordinator	L to moderate	Mixed	Part-time
Project-oriented	H to almost total	Full-time designated job role	H to almost total	PM	Full-time
Virtual	L to moderate	Full-time or part-time	L to moderate	Mixed	Full-time/ Part-time
Hybrid	Mixed	Mixed	Mixed	Mixed	Mixed
PMO	H to total	Full-time designated job role	H to almost total	PM	Full-time

Project management office **PMO**

Project management office

PMO is an organizational structure that standardizes the project-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques

Supportive

- Provide a consultative role by supplying templates, best practices, training, access to information, and lessons learned from other projects.

Controlling

- Provide support and require compliance
- The degree of control is moderate.

Directive

- Directly managing the projects.
- Project managers are assigned by and report to the PMO.
- The degree of control is high.

Project management office **PMO**

A primary function of a PMO is to support project managers by:

- Managing shared resources across all projects.
- Identifying and developing project management methodology, best practices, and standards.
- Coaching, mentoring, training, and oversight.
- Monitoring project compliance and project audits.
- Developing and managing project policies, procedures, templates, and other shared documentation (organizational process assets).
- Coordinating communication across projects.





3. THE ROLE OF PROJECT MANAGER



Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer

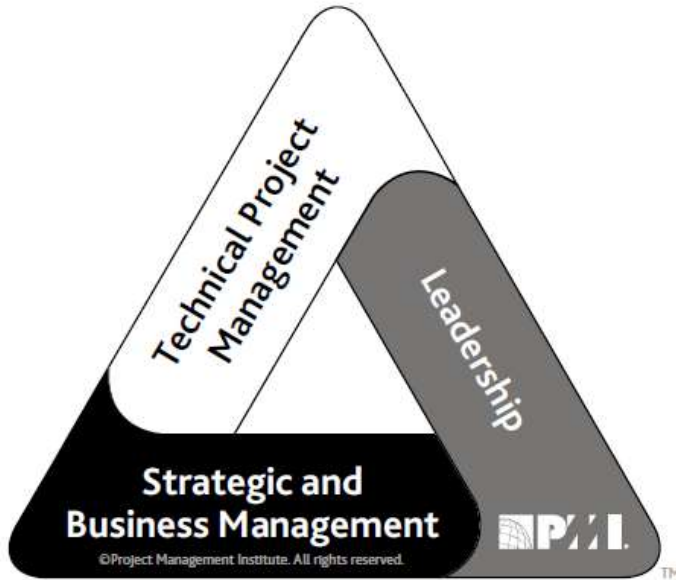
The **Project Manager** Competency

Project manager is the person assigned by the performing organization to lead the team responsible for achieving the project objectives.



The **Project Manager** Competency

PMI studies applied the Project Manager Competency Development (PMCD) Framework to the skills needed by project managers through the use of The PMI Talent Triangle.



Technical project management.

The knowledge, skills, and behaviors related to specific domains of project, program, and portfolio management.



Strategic and business management.

The knowledge of and expertise in the industry and organization that enhanced performance and better delivers business outcomes.



Leadership

The knowledge, skills, and behaviors needed to guide, motivate, and direct a team, to help an organization achieve its business goals.

The **Project Manager** Competency



LEADERSHIP

Leadership skills involve the ability to **guide, motivate, and direct** a team. include essential capabilities such as negotiation, resilience, communication, problem solving, critical thinking, and interpersonal skills.

Dealing with people

A project manager applies leadership skills and qualities when working with all project stakeholders, including the project team, the steering team, and project sponsors.



Leadership styles

Laissez-faire: allowing the team to make their own decisions and establish their own goals.

Transactional: focus on goals, feedback, and accomplishment to determine rewards; management by exception.

Servant leader: demonstrates commitment to serve and put other people first; focuses on other people's growth, learning, development, autonomy, and well-being; concentrates on relationships, community and collaboration.



Project

Manager

Leadership styles



Project

Manager

Transformational: empowering followers through idealized attributes and behaviors, inspirational motivation, encouragement for innovation and creativity, and individual consideration.

Charismatic: able to inspire; is high-energy, enthusiastic, self-confident; holds strong convictions.

Interactional: a combination of transactional, transformational, and charismatic.

Manager vs Leader

Project managers need to employ both leadership and management in order to be successful.

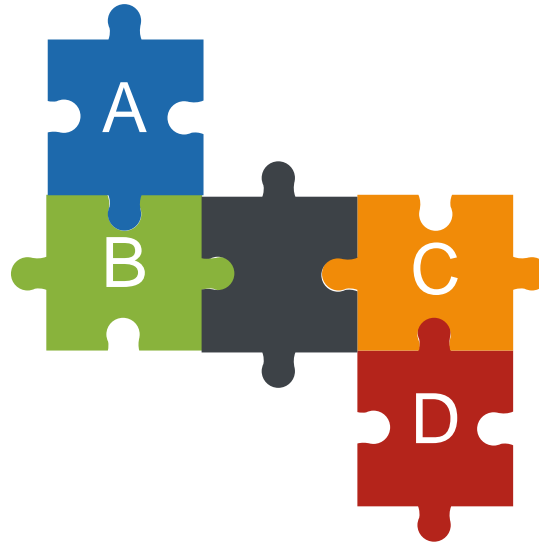
Management	Leadership
<ol style="list-style-type: none">1. Direct using positional power2. Maintain3. Administrate4. Focus on systems and structure5. Rely on control6. Focus on near-term goals7. Ask how and when8. Focus on bottom line9. Accept status quo10. Do things right11. Focus on operational issues and problem solving	<ol style="list-style-type: none">1. Guide, influence, and collaborate using relational power2. Develop3. Innovate4. Focus on relationships with people5. Inspire trust6. Focus on long-range vision7. Ask what and why8. Focus on the horizon9. Challenge status quo10. Do the right things11. Focus on vision, alignment, motivation, and inspiration

Perform **Integration**

 **Integration is a critical skill for project managers.**

Integration and execution of the strategy.

When working with the project sponsor to understand the strategic objectives and ensure the alignment of the project objectives and results with those of the portfolio, program, and business areas.



Integration of processes, knowledge, and people.

By guiding the team to work together to focus on what is really essential at the project level.



4. PROJECT INTEGRATION MANAGEMENT



Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer

Project **Integration** Management

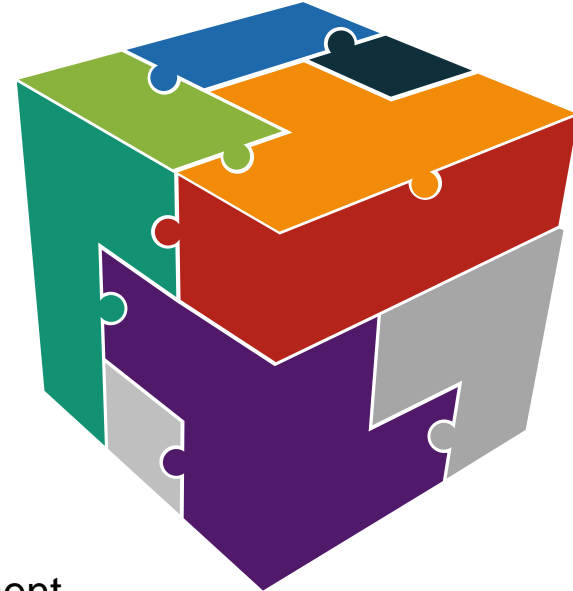
Project Integration Management

Includes the processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities within the Project Management Process Groups.



Includes making choices about:

- Resource allocation.
- Balancing competing demands.
- Examining any alternative approaches.
- Tailoring the processes to meet objectives.
- Managing the interdependencies among the Project Management Knowledge Areas

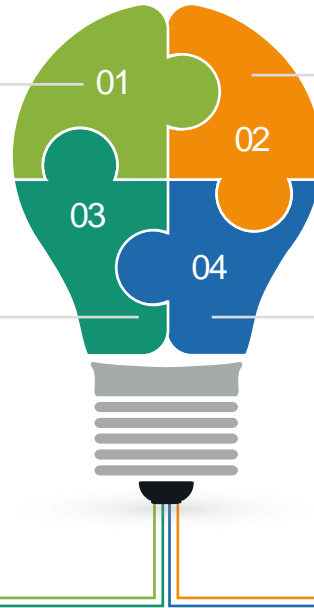


Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Schedule Management		6.1 Plan Schedule 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule Management		6.6 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Key concepts for Project Integration Management

Project Management it is the specific **responsibility** of the project manager and it cannot be delegated or transferred.

Project manager **combines the results** from all the other Knowledge Areas to provide an overall view of the project.



Projects and project management are **integrative** by nature

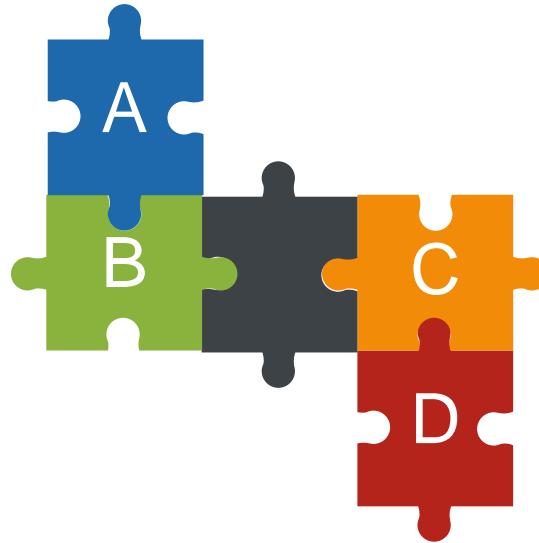
The project manager is ultimately **responsible** for the project as a whole

Key concepts for Project Integration Management

Tailoring consideration

Because each project is unique, the project manager may need to tailor the way that Project Integration Management

- Project life cycle
- Development life cycle.
- Management approaches
- Knowledge management.
- Change
- Governance
- Lessons learned
- Benefits



Agile/ Adaptive Consideration

- ✓ Iterative and agile approaches promote the engagement of team members as local domain experts in integration management.
- ✓ The team members determine how plans and components should integrate.
- ✓ control of the detailed product planning and delivery is delegated to the team.
- ✓ The project manager's focus is on building a collaborative decision-making environment

4.1 Develop Project Charter

Develop Project Charter

Inputs

- 1 Business documents
 - Business case
 - Benefits management plan
- 2 Agreements
- 3 EEF
- 4 OPA

Tools & Techniques

- 1 Expert judgment
- 2 Data gathering
 - Brainstorming
 - Focus groups
 - Interviews
- 3 Interpersonal and team skills
 - Conflict management
 - Facilitation
 - Meeting management
- 4 Meetings

Outputs

- .1 Project charter
- .2 Assumption log

4.1 Develop Project Charter Input

01

Business documents

02

Agreements

- They are used to define **initial intentions** for a project.
- Agreements May take the form of contracts, memorandums of understanding (MOUs), service level agreements (SLA), letters of agreement, letters of intent, verbal agreements, email, or other written agreements.
 - A contract is used when a project is being performed for an external customer.

03

Enterprise Environmental Factor

04

Organization Process Asset



4.1 Develop Project Charter Tools & Techniques

01 Expert judgment

- Defined as judgment provided based upon expertise in an application area, Knowledge Area, discipline, industry, etc., as appropriate for the activity being performed.
- Such expertise may be provided by any group or person with specialized education, knowledge, skill, experience, or training.

02 Data Gathering Brainstorming

- Is used to identify a list of ideas in a short period of time.
- It is conducted in a group environment and is led by a facilitator.
- Brainstorming comprises **two** parts: **idea generation and analysis.**



4.1 Develop Project Charter Tools & Techniques

02 Data Gathering

Focus group

- Bring together stakeholders and subject matter experts to learn about the perceived project risk, success criteria, and other topics in a more conversational way than a one-on-one interview.

Interviews

- are used to obtain information on high-level requirements, assumptions or constraints, approval criteria, and other information from stakeholders by talking directly to them.

4.1 Develop Project Charter Tools & Techniques

03

Interpersonal and team skills

Conflict management

- Can be used to help bring stakeholders into alignment on the objectives, success criteria, high-level requirements, project description, summary milestones, and other elements of the charter.

Facilitation

- The ability to effectively guide a group event to a successful decision.
- A facilitator ensures that there is effective participation, that participants achieve a mutual understanding, that all contributions are considered, that conclusions or results **have full buy-in**.

Meeting management

- Includes preparing the agenda, ensuring that a representative for each key stakeholder group is invited, and preparing and sending the follow-up minutes and actions.

04

Meetings

meetings are held with key stakeholders to identify the project objectives, success criteria, key deliverables, high-level requirements, and other summary information.

4.1 Develop Project Charter **Output**

01 **Project Charter**

- The project charter is the document issued by the project initiator or sponsor that formally **authorizes** the existence of a project and provides the project manager with the **authority** to apply organizational resources to project activities

02 **Assumption Log**

- High-level strategic and operational assumptions and constraints.
- Lower-level activity and task assumptions (technical specifications, estimates, the schedule, risks)
- The assumption log is used to record all assumptions and constraints throughout the project life cycle.



Project Charter

Project charter documents the **high-level** information on the project such as:

- Project purpose;
- Measurable project objectives and related success criteria;
- High-level requirements;
- Overall project risk;
- Summary milestone schedule;
- Preapproved financial resources;
- Key stakeholder list;
- Name and authority of the sponsor or other person(s) authorizing the project charter.



4.2 Develop Project Management Plan

Develop Project Management Plan

Inputs

- 1 Project charter
- 2 Outputs from other processes
- 3 EEF
- 4 OPA

Inputs Tools & Techniques Outputs

- 1 Expert judgment
- 2 Data gathering
 - Brainstorming
 - Checklists
 - Focus groups
 - Interviews
- 3 Interpersonal and team skills
 - Conflict management
 - Facilitation
 - Meeting management
- 4 Meetings

Outputs

- 1 Project management plan

4.2 Develop Project Management Plan Input

01 Project charter

02 Outputs from other processes

- Subsidiary plans
- All baselines

03 Enterprise Environmental Factor

04 Organization Process Asset



4.2 Develop Project Management Plan Tools & Techniques

01 Expert judgment

02 Data gathering

- Brainstorming
- Focus group
- Interviews
- Checklists: A checklist may guide the project manager to develop the plan or may help to verify that all the required information is included in the project management plan.

03 Interpersonal and team skills

- Conflict management
- Facilitation
- Meeting management

04 Meetings



4.2 Develop Project Management Plan Output

- 01 **Project Management Plan** is the document that describes how the project will be executed, monitored and controlled, and closed. It integrates and consolidates all of the subsidiary management plans and baselines, and other information necessary to manage the project



Project baselines:

- Scope baseline.
- Schedule baseline.
- Cost baseline.



Additional components as:

- Change management plan
- Configuration management plan
- Management reviews



Subsidiary plans as: Scope plan, Schedule management plan, Etc.



Project Management Plan

1. Scope management plan
2. Requirements management plan
3. Schedule management plan
4. Cost management plan
5. Quality management plan
6. Resource management plan
7. Communications management plan
8. Risk management plan
9. Procurement management plan
10. Stakeholder engagement plan
11. Change management plan
12. Configuration management plan
13. Scope baseline
14. Schedule baseline
15. Cost baseline
16. Performance measurement baseline
17. Project life cycle description
18. Development approach

Project Documents

1. Activity attributes
2. Activity list
3. Assumption log
4. Basis of estimates
5. Change log
6. Cost estimates
7. Cost forecasts
8. Duration estimates
9. Issue log
10. Lessons learned register
11. Milestone list
12. Physical resource assignments
13. Project calendars
14. Project communications
15. Project schedule
16. Project schedule network diagram
17. Project scope statement
18. Project team assignments
19. Quality control measurements
20. Quality metrics
21. Quality report
22. Requirements documentation
23. Requirements traceability matrix
24. Resource breakdown structure
25. Resource calendars
26. Resource requirements
27. Risk register
28. Risk report
29. Schedule data
30. Schedule forecasts
31. Stakeholder register
32. Team charter
33. Test and evaluation documents

4.3 Direct and Manage Project Work

4.3 Direct and Manage Project Work

Inputs

- .1 Project management plan
 - Any component
- .2 Project documents
 - Change log
 - Lessons learned register
 - Milestone list
 - Project communications
 - Project schedule
 - Requirements traceability matrix
 - Risk register
 - Risk report
- .3 Approved change requests
- .4 EEF
- .5 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Project management information system
- .3 Meetings

Outputs

- .1 Deliverables
- .2 Work performance data
- .3 Issue log
- .4 Change requests
- .5 Project management plan updates
 - Any component
- .6 Project documents updates
 - Activity list
 - Assumption log
 - Lessons learned register
 - Requirements documentation
 - Risk register
 - Stakeholder register
- .7 OPA updates

4.3 Direct and Manage Project Work **Input**

01 Project management plan

02 Project documents

- Change log
- Lessons learned register
- Milestone list
- Project communications
- Project schedule
- Requirements traceability matrix
- Risk register
- Risk report

03 **Approved change requests** an output of the Perform

Integrated

Change Control process,

04 **EEFs.**

05 **OPA.**



4.3 Direct and Manage Project Work Tools & Techniques

01 Expert judgment

02 Project Management Information System (PMIS)

Is part of the environmental factors, provides access to tools : scheduling tool - configuration management system - information collection and distribution system - Interfaces to other online automated systems.

03 Meetings



4.3 Direct and Manage Project Work Output

- 01 **Deliverable:** deliverable is any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project.

- 02 **Work performance data:** are the raw observations and measurements identified during activities being performed to carry out the project work.

- 03 **Issue log:** is a project document where all the issues are recorded and tracked Project communications.



4.3 Direct and Manage Project Work Output

04 Change Requests

- **Corrective action.** An intentional activity that **realigns** the performance of the project work with the project management plan.
- **Preventive action.** An intentional activity that **ensures** the future performance of the project work is aligned with the plan.
- **Defect repair.** An intentional activity to **modify** a nonconforming product or product component.
- **Updates.** Changes to formally controlled project documents, plans, etc., to reflect modified or additional ideas or content.


05 Project management plan updates


06 Project document updates

07 Organizational process assets updates



4.4 Manage Project Knowledge

 **Manage Project Knowledge** the process of using existing knowledge and creating new knowledge to achieve the project's objectives and contribute to organizational learning.

 **The Key Benefit** are that prior organizational knowledge is leveraged to produce or improve the project outcomes, and knowledge created by the project is available to support organizational operations and future projects or phases.



4.4 Manage Project Knowledge

4.4 Manage Project Knowledge

Inputs

- 1 Project management plan
 - All components
- 2 Project documents
 - Lessons learned register
 - Project team assignments
 - Resource breakdown structure
 - Source selection criteria
 - Stakeholder register
- 3 Deliverables
- 4 EEF
- 5 OPA

Tools & Techniques

- 1 Expert judgment
- 2 Knowledge management
- 3 Information management
- 4 Interpersonal and team skills
 - Active listening
 - Facilitation
 - Leadership
 - Networking
 - Political awareness

Outputs

- 1 Lessons learned register
- 2 Project management plan updates
 - Any component
- 3 OPA update

4.4 Manage Project Knowledge **Input**

01 **Project management plan.**

02 **Project documents.**

- Lessons learned register
- Project team assignments
- Resource breakdown structure
- Source selection criteria
- Stakeholder register

03 **Deliverables.**

Deliverable is any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project.

04 **EEFs.**

05 **OPA.**



4.4 Manage Project Knowledge Tools & Techniques

01 Expert judgment

2 **Knowledge management tools and techniques** connect people so they can work together to create new knowledge.

3 Information management

4 Interpersonal and team skills

- **Active listening.**
- **Facilitation.**
- **Leadership.**
- **Networking.**

Allows informal connections and relations among project stakeholders to be established and creates the conditions to share tacit and explicit knowledge.

- **Political awareness.**

Helps the project manager to plan communications based on the project environment as well as the organization's political environment.

4.4 Manage Project Knowledge Output

01

Lessons learned register

can include

- the category and description of the situation
- the impact, recommendations, and proposed actions associated with the situation.
- record challenges, problems, realized risks and opportunities, or other content as appropriate.

02

Project management plan updates

03

OPA updates



4.5 Monitor and Control Project Work

4.5 Monitor and Control Project Work

Inputs

- 1 Project management plan
- 2 Project documents
 - Assumption log
 - Basis of estimates
 - Cost forecasts
 - Issue log
 - Lessons learned register
 - Milestone list
 - Quality reports
 - Risk register
 - Risk report
 - Schedule forecasts
- .3 Work performance information
- .4 Agreements
- .5 Enterprise environmental factors
- .6 Organizational process assets

Tools & Techniques

- .1 Expert judgment
- .2 Data analysis
 - Alternatives analysis
 - Cost-benefit analysis
 - Earned value analysis
 - Root cause analysis
 - Trend analysis
 - Variance analysis
- .3 Decision making
- .4 Meetings

Outputs

- 1 Work performance reports
- 2 Change requests
- 3 Project management plan updates
- 4 Project documents updates
 - Cost forecasts
 - Issue log
 - Lessons learned register
 - Risk register
 - Schedule forecasts

4.5 Monitor and Control Project Work Input - 1

01 Project management plan

02 Project documents

- Assumption log
- Basis of estimates
- Cost forecasts
- Issue log
- Lessons learned register
- Milestone list
- Quality reports
- Risk register
- Risk report
- Schedule forecasts

03 Work performance information

- It is gathered through work execution and passed to the controlling processes.
- To become work performance information, the work performance data are compared with the project management plan components, project documents, and other project variables.

04 Agreements

05 EEFs

06 OPA

4.5 Monitor and Control Project Work Tools & Techniques

01 Expert judgment

02 Data analysis

- **Alternatives analysis.** is used to select the corrective actions or a combination of corrective and preventive actions to implement when a deviation occurs.
- **Cost-benefit analysis.** helps to determine the best corrective action in terms of cost in case of project deviations.
- **Earned value analysis.** provides an integrated perspective on scope, schedule, and cost performance.
- **Root cause analysis.** focuses on identifying the main reasons of a problem. It can be used to identify the reasons for a deviation and the areas the project manager should focus on in order to achieve the objectives of the project.

4.5 Monitor and Control Project Work Tools & Techniques

02 Data analysis

- **Trend analysis.**

- ✓ It is used to forecast future performance based on past results.
- ✓ It looks ahead in the project for expected slippages and warns the project manager ahead of time that there may be problems later in the schedule if established trends persist.
- ✓ This information is made available early enough in the project timeline to give the project team time to analyze and correct any anomalies.
- ✓ The results of trend analysis can be used to recommend preventive actions if necessary.

4.5 Monitor and Control Project Work Tools & Techniques

02 Data analysis

Variance analysis.

Reviews the differences (or variance) between planned and actual performance. This can include duration estimates, cost estimates, resources utilization, resources rates, technical performance, and other metrics.

03 Decision making

Voting, It can include making decisions based on unanimity, majority, or plurality.

04 Meetings

4.5 Monitor and Control Project Work **Output**

- 01 **Work performance reports**
- 02 **Change requests**
- 03 **Project management plan updates**
- 04 **Project documents updates**
 - Cost forecasts
 - Issue log
 - Lessons learned register
 - Risk register
 - Schedule forecasts



4.6 Perform Integrated Change Control

4.6 Perform Integrated Change Control

Inputs

- .1 Project management plan
 - Change management plan
 - Configuration management plan
 - Scope baseline
 - Schedule baseline
 - Cost baseline
- .2 Project documents
 - Basis of estimates
 - Requirements traceability matrix
 - Risk report
- .3 Work performance reports
- .4 Change requests
- .5 Enterprise environmental factors
- .6 Organizational process assets

Tools & Techniques

- .1 Expert judgment
- .2 Change control tools
- .3 Data analysis
 - Alternatives analysis
 - Cost-benefit analysis
- .4 Decision making
 - Voting
 - Autocratic decision making
 - Multi-criteria decision analysis
- .5 Meetings

Outputs

- .1 Approved change requests
- .2 Project management plan updates
 - Any component
- .3 Project documents updates
 - Change log

4.6 Perform Integrated Change Control Input

01 **Project management plan**

02 **Project documents.**

03 **Work performance reports.**

Reports of particular interest to the Perform Integrated Change Control

process include resource availability, schedule and cost data, earned value reports, and burn-up or burn-down charts.

04 **Change requests.**

05 **EEFs.**

06 **OPA.**



4.6 Perform Integrated Change Control Tools & Techniques

01 EXPERT JUDGMENT

In addition to the project management team's expert judgment, stakeholders may be asked to provide their expertise and maybe asked to sit on **the change control board (CCB)**.

02 CHANGE CONTROL TOOLS

Tools are used to manage the change requests and the resulting decisions. It should support the following **configuration** management activities:

- Identify configuration item.
- Record and report configuration item status.
- Perform configuration item verification and audit.

4.6 Perform Integrated Change Control Tools & Techniques

03

DATA ANALYSIS

- Alternatives analysis.
- Cost-benefit analysis.

04

DECISION MAKING

- **Voting.**
 - Voting can take the form of **unanimity, majority, or plurality** to decide on whether to accept, defer, or reject change requests.
- **Autocratic decision making.**
 - One individual takes the responsibility for making the decision for the entire group.
- **Multi-criteria decision analysis.**
 - This technique uses a decision matrix to provide a systematic analytical approach to evaluate the requested changes according to a set of predefined criteria.

05

MEETINGS

4.6 Perform Integrated Change Control **Output**

01 **APPROVED CHANGE REQUESTS**

- Approved change requests will be implemented through the Direct and Manage Project Work process.
- All change requests are recorded in the change log as a project document update.

02 **PROJECT MANAGEMENT PLAN UPDATES**

03 **PROJECT DOCUMENTS UPDATES.**



4.7 Close Project or Phase



the project manager reviews the project management plan to ensure that all project work is completed and that the project has met its objectives.

Actions and activities necessary to satisfy completion or exit criteria for the phase or project

- Making certain that all documents and deliverables are up-to-date and that all issues are resolved.
- Confirming the delivery and formal acceptance of deliverables by the customer.
- Ensuring that all costs are charged to the project.
- Closing project accounts.
- Reassigning personnel.
- Dealing with excess project material.
- Reallocating project facilities, equipment, and other resources.
- Elaborating the final project reports as required by organizational policies.

4.7 Close Project or Phase

4.7 Close Project or Phase		
Inputs	Tools & Techniques	Outputs
<ul style="list-style-type: none"> 1 Project charter 2 Project management plan 3 Project documents <ul style="list-style-type: none"> • Assumption log • Basis of estimates • Change log • Issue log • Lessons learned register • Milestone list • Project communications • Quality control measurements • Quality reports • Requirements documentation • Risk register • Risk report 4 Accepted deliverables 5 Business documents <ul style="list-style-type: none"> • Business case • Benefits management plan 6 Agreements 7 Procurement documentation 8 Organizational process assets 	<ul style="list-style-type: none"> .1 Expert judgment .2 Data analysis <ul style="list-style-type: none"> • Document analysis • Regression analysis • Trend analysis • Variance analysis .3 Meetings 	<ul style="list-style-type: none"> .1 Project documents updates <ul style="list-style-type: none"> • Lessons learned register .2 Final product, service, or result transition .3 Final report .4 Organizational process assets updates

4.7 Close Project or Phase Input

- 01 **PROJECT CHARTER**
- 02 **PROJECT MANAGEMENT PLAN**
- 03 **PROJECT DOCUMENTS**
- 04 **ACCEPTED DELIVERABLES.**
- 05 **BUSINESS DOCUMENTS.**
- 06 **AGREEMENTS.**
- 07 **PROCUREMENT DOCUMENTATION.**
- 08 **OPA.**



4.7 Close Project or Phase Tools & Techniques

01 EXPERT JUDGMENT

02 DATA ANALYSIS

- Document analysis.
- Regression analysis.

Analyzes the interrelationships between different project variables that contributed to the project outcomes to improve performance on future projects.

- Trend analysis.
- Variance analysis.

03 MEETINGS

01 **PROJECT DOCUMENTS UPDATES**

02 **FINAL PRODUCT, SERVICE, OR RESULT TRANSITION**

03 **FINAL REPORT**

The final report provides a summary of the project performance.

04 **OPA UPDATES**





5. PROJECT SCOPE MANAGEMENT



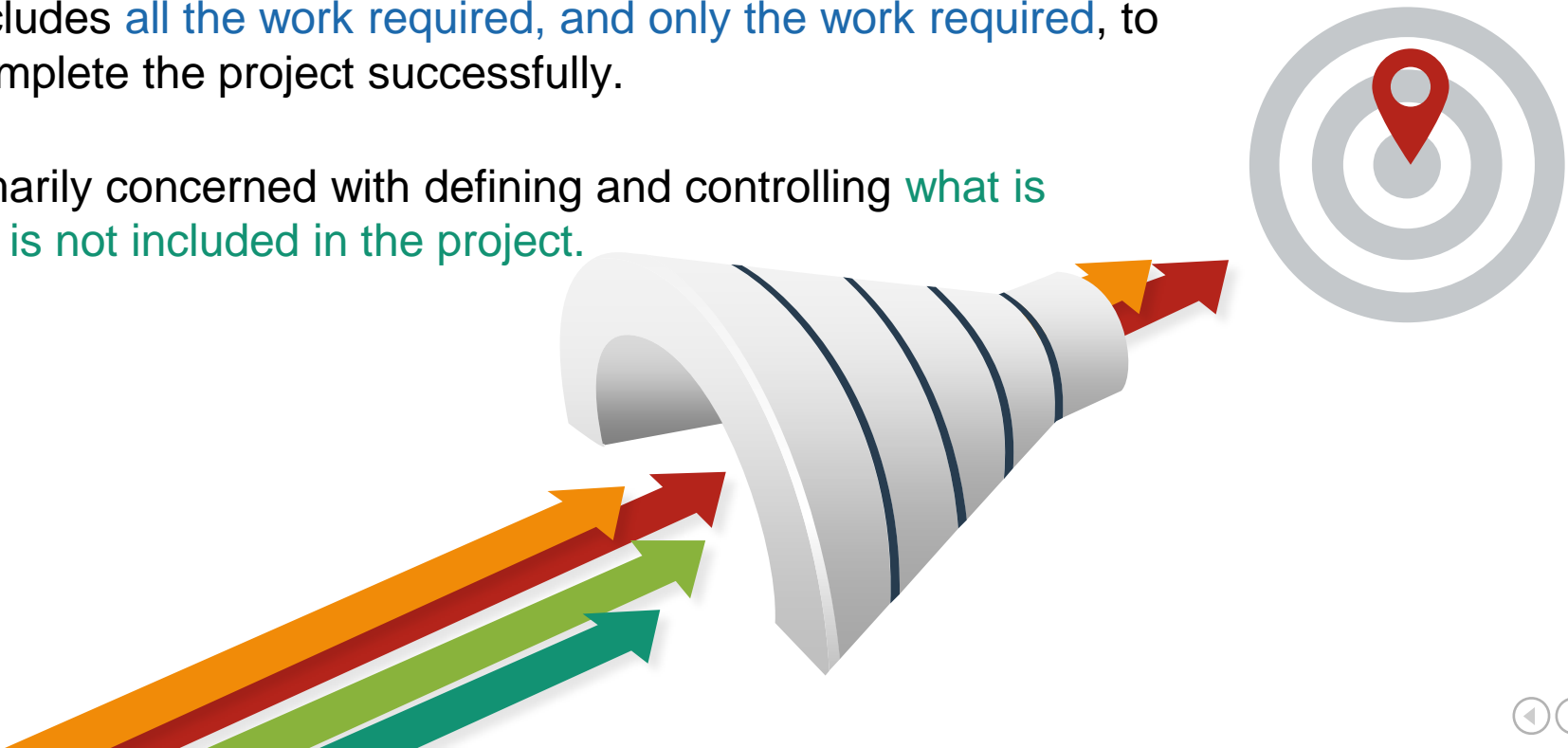
Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer

Project Scope Management

- Includes the processes required to ensure that the project includes **all the work required, and only the work required**, to complete the project successfully.
- primarily concerned with defining and controlling **what is and is not included in the project.**



Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Schedule Management		6.1 Plan Schedule 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule Management		6.6 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Key concepts for Project Scope Management

The term “scope” can refer to:

Product scope. The features and functions that characterize a product, service, or result.

Project scope. The work performed to deliver a product, service, or result with the specified features and functions. The term “project scope” is sometimes viewed as including product scope.

- ❖ **Project scope completion** is measured against the project management plan.
- ❖ **product scope completion** is measured against the product requirements

Project life cycles can be :

- ❖ **Predictive life cycle**
The project deliverables are defined at the beginning of the project and any changes to the scope are progressively managed.
- ❖ **Adaptive or agile life cycle**
the deliverables are developed over multiple iterations where a detailed scope is defined and approved for each iteration when it begins.
- ❖ The **uncontrolled expansion** to product or project scope without adjustments to time, cost, and resources is referred to as **scope creep**.

Key concepts for **Project Scope Management**

TAILORING CONSIDERATIONS

- Knowledge and requirements management.
- Validation and control.
- Development approach.
- Stability of requirements.
- Governance.



Scope Creep

(requirement creep, function creep) Refers to changes, continuous or uncontrolled growth in a project's scope. It occurs when the scope of a project is not properly defined, documented, or controlled.

Gold Plating concept

Giving the customer more than what he originally asked for.

5.1 Plan Scope Management

5.1 Plan Scope Management

Inputs

- 1 Project charter
- 2 Project management plan
 - Quality management plan
 - Project life cycle description
 - Development approach
- 3 Enterprise environmental factors
- 4 Organizational process assets

Tools & Techniques

- .1 Expert judgment
- .2 Data analysis
 - Alternatives analysis
- .3 Meetings

Outputs

- 1 Scope management plan
- 2 Requirements management plan

5.1 Plan Scope Management **Input**

- 01 **PROJECT CHARTER**
- 02 **PROJECT MANAGEMENT PLAN**
 - Quality management plan
 - Project life cycle description
 - Development approach
- 03 **ENTERPRISE ENVIRONMENTAL FACTORS**
- 04 **ORGANIZATIONAL PROCESS ASSETS**



5.1 Plan Scope Management Tools & Techniques

- 01 **Expert judgment**
- 02 **Data Analysis**
 - Alternatives analysis
- 03 **Meetings**



5.1 Plan Scope Management Output

01 SCOPE MANAGEMENT PLAN

Component of the project management plan that describes how the scope will be defined, developed, monitored, controlled, and validated;

02 REQUIREMENTS MANAGEMENT PLAN

- Component of the project management plan that describes how project and product requirements will be analyzed, documented, and managed.
- Some organizations refer to it as a **business analysis plan**.



5.2 Collect Requirements

5.2 Collect Requirements

Inputs

- .1 Project charter
- .2 Project management plan
 - Scope management plan
 - Requirements management plan
 - Stakeholder engagement plan
- .3 Project documents
 - Assumption log
 - Lessons learned register
 - Stakeholder register
- .4 Business documents
 - Business case
- .5 Agreements
- .6 Enterprise environmental factors
- .7 Organizational process assets

Tools & Techniques

- .1 Expert judgment
- .2 Data gathering
 - Brainstorming
 - Interviews
 - Focus groups
 - Questionnaires and surveys
 - Benchmarking
- .3 Data analysis
 - Document analysis
- .4 Decision making
 - Voting
 - Multicriteria decision analysis
- .5 Data representation
 - Affinity diagrams
 - Mind mapping
- .6 Interpersonal and team skills
 - Nominal group technique
 - Observation/conversation
 - Facilitation
- .7 Context diagram
- .8 Prototypes

Outputs

- .1 Requirements documentation
- .2 Requirements traceability matrix

5.2 Collect Requirements Input

- 01 **PROJECT CHARTER**
- 02 **PROJECT MANAGEMENT PLAN**
 - Scope management plan.
 - Requirements management plan.
 - Stakeholder engagement plan.
- 03 **PROJECT DOCUMENTS**
 - Assumption Log.
 - Lessons learned register.
 - Stakeholder Register.
- 04 **BUSINESS DOCUMENTS**
- 05 **AGREEMENTS**
- 06 **EEF**
- 07 **OPA**



5.2 Collect Requirements

Tools & Techniques

01 DATA GATHERING

Brainstorming. generate and collect multiple ideas related to project and product requirements.

Focus groups. bring together stakeholders and subject matter experts to learn about their expectations.

Questionnaires & surveys. sets of questions designed to quickly accumulate information



Interviews. Formal/ informal approach to elicit information from stakeholders by talking to them directly.

Benchmarking comparing actual or planned products, to those of comparable organizations to identify best practices, generate ideas for improvement.

5.2 Collect Requirements Tools & Techniques

02 EXPERT JUDGMENT

03 DATA ANALYSIS

Document analysis: reviewing and assessing any relevant documented information to elicit requirements by analyzing existing documentation and identifying information relevant to the requirements.

04 DECISION MAKING

Voting.

- Unanimity - everyone agrees on a single course of action.
- Majority – More than 50% of the members agree.
- Plurality. – Largest block in a group decides.

Autocratic decision making one individual takes responsibility for making the decision.

Multi-criteria decision analysis uses a decision matrix to provide a systematic analytical approach for establishing criteria to evaluate and rank many ideas.



5.2 Collect Requirements Tools & Techniques

05 DATA REPRESENTATION

- **Affinity diagrams** - large numbers of ideas to be classified into groups for review and analysis.
- **Mind mapping** - consolidates ideas created through individual brainstorming sessions into a single map to reflect commonality and differences in understanding and to **generate new ideas**.



06 INTERPERSONAL AND TEAM SKILLS

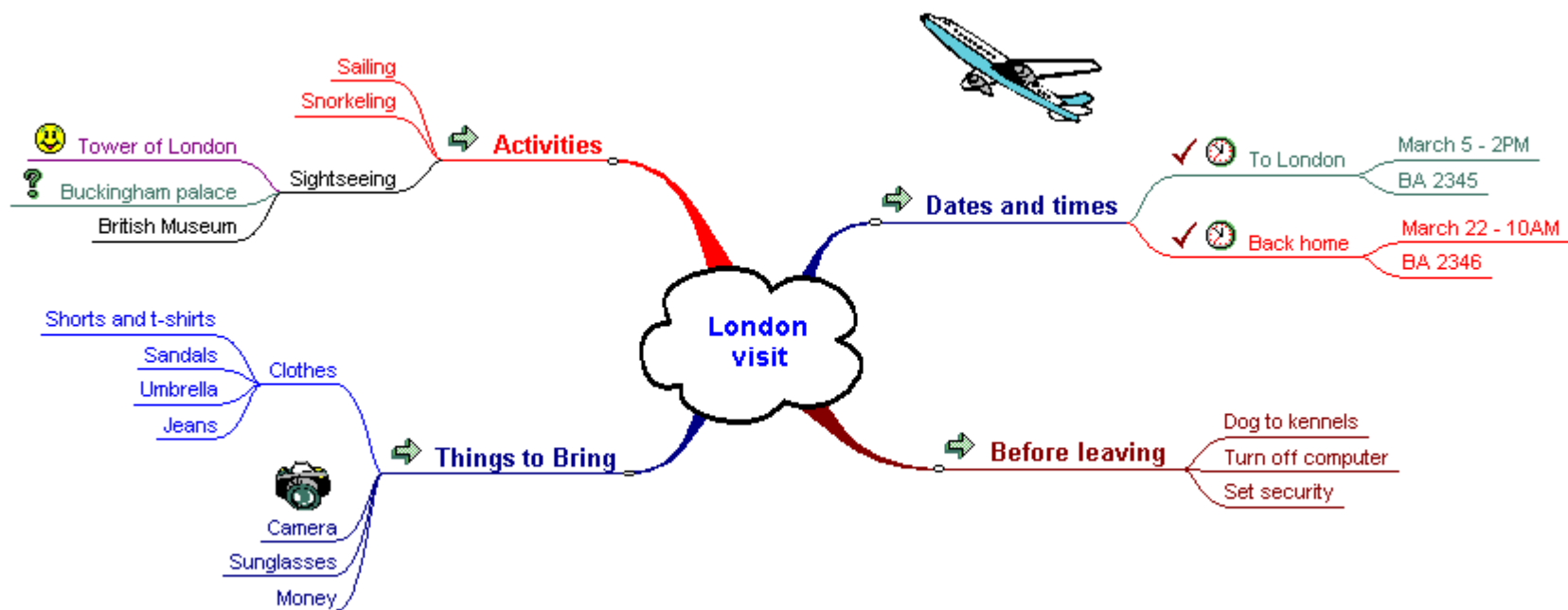
- **Nominal group technique**
- **Observation/conversation**
- **Facilitation**.

- **07 Prototypes** providing a model of the expected product before actually building it, to obtaining early feedback on requirements

Affinity Diagram

Staff	Distribution	Quality	Capacity
Lack of staff training	Not enough trucks.	Variable ingredients quality	Insufficient ovens
Difficulties recruiting	Cooling systems in trucks unreliable.	Packaging not strong enough	Limited storage space
High overtime	Product damaged in transit		Seasonal demand

Mind Map

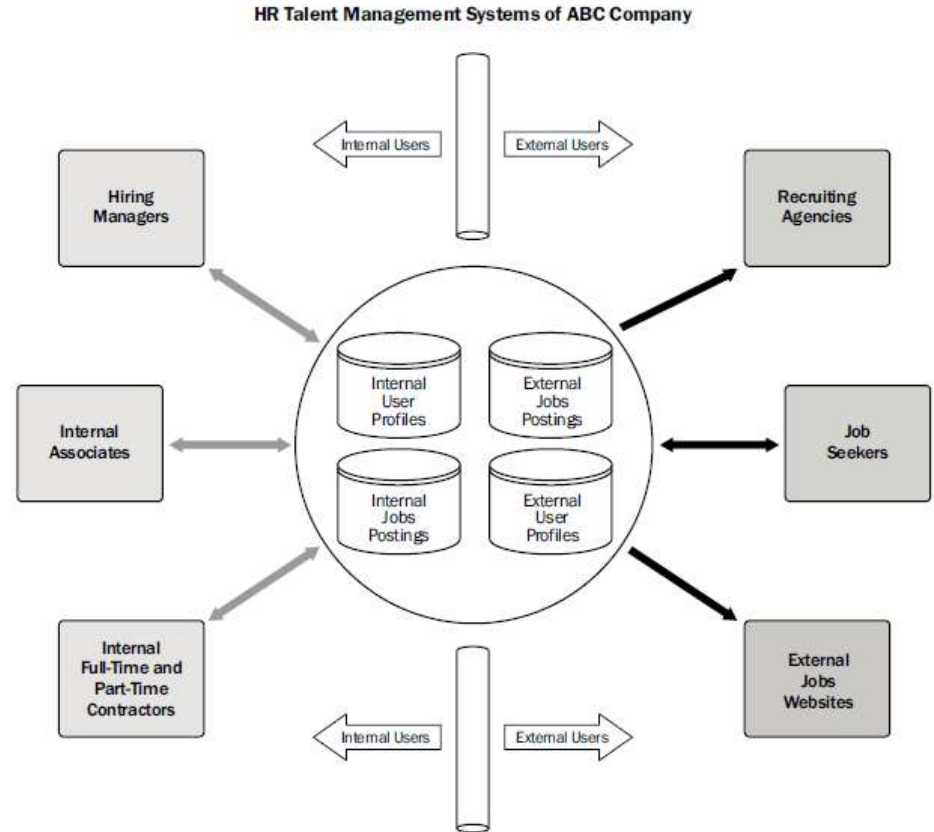


5.2 Collect Requirements

Tools & Techniques

08 CONTEXT DIAGRAM

Visually depict the product scope by showing a **business system**, and how **people and other systems (actors)** interact with it.



5.2 Collect Requirements Output

01

REQUIREMENTS DOCUMENTATION

- **Business requirements.** describe the higher-level needs of the organization as a whole.
- **Stakeholder requirements.** describe needs of a stakeholder or stakeholder group.
- **Solution requirements.** describe features, functions, and characteristics of the product, service, or result that will meet the business and stakeholder requirements.

Functional Ex: actions, processes, data, and interactions that the product should execute

Nonfunctional Ex: reliability, security, performance, safety, level of service, supportability, retention.

- **Transition and readiness requirements.**
- **Project requirements.**
- **Quality requirements.** Ex: include tests, certifications, validations, etc.

5.2 Collect Requirements Output

02 Requirements Traceability Matrix

Requirements Traceability Matrix								
Project Name:								
Cost Center:								
Project Description:								
ID	Associate ID	Requirements Description	Business Needs, Opportunities, Goals, Objectives	Project Objectives	WBS Deliverables	Product Design	Product Development	Test Cases
001	1.0							
	1.1							
	1.2							
	1.2.1							
002	2.0							
	2.1							
	2.1.1							

5.3 Define Scope

5.3 Define Scope

Inputs

- 1 Project charter
- 2 Project management plan
 - Scope management plan
- 3 Project documents
 - Assumption log
 - Requirements documentation
 - Risk register
- 4 Enterprise environmental factors
- 5 Organizational process assets

Tools & Techniques

- .1 Expert judgment
- .2 Data analysis
 - Alternatives analysis
- .3 Decision making
 - Multicriteria decision analysis
- .4 Interpersonal and team skills
 - Facilitation
- .5 Product analysis

Outputs

- 1 Project scope statement
- 2 Project documents updates
 - Assumption log
 - Requirements documentation
 - Requirements traceability matrix
 - Stakeholder register

5.3 Define Scope

Input

- 01 **PROJECT CHARTER**
- 02 **PROJECT MANAGEMENT PLAN**
 - **Assumption log**: identifies assumptions and constraints about the product, project, environment, stakeholders, and other factors that can influence the project
 - **Requirements documentation**.
 - **Risk register**.
- 03 **ENTERPRISE ENVIRONMENTAL FACTORS**
- 04 **ORGANIZATIONAL PROCESS ASSETS**



5.3 Define Scope Tools & Techniques

01 EXPERT JUDGMENT

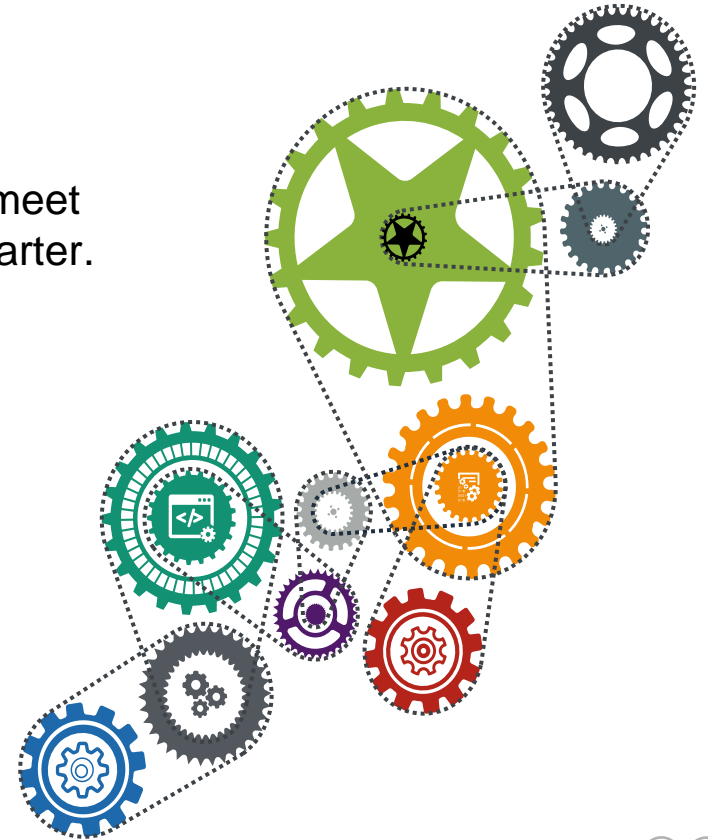
02 DATA ANALYSIS

Alternatives analysis can be used to evaluate ways to meet the requirements and the objectives identified in the charter.

03 DECISION MAKING

04 INTERPERSONAL AND TEAM SKILLS

05 PRODUCT ANALYSIS



5.3 Define Scope

Output

01 PROJECT SCOPE STATEMENT

- Description of the project scope, major deliverables, assumptions, and constraints. It contains a detailed description of the scope components.
- The detailed project scope statement includes:
 - Product scope description.
 - Deliverables.
 - Acceptance criteria.
 - Project exclusions.

02 PROJECT DOCUMENTS UPDATES

- Assumption log.
- Requirements documentation.
- Requirements traceability matrix.
- Stakeholder register.



Statement Of Work VS Scope Statement

5.4 Create WBS

5.4 Create WBS

Inputs

- .1 Project management plan
 - Scope management plan
- .2 Project documents
 - Project scope statement
 - Requirements documentation
- .3 Enterprise environmental factors
- .4 Organizational process assets

Tools & Techniques

- .1 Expert judgment
- .2 Decomposition

Outputs

- .1 Scope Baseline
- .2 Project documents updates
 - Assumption log
 - Requirements documentation

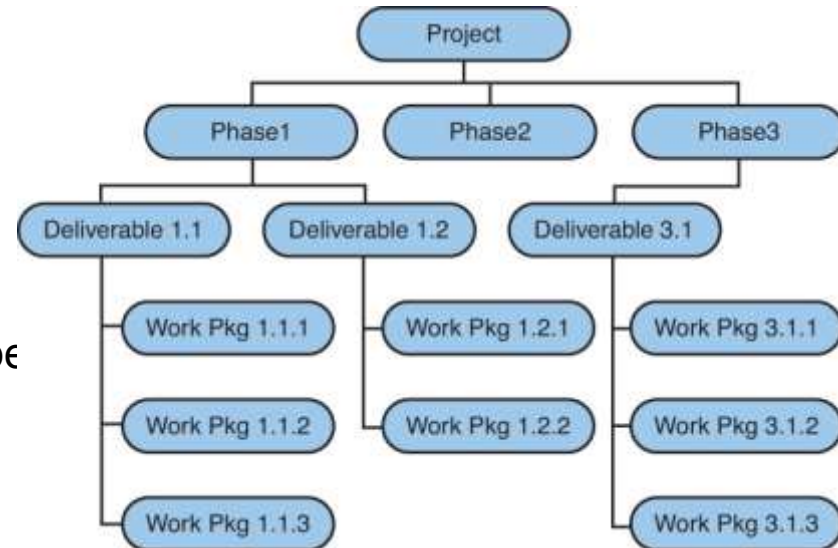
5.4 Create WBS

CREATE WBS IS the process of subdividing project deliverables and project work into smaller, more manageable components.

WBS is a hierarchical decomposition of the total scope of work, specified in the current approved project scope statement.

The 100% Rule: the sum of the work at the "child" level must equal 100% of the work represented by the "parent".

- **80-hour rule:** "lowest level of detail of the WBS" for a deliverable should be more than 80 hours of effort.
- **Rule of thumb:** lowest level of detail of the WBS" longer than a single reporting period.



5.4 Create WBS

Input

- 01 **PROJECT MANAGEMENT PLAN**
- 02 **PROJECT DOCUMENTS**
 - Project scope statement.
 - Requirements documentation.
- 03 **ENTERPRISE ENVIRONMENTAL FACTORS (EEF)**
- 04 **ORGANIZATIONAL PROCESS ASSETS (OPA)**



5.4 Create WBS Tools & Techniques

01 EXPERT JUDGMENT

02 **DECOMPOSITION** is a technique used for dividing and subdividing the project scope and project deliverables into smaller, more manageable parts.

- **The work package** is the work defined at the lowest level of the WBS for which cost and duration can be estimated and managed.
- **Control account** is a management control point where scope, budget, and schedule are integrated and compared to the earned value for performance measurement.
- **Planning package** is a work breakdown structure component below the control account and above the work package with known work

Control account has two or more work packages.



5.4 Create WBS Output

01

SCOPE BASELINE

- **Project scope statement.**
- **WBS.**
- **WBS Dictionary:** it is a document that provides detailed deliverable, activity, and scheduling information about each component in the WBS. It includes Code of account identifier, Description of work, Assumptions and constraints, Responsible organization, Schedule milestones, Associated schedule activities,

02

PROJECT DOCUMENTS UPDATES

- Assumption log.
- Requirements documentation.

5.4 Create WBS Excercise

SAAD want to re-qualify his bedroom; he decides to change his bed, paint walls, buy new sofa and Get rid of old furniture's.
Since he doesn't have enough budget; he also decides to keep some money from his monthly salary for three months.

**“SAAD Room Re-qualify Project”
Could you create WBS for this project?**

Option 1

Requalified Room Project

```
graph TD; A[Requalified Room Project] --> B[1.1 Collect Money]; A --> C[1.2 Paints walls]; A --> D[1.3 Get rid old Furniture's]; A --> E[1.4 Change sofa];
```

1.1

Collect Money

1.2

Paints walls

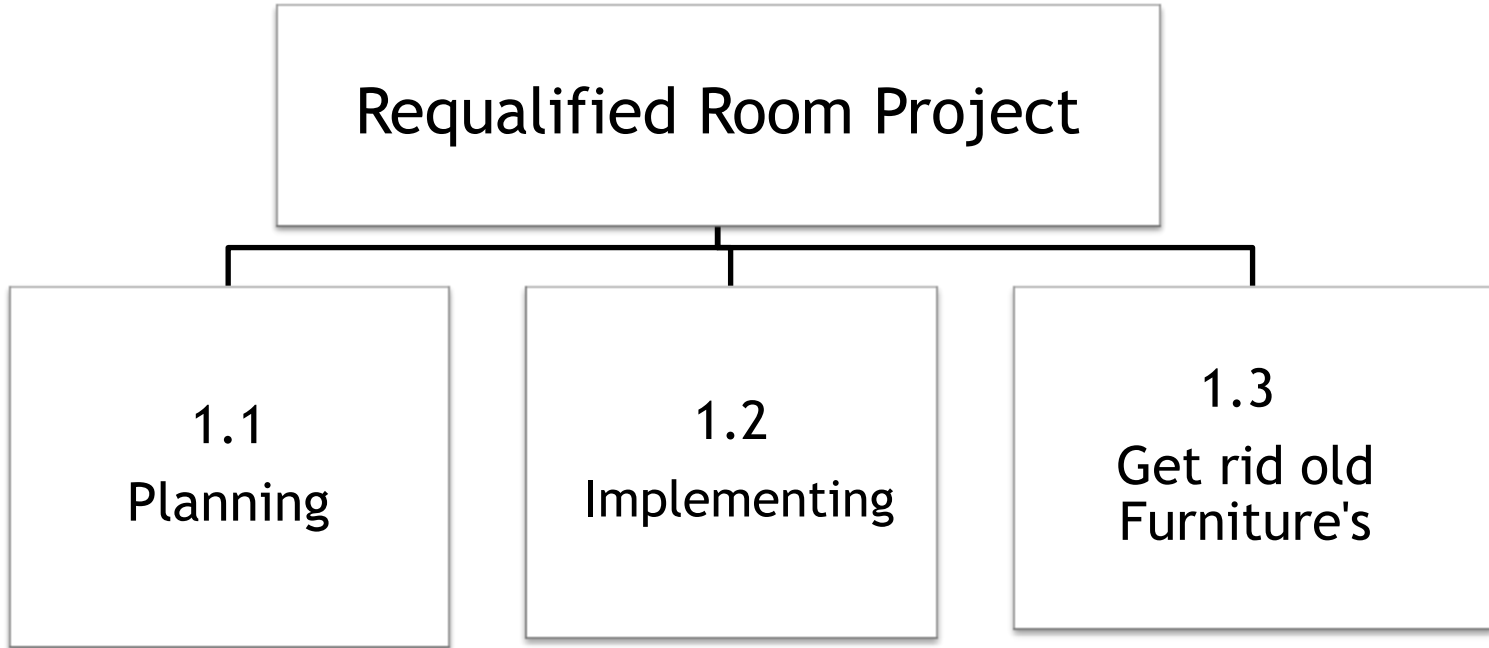
1.3

Get rid old
Furniture's

1.4

Change sofa

Option 2



5.5 Validate Scope

5.5 Validate Scope

Inputs

- .1 Project management plan
 - Scope management plan
 - Requirements management plan
 - Scope baseline
- .2 Project documents
 - Lessons learned register
 - Quality reports
 - Requirements documentation
 - Requirements traceability matrix
- .3 Verified deliverables
- .4 Work performance data

Tools & Techniques

- .1 Inspection
- .2 Decision making
 - Voting

Outputs

- .1 Accepted deliverables
- .2 Work performance information
- .3 Change requests
- .4 Project document updates
 - Lessons learned register
 - Requirements documentation
 - Requirements traceability matrix

5.5 Validate Scope Input

- 01 **Project management plan**
 - Scope management plan
 - Requirements management plan
 - Scope baseline
- 02 **Project documents**
 - Lessons learned register
 - Quality reports
 - Requirements documentation
 - Requirements traceability matrix
- 03 **Verified deliverables**
- 04 **Work performance data**



5.5 Validate Scope Tools & Techniques

01 INSPECTION

- Includes activities such as measuring, examining, and validating to determine whether work and deliverables meet requirements and product acceptance criteria.
- Inspections are sometimes called reviews, product reviews, and walkthroughs.

02 DECISION MAKING

Voting is used to reach a conclusion when the validation is performed by the project team and other stakeholders.



5.5 Validate Scope Output

- 01 **ACCEPTED DELIVERABLES**
- 02 **WORK PERFORMANCE INFORMATION**
- 03 **CHANGE REQUESTS**
- 04 **PROJECT DOCUMENTS UPDATES**
 - Lessons learned register.
 - Requirements documentation.
 - Requirements traceability matrix.



5.6 Control Scope

5.6 Control Scope

Inputs

- 1 Project management plan
 - Scope management plan
 - Requirements management plan
 - Change management plan
 - Configuration management plan
 - Scope baseline
 - Performance measurement baseline
- .2 Project documents
 - Lessons learned register
 - Requirements documentation
 - Requirements traceability matrix
- .3 Work performance data
- .4 Organizational process assets

Tools & Techniques

- .1 Data analysis
 - Variance analysis
 - Trend analysis

Outputs

- .1 Work performance information
- .2 Change requests
- .3 Project management plan updates
 - Scope management plan
 - Scope baseline
 - Schedule baseline
 - Cost baseline
 - Performance measurement baseline
- .4 Project documents updates
 - Lessons learned register
 - Requirements documentation
 - Requirements traceability matrix

5.6 Control Scope Input

- 01 **PROJECT MANAGEMENT PLAN**
 - Scope management plan.
 - Requirements management plan.
 - Change management plan.
 - Configuration management plan.
 - Scope baseline.
 - Performance measurement baseline.
- 02 **PROJECT DOCUMENTS**
 - Lessons learned register
 - Requirements documentation.
 - Requirements traceability matrix.
- 03 **WORK PERFORMANCE DATA**
- 04 **ORGANIZATIONAL PROCESS ASSETS**



5.6 Control Scope Tools & Techniques

01

DATA ANALYSIS

➤ Variance analysis.

Is used to compare the baseline to the actual results and determine if the variance is within the threshold amount or if corrective or preventive action is appropriate.

➤ Trend analysis.

Examines project performance over time to determine if performance is improving or deteriorating.



5.6 Control Scope Output

01

WORK PERFORMANCE INFORMATION

02

CHANGE REQUESTS

03

PROJECT MANAGEMENT PLAN UPDATES

- Scope management plan.
- Scope baseline.
- Schedule baseline.
- Cost baseline.
- Performance measurement baseline.

04

PROJECT DOCUMENTS UPDATES

- Lessons learned register.
- Requirements documentation.
- Requirements traceability matrix.





6. PROJECT SCHEDULE MANAGEMENT



Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer

Project Schedule Management

Project Schedule Management includes the processes required to manage the timely completion of the project.

Project scheduling provides a detailed plan that represents how and when the project will deliver the products, services, and results defined in the project scope and serves as a tool for communication, managing stakeholders' expectations, and as a basis for performance reporting.



Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Schedule Management		6.1 Plan Schedule 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule Management		6.6 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Trends and emerging practices in Project Schedule Management

Iterative scheduling with a backlog.

- This is a form of **rolling wave** planning based on adaptive life cycles.
- This approach is often used to deliver **incremental value** to the customer.
- Teams can concurrently **develop a large** number of features that have few interconnected dependencies.
- The benefit of this approach is that it **welcomes changes** throughout the development life cycle.



On-demand scheduling.

- This approach, typically used in a **Kanban system**, is based on the theory-of constraints and pull-based scheduling concepts from lean manufacturing to limit a team's work in progress in order to balance demand against the team's delivery throughput.
- **Not rely on a schedule** that was developed previously, but rather pulls work from a backlog done immediately as resources become available.
- Used for **projects that evolve** the product incrementally.



Key concepts for **Project Schedule Management**

TAILORING CONSIDERATIONS



- **Life cycle approach.**
- **Resource availability.**
- **Project dimensions.**
- **Technology support.**

6.1 Plan Schedule Management

6.1 Plan Schedule Management

Inputs

- .1 Project charter
- .2 Project management plan
 - Scope management plan
 - Development approach
- .3 EEF
- .4 PA

Tools & Techniques

- .1 Expert judgment
- .2 Data analysis
- .3 Meetings

Outputs

- 1 Schedule management plan

6.1 Plan Schedule Management **Input**

- 01 **PROJECT CHARTER**
- 02 **PROJECT MANAGEMENT PLAN**
 - Scope management plan.
 - Development approach.
- 03 **ENTERPRISE ENVIRONMENTAL FACTORS**
- 04 **ORGANIZATIONAL PROCESS ASSETS**



6.1 Plan Schedule Management Tools & Techniques

- 01 **Expert judgment**
- 02 **Data Analysis**
- 03 **Meetings**



6.1 Plan Schedule Management Output

01 SCHEDULE MANAGEMENT PLAN

- Establishes the criteria and the activities for developing, monitoring, and controlling the schedule.
- It may be formal or informal, highly detailed, or broadly framed based on the needs of the project, and includes appropriate control thresholds.
- The schedule management plan can establish the following:
 - Project schedule model development.
 - Release and iteration length
 - Level of accuracy and Units of measure.
 - Organizational procedures links.
 - Control thresholds
 - Rules of performance measurement.
 - Reporting formats.



6.2 Define Activities

6.2 Define Activities

Inputs

- 1 Project management plan
 - Schedule management plan
 - Scope baseline
- 2 EEF
- 3 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Decomposition
- .3 Rolling wave planning
- .4 Meetings

Outputs

- .1 Activity list
- .2 Activity attributes
- .3 Milestone list
- .4 Change requests
- .5 Project management plan updates
 - Schedule baseline
 - Cost baseline

6.2 Define Activities Input

- 01 **PROJECT MANAGEMENT PLAN**
 - Schedule management plan.
 - Scope baseline.
- 02 **ENTERPRISE ENVIRONMENTAL FACTORS**
- 03 **ORGANIZATIONAL PROCESS ASSETS**



6.2 Define Activities Tools & Techniques

01 Expert judgment

02 Decomposition

03 Rolling wave planning

- Is an iterative planning technique in which the work to be accomplished in the near term is planned in detail, while work further in the future is planned at a higher level.
- It is a form of progressive elaboration applicable to work packages, planning packages, and release planning when using an agile or waterfall approach.

04 Meetings



6.2 Define Activities Output

01 Activity list

The activity list includes an activity identifier and a scope of work description for each activity in sufficient detail to ensure that project team members understand what work is required to be completed.

02 Activity attributes

Extend the description of the activity by identifying multiple components associated with each activity.



6.2 Define Activities Output

	A	B	C
1	Activity	Start Date	Number of Days
2	Get the Equipments	2/25/2015	2
3	Build the Arms Cover	2/28/2015	3

ID: <i>From activity list</i>		Activity: <i>From activity list</i>			
Description of Work: <i>A description of the activity in enough detail so that the person(s) performing the work understands what is required to complete it.</i>					
Predecessors	Relationship	Lead or Lag	Successor	Relationship	Lead or Lag
<i>Any activities that must occur before the activity.</i>	<i>The nature of the relationship, such as start-to-start, finish-to-start, or finish-to-finish.</i>	<i>Any required delays between activities (lag) or accelerations (lead).</i>	<i>Any activities that must occur after the activity.</i>	<i>The nature of the relationship, such as start-to-start, finish-to-start, or finish-to-finish.</i>	<i>Any required delays between activities (lag) or accelerations (lead).</i>

6.2 Define Activities **Output**

03 **Milestone list**

- A milestone is a significant point or event in a project.
- A milestone list identifies all project milestones and indicates whether the milestone is mandatory, such as those required by contract, or optional, such as those based on historical information.
- Milestones have zero duration because they represent a significant point or event.

04 **Change requests**

05 **Project management plan updates**

- Schedule baseline
- Cost baseline



6.3 Sequence Activities

6.3 Sequence Activities

Inputs

- .1 Project management plan
 - Schedule management plan
 - Scope baseline
- .2 Project documents
 - Activity attributes
 - Activity list
 - Assumption log
 - Milestone list
- .3 EES
- .4 OPA

Tools & Techniques

- 1 Precedence diagramming method
- 2 Dependency determination and integration
- .3 Leads and lags
- .4 Project management information system

Outputs

- .1 Project schedule network diagrams
- .2 Project documents updates
 - Activity attributes
 - Activity list
 - Assumption log
 - Milestone list

6.3 Sequence Activities Input

01

PROJECT MANAGEMENT PLAN

- Schedule management plan
- Scope baseline

02

PROJECT DOCUMENTS

- Activity attributes
- Activity list
- Assumption log
- Milestone list

03

ENTERPRISE ENVIRONMENTAL FACTORS

04

ORGANIZATIONAL PROCESS ASSETS



6.3 Sequence Activities Tools & Techniques

01 Precedence diagramming method

- PDM is a technique for constructing a schedule model in which activities are represented by nodes and are graphically linked by one or more logical relationships to show the sequence in which the activities are to be performed.

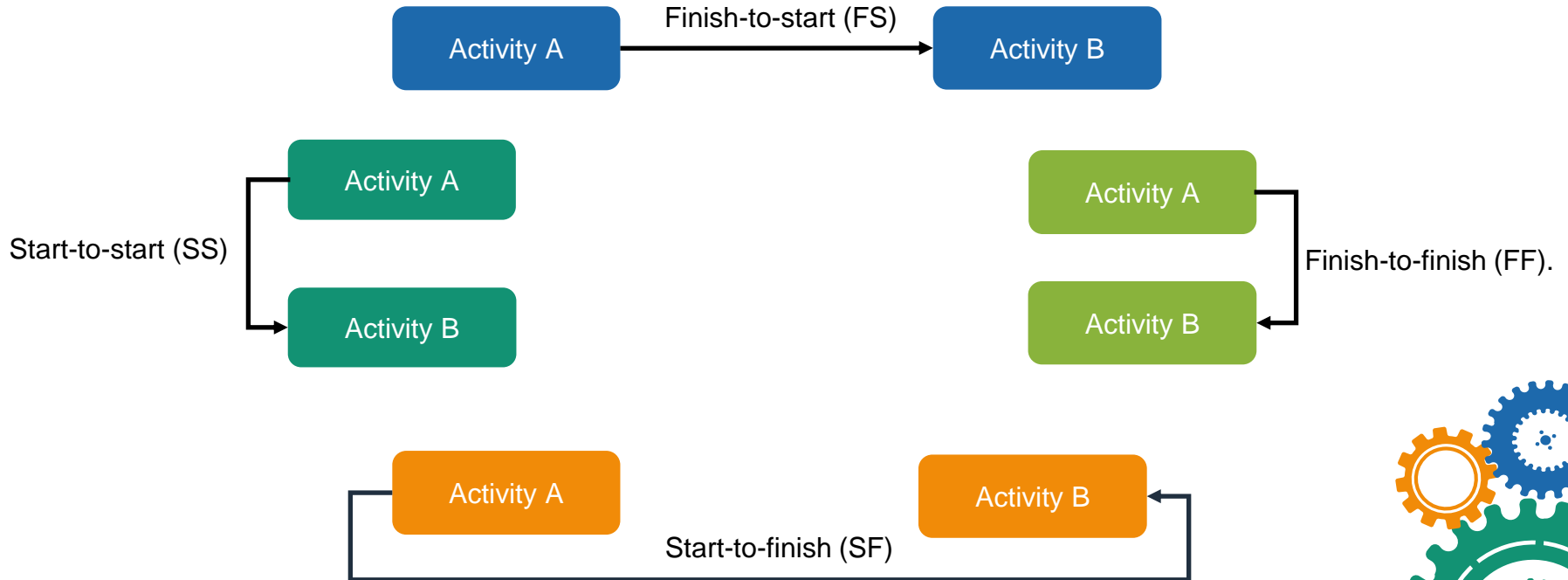


- PDM includes four types of dependencies or logical relationships.
 - Finish-to-start (FS).
 - Finish-to-finish (FF).
 - Start-to-start (SS).
 - Start-to-finish (SF).



6.3 Sequence Activities Tools & Techniques

Types of dependencies or logical relationships.



6.3 Sequence Activities Tools & Techniques

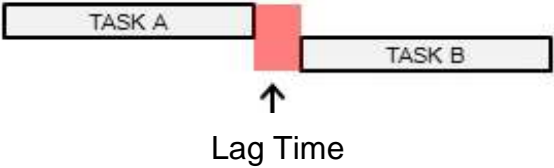
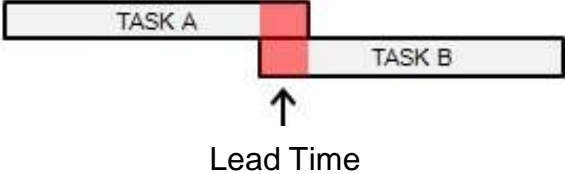
02 Dependency determination and integration

- **Mandatory dependencies. (Hard Logic)**
legally or contractually required or inherent in the nature of the work.
Example: You must design before you can construct
- **Discretionary dependencies** (preferred logic or preferential logic, or soft logic)
- **External dependencies.**
relationship between project activities and non project activities.(suppliers)
- **Internal dependencies.**
precedence relationship between project activities and are generally inside the project team's control



6.3 Sequence Activities Tools & Techniques

03 Leads and lags



04 Project management information system

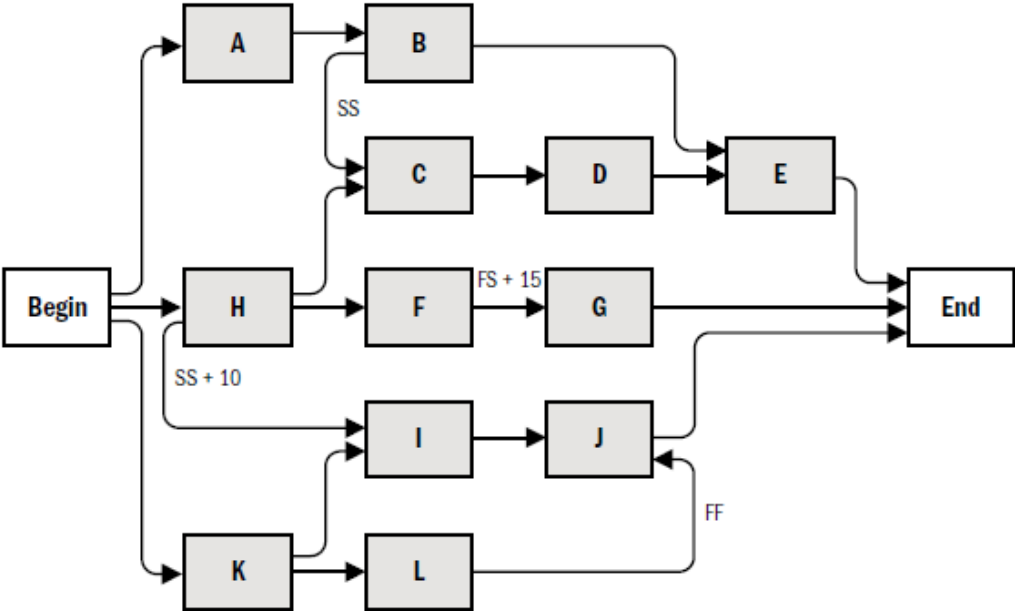
Includes scheduling software that has the capability to help plan, organize, and adjust the sequence of the activities; insert the logical relationships, lead and lag values; and differentiate the different types of dependencies.



6.3 Sequence Activities **Output**

01 PROJECT SCHEDULE NETWORK DIAGRAMS

Graphical representation of the logical relationships, also referred to as dependencies, among the project schedule activities.



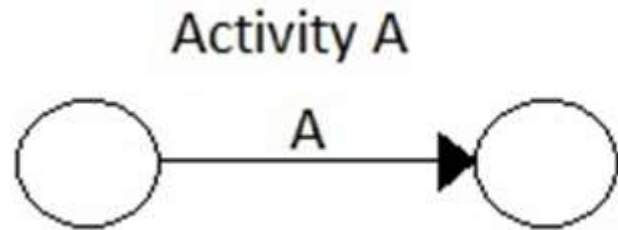
6.3 Sequence Activities Output

02 PROJECT DOCUMENTS UPDATES

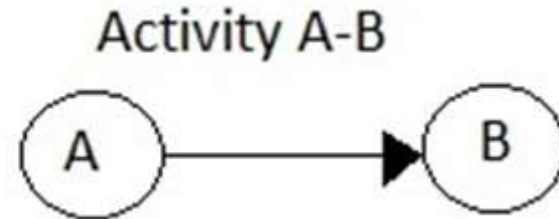
- Activity attributes.
- Activity list.
- Assumption log
- Milestone list.

Note:

PDM Is Activity On Node (AON);
It Mean Activity Present By Node.
While Activity On Arrow (AOA);
Activity Present By Arrow.



OR

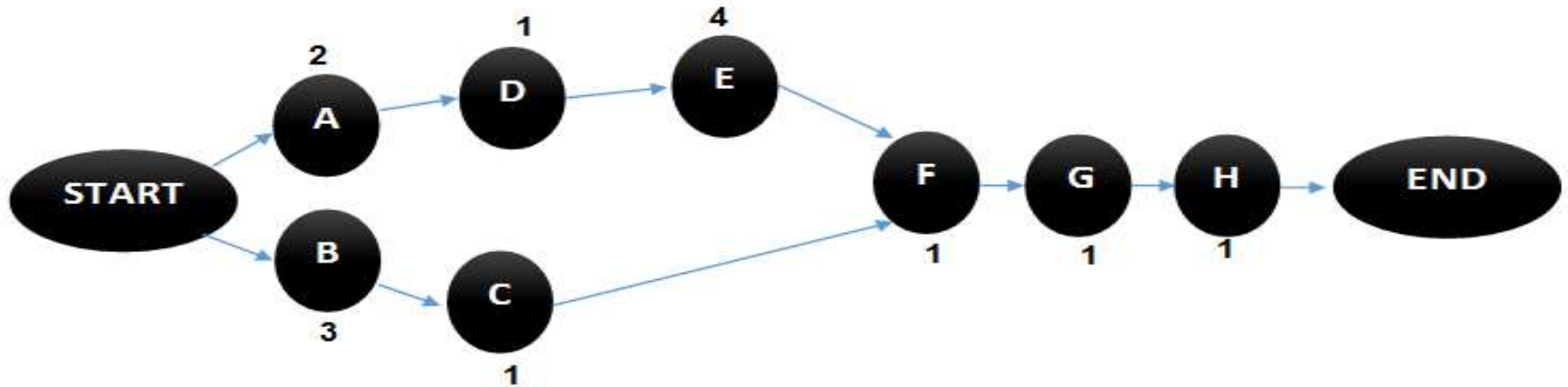


Exercise

Activity	Description	Predecessors	Duration-Month
A	Review customer complaints	-	2
B	Review old process flow documents	-	3
C	Specify repeated procedures	B	1
D	Make short list of complaints	A	1
E	Make required change to satisfy customer	D	4
F	Approve for changes and delete repeated procedures	C,E	1
G	Update process flow	F	1
H	Inform interested party	G	1

Draw PDM for above activity list

Exercise



6.4 Estimate Activity Durations

6.4 Estimate Activity Durations

Inputs

- .1 Project management plan
 - Schedule management plan
 - Scope baseline
- .2 Project documents
 - Activity attributes
 - Activity list
 - Assumption log
 - Lessons learned register
 - Milestone list
 - Project team assignments
 - Resource breakdown structure
 - Resource calendars
 - Resource requirements
 - Risk register
- .3 EEF
- .4 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Analogous estimating
- .3 Parametric estimating
- .4 Three-point estimating
- .5 Bottom-up estimating
- .6 Data analysis
 - Alternatives analysis
 - Reserve analysis
- .7 Decision making
- .8 Meetings

Outputs

- .1 Duration estimates
- .2 Basis of estimates
- .3 Project documents updates
 - Activity attributes
 - Assumption log
 - Lessons learned register

6.4 Estimate Activity Durations **Input**

- 01 **Project management plan**
 - Schedule management plan
 - Scope baseline
- 02 **Project documents**
 - Activity attributes
 - Activity list
 - Assumption log
 - Lessons learned register
 - Milestone list
 - Risk register
 - Project team assignments
 - Resource breakdown structure
 - Resource calendars
 - Resource requirements
- 03 **Enterprise environmental factors**
- 04 **Organizational process assets**



6.4 Estimate Activity Durations Tools & Techniques

01 Expert judgment

02 Analogous estimating

- A technique for estimating the duration or cost of an activity or a project using historical data from a similar activity or project.
- Less costly
- Less time
- Less accurate

03 Parametric estimating

- An estimating technique in which the duration is calculated based on historical data and project parameters.
- It uses a statistical relationship between historical data and other variables to calculate an estimate for activity parameters.
- Provide higher level of accuracy compared with analogous estimating technique



6.4 Estimate Activity Durations Tools & Techniques

04

Three-point estimating

The accuracy of single-point activity duration estimates may be improved by considering estimation uncertainty and risk.

- ❖ **Triangular distributions.** used when there is insufficient historical data or when using judgmental data

$$E = (O + M + P) / 3$$

Most likely (tM) - Optimistic (tO) - Pessimistic (tP)

$$\text{Standard Deviation} = (tP - tO) / 6$$

- ❖ Activity **standard deviation** is the possible range for the estimate.



6.4 Estimate Activity Durations Tools & Techniques

05 Bottom-up estimating

estimating project duration or cost by aggregating the estimates of the lower-level components of the WBS

06 Data analysis

07 Decision Making

07 Meetings

09 Reserve analysis:

Determine the amount of contingency and management reserve needed for the project.

✓ Contingency reserves

- Associated with the known-unknowns that can affect a project.
- Contingency should be clearly identified in the schedule documentation.

✓ Management reserves

- Associated with the unknown-unknowns that can affect a project.
- Management reserve is not included in the schedule baseline, but it is part of the overall project duration requirements.



6.4 Estimate Activity Durations **Output**

01 **Duration Estimates**

- Number of time periods that are required to complete an activity.
- Duration estimates do not include any lags
- May include some indication of the range of possible results.

02 **Basis of Estimates**

- Documentation of the basis of the estimate.
- Documentation of any known constraints.

03 **Project documents updates**

- Activity attributes
- Assumption log
- Lessons learned register



6.5 Develop Schedule

6.5 Develop Schedule

Inputs

- .1 Project management plan
 - Schedule management plan
 - Scope baseline
- .2 Project documents
 - Activity attributes
 - Activity list
 - Assumption log
 - Basis of estimates
 - Duration estimates
 - Lessons learned register
 - Milestone list
 - Project schedule network diagrams
 - Project team assignments
 - Resource calendars
 - Resource requirements
 - Risk register
- .3 Agreements
- .4 EEF
- .5 OPA

Tools & Techniques

- 1 Schedule network analysis
- 2 Critical path method
- 3 Resource optimization
- 4 Data analysis
 - What-if scenario analysis
 - Simulation
- 5 Leads and lags
- 6 Schedule compression
- 7 Project management information system
- 8 Agile release planning

Outputs

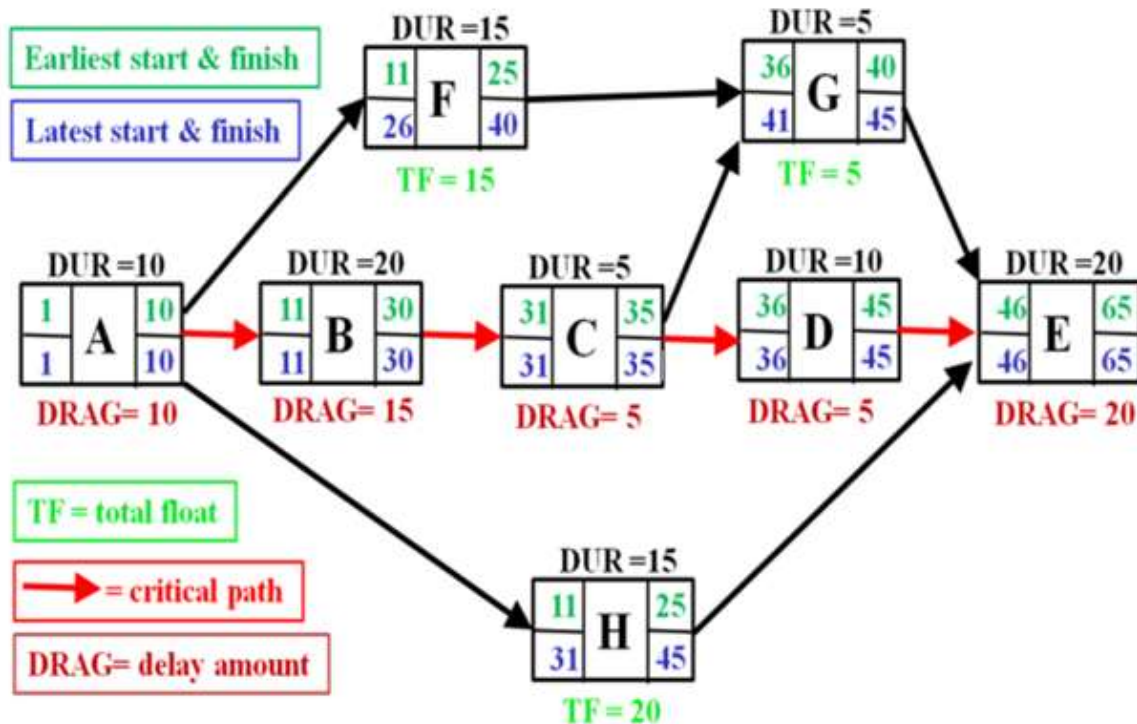
- .1 Schedule baseline
- .2 Project schedule
- .3 Schedule data
- .4 Project calendars
- .5 Change requests
- .6 Project management plan updates
 - Schedule management plan
 - Cost baseline
- .7 Project documents updates
 - Activity attributes
 - Assumption log
 - Duration estimates
 - Lessons learned register
 - Resource requirements
 - Risk register

6.5 Develop Schedule Input

- 01 **Project management plan**
 - Schedule management plan
 - Scope baseline
- 02 **Project documents**
 - Activity attributes
 - Activity list
 - Assumption log
 - Basis of estimates
 - Duration estimates
 - Lessons learned register
 - Milestone list
 - Project schedule network diagrams
 - Project team assignments
 - Resource calendars
 - Resource requirements
 - Risk register
- 03 **Agreements**
- 04 **Enterprise environmental factors**
- 05 **Organizational process assets**



Schedule Network Analysis



6.5 Develop Schedule Tools & Techniques

01 SCHEDULE NETWORK ANALYSIS

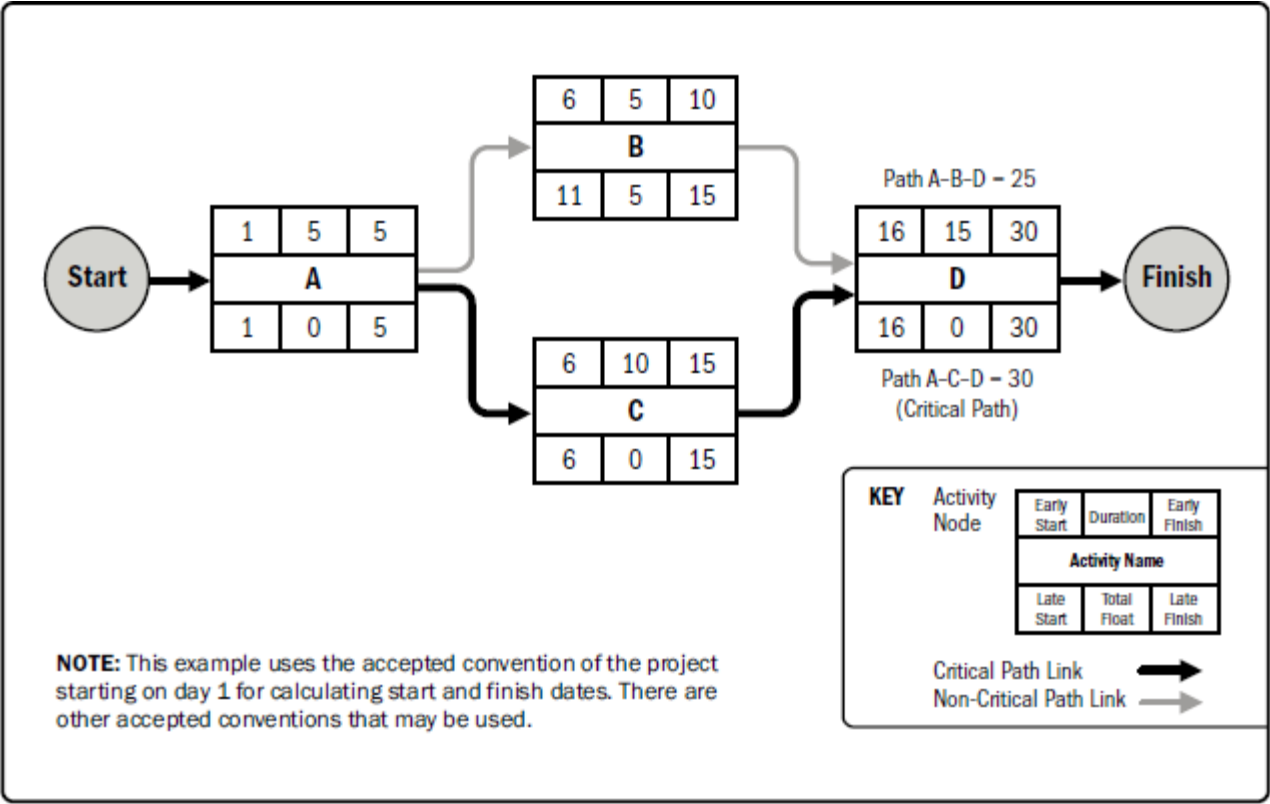
A technique to identify early and late start dates, as well as early and late finish dates, for the uncompleted portions of project activities.

02 CRITICAL PATH METHOD

- Critical path is the sequence of activities that represents the longest path through a project. Determines the shortest possible project duration
- Characterized by zero total float.
- **Total And Free Float Or Schedule Flexibility** Is the amount of time that a schedule activity can be delayed or extended from its early start date without delaying the project finish date or violating a schedule constraint.
- Schedule networks may have multiple **near-critical paths**.



6.5 Develop Schedule Tools & Techniques



6.5 Develop Schedule Tools & Techniques

03 RESOURCE OPTIMIZATION

used to adjust the start and finish dates of activities to adjust planned resource use to be equal to or less than resource availability.

Resource leveling

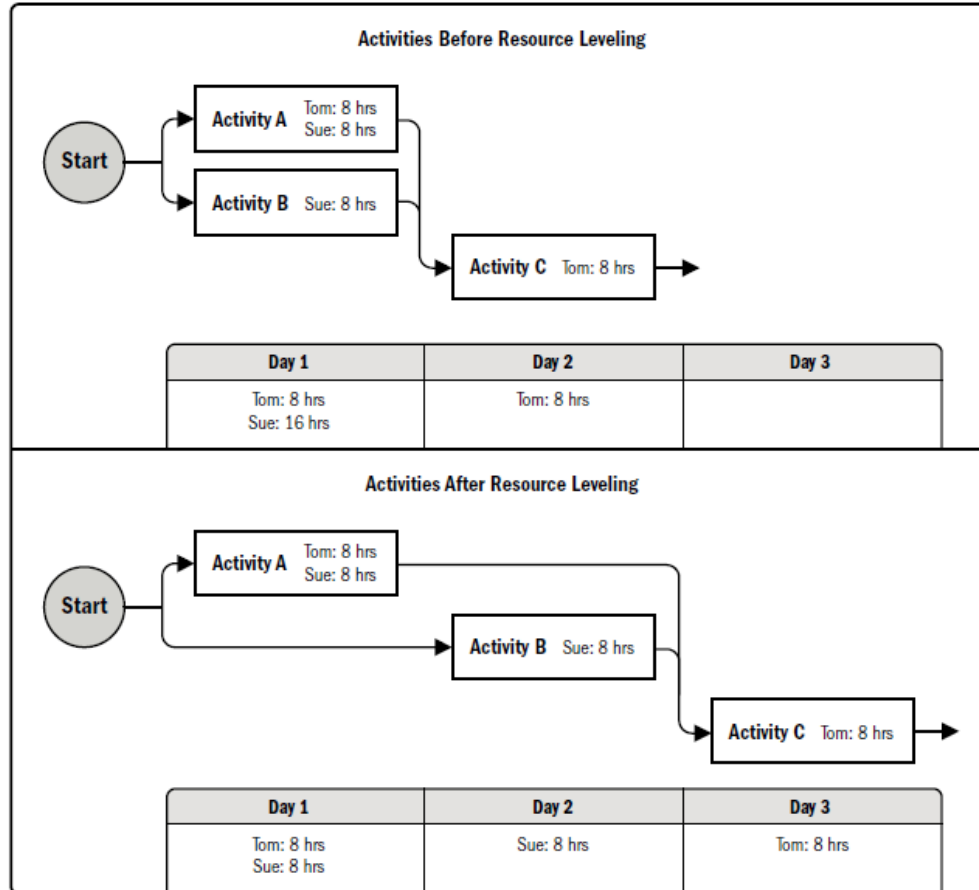
- A technique in which start and finish dates are adjusted based on resource constraints.
- A way to fix resource over allocation.
- Critical path may change.

Resource Smoothing

- A technique that adjusts the activities of a schedule model to solve utilization.
- Critical path is not changed and the completion date may not be delayed.
- Activities may be delayed within their free and total float.



6.5 Develop Schedule Tools & Techniques



6.5 Develop Schedule Tools & Techniques

04 DATA ANALYSIS

❖ What-If Scenario Analysis:

Evaluating scenarios in order to predict their effect positively or negatively on project objectives.

❖ Simulation:

Calculating multiple project durations with different sets of activity assumptions usually using probability distributions constructed from the three-point estimates to account for uncertainty.

The most common simulation technique is **Monte Carlo analysis** it used to calculate possible schedule outcomes for the total project based on 3-point estimates for each activity on network diagram.

05 LEADS AND LAGS



6.5 Develop Schedule Tools & Techniques

06

SCHEDULE COMPRESSION

Shorten the schedule duration without reducing the project scope, in order to meet schedule constraints, imposed dates, or other schedule objectives

❖ **Crashing:**

A technique used to shorten the schedule duration by adding resources (increase cost)

❖ **Fast tracking:**

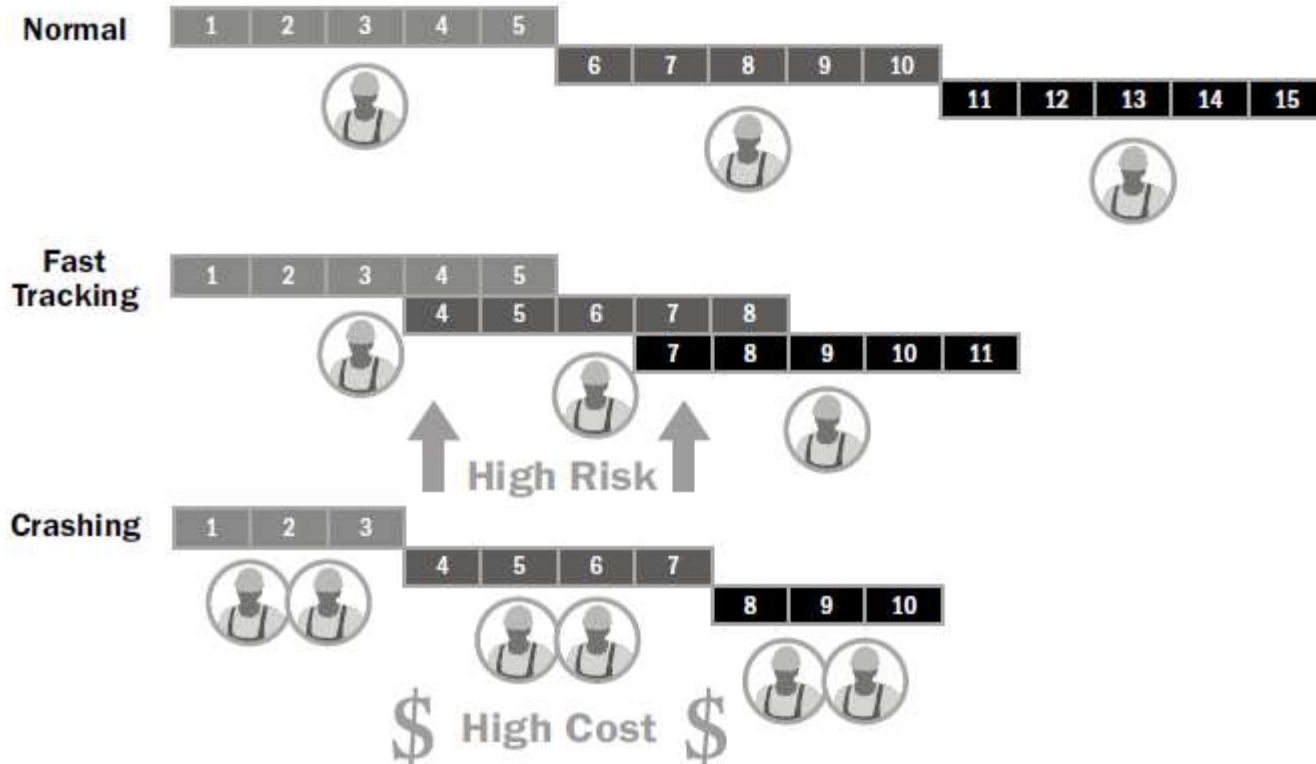
Activities or phases normally done in sequence are performed in parallel.

07

PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)



6.5 Develop Schedule Tools & Techniques

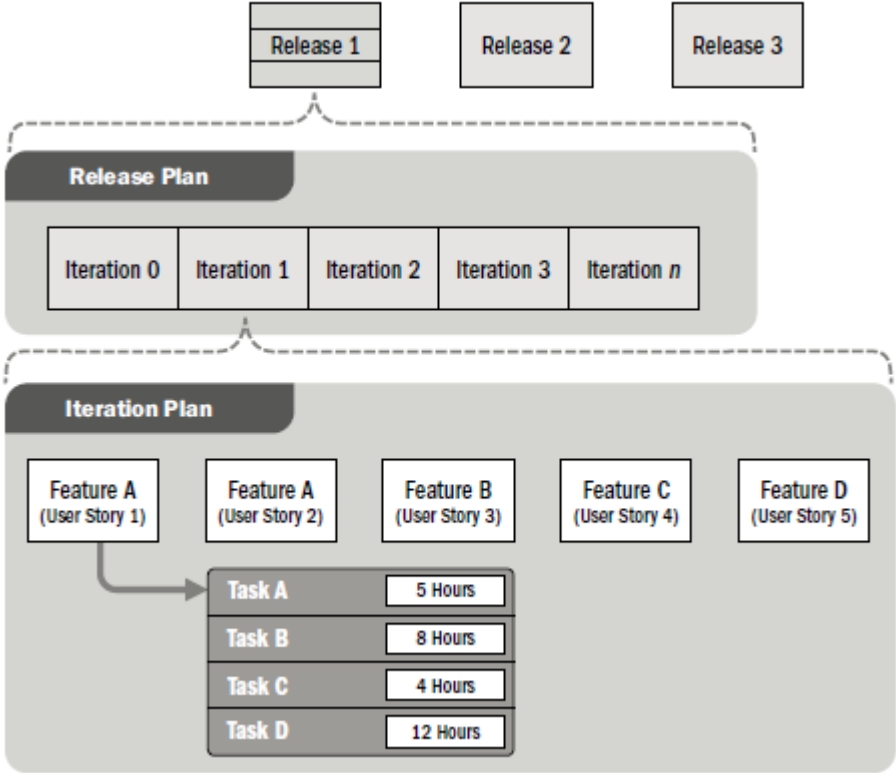


6.5 Develop Schedule Tools & Techniques

08 AGILE RELEASE PLANNING

Provides a high-level summary timeline of the release schedule (typically 3 to 6 months) based on the product roadmap.

Determines the number of iterations or sprints in the release.



6.5 Develop Schedule Output

01

Schedule Baseline

The approved version of a schedule model that can be changed only through formal change control procedures and is used as a basis for comparison to actual results. Accepted & approved by the appropriate stakeholders.

02

Project Schedule

presents linked activities with planned dates, durations, milestones, and resources.

It can be presented in tabular form using below formats:

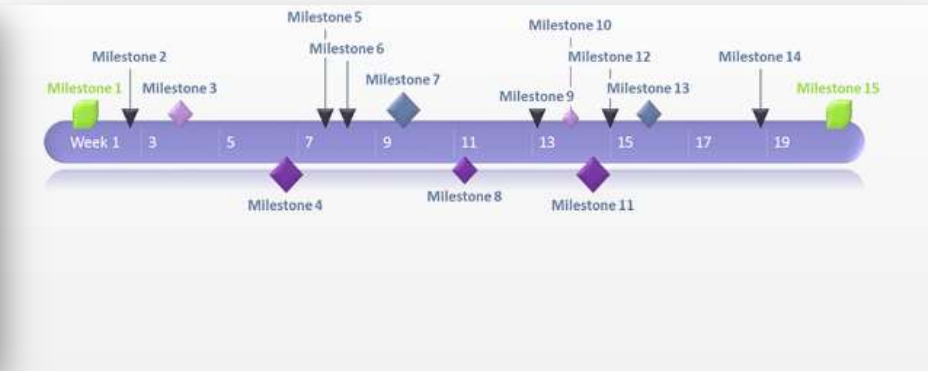
- **Bar charts** (Gantt charts)
- **Milestone charts**
- **Project schedule network diagrams** (logical diagram) presented in the activity-on-node diagram format showing activities and relationships without a time scale,



6.5 Develop Schedule Output



Bar charts (Gantt charts)



Milestone charts

6.5 Develop Schedule **Output**

03

Schedule Data

The collection of information for describing and controlling the schedule. Includes (milestones, schedule activities, activity attributes, and documentation of all identified assumptions & constraints)

04

Project calendar

05

Change requests

06

Project management plan updates

07

Project documents updates



6.6 Control Schedule

6.6 Control Schedule

Inputs

- 1 Project management plan
 - Schedule management plan
 - Schedule baseline
 - Scope baseline
 - Performance measurement baseline
- 2 Project documents
 - Lessons learned register
 - Project calendars
 - Project schedule
 - Resource calendars
 - Schedule data
- 3 Work performance data
- 4 OPA

Tools & Techniques

- .1 Data analysis
 - Earned value analysis
 - Iteration burndown chart
 - Performance reviews
 - Trend analysis
 - Variance analysis
 - What-if scenario analysis
- .2 Critical path method
- .3 Project management information system
- .4 Resource optimization
- .6 Leads and lags
- .7 Schedule compression

Outputs

- .1 Work performance information
- .2 Schedule forecasts
- .3 Change requests
- .4 Project management plan updates
 - Schedule management plan
 - Schedule baseline
 - Cost baseline
 - Performance measurement baseline
- .5 Project documents updates
 - Assumption log
 - Basis of estimates
 - Lessons learned register
 - Project schedule
 - Resource calendars
 - Risk register
 - Schedule data

6.6 Control Schedule Input

- 01 **Project management plan**
 - Schedule management plan
 - Schedule baseline
 - Scope baseline
 - Performance measurement baseline
- 02 **Project documents**
 - Lessons learned register
 - Project calendars
 - Project schedule
 - Resource calendars
 - Schedule data
- 03 **Enterprise environmental factors**
- 04 **Organizational process assets**



6.6 Control Schedule Tools & Techniques

01 DATA ANALYSIS

- **Earned value analysis (cost part)**
- **Iteration burndown chart** This chart tracks the work that remains to be completed in the iteration backlog.
- **Performance reviews** compare, and analyze schedule performance against the schedule baseline

02 CRITICAL PATH METHOD

03 PROJECT MANAGEMENT INFORMATION SYSTEM

04 RESOURCE OPTIMIZATION

05 LEADS AND LAGS

06 SCHEDULE COMPRESSION



6.6 Control Schedule Output

01 Work performance information

02 Schedule forecasts

are estimates or predictions of conditions and events in the project's future based on information and knowledge available at the time of the forecast.

03 Change requests

04 Project management plan updates

- Schedule management plan
- Performance measurement baseline

05 Project documents updates





7. PROJECT COST MANAGEMENT



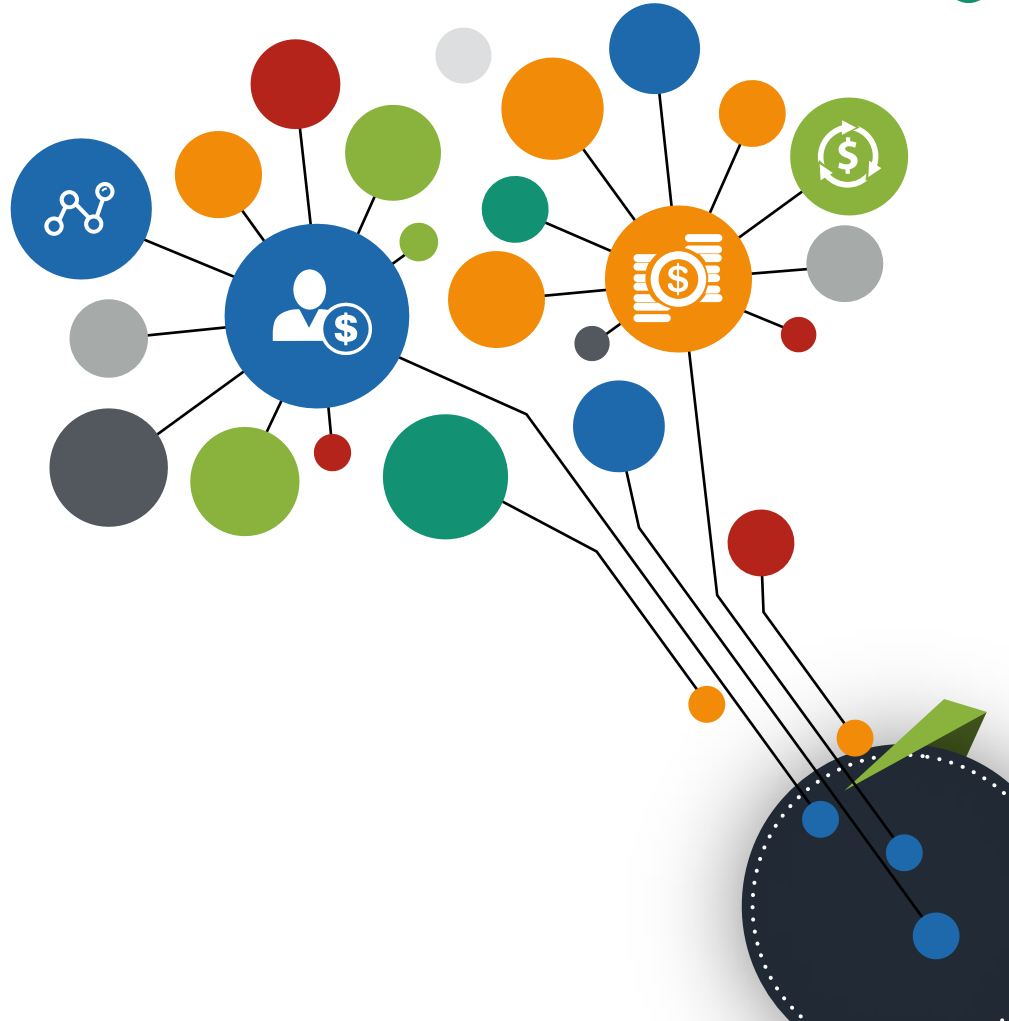
Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer

Project Cost Management

Project Cost Management includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget



Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Schedule Management		6.1 Plan Schedule 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule Management		6.6 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Key concepts for **Project Cost Management**

TAILORING CONSIDERATIONS

Project Cost Management processes are applied. Considerations for tailoring include :

- **Knowledge management.**
- **Estimating and budgeting.**
- **Earned value management.**
- **Use of agile approach.**
- **Governance.**



7.1 Plan Cost Management

7.1 Plan Cost Management

Inputs

- .1 Project charter
- .2 Project management plan
 - Schedule management plan
 - Risk management plan
- .3 EEF
- .4 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Data analysis
- .3 Meetings

Outputs

- .1 Cost management plan

7.1 Plan Cost Management Input

- 01 PROJECT CHARTER
- 02 PROJECT MANAGEMENT PLAN
- 03 ENTERPRISE ENVIRONMENTAL FACTORS
- 04 ORGANIZATIONAL PROCESS ASSETS



7.1 Plan Cost Management Tools & Techniques

- 01 Expert judgment
- 02 Data Analysis
- 03 Meetings



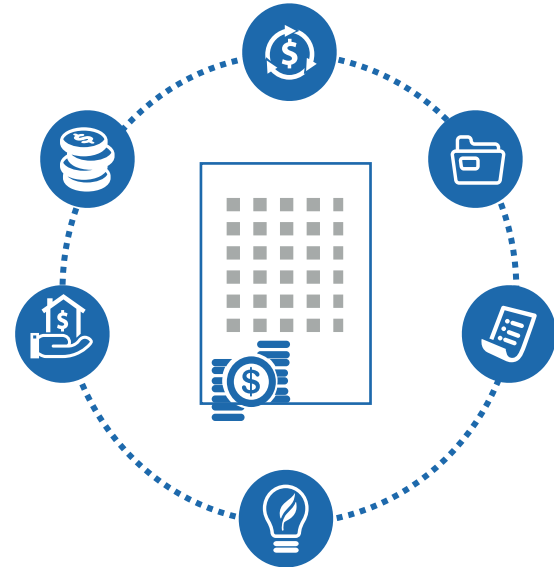
7.1 Plan Cost Management Output

01

Cost management plan

Describes how the project costs will be planned, structured, and controlled.

- **Units of measure.**
- **Level of precision.** rounded up or down.
- **Level of accuracy.** The acceptable range (e.g., $\pm 10\%$).
- **Organizational procedures links.** Each control account is assigned a unique code or account number(s) that links directly to the performing organization's accounting system.
- **Control thresholds.** the percentage deviations from the baseline plan.
- **Rules of performance measurement.** EVM rules
- **Reporting formats.** The formats and frequency for cost reports.



7.2 Estimate Costs

7.2 Estimate Costs

Inputs

- .1 Project management plan
 - Cost management plan
 - Quality management plan
 - Scope baseline
- .2 Project documents
 - Lessons learned register
 - Project schedule
 - Resources requirements
 - Risk register
- .3 EEF
- .4 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Analogous estimating
- .3 Parametric estimating
- .4 Bottom-up estimating
- .5 Three-point estimating
- .6 Data analysis
 - Alternatives analysis
 - Reserve analysis
 - Cost of quality
- .7 PMIS
- .8 Decision making

Outputs

- .1 Cost estimates
- .2 Basis of estimates
- .3 Project documents updates
 - Assumption log
 - Lessons learned register
 - Risk register

7.2 Estimate Costs Input

- 01 PROJECT MANAGEMENT PLAN
- 02 PROJECT DOCUMENTS
- 03 ENTERPRISE ENVIRONMENTAL FACTORS
- 04 ORGANIZATIONAL PROCESS ASSETS



7.2 Estimate Costs Tools & Techniques

- 01 Expert Judgment
 - 02 Analogous Estimating
 - 03 Parametric Estimating
 - 04 Bottom-up Estimating
 - 05 Three-point Estimating
 - 06 PMIS
 - 07 Decision Making
 - 08 Data Analysis
- Alternatives Analysis - Reserve Analysis - Cost Of Quality.



7.2 Estimate Costs Output

01 COST ESTIMATES

Include quantitative assessments of the costs required to complete project work, as well as **contingency amounts to account for identified risks**, and **management reserve to cover unplanned work**.

- **Direct cost** : labor, materials, equipment, information technology, Etc
- **Indirect costs**: can be included at the activity level or at higher levels.

02 BASIS OF ESTIMATES

should provide a clear and complete understanding of how the cost estimate was derived.

03 PROJECT DOCUMENTS UPDATES

Assumption log - Lessons learned register - Risk register



7.3 Determine Budget



A project budget includes all the funds authorized to execute the project.

The cost baseline is the approved version of the time-phased project budget that includes **contingency reserves**, but **excludes management reserves**.



7.3 Determine Budget

7.3 Determine Budget

Inputs

- .1 Project management plan
 - Cost management plan
 - Resource management plan
 - Scope baseline
- .2 Project documents
 - Basis of estimates
 - Cost estimates
 - Project schedule
 - Risk register
- .3 Business documents
 - Business case
 - Benefits management plan
- .4 Agreements
- .5 EEF
- .6 OPA

Inputs Tools & Techniques Outputs

- .1 Expert judgment
- .2 Cost aggregation
- .3 Data analysis
 - Reserve analysis
- .4 Historical information review
- .5 Funding limit reconciliation
- .6 Financing

Outputs

- .1 Cost baseline
- .2 Project funding requirements
- .3 Project documents updates
 - Cost estimates
 - Project schedule
 - Risk register

7.3 Determine Budget **Input**

- 01 **Project management plan**
Cost management plan - Resource management plan - Scope baseline
- 02 **Project documents**
Basis of estimates - Cost estimates - Project schedule - Risk register
- 03 **Business documents**
Business case - Benefits management plan
- 04 **Agreements**
- 05 **Enterprise environmental factors**
- 06 **Organizational process assets**



7.3 Determine Budget Tools & Techniques

01 EXPERT JUDGMENT

02 COST AGGREGATION

The work package cost estimates are then aggregated for the higher component levels of the WBS (such as control accounts) and, ultimately, for the entire project.

03 DATA ANALYSIS

04 HISTORICAL INFORMATION REVIEW

Assist in developing parametric estimates or analogous estimates.

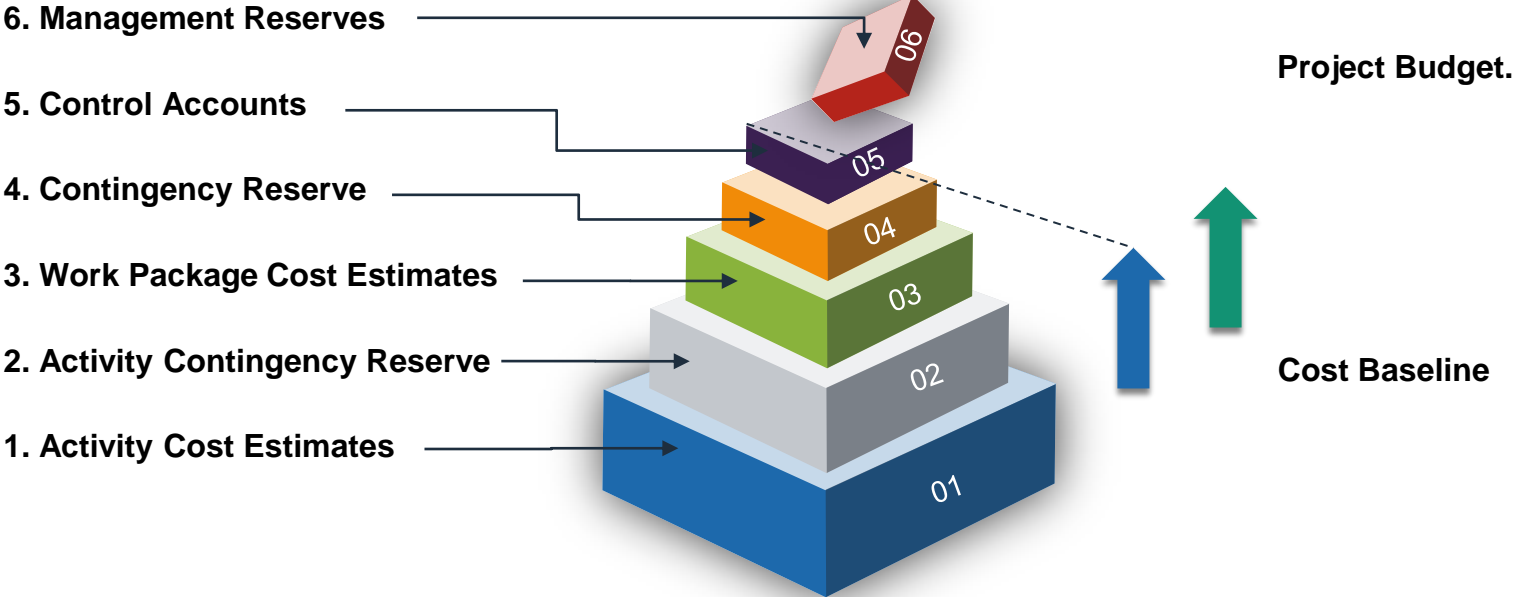
05 FUNDING LIMIT RECONCILIATION

The expenditure of funds should be reconciled with any funding limits on the commitment of funds for the project.

06 FINANCING: Financing entails acquiring funding for projects.



PROJECT BUDGET.



7.3 Determine Budget Output

01 COST BASELINE

It is the approved version of the project budget, excluding any management reserves, Can only be changed through formal change control procedures.

02 PROJECT FUNDING REQUIREMENTS

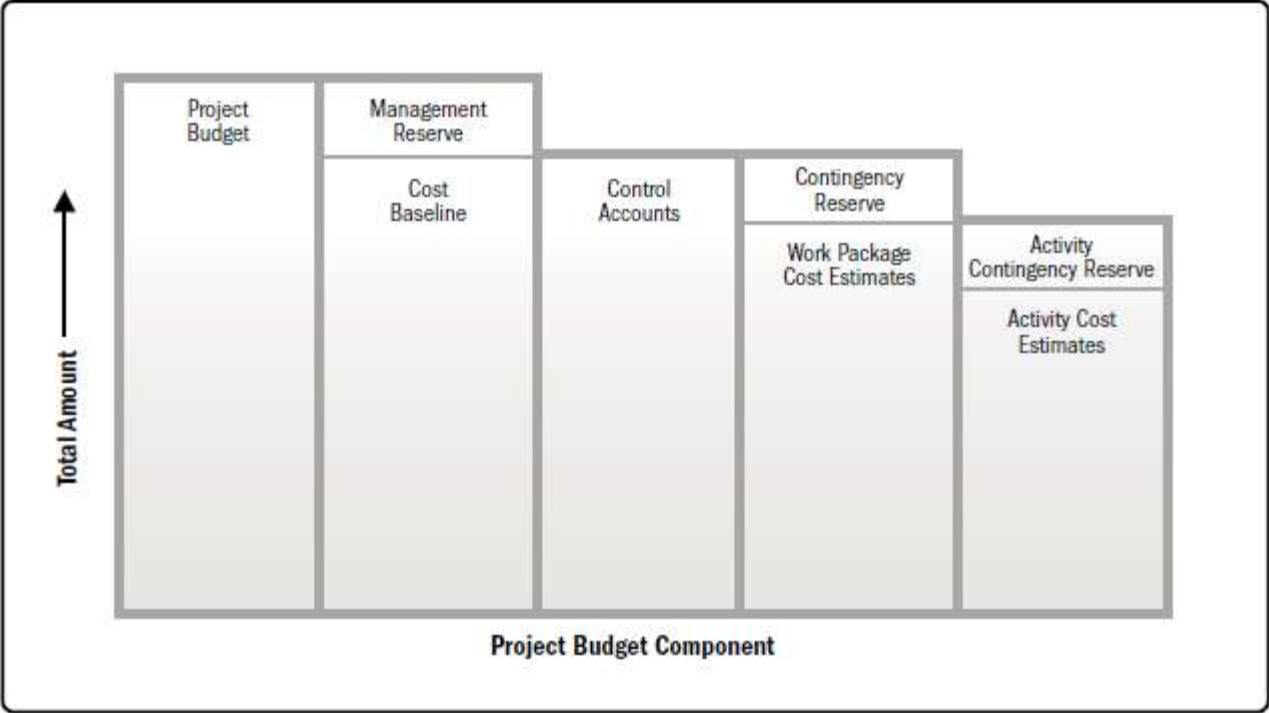
- ✓ Total funding requirements and periodic funding requirements (e.g., quarterly, annually) are derived from the cost baseline.
- ✓ Total funds required are those included in the cost baseline plus management reserves

03 PROJECT DOCUMENTS UPDATES

Cost estimates - Project schedule - Risk register



Project budget.



Project budget.

Project budgeting

	Annual budget 12 months	Budget (Jan-Mar) 3 months	Actual (Jan-Mar) 3 months	Variance 3 months	Variance/ budget % 3 months
Income (£)					
Grants	505,000	182,000	152,000	(30,000)	(16%)
Fee income	58,600	14,650	15,247	597	4%
Bank interest	2,000	0	10	10	0%
Other income	26,000	6,500	9,059	2,559	39%
Total income	591,600	203,150	176,316	(26,834)	(13%)
Expenditure (£)					
Salaries	262,680	65,670	68,309	(2,639)	(4%)
Recruitment costs	4,990	3,000	50	2,950	98%
Medical supplies/drugs	254,000	63,500	83,393	(19,893)	(31%)
Rent	49,000	24,500	25,790	(1,290)	(5%)
Insurance	3,880	3,880	530	3,350	86%
Telephone/electric/water	6,030	1,508	1,461	47	3%
Office costs	6,760	1,690	1,538	152	9%
Other expenses	4,260	1,065	1,809	(744)	(70%)
Total expenditure	591,600	164,813	182,880	(18,067)	(11%)
Income less expenditure	0	38,337	(6,564)	(44,901)	

7.4 Control Costs

7.4 Control Costs

Inputs

- .1 Project management plan
 - Cost management plan
 - Cost baseline
 - Performance measurement baseline
- .2 Project documents
 - Lessons learned register
- .3 Project funding requirements
- .4 Work performance data
- .5 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Data analysis
 - Earned value analysis
 - Variance analysis
 - Trend analysis
 - Reserve analysis
- .3 To-complete performance index
- .4 PMIS

Outputs

- .1 Work performance information
- .2 Cost forecasts
- .3 Change requests
- .4 Project management plan updates
 - Cost management plan
 - Cost baseline
 - Performance measurement baseline
- .5 Project documents updates
 - Assumption log
 - Basis of estimates
 - Cost estimates
 - Lessons learned register
 - Risk register

7.4 Control Costs Input

- 01 **Project management plan**
 - Cost management plan
 - Cost baseline
 - Performance measurement baseline
- 02 **Project documents**
 - Lessons learned register
- 03 **Project funding requirements**
- 04 **Enterprise environmental factors**
- 05 **Organizational process assets**



7.4 Control Costs Tools & Techniques

01 EXPERT JUDGMENT

02 DATA ANALYSIS

✓ **Earned value analysis (EVA).** compares the performance measurement baseline to the actual schedule and cost performance.

❖ **Planned value (PV)**

❖ **Earned value (EV)**

❖ **Actual cost (AC) the**

❖ **Schedule variance (SV) :** **$SV = EV - PV$**

Positive = Ahead of Schedule / Neutral = On schedule / Negative = Behind Schedule

❖ **Cost variance (CV) :** **$CV = EV - AC$**

Positive = Under planned cost / Neutral = On planned cost / Negative = Over planned cost

7.4 Control Costs Tools & Techniques

- ❖ The cost variance at the end of the project will be the difference between the budget at completion (BAC) and the actual amount spent.

$$VAC = BAC - EAC$$

- ❖ Schedule performance index (SPI) is a measure of schedule efficiency expressed as the ratio of earned value to planned value. It measures how efficiently the project team is accomplishing the work.

$$SPI = EV/PV.$$

SPI < 1.0 indicates less work was completed than was planned.

SPI > 1.0 indicates that more work was completed than was planned.

SPI = Neutral indicates On schedule



7.4 Control Costs Tools & Techniques

- ❖ **Cost performance index (CPI)** is a measure of the cost efficiency of budgeted resources,
CPI = EV/AC
CPI < 1.0 indicates a cost overrun
CPI > 1.0 indicates a cost underrun of performance to date.
CPI = Neutral indicates a cost On planned cost

- ✓ **Trend analysis** examines project performance over time to determine if performance is improving or deteriorating.
- ✓ **Reserve analysis**



7.4 Control Costs Tools & Techniques

- ❖ **Forecasting.** the project team may develop a forecast (EAC) that may differ from the budget at completion (BAC) based on the project performance
 - 1.If the CPI is expected to be the same for the remainder of the project,
 $EAC = BAC / CPI$
 - 2.If future work will be accomplished at the planned rate,
 $EAC = AC + BAC - EV$
 - 3.If the initial plan is no longer valid,
 $EAC = AC + \text{Bottom-up ETC}$
 - 4.If both the CPI and SPI influence the remaining work,
 $EAC = AC + [(BAC - EV) / (CPI \times SPI)]$



7.4 Control Costs Tools & Techniques

03 **TO-COMPLETE PERFORMANCE INDEX**

A measure of the cost performance that must be achieved with the remaining resources in order to meet a specified management goal,

- The efficiency that must be maintained in order to complete on plan.

$$TCPI = (BAC - EV)/(BAC - AC)$$

- The efficiency that must be maintained in order to complete the current EAC.

$$TCPI = (BAC - EV)/(EAC - AC)$$

TCPI > 1.0 Harder to complete

TCPI = 1.0 Same to complete

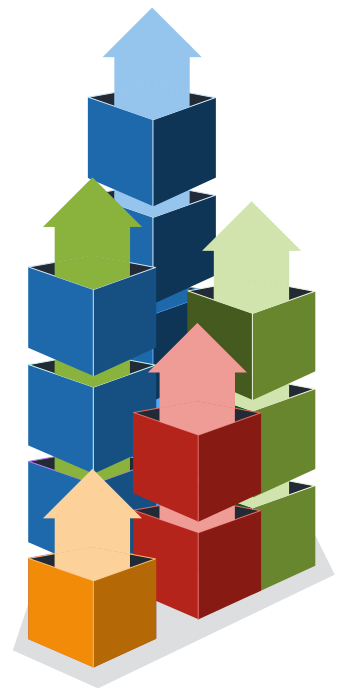
TCPI < 1.0 Easier to complete

04 **PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)**



7.4 Control Costs Output

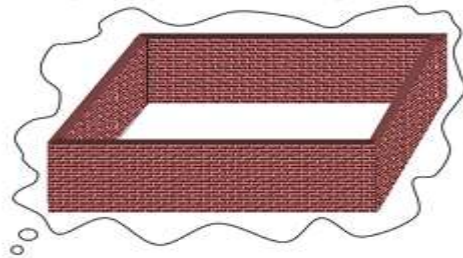
- 01 **Work performance information**
- 02 **Cost forecasts**
- 03 **Change requests**
- 04 **Project management plan updates**
 - Cost management plan
 - Cost baseline
 - Performance measurement baseline
- 05 **Project documents updates**
 - Assumption log
 - Basis of estimates
 - Cost estimates
 - Lessons learned register
 - Risk register





Exercise

Earned Value Management



Assume 4 equal sides, budget 200\$ per side, schedule 1 side per day.
Finish 4 days & cost 800\$.

Day1: side 1 complete, budget of 200\$ spent.

Day2: side 2 started but not complete, Incurred cost will be 220\$

Day3: side 2 completed, and half of side 3 completed but team left early and only spent 140\$

Where we are now? Ahead or Behind

EVM Example:

Earned Value Formulae

Name	Formulae	Value and Meaning
Cost Variance	$CV = EV - AC$	$(\$200 + \$200 + \$100 = \$500) -$ $(\$200 + \$220 + \$140 = \$560) = \mathbf{-\$60}$ (We are over budget)
Schedule Variance	$SV = EV - PV$	$(\$200 + \$200 + \$100 = \$500) -$ $(\$200 + \$200 + \$200 = \$600) = \mathbf{-\$100}$ (We are behind schedule)
Cost Performance Index	$CPI = EV / AC$	$\$500 / \$560 = \mathbf{0.89}$ (I am getting 89 cents out of every \$)
Schedule Performance Index	$SPI = EV / PV$	$\$500 / \$600 = \mathbf{0.83}$ (I am progressing at 83% of the rate originally planned)
Estimate At Completion	$EAC = BAC / CPI$	$\$800 / 0.89 = \mathbf{\$900}$ (The total is now likely to be \$900)
Estimate To Complete	$ETC = EAC - AC$	$\$900 - \$560 = \mathbf{\$340}$ (From now I will likely spend \$340)
Variance At Completion	$BAC - EAC$	$\$800 - \$900 = \mathbf{-\$100}$ (We expect to be \$100 over budget)



Exercise

Earned Value Management

- **Project of Highway Paving 100 Km; for each 10 Km we need a month with cost 100 k\$, total project budget is 1 million and duration 10 Month.**
- **MONTH1:** 10 km complete, budget of 90k spent.
- **MONTH2:** 15 km complete, budget of 150k spent.
- **MONTH3:** 15 km complete, budget of 110k spent.
- **MONTH4:** 10 km complete, budget of 100k spent.

Where we are now? Ahead or Behind

Answer

- PV ; EV ; AC ;
- $CV = EV - AC$
- $SV = EV - PV$
- $CPI = EV / AC$
- $SPI = EV / PV$

Answer

- $PV = 100 + 100 + 100 + 100 = 400 \text{ k}$
- $EV = (10+15+15+10)=50 \text{ km} * 100\text{k} = 500\text{k}$
- $AC = 90 + 150 + 110 + 100 = 450 \text{ k}$
- $CV = EV - AC = 500 - 450 = 50$
- $SV = EV - PV = 500 - 400 = 100$
- $CPI = EV / AC = 500 / 450 = 1.1$
- $SPI = EV / PV = 500 / 400 = 1.25$



8. PROJECT QUALITY MANAGEMENT



Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer

Project Quality Management

Project Quality Management supports continuous process improvement activities as undertaken on behalf of the performing organization.

Quality: The degree to which a set of inherent characteristics fulfill requirements.

Differences between grade and quality

Grade: The same technical use, but different characteristics.

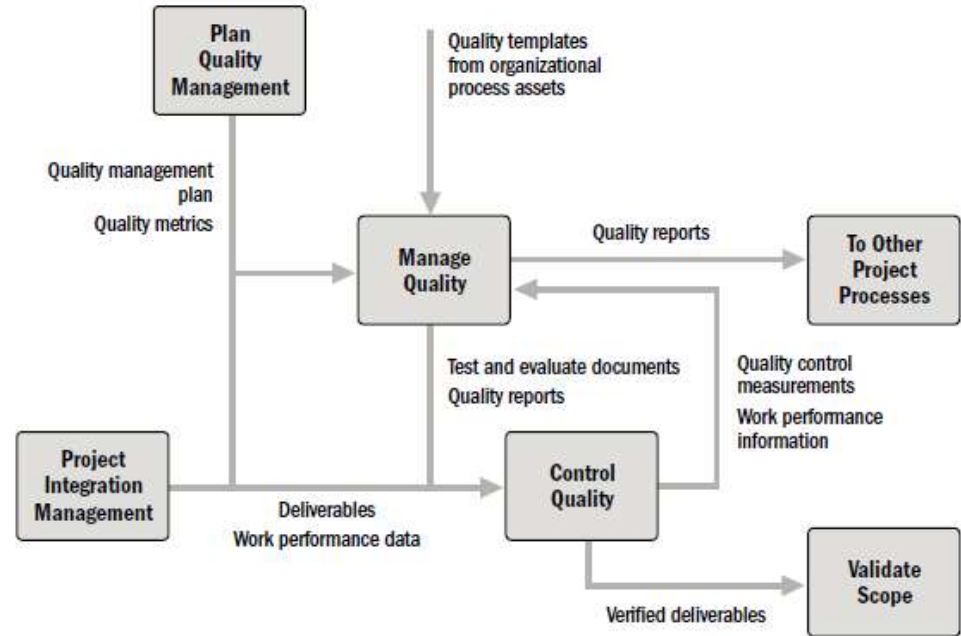
Quality: The degree of characteristics fulfill the requirements.



Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Schedule Management		6.1 Plan Schedule 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule Management		6.6 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Quality Management Process **Interrelations**

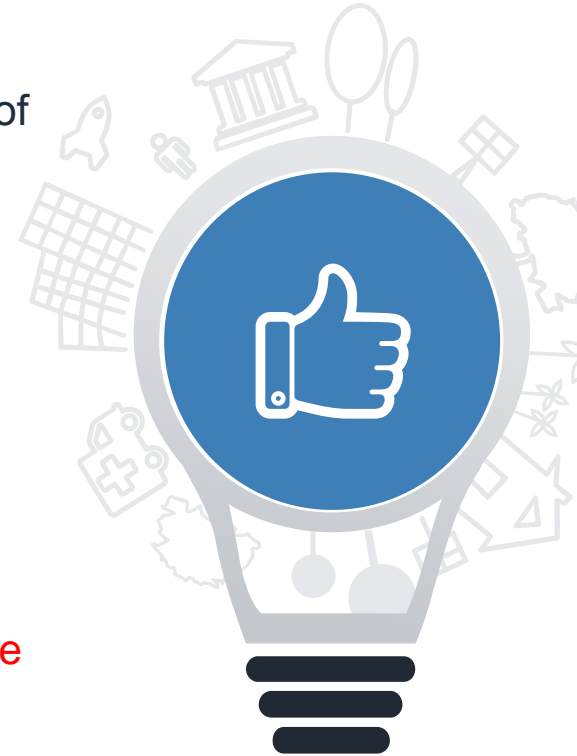
- The Plan Quality Management process is concerned with the quality that the work needs to have.
- Manage Quality is concerned with managing the quality processes throughout the project.
- Control Quality is concerned with comparing the work results.
- There are two outputs specific to the Quality Knowledge Area that are used by other Knowledge Areas:
 - **Verified deliverables.**
 - **Quality reports.**



Key concepts for **Project Quality Management**

- **Project Quality Management** addresses the management of the project and its deliverables. It applies to all projects, regardless of the nature of their deliverables.
- **Quality measures and techniques** are specific to the type of deliverables
- **Prevention Vs inspection.**
 - **Prevention** (keeping errors out of the process)
 - **Inspection** (keeping errors out of the hands of the customer);

The cost of preventing mistakes is generally much less than the cost of correcting mistakes



Key concepts for **Project Quality Management**

■ Attribute sampling Vs variable sampling

- **Tolerances:** specified range of acceptable results.
- **Control limits:** identify the boundaries of **common variation** in a statistically stable process or process performance).

- **Cost of quality (COQ):** all costs incurred over the life of the product by investment in preventing nonconformance to requirements, appraising the product or service for conformance to requirements.

Cost of poor quality categorized into internal (found by the project team) and external (found by the customer).



TRENDS AND EMERGING PRACTICES IN PROJECT QUALITY MANAGEMENT

Modern quality management approaches seek to **minimize variation** and to deliver results that meet defined stakeholder requirements.

- **Customer satisfaction.**
- **Continual improvement.**
- **Management responsibility.**
- **Mutually beneficial partnership with suppliers.**



TAILORING CONSIDERATIONS

Each project is unique; therefore, the project manager will need to tailor the way Project Quality Management processes are applied.



- **Policy compliance and auditing.**
- **Standards and regulatory compliance.**
- **Continuous improvement.**
- **Stakeholder engagement.**

8.1 Plan Quality Management

8.1 Plan Quality Management

Inputs

- .1 Project charter
- .2 Project management plan
 - Requirements management plan
 - Risk management plan
 - Stakeholder engagement plan
 - Scope baseline
- .3 Project documents
 - Assumption log
 - Requirements documentation
 - Requirements traceability matrix
 - Risk register
 - Stakeholder register
- .4 EEF
- .5 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Data gathering
 - Benchmarking
 - Brainstorming
 - Interviews
- .3 Data analysis
 - Cost-benefit analysis
 - Cost of quality
- .4 Decision making
 - Multicriteria decision analysis
- .5 Data representation
 - Flowcharts
 - Logical data model
 - Matrix diagrams
 - Mind mapping
- .6 Test and inspection planning
- .7 Meetings

Outputs

- .1 Quality management plan
- .2 Quality metrics
- .3 Project management plan updates
 - Risk management plan
 - Scope baseline
- .4 Project documents updates
 - Lessons learned register
 - Requirements traceability matrix
 - Risk register
 - Stakeholder register

8.1 Plan Quality Management **Input**

01 PROJECT CHARTER

02 PROJECT MANAGEMENT PLAN

- Requirements management plan
- Risk management plan
- Stakeholder engagement plan
- Scope baseline

03 PROJECT DOCUMENTS

- Assumption log
- Requirements documentation
- Requirements traceability matrix
- Risk register
- Stakeholder register

04 ENTERPRISE ENVIRONMENTAL FACTORS

05 ORGANIZATIONAL PROCESS ASSETS



8.1 Plan Quality Management Tools & Techniques

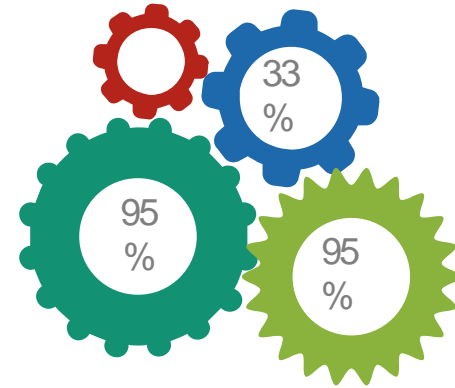
01 EXPERT JUDGMENT

02 DATA GATHERING

03 DATA ANALYSIS

Cost-benefit analysis

Is financial analysis tool used for estimate the strength and weakness of alternatives to determine the best alternative.



8.1 Plan Quality Management Tools & Techniques

COST OF QUALITY.

- **Prevention costs:** Related to the prevention of poor quality in the deliverables.
- **Appraisal costs:** Related to evaluating, measuring, auditing, and testing the deliverables.
- **Failure costs (internal/external):** Related to nonconformance of the deliverables to the needs or expectations of the stakeholders.

8.1 Plan Quality Management

Tools & Techniques

Cost of Conformance

Prevention Costs

(Build a quality product)

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

Appraisal Costs

(Assess the quality)

- Testing
- Destructive testing loss
- Inspections

Money spent during the project
to avoid failures

Cost of Nonconformance

Internal Failure Costs

(Failures found by the project)

- Rework
- Scrap

External Failure Costs

(Failures found by the Customer)

- Liabilities
- Warranty work
- Lost business

Money spent during and after the project
because of failures

8.1 Plan Quality Management Tools & Techniques

04 DECISION MAKING

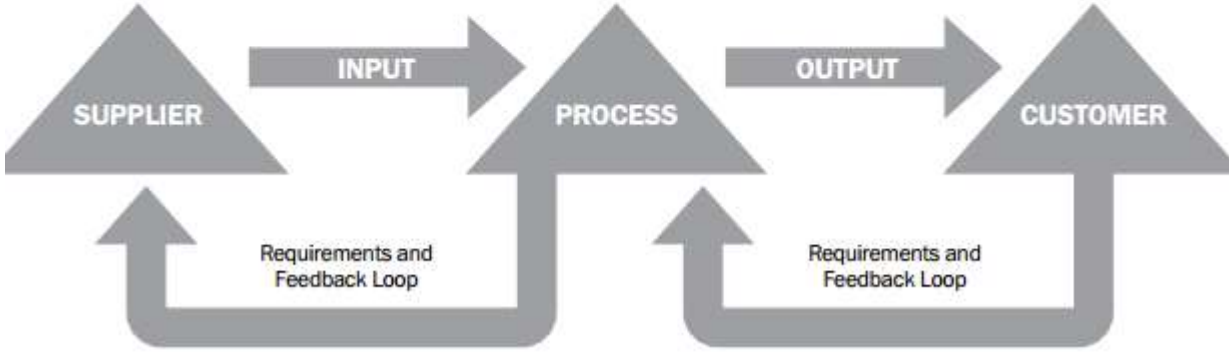
05 DATA REPRESENTATION

Flowcharts or process maps because they display the sequence of steps and the branching possibilities that exist for a process that transforms one or more inputs into one or more outputs.

- ✓ SIPOC (suppliers, inputs, process, outputs, and customers) value chain model.
- ✓ Process flows or process flow diagrams When flowcharts used to represent steps in a process, and they can be used for process improvement as well as identifying where quality defects can occur or where to incorporate quality checks.

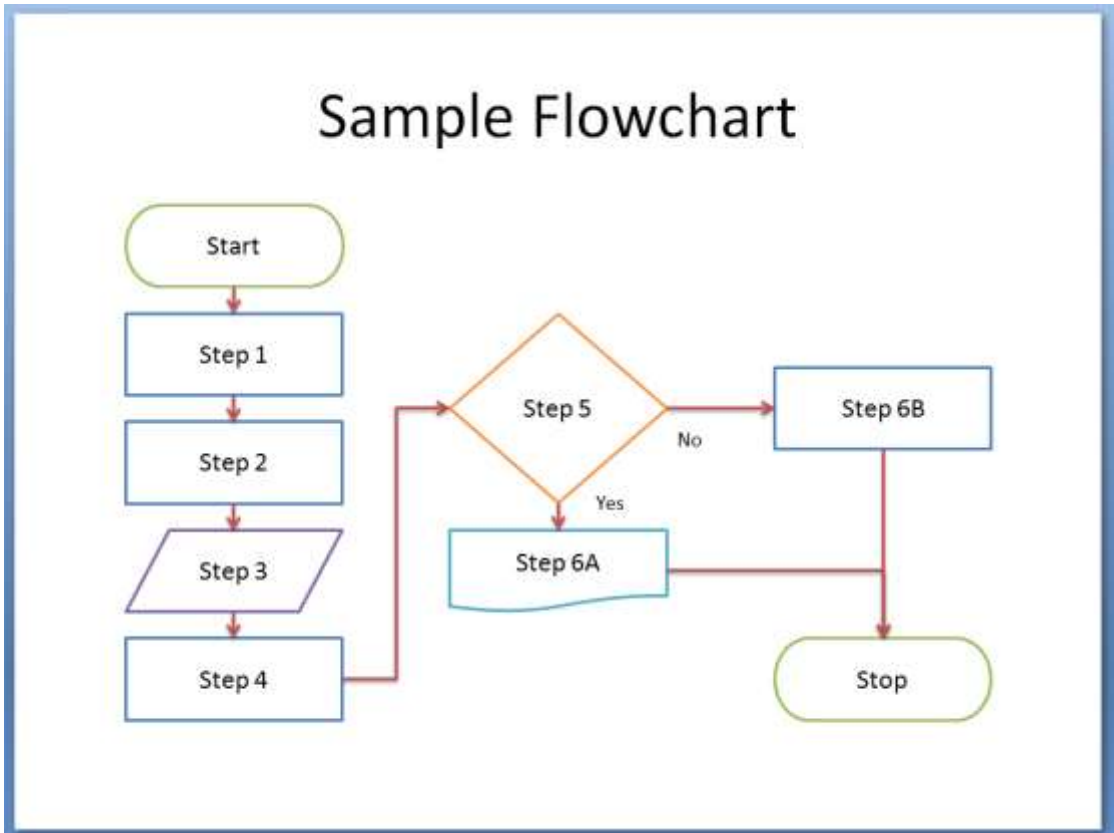
8.1 Plan Quality Management Tools & Techniques

Suppliers	Inputs	Process	Outputs	Customers
_____	• _____	• _____	• _____	• _____
_____	• _____	• _____	• _____	• _____
_____	• _____	• _____	• _____	• _____
_____	• _____	• _____	• _____	• _____



SIPOC value chain model.

8.1 Plan Quality Management Tools & Techniques



8.1 Plan Quality Management Tools & Techniques

Logical data model. Visual representation of an organization's data, described in business language and independent of any specific technology.

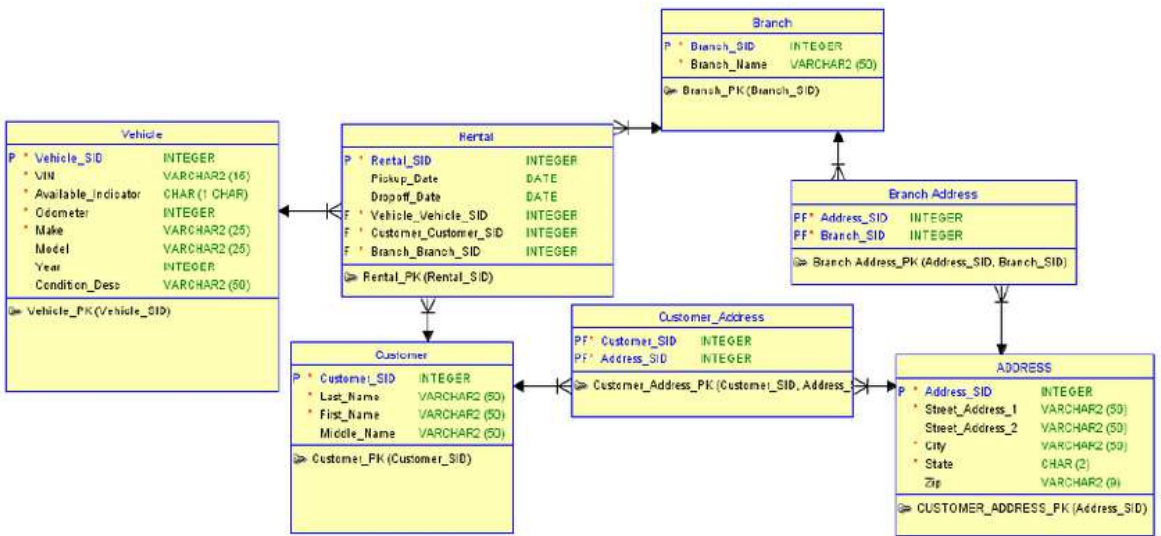
Matrix diagrams. Matrix diagrams help find the strength of relationships among different factors, causes, and objectives that exist between the rows and columns that form the matrix.

Mind mapping The mind-mapping technique may help in the rapid gathering of project quality requirements, constraints, dependencies, and relationships.



8.1 Plan Quality Management

Tools & Techniques



Logical Data Model.

8.1 Plan Quality Management Tools & Techniques

FEATURES	PRODUCT 1	PRODUCT 2	PRODUCT 3
Feature Description	✓	✓	X
Feature Description	✓	X	X
Feature Description	✓	X	✓
Feature Description	✓	✓	X

Matrix Diagrams

8.1 Plan Quality Management Tools & Techniques

06 TEST AND INSPECTION PLANNING

PM and the project team determine how to test or inspect the product, deliverable, or service to meet the stakeholders' needs and expectations, as well as how to meet the goal for the product's performance and reliability.

07 MEETINGS



8.1 Plan Quality Management Output

01 QUALITY MANAGEMENT PLAN

- Describes how applicable policies, procedures, and guidelines will be implemented to achieve the quality objectives.
- It describes the activities and resources necessary for the project management team to achieve the quality objectives set for the project.

It may Includes:

- Quality standards.
- Quality objectives.
- Quality roles and responsibilities;
- Quality tools.
- Major procedures relevant for the project, such as dealing with nonconformance, corrective actions procedures, and continuous improvement procedures



8.1 Plan Quality Management

Output

02

QUALITY METRICS

Specifically describes a project or product **attribute** and how the Control Quality process will verify compliance to it.

03

PROJECT MANAGEMENT PLAN UPDATES

- Risk management plan.
- Scope baseline

04

PROJECT DOCUMENTS UPDATES

- Lessons learned register
- Requirements traceability matrix.
- Risk register.
- Stakeholder register.



8.2 Manage Quality

- Sometimes called **quality assurance**,
- It is referred as **non-project** work.
- QA focus on the processes used in the project.
- QA is about using project processes effectively.
- It involves following and meeting standards to assure the final product will meet stakeholders needs, expectations, and requirements.



8.2 Manage Quality

- The project manager and project team may use the organization's quality assurance department.
- Quality assurance departments usually have **cross-organizational** experience in using quality tools and techniques.
- Manage Quality is considered the work of everybody. Each has its roles in managing quality.
- In agile projects, quality management is performed by all team members throughout the project, but in traditional projects, quality management is often the responsibility of specific team members.



8.2 Manage Quality

8.2 Manage Quality

Inputs

- .1 Project management plan
 - Quality management plan
- .2 Project documents
 - Lessons learned register
 - Quality control measurements
 - Quality metrics
 - Risk report
- .3 OPA

Tools & Techniques

- .1 Data gathering
 - Checklists
- .2 Data analysis
 - Alternatives analysis
 - Document analysis
 - Process analysis
 - Root cause analysis
- .3 Decision making
 - Multi-criteria decision analysis
- .4 Data representation
 - Affinity diagrams
 - Cause-and-effect diagrams
 - Flowcharts
 - Histograms
 - Matrix diagrams
 - Scatter diagrams
- .5 Audits
- .6 Design for X
- .7 Problem solving
- .8 Quality improvement methods

Outputs

- .1 Quality reports
- .2 Test and evaluation documents
- .3 Change requests
- .4 Project management plan updates
 - Quality management plan
 - Scope baseline
 - Schedule baseline
 - Cost baseline
- .5 Project documents updates
 - Issue log
 - Lessons learned register
 - Risk register

8.2 Manage Quality Input

01 PROJECT MANAGEMENT PLAN

- Quality management plan

02 PROJECT DOCUMENTS

- Lessons learned register
- Quality control measurements
- Quality metrics
- Risk report

03 ORGANIZATIONAL PROCESS ASSETS



01 DATA GATHERING Checklist

Is a structured tool used to verify that a set of required steps has been performed or to check if a list of requirements has been satisfied.



02 DATA ANALYSIS

- **Alternatives analysis.**
- **Document analysis.**
- **Process analysis.** Identifies opportunities for process improvements.
- **Root cause analysis (RCA).**

03

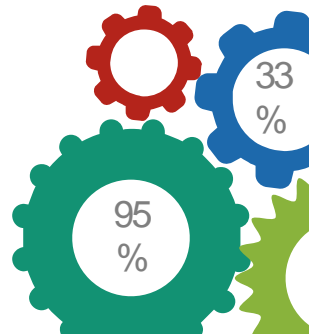
DECISION MAKING

Product decisions can include evaluating the life cycle cost, schedule, stakeholder satisfaction, and risks associated with resolving product defects.

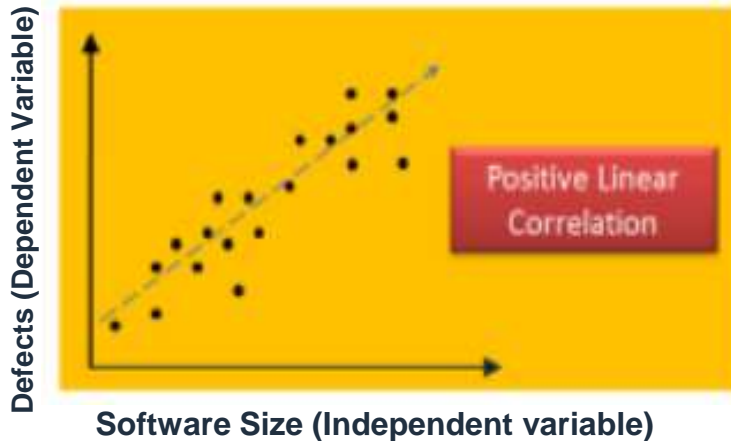
04

DATA REPRESENTATION

- **Affinity diagrams.**
- **Cause-and-effect diagrams.** Or fishbone diagrams, why-why diagrams, or Ishikawa diagrams. This type of diagram breaks down the causes of the problem statement identified into discrete branches, helping to identify the main or root cause of the problem.
- **Flowcharts.**

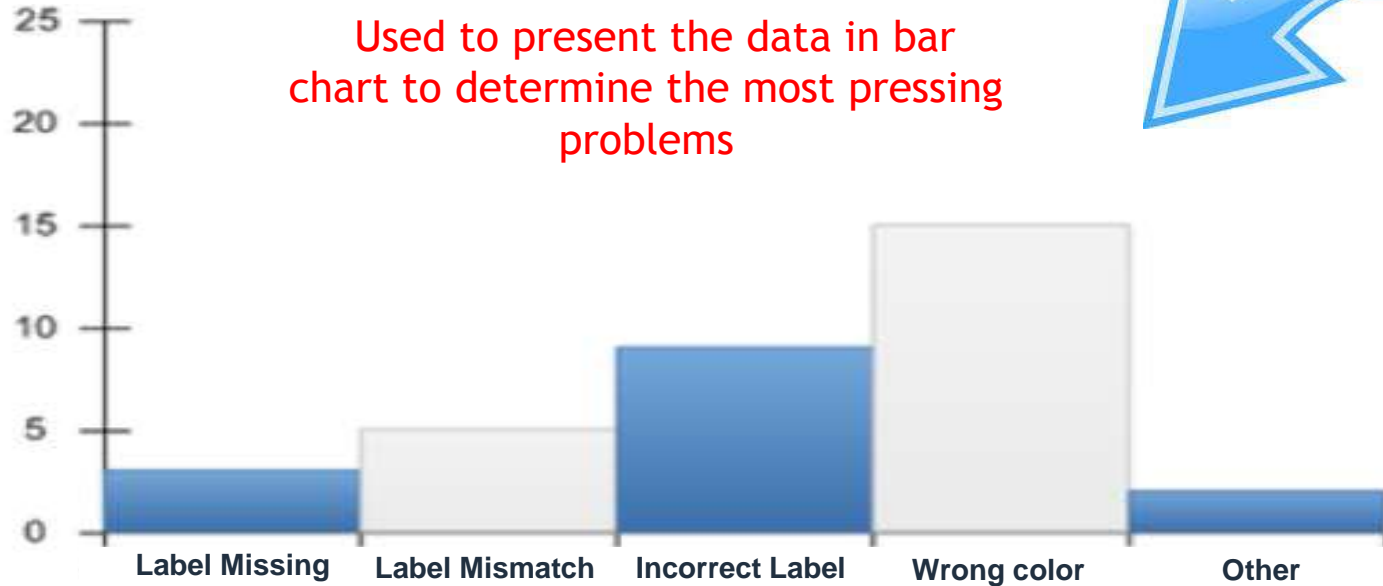


- **Histograms.** Graphical representation of numerical data. It can show the number of defects per deliverable, a ranking of the cause of defects, the number of times each process is noncompliant,
- **Matrix diagrams.**
- **Scatter diagrams.** Graph that shows the relationship between two variables.



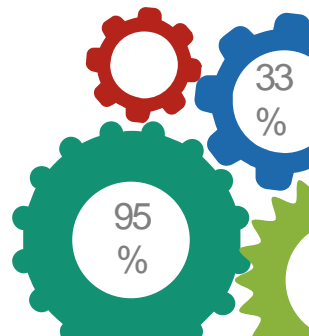
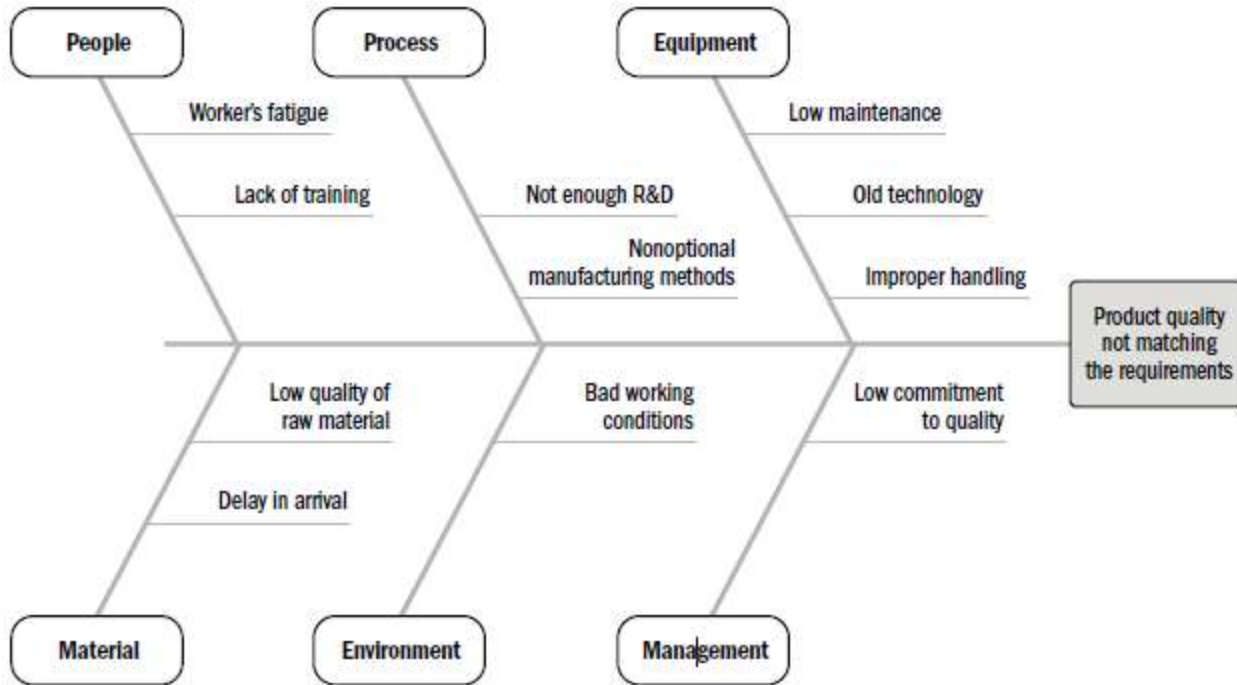
Used to tracks two variables to determine their relationship





Histogram

8.2 Manage Quality Tools & Techniques



8.2 Manage Quality Tools & Techniques

05 AUDITS

An audit is a structured, independent process used to determine if project activities comply with organizational and project policies, processes, and procedures. **Usually conducted by a team external to the project.**

06 QUALITY IMPROVEMENT METHODS

Quality improvements can occur based on findings and recommendations from quality control processes, the findings of the quality audits, or problem solving in the Manage Quality process.

Plan-do-check-act and Six Sigma are two of the most **common quality improvement tools.**



8.2 Manage Quality Tools & Techniques

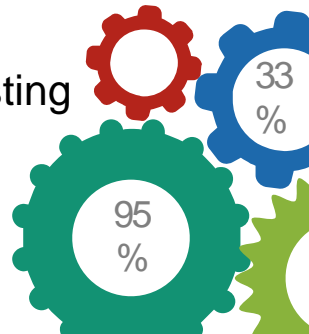
07 DESIGN FOR X

- Is a set of technical guidelines that may be applied during the design of a product for the optimization of a **specific aspect** of the design.
- DfX can control or improve the product's final characteristics.
- The X in DfX can be different aspects of product development, such as reliability, deployment, assembly, manufacturing, cost, service, usability, safety, and quality.

08 PROBLEM SOLVING

Problems can arise from Control Quality process or from quality audits and can be associated with a process or deliverable.

Problem-solving method will help eliminate the problem and develop a long-lasting solution.



01 **QUALITY REPORTS**

The quality reports can be graphical, numerical, or qualitative, include all quality management issues escalated by the team; recommendations for process, project, and product improvements; corrective actions recommendations (including rework, defect/bugs repair).

02 **TEST AND EVALUATION DOCUMENTS**

They are inputs to the Control Quality process and are used to evaluate the achievement of quality objectives. may include dedicated checklists and detailed requirements traceability matrices as part of the document.

03 **CHANGE REQUESTS**



04 Project management plan updates

- Quality management plan
- Scope baseline
- Schedule baseline
- Cost baseline

05 Project documents updates

- Issue log
- Lessons learned register
- Risk register



8.3 Control Quality

Inputs

- .1 Project management plan
 - Quality management plan
- .2 Project documents
 - Lessons learned register
 - Quality metrics
 - Test and evaluation documents
- .3 Approved change requests
- .4 Deliverables
- .5 Work performance data
- .6 EEF
- .7 OPA

Tools & Techniques

- .1 Data gathering
 - Checklists
 - Check sheets
 - Statistical sampling
 - Questionnaires and surveys
- .2 Data analysis
 - Performance reviews
 - Root cause analysis
- .3 Inspection
- .4 Testing/product evaluations
- .5 Data representation
 - Cause-and-effect diagrams
 - Control charts
 - Histogram
 - Scatter diagrams
- .6 Meetings

Outputs

- .1 Quality control measurements
- .2 Verified deliverables
- .3 Work performance information
- .4 Change requests
- .5 Project management plan updates
 - Quality management plan
- .6 Project documents updates
 - Issue log
 - Lessons learned register
 - Risk register
 - Test and evaluation documents

8.3 Control Quality Input

- 01 **Project management plan**
 - Quality management plan
- 02 **Project documents**
 - Lessons learned register
 - Quality metrics
 - Test and evaluation documents
- 03 **Approved change requests**
- 04 **Deliverables**
- 05 **Work performance data**
- 06 **Enterprise environmental factors**
- 07 **Organizational process assets**



8.3 Control Quality Tools & Techniques

01 DATA GATHERING

- **Checklist**
- **Check sheets.** tally sheets, used to organize facts in a manner that will facilitate the effective collection of useful data about a potential quality problem.
- **Statistical sampling**
- **Questionnaires and Surveys**

02 DATA ANALYSIS

- **Performance reviews.** Performance reviews measure, compare, and analyze the quality metrics defined by the Plan process against the actual results.
- **Root cause analysis (RCA)**

03 INSPECTION

Is the examination of a work product to determine if it conforms to documented standards. Inspections may be called reviews, peer reviews, audits, or walkthroughs.

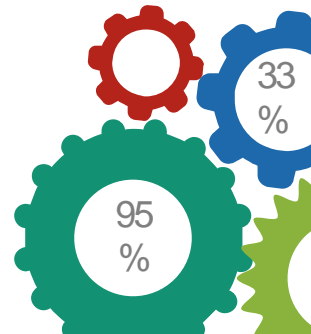


8.3 Control Quality Tools & Techniques

4 TESTING/PRODUCT EVALUATIONS

Testing is an organized and constructed investigation conducted to provide objective information about the quality of the product or service in accordance with requirements.

- The intent of testing is to find errors, defects, bugs, or other nonconformance problems in the product or service.
- Tests can be performed throughout the project, as different components of the project become available, and at the end of the project on the final deliverables.
- Early testing helps identify nonconformance problems and reduce the cost of fixing the nonconforming components.



8.3 Control Quality Tools & Techniques

05 DATA REPRESENTATION

- Cause-and-effect diagrams
- Histograms
- Scatter diagrams.
- Control charts.

Used to determine whether or not a process is stable or has predictable performance.

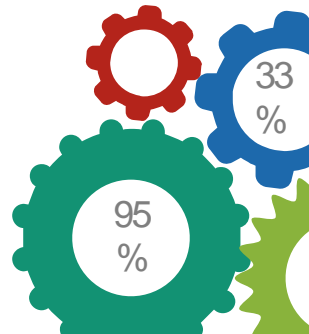
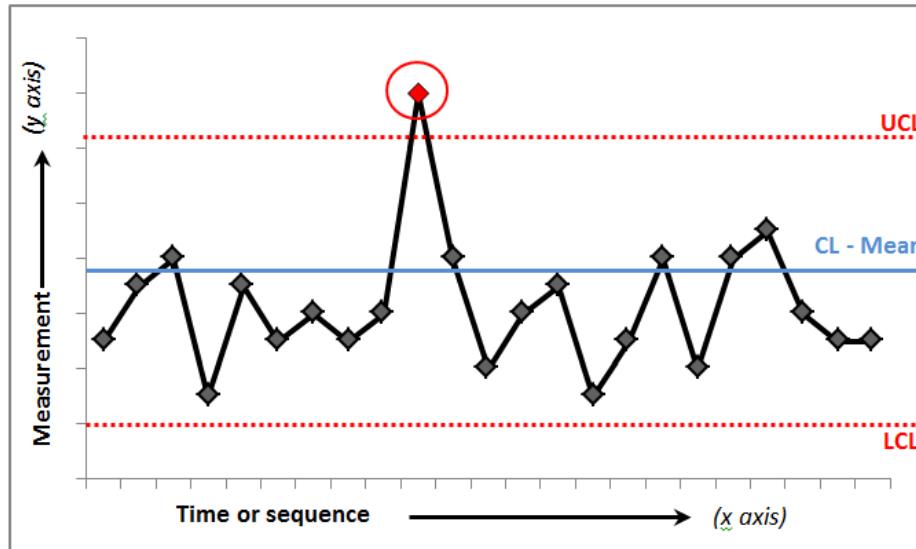
- Upper and lower specification limits are based on the requirements.
- The control limits are determined using standard statistical calculations and principles to ultimately establish the natural capability for a stable process.
- The PM and SH use the statistically calculated control limits to identify the points at which corrective action will be taken to prevent performance that remains outside the control limits.



8.3 Control Quality Tools & Techniques

Control charts

- Can be used to monitor various types of output variables.
- Used to track repetitive activities required for producing manufactured lots,
- Control charts may also be used to monitor cost and schedule variances, volume, frequency of scope changes, or other management results



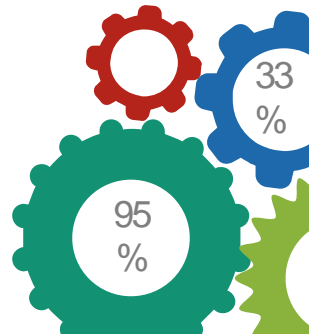
8.3 Control Quality Tools & Techniques

06 MEETINGS

Approved change requests review. All approved change requests should be reviewed to verify that they were implemented as approved.

Retrospectives/lesson learned: A meeting held by a project team to discuss:

- Successful elements in the project/phase.
- What could be improved.
- What to incorporate in the ongoing project and what in future projects.
- What to add to the organization process assets.



01 QUALITY CONTROL MEASUREMENTS

02 VERIFIED DELIVERABLES

The results of performing the Control Quality process are verified deliverables that become an input to the Validate Scope process for formalized acceptance.

03 WORK PERFORMANCE INFORMATION

04 CHANGE REQUESTS

05 PROJECT MANAGEMENT PLAN UPDATES

06 PROJECT DOCUMENTS UPDATES

- Issue log.
- Risk register
- Lessons learned register.
- Test and evaluation documents.





9. PROJECT RESOURCE MANAGEMENT



Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer

Project **Resource** Management

- **Project Resource Management** includes the processes to identify, acquire, and manage the resources needed for the successful completion of the project.
- **Project Resource Management** help ensure that the right resources will be available to the project manager and project team at the right time and place.



Resource

Resource could be:

- Team Resource : Refer to the human resources.
- Physical Resource : equipment, materials, facilities, and infrastructure.



What about money?

Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Schedule Management		6.1 Plan Schedule 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule Management		6.6 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

TRENDS AND EMERGING PRACTICES IN PROJECT RESOURCE MANAGEMENT

- **Project management** styles are shifting from a **command and control** structure for managing projects and toward a more **collaborative and supportive** management approach that empowers teams by delegating decision making to the team members.
- **Emotional intelligence (EI)**. The project manager should invest in personal EI by improving inbound (e.g., self-management and self-awareness) and outbound (e.g., relationship management) competencies.
- **Self-organizing teams**. using agile approaches ; rise to the self-organizing team, where the team functions with an absence of centralized control.



TAILORING CONSIDERATIONS



- Diversity
- Physical location
- Industry-specific resources
- Acquisition of team members
- Management of team
- Life cycle approaches

9.1 Plan Resource Management

9.1 Plan Resource Management

Inputs

- .1 Project charter
- .2 Project management plan
 - Quality management plan
 - Scope baseline
- .3 Project documents
 - Project schedule
 - Requirements documentation
 - Risk register
 - Stakeholder register
- .4 EEF
- .5 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Data representation
 - Hierarchical charts
 - Responsibility assignment matrix
 - Text-oriented formats
- .3 Organizational theory
- .4 Meetings

Outputs

- .1 Resource management plan
- .2 Team charter
- .3 Project documents updates
 - Assumption log
 - Risk register

9.1 Plan Resource Management

Input

- 01 **Project charter**
- 02 **Project management plan**
 - Quality management plan
 - Scope baseline
- 03 **Project documents**
 - Project schedule
 - Requirements documentation
 - Risk register
 - Stakeholder register
- 04 **Enterprise environmental factors**
- 05 **Organizational process assets**



01 EXPERT JUDGMENT

02 ORGANIZATIONAL THEORY

Provides information regarding the way in which people, teams, and organizational units behave. Effective use of common techniques identified in organizational theory can shorten the amount of time, cost, and effort needed to create the Plan Resource Management.

03 MEETINGS

04 DATA REPRESENTATION

- ❖ **Hierarchical charts.** The traditional organizational chart structure can be used to show positions and relationships in a graphical, top-down format.
- ❖ **Responsibility Assignment Matrix - RAM** : shows the project resources assigned to **each work package**. One example of a RAM is a RACI.



9.1 Plan Resource Management Tools & Techniques

RACI Chart	Person				
Activity	Ann	Ben	Carlos	Dina	Ed
Define	A	R	I	I	I
Design	I	A	R	C	C
Develop	I	A	R	C	C
Test	A	I	I	R	I

RACI (Responsible, Accountable, Consultant, Inform)

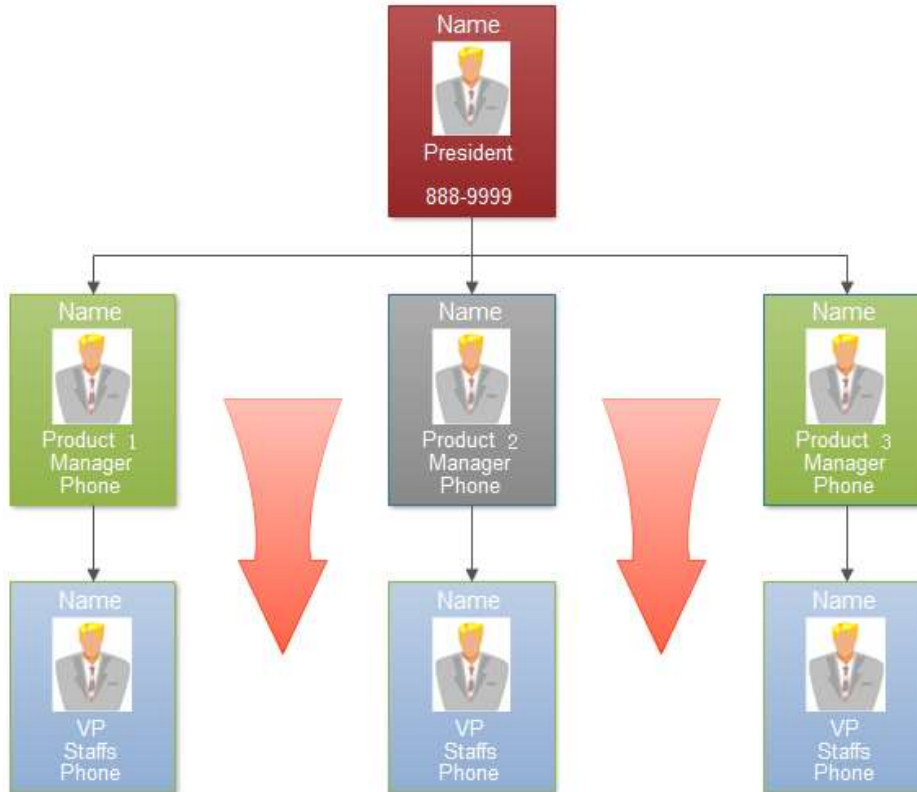
- ❖ **Text-oriented formats.** Team member responsibilities that require detailed descriptions can be specified in text oriented formats.
- Usually in outline form, these documents provide information such as responsibilities, authority, competencies, and qualifications.

Role _____

Responsibilities _____

Authority _____

**Text-oriented
Format**



Hierarchical charts

01 RESOURCE MANAGEMENT PLAN

provides guidance on how project resources should be categorized, allocated, managed, and released. management plan may include :

- ❖ Identification of resources
- ❖ Acquiring resources
- ❖ Roles and responsibilities

Role – Authority – deliverables – Responsibility – Competence

- ❖ **Project organization charts.** Is a graphic display of project team members and their reporting relationships.
- ❖ **Project team resource management**
- ❖ **Training**
- ❖ **Team development**
- ❖ **Resource control**
- ❖ **Recognition plan**



02

TEAM CHARTER

A document that establishes the **team values**, **agreements**, and **operating guidelines** for the team it may includes:

- Team values.
- Communication guidelines.
- Decision-making criteria and process.
- Conflict resolution process.
- Meeting guidelines.
- Team agreements.

03

PROJECT DOCUMENTS UPDATES

- Assumption log
- Risk register

9.2 Estimate Activity Resources

9.2 Estimate Activity Resources

Inputs

- .1 Project management plan
 - Resource management plan
 - Scope baseline
- .2 Project documents
 - Activity attributes
 - Activity list
 - Assumption log
 - Cost estimates
 - Resource calendars
 - Risk register
- .3 EEF
- .4 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Bottom-up estimating
- .3 Analogous estimating
- .4 Parametric estimating
- .5 Data analysis
 - Alternatives analysis
- .6 PMIS
- .7 Meetings

Outputs

- .1 Resource requirements
- .2 Basis of estimates
- .3 Resource breakdown structure**
- .4 Project documents updates
 - Activity attributes
 - Assumption log
 - Lessons learned register

9.2 Estimate Activity Resources

Input

01 PROJECT MANAGEMENT PLAN

- Resource management plan
- Scope baseline

02 PROJECT DOCUMENTS

- Activity attributes
- Activity list
- Assumption log
- Cost estimates
- Resource calendars
- Risk register

03 EEF

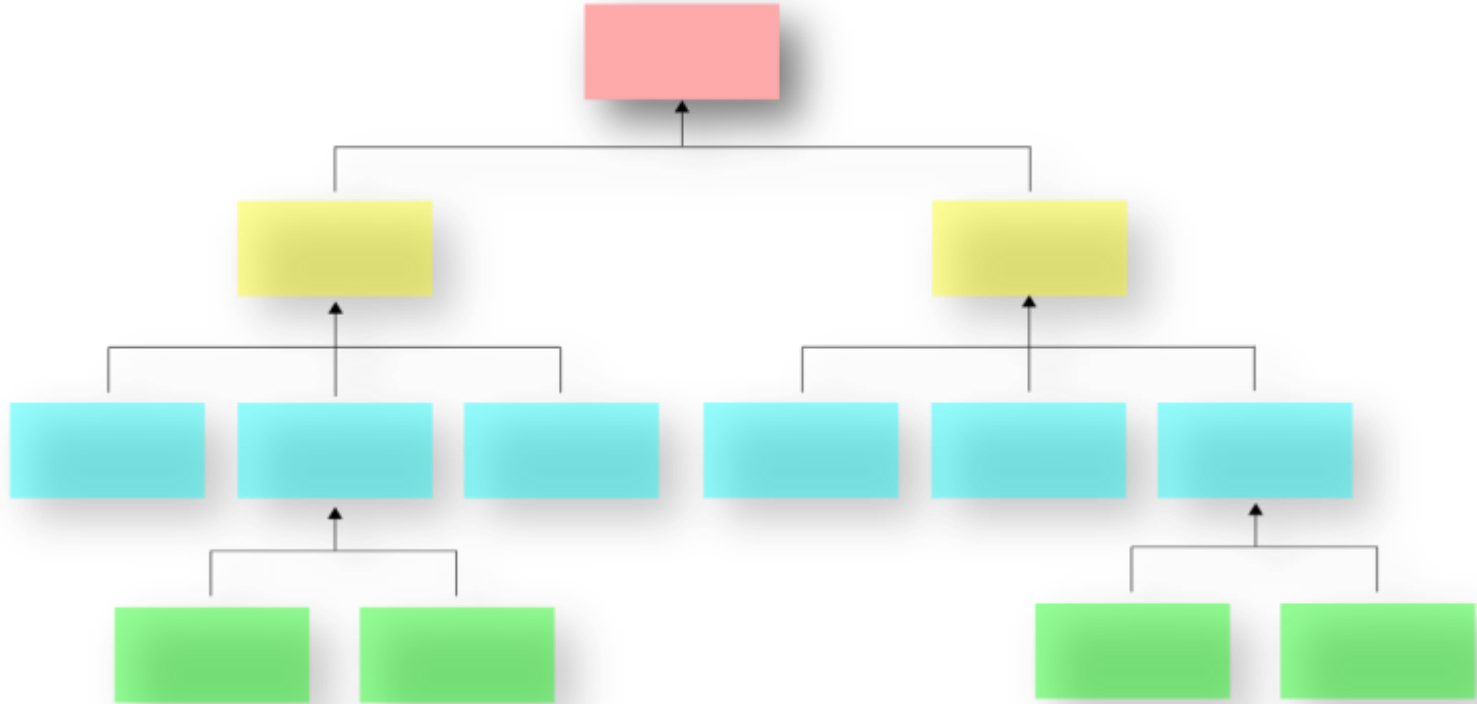
04 OPA



- 01 EXPERT JUDGMENT
- 02 BOTTOM-UP ESTIMATING
- 03 ANALOGOUS ESTIMATING
- 04 PARAMETRIC ESTIMATING
- 05 DATA ANALYSIS
 - Alternatives Analysis
- 06 PROJECT MANAGEMENT INFORMATION SYSTEM
- 07 MEETINGS



Bottom-up Estimating



01 RESOURCE REQUIREMENTS

Identify the **types** and **quantities** of resources required for **each work package or activity** in a work package and can be aggregated to determine the estimated resources for each work package, each WBS branch, and the project as a whole.

02 BASIS OF ESTIMATES

The amount and type of additional details supporting the resource estimate vary by application area.

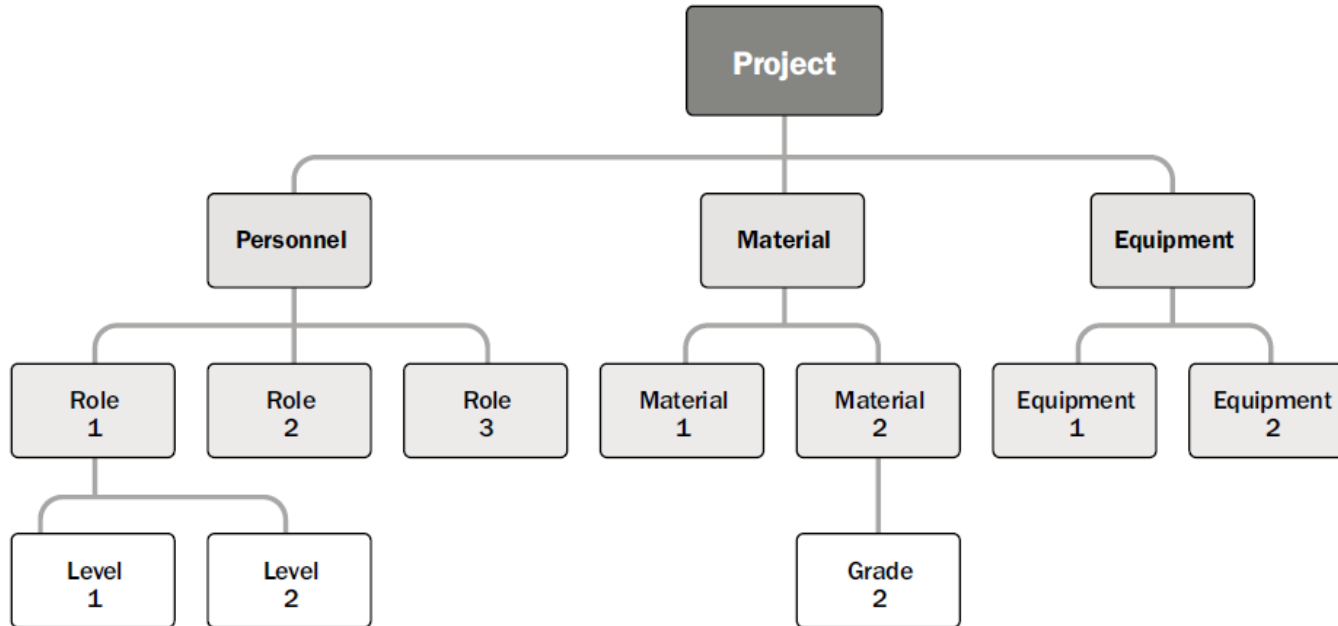
03 RESOURCE BREAKDOWN STRUCTURE

A hierarchical representation of resources by category and type Categories include but are not limited to **labor, material, equipment, and supplies**. Type include the skill level, grade level, required certifications, or other information.

04 PROJECT DOCUMENTS UPDATES

- Activity attributes
- Assumption log
- Lessons learned register





Resource Breakdown Structure

9.3 Acquire Resources



ACQUIRE RESOURCES

Is the process of obtaining team members, facilities, equipment, materials, supplies, and other resources necessary to complete project work.



THE KEY BENEFIT

It outlines and guides the selection of resources and assigns them to their respective activities.



This process is performed periodically throughout the project as needed.



9.3 Acquire Resources



The resources needed for the project can be internal or external to the project-performing organization.

- Internal resources are **acquired (assigned) from functional or resource managers.**
- External resources are **acquired through the procurement processes.**



The project manager or project management team will be required to document the impact of the unavailability of required resources in the project schedule, project budget, project risks, project quality, training plans, and other project management plans

9.3 Acquire Resources

Inputs

- .1 Project management plan
 - Resource management plan
 - Procurement management plan
 - Cost baseline
- .2 Project documents
 - Project schedule
 - Resource calendars
 - Resource requirements
 - Stakeholder register
- .3 EEF
- .4 OPA

Tools & Techniques

- .1 Decision making
 - Multicriteria decision analysis
- .2 Interpersonal and team skills
 - Negotiation
- .3 Pre-assignment
- .4 Virtual teams

Outputs

- .1 Physical resource assignments
- .2 Project team assignments
- .3 Resource calendars
- .4 Change requests
- .5 Project management plan updates
 - Resource management plan
 - Cost baseline
- .6 Project documents updates
 - Lessons learned register
 - Project schedule
 - Resource breakdown structure
 - Resource requirements
 - Risk register
 - Stakeholder register
- .7 EEF updates
- .8 OPA Updates

9.3 Acquire Resources Input

01 PROJECT MANAGEMENT PLAN

- Resource management plan
- Procurement management plan
- Cost baseline

02 PROJECT DOCUMENTS

- Project schedule
- Resource calendars
- Resource requirements
- Stakeholder register

03 Enterprise environmental factors

04 Organizational process assets



9.3 Acquire Resources Tools & Techniques

01

DECISION MAKING

Using a multi-criteria decision analysis tool, criteria are developed and used to rate or score potential ,The criteria are weighted according to their relative importance and values can be changed for different types of resources.

Unique **selection criteria** that for team resources are:

- **Experience:** Verify that the team member has the relevant experience.
- **Knowledge:** Consider if the team member has relevant knowledge of the customer, similar implemented projects, and nuances of the project environment.
- **Skills:** Determine if the team member has the relevant skills to use a project tool.
- **Attitude:** Determine if the team member has the ability to work with others as a cohesive team.
- **International factors.** Consider team member location, time zone, and communication capabilities.



9.3 Acquire Resources Tools & Techniques

02 INTERPERSONAL AND TEAM SKILLS

Negotiate:

The project management team may need to negotiate with:

- Functional managers.
- Other project management teams.
- External organizations and suppliers.

03 PRE-ASSIGNMENT

When physical or team resources for a project are determined **in advance**, they are considered pre-assigned. (when resources being identified as part of a competitive proposal, or if the project is dependent upon the expertise of particular persons).



9.3 Acquire Resources

Tools & Techniques

04 VIRTUAL TEAMS

Virtual teams can be defined as groups of people with a shared goal who fulfill their roles with little or no time spent meeting face to face.

The availability of communication technology has made virtual teams feasible. The virtual team model makes it possible to:

- Form teams of people who live in widespread geographic areas.
- Add special expertise.
- Work from home offices.
- Form teams of people who work different shifts, hours, or days.
- Include people with mobility limitations or disabilities.
- Move forward with projects that would have been held or canceled due to travel expenses.
- Save the expense of offices and all physical equipment.



01 **PHYSICAL RESOURCE ASSIGNMENTS**

Documentation of the physical resource assignments records the material, equipment, supplies, locations, and other physical resources that will be used during the project.

02 **PROJECT TEAM ASSIGNMENTS**

Documentation of team assignments records the team members and their roles and responsibilities for the project.

03 **RESOURCE CALENDARS**

Identifies the *working days, shifts, start and end of normal business hours, weekends, and public holidays* when each specific resource is available.

Also specify when and for how long identified team and physical resources will be available during the project.

04 **CHANGE REQUESTS**



05 PROJECT MANAGEMENT PLAN UPDATES

- Resource management plan.
- Cost baseline.

06 PROJECT DOCUMENTS UPDATES

- Lessons learned register.
- Project schedule
- Resource breakdown structure.
- Resource requirements.
- Risk register.
- Stakeholder register.

07 ENTERPRISE ENVIRONMENTAL FACTORS UPDATES

- Resource availability within the organization.
- Amount of the organization's consumable resources that have been used.

08 ORGANIZATIONAL PROCESS ASSETS UPDATES

Include updates to documentation related to acquiring, assigning and allocating resources.



9.4 Develop Team



DEVELOP TEAM

is the process of improving competencies, team member interaction, and the overall team environment to enhance project performance.



THE KEY BENEFIT

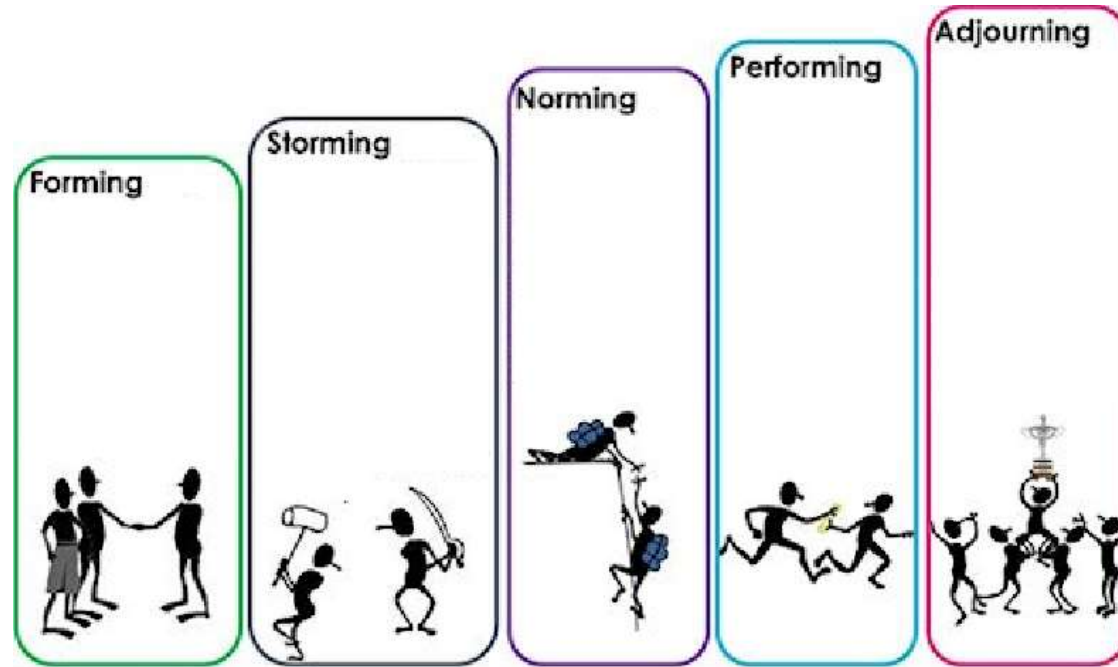
it results in improved teamwork, enhanced interpersonal skills and competencies, motivated employees, reduced attrition, and improved overall project performance.



This process is performed periodically throughout the project as needed



9.4 Develop Team



Team Building Activities (THE TUCKMAN MODEL)

9.4 Develop Team

Inputs

- .1 Project management plan
 - Resource management plan
- .2 Project documents
 - Lessons learned register
 - Project schedule
 - Project team assignments
 - Resource calendars
 - Team charter
- .3 EEF
- .4 OPA

Tools & Techniques

- .1 Colocation
- .2 Virtual teams
- .3 Communication technology
- .4 Interpersonal and team skills
 - Conflict management
 - Influencing
 - Motivation
 - Negotiation
 - Team building
- .5 Recognition and rewards
- .6 Training
- .7 Individual and team assessments
- .8 Meetings

Outputs

- 1. Team performance assessments
- .2 Change requests
- .3 Project management plan updates
 - Resource management plan
- .4 Project documents updates
 - Lessons learned register
 - Project schedule
 - Project team assignments
 - Resource calendars
 - Team charter
- .5 EEF updates
- .6 OPA Updates

9.4 Develop Team Input

01 PROJECT MANAGEMENT PLAN

- Resource management plan

02 PROJECT DOCUMENTS

- Lessons learned register
- Project schedule
- Project team assignments
- Resource calendars
- Team charter

03 Enterprise environmental factors

04 Organizational process assets



01 COLOCATION

02 VIRTUAL TEAMS

03 COMMUNICATION TECHNOLOGY

- Shared portal.
- Conferencing.
- Audio conferencing.
- Email/chat..

04 INTERPERSONAL AND TEAM SKILLS

- **Conflict management**
- **Influencing.**
- **Motivation.**
Providing a reason for someone to act.
- **Negotiation.**
- **Team building.**
Conducting activities that enhance the team's social relations and build a collaborative and cooperative working environment.



05

RECOGNITION AND REWARDS

- Part of the team development process involves recognizing and rewarding desirable behavior.
- Rewards will be effective only if they satisfy a need that is valued by that individual.
- Reward decisions are made, formally or informally,

06

TRAINING

Includes all activities designed to enhance the competencies of the project team members.
Can be formal or informal.

07

INDIVIDUAL AND TEAM ASSESSMENTS

Give the project manager and the project team insight into areas of strengths and weaknesses. Help project managers assess team members' preferences, aspirations, how they make decisions,

08

MEETINGS

01 **TEAM PERFORMANCE ASSESSMENTS**

As a result of conducting an evaluation of the project management team can identify the specific training, coaching, mentoring, assistance, or changes required to improve the team's performance.

02 **CHANGE REQUESTS**

03 **PROJECT MANAGEMENT PLAN UPDATES**

04 **PROJECT DOCUMENTS UPDATES**

05 **ENTERPRISE ENVIRONMENTAL FACTORS UPDATES**

06 **ORGANIZATIONAL PROCESS ASSETS UPDATES**



9.5 MANAGE TEAM



MANAGE TEAM

Is the process of tracking team member performance, providing feedback, resolving issues, and managing team changes to optimize project performance.



THE KEY BENEFIT

it influences team behavior, manages conflict, and resolves issues.



This process is performed throughout the project as needed.



9.5 MANAGE TEAM

Inputs

- .1 Project management plan
 - Resource management plan
- .2 Project documents
 - Issue log
 - Lessons learned register
 - Project team assignments
 - Team charter
- .3 Work performance reports
- .4 Team performance Assessments
- .5 EEF
- .6 OPA

Tools & Techniques

- .1 Interpersonal and team skills
 - Conflict management
 - Decision making
 - Emotional intelligence
 - Influencing
 - Leadership
- .2 PMIS

Outputs

- .1 Change requests
- .2 Project management plan updates
 - Resource management plan
 - Schedule baseline
 - Cost baseline
- .3 Project documents updates
 - Issue log
 - Lessons learned register
 - Project team assignments
- .4 EEF updates

9.5 MANAGE TEAM **Input**

- 01 **PROJECT MANAGEMENT PLAN**
 - Resource management plan
- 02 **PROJECT DOCUMENTS**
 - Issue log
 - Lessons learned register
 - Project team assignments
 - Team charter
- 03 **WORK PERFORMANCE REPORTS**
- 04 **TEAM PERFORMANCE ASSESSMENTS**
- 05 **Enterprise environmental factors**
- 06 **Organizational process assets**





9.5 MANAGE TEAM

Tools & Techniques

01 INTERPERSONAL AND TEAM SKILLS

Conflict management.

Sources of conflict include scarce resources, scheduling priorities, and personal work styles.

Team **ground rules**, **group norms**, and **solid project management practices**,

Successful conflict management results in greater productivity and positive working relationships.



Five general techniques for resolving conflict

Lose-Lose

Searching for solutions that bring some degree of satisfaction to all parties

Win-Lose

Pushing one's viewpoint at the expense of others

Accommodate

Emphasizing areas of agreement rather than areas of difference

**Compromise/
reconcile.**

**Force/
direct.**

**Smooth/
accommodate**

Win-Win

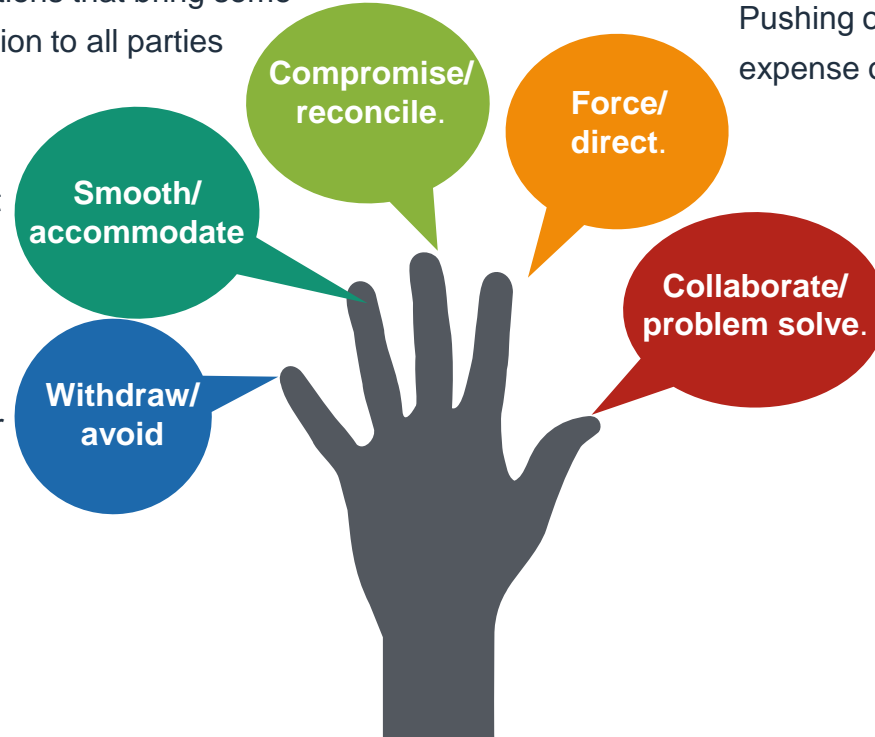
Incorporating multiple viewpoints and insights from differing perspectives

**Collaborate/
problem solve.**

Avoid

Postponing the issue to be better prepared or to be resolved by others.

**Withdraw/
avoid**





- **Decision making.**
- **Emotional intelligence.**

Emotional intelligence is the ability to identify, assess, and manage the personal emotions of oneself and other people, as well as the collective emotions of groups of people.

The team can use emotional intelligence to **reduce tension and increase cooperation** by identifying, assessing, and controlling the sentiments of project team members, anticipating their actions, acknowledging their concerns, and following up on their issues.

9.5 MANAGE TEAM **Tools & Techniques**

Influencing.

Because project managers often have little or no direct authority over team members in a matrix environment, their ability to influence stakeholders on a timely basis is critical to project success.

Leadership. is the ability to lead a team and inspire them to do their jobs well. Leadership is important through all phases of the project life cycle.

02

PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)



01 CHANGE REQUESTS

02 PROJECT MANAGEMENT PLAN UPDATES

- Resource management plan
- Schedule baseline
- Cost baseline

03 PROJECT DOCUMENTS UPDATES

- Issue log
- Lessons learned register
- Project team assignments

04 ENTERPRISE ENVIRONMENTAL FACTORS UPDATES



9.6 Control Resources



CONTROL RESOURCES

is the process of ensuring that the physical resources assigned and allocated to the project are available as planned, as well as monitoring the planned versus actual utilization of resources and taking corrective action as necessary.



THE KEY BENEFIT

is ensuring that the assigned resources are available to the project at the right time and in the right place and are released when no longer needed



This process is performed throughout the project as needed



9.6 Control Resources

Inputs

- .1 Project management plan
 - Resource management plan
- .2 Project documents
 - Issue log
 - Lessons learned register
 - Physical resource assignments
 - Project schedule
 - Resource breakdown structure
 - Resource requirements
 - Risk register
- .3 Work performance data
- .4 Agreements
- .5 OPA

Tools & Techniques

- .1 Data analysis
 - Alternatives analysis
 - Cost-benefit analysis
 - Performance reviews
 - Trend analysis
- .2 Problem solving
- .3 Interpersonal and team skills
 - Negotiation
 - Influencing
- .4 PMIS

Outputs

- .1 Work performance information
- .2 Change requests
- .3 Project management plan updates
 - Resource management plan
 - Schedule baseline
 - Cost baseline
- .4 Project documents updates
 - Assumption log
 - Issue log
 - Lessons learned register
 - Physical resource assignments
 - Resource breakdown structure
 - Risk register

9.6 Control Resources Input

01 PROJECT MANAGEMENT PLAN

- Resource management plan

02 PROJECT DOCUMENTS

- Issue log
- Lessons learned register
- Physical resource assignments
- Project schedule
- Resource breakdown structure
- Resource requirements
- Risk register

03 WORK PERFORMANCE DATA

04 AGREEMENTS

05 Organizational process assets



9.6 Control Resources Tools & Techniques

01 DATA ANALYSIS

- **Alternatives analysis**
- **Cost-benefit analysis**
- **Performance reviews.** compare, and analyze planned resource utilization to actual resource utilization.
- **Trend analysis.** examines project performance over time and can be used to determine whether performance is improving or deteriorating.

02 PROBLEM SOLVING

The project manager should use methodical steps to deal with problem solving,

1. **Identify the problem.** Specify the problem.
2. **Define the problem.** Break it into smaller, manageable problems.
3. **Investigate.** Collect data.
4. **Analyze.** Find the root cause of the problem.
5. **Solve.** Choose the suitable solution from a variety of available ones.
6. **Check the solution.** Determine if the problem has been fixed.



9.6 Control Resources **Tools & Techniques**

03 **INTERPERSONAL AND TEAM SKILLS**

sometimes known as “soft skills,” include:

- Negotiation.
- Influencing.

04 **PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)**



9.6 Control Resources Output

- 01 **WORK PERFORMANCE INFORMATION**
- 02 **CHANGE REQUESTS**
- 03 **PROJECT MANAGEMENT PLAN UPDATES**
 - Resource management plan
 - Schedule baseline
 - Cost baseline
- 04 **PROJECT DOCUMENTS UPDATES**
 - Assumption log
 - Issue log
 - Lessons learned register
 - Physical resource assignments
 - Resource breakdown structure
 - Risk register





10. PROJECT COMMUNICATIONS MANAGEMENT



Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer

Project **Communications** Management

What is a Project Communications Management?

Includes the processes necessary to ensure that the information needs of the project and its stakeholders are met through development of artifacts and implementation of activities designed to achieve effective information exchange

Consists of two parts

The first part is developing a strategy to ensure communication is effective for stakeholders.

The second part is carrying out the activities necessary to implement the communication strategy



Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Schedule Management		6.1 Plan Schedule 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule Management		6.6 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	



Key concepts for project communication management



Project managers spend most of their time communicating with team members and other project stakeholders, both internal (at all organizational levels) and external to the organization



Communication is the **exchange of information**, intended or involuntary. The information exchanged can be in the form of ideas, instructions, or emotions.



Information can be sent or received, either through **communication activities**, such as meetings and presentations, or **artifacts**, such as emails, social media, project reports, or project documentation.



Key concepts for project communication management

Mechanisms of exchange Information

- **Written form.** Either physical or electronic.
- **Spoken.** Either face-to-face or remote.
- **Formal or informal** (as in formal papers or social media).
- **Through gestures.** Tone of voice and facial expressions.
- **Through media.** Pictures, actions, or even just the choice of words.





Key concepts for project communication management



Dimensions of communications

- **Internal & External**
- **Formal & Informal**
- **Hierarchical focus**
 - Upward
 - Downward
 - Horizontal
- **Official & Unofficial**
- **Written & Oral.**



10.1 Plan communication management



Is the process of developing an appropriate approach and plan for project communications activities based on the information needs of each stakeholder or group, available organizational assets, and the needs of the project.



The key benefit of this process is a documented approach to effectively and efficiently engage stakeholders by presenting relevant information in a timely manner.



10.1 Plan communication management

Inputs

- .1 Project charter
- .2 Project management plan
 - Resource management plan
 - Stakeholder engagement plan
- .3 Project documents
 - Requirements documentation
 - Stakeholder register
- .4 EEF
- .5 OPA

Inputs Tools & Techniques Outputs

- .1 Expert judgment
- .2 Communication requirements analysis
- .3 Communication technology
- .4 Communication models
- .5 Communication methods
- .6 Interpersonal and team skills
 - Communication styles assessment
 - Political awareness
 - Cultural awareness
- .7 Data representation
 - Stakeholder engagement assessment matrix
- .8 Meetings

Outputs

- .1 Communications management plan
- .2 Project management plan updates
 - Stakeholder engagement plan
- .3 Project documents updates
 - Project schedule
 - Stakeholder register

10.1 Plan communication management



Input:

- 01 Project charter
- 02 Project management plan
 - Resource management plan
 - Stakeholder engagement plan
- 03 Project documents
 - Requirements documentation
 - Stakeholder register
- 04 Enterprise environmental factors
- 05 Organizational process assets



10.1 Plan communication management



Tools & Techniques

01 Expert judgment

02 Communication requirements analysis

Determines the information needs of the project stakeholders.

Define project communication requirements:

- Number of potential communication channels (one-to-one, one-to-many, and many-to-many)
- Organizational charts;
- Stakeholder responsibility, relationships, and interdependencies;
- Development approach;
- Disciplines, departments, and specialties involved in the project;
- Logistics of how many stockholders and their locations;
- Internal and External information
- Legal requirements.



10.1 Plan communication management



Tools & Techniques (2/4)

03 Communication technology

The methods used to transfer information among stakeholders.

Factors affect the choice of communication technology

- Urgency of the need for information.
- Availability and reliability of technology.
- Ease of use.
- Project environment.
- Sensitivity and confidentiality of the information.



10.1 Plan communication management

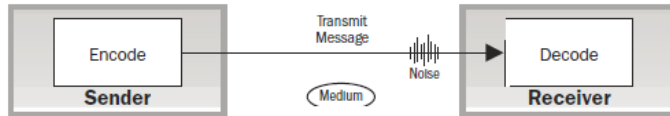


Tools & Techniques (3/4)

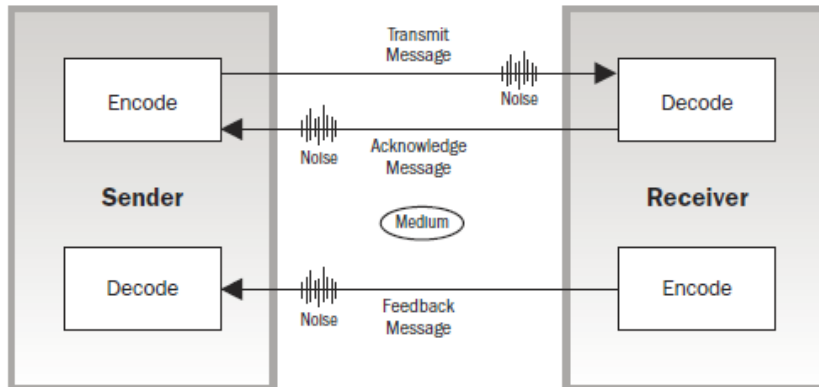
04

Communication models

Sample basic sender/receiver communication model.



Sample interactive communication model



10.1 Plan communication management



Tools & Techniques (4/4)

- 05 **Communication Method**
 - Interactive communication
 - Push communication
 - Pull communication.

- 06 **Interpersonal and team skills**
 - Communication styles assessment
 - Political awareness
 - Cultural awareness

- 07 **Data representation**

- 08 **Meetings**



10.1 Plan communication management



Output:

- 01 **Communications management plan**
- 02 **Project management plan updates**
 - Stakeholder engagement plan
- 03 **Project documents updates**
 - Project schedule
 - Stakeholder register



10.1 Plan communication management

Our Contact	Customer Contact	Frequency	Method	Content
<i>Alice Green (CEO)</i>	<i>Bob Thompson (CEO)</i>	<i>Quarterly</i>	<i>Face-to-face</i>	<i>Review annual spend. Understand business priorities.</i>
<i>Kelly Thompson (VP, Sales)</i>	<i>Jake Tau (CIO)</i>	<i>Quarterly</i>	<i>Phone call</i>	<i>Check point on customer satisfaction.</i>
<i>John Johnson (Service Director)</i>	<i>Frank Reece (Senior Manager Delivery)</i>	<i>Weekly</i>	<i>Email</i>	<i>Progress Report on existing projects</i>
<i>Me (Account Executive)</i>	<i>Hal Bonham (Director, Infrastructure)</i>	<i>Monthly</i>	<i>Face-to-face</i>	<i>Review status of pending opportunities. Communicate industry direction.</i>

10.2 Manage Communications

Inputs

- .1 Project management plan
- Resource management plan
 - Communications management plan
 - Stakeholder engagement plan
- .2 Project documents
 - Change log
 - Issue log
 - Lessons learned register
 - Quality report
 - Risk report
 - Stakeholder register
- .3 Work performance reports
- .4 EEF
- .5 OPA

Tools & Techniques

- .1 Communication technology
- .2 Communication methods
- .3 Communication skills
 - Communication competence
 - Feedback
 - Nonverbal
 - Presentations
- .4 PMIS
- .5 Project reporting
- .6 Interpersonal and team skills
 - Active listening
 - Conflict management
 - Cultural awareness
 - Meeting management
 - Networking
 - Political awareness
- .7 Meetings

Outputs

- .1 Project communications
- .2 Project management plan updates
 - Communications management plan
 - Stakeholder engagement plan
- .3 Project documents updates
 - Issue log
 - Lessons learned register
 - Project schedule
 - Risk register
 - Stakeholder register
- .4 OPA updates

10.2 Manage Communications



Input:

- 01 **Project management plan**
 - Resource management plan
 - Communications management plan
 - Stakeholder engagement plan
- 02 **Project documents**
 - Change log
 - Issue log
 - Lessons learned register
 - Quality report
 - Risk report
 - Stakeholder register
- 03 **Work performance reports**
- 04 **Enterprise environmental factors**
- 05 **Organizational process assets**



10.2 Manage Communications



Tools & Techniques (1/2)

- 01 **Communication technology**
- 02 **Communication methods**
- 03 **Communication skills**
 - Communication competence
 - Feedback
 - Nonverbal
 - Presentations
- 04 **Project management information system**
- 05 **Project reporting**



10.2 Manage Communications



Tools & Techniques (2/2)

06 Interpersonal and team skills

- Active listening
- Conflict management
- Cultural awareness
- Meeting management
- Networking
- Political awareness

07 Meetings



10.2 Manage Communications



Output:

- 01 **Project communications**
- 02 **Project management plan updates**
 - Communications management plan
 - Stakeholder engagement plan
- 03 **Project documents updates**
 - Issue log
 - Lessons learned register
 - Project schedule
 - Risk register
 - Stakeholder register
- 04 **Organizational process assets updates**



10.3 Monitor Communications

Inputs

- .1 Project management plan
 - Resource management plan
 - Communications management plan
 - Stakeholder engagement plan
- .2 Project documents
 - Issue log
 - Lessons learned register
 - Project communications
- .3 Work performance data
- .4 EEF
- .5 OPA

Tools & Techniques

- .1 Expert judgment
- .2 PMIS
- .3 Data analysis
 - Stakeholder engagement assessment matrix
- .4 Interpersonal and team skills
 - Observation/conversation
- .5 Meetings

Outputs

- .1 Work performance information
- .2 Change requests
- .3 Project management plan updates
 - Communications management plan
 - Stakeholder engagement plan
- .4 Project documents updates
 - Issue log
 - Lessons learned register
 - Stakeholder register

Why "Monitor"?!

10.3 Monitor Communications



Input:

- 01 **Project management plan**
 - Resource management plan
 - Communications management plan
 - Stakeholder engagement plan
- 02 **Project documents**
 - Issue log
 - Lessons learned register
 - Project communications
- 03 **Work performance data**
- 04 **Enterprise environmental factors**
- 05 **Organizational process assets**



10.3 Monitor Communications



Tools & Techniques (1/1)

- 01 **Expert judgment**
- 02 **Project management information system**
- 03 **Data analysis**
 - Stakeholder engagement assessment matrix
- 04 **Interpersonal and team skills**
 - Observation/conversation
- 05 **Meetings**



10.3 Monitor Communications



Output:

- 01 **Work performance information**
- 02 **Change requests**
- 03 **Project management plan updates**
 - Communications management plan
 - Stakeholder engagement plan
- 04 **Project documents updates**
 - Issue log
 - Lessons learned register
 - Stakeholder register





11. PROJECT RISK MANAGEMENT



Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer

What is The objectives of project risk management?!

Project Risk Management

Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, response implementation, and monitoring risk on a project.

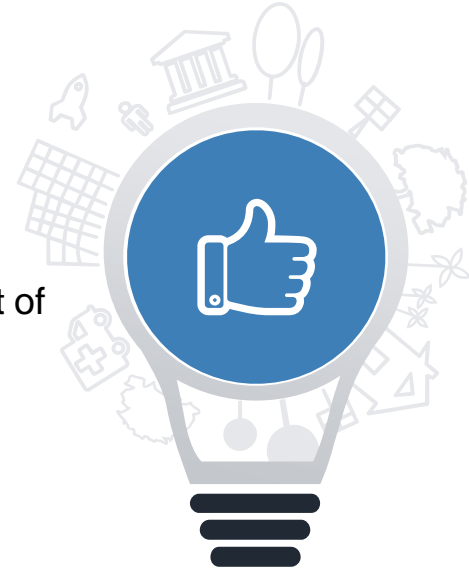
The objectives of project risk management are to increase the probability and/or impact of positive risks and to decrease the probability and/or impact of negative risks, in order to optimize the chances of project success.



Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Schedule Management		6.1 Plan Schedule 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule Management		6.6 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Key concepts for Project Risk Management

- Project Risk Management processes address **two** levels of risk in projects:
 - **Individual project risk**
 - **Overall project risk**
- Project team needs to know what level of risk exposure is acceptable in pursuit of the project objectives. (Risk thresholds).
- Risk thresholds express the degree of acceptable variation around a project objective.



Key concepts for Project Risk Management

Definitions

- **Risk appetite** a general, **high-level** description of the acceptable level of risk.
- **Risk tolerance** the **degree**, **amount**, or **volume** of risk that an organization or individual will accept.
- **Risk threshold** the specific **point** at which risk becomes **unacceptable**



TAILORING CONSIDERATIONS



- **Project size.**
- **Project complexity.**
- **Project importance.**
- **Development approach.**

CONSIDERATIONS FOR AGILE/ADAPTIVE ENVIRONMENTS



- High-variability environments, by definition, incur more uncertainty and risk.
- PM using adaptive approaches to accelerate knowledge sharing and ensure that risk is understood and managed.
- Risk is considered when selecting the content of each iteration, and risks will also be identified, analyzed, and managed during each iteration.
- Work may be reprioritized as the project progresses, based on an improved understanding of current risk exposure.

11.1 Plan Risk Management

Inputs

- .1 Project charter
- .2 Project management plan
 - All components
- .3 Project documents
 - Stakeholder register
- .4 EEF
- .5 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Data analysis
 - Stakeholder analysis
- .3 Meetings

Outputs

- .1 Risk management plan

11.1 Plan Risk Management

Input

- 01 **PROJECT CHARTER**
- 02 **PROJECT MANAGEMENT PLAN**
 - All components
- 03 **PROJECT DOCUMENTS**
 - Stakeholder register
- 04 **ENTERPRISE ENVIRONMENTAL FACTORS**
- 05 **ORGANIZATIONAL PROCESS ASSETS**



11.1 Plan Risk Management Tools & Techniques

01 EXPERT JUDGMENT

02 DATA ANALYSIS
• Stakeholder analysis

03 Meetings



11.1 Plan Risk Management

Output

01 RISK MANAGEMENT PLAN

Describes how risk management activities will be structured and performed.

- Risk strategy.
- Methodology.
- Roles and responsibilities.
- Funding.
- Timing.
- Risk categories.



11.1 Plan Risk Management Output

Risk Breakdown Structure (RBS)

RBS LEVEL 0	RBS LEVEL 1	RBS LEVEL 2
0. ALL SOURCES OF PROJECT RISK	1. TECHNICAL RISK	1.1 Scope definition
		1.2 Requirements definition
		1.3 Estimates, assumptions, and constraints
		1.4 Technical processes
		1.5 Technology
		1.6 Technical interfaces
		Etc.
	2. MANAGEMENT RISK	2.1 Project management
		2.2 Program/portfolio management
		2.3 Operations management
		2.4 Organization
		2.5 Resourcing
		2.6 Communication
		Etc.
	3. COMMERCIAL RISK	3.1 Contractual terms and conditions
		3.2 Internal procurement
		3.3 Suppliers and vendors
		3.4 Subcontracts
		3.5 Client/customer stability
		3.6 Partnerships and joint ventures
		Etc.
	4. EXTERNAL RISK	4.1 Legislation
		4.2 Exchange rates
		4.3 Site/facilities
		4.4 Environmental/weather
		4.5 Competition
		4.6 Regulatory
		Etc.

11.1 Plan Risk Management Output

- **Stakeholder risk appetite.** The risk appetites of key stakeholders on the project are recorded in the risk management plan, as they inform the details of the Plan Risk Management process stakeholder risk appetite should be expressed as measurable risk thresholds
- **Definitions of risk probability and impacts.** used to evaluate both threats and opportunities by interpreting the impact definitions as negative for threats (delay, additional cost, and performance shortfall) and positive for opportunities (reduced time or cost, and performance enhancement).

SCALE	PROBABILITY	+/- IMPACT ON PROJECT OBJECTIVES		
		TIME	COST	QUALITY
Very High	>70%	>6 months	>\$5M	Very significant impact on overall functionality
High	51-70%	3-6 months	\$1M-\$5M	Significant impact on overall functionality
Medium	31-50%	1-3 months	\$501K-\$1M	Some impact in key functional areas
Low	11-30%	1-4 weeks	\$100K-\$500K	Minor impact on overall functionality
Very Low	1-10%	1 week	<\$100K	Minor impact on secondary functions
Nil	<1%	No change	No change	No change in functionality

11.1 Plan Risk Management Output

- **Reporting formats.** Reporting formats define how the outcomes of the Project Risk Management process will be documented, analyzed, and communicated.
- **Tracking.** Tracking documents how risk activities will be recorded and how risk management processes will be audited.



11.2 Identify Risks

Inputs

- .1 Project management plan
 - Requirements management plan
 - Schedule management plan
 - Cost management plan
 - Quality management plan
 - Resource management plan
 - Risk management plan
 - Scope baseline
 - Schedule baseline
 - Cost baseline
- .2 Project documents
 - Assumption log
 - Cost estimates
 - Duration estimates
 - Issue log
 - Lessons learned register
 - Requirements documentation
 - Resource requirements
 - Stakeholder register
- .3 Agreements
- .4 Procurement documentation
- .5 EEF
- .6 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Data gathering
 - Brainstorming
 - Checklists
 - Interviews
- .3 Data analysis
 - Root cause analysis
 - Assumption and constraint analysis
 - SWOT analysis
 - Document analysis
- .4 Interpersonal and team skills
 - Facilitation
- .5 Prompt lists
- .6 Meetings

Outputs

- . 1 Risk register
- .2 Risk report
- .3 Project documents updates
 - Assumption log
 - Issue log
 - Lessons learned register

11.2 Identify Risks Input

01

PROJECT MANAGEMENT PLAN

- Requirements management plan
- Schedule management plan
- Cost management plan
- Quality management plan
- Resource management plan
- Risk management plan
- Scope baseline
- Schedule baseline
- Cost baseline

02

PROJECT DOCUMENTS

- Assumption log
- Cost estimates
- Duration estimates
- Issue log
- Lessons learned register
- Requirements documentation
- Resource requirements
- Stakeholder register

03

AGREEMENTS

04

PROCUREMENT DOCUMENTATION

05

ENTERPRISE ENVIRONMENTAL FACTORS

06

ORGANIZATIONAL PROCESS ASSETS



11.2 Identify Risks Tools & Techniques

01

EXPERT JUDGMENT

02

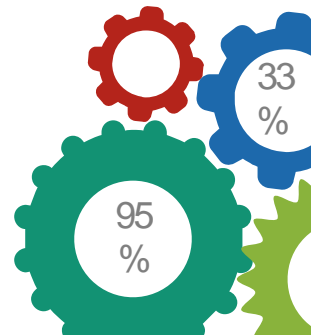
DATA GATHERING

- **Brainstorming.** to obtain a comprehensive list of individual project risks and sources of overall project risk.
- **Checklists.** developed based on historical information and knowledge that has been accumulated from similar projects and from other sources of information.
- **Interviews.** interviewing experienced participants, stakeholders, and subject matter experts to identify risks

03

DATA ANALYSIS

- **Root cause analysis.** to discover the underlying causes that lead to a problem, and develop preventive action.
- **Assumption and constraint analysis.** To explores the validity of assumptions and constraints to determine which pose a risk to the project
- **SWOT analysis.** examines the project from each of the strengths, weaknesses, opportunities, and threats (SWOT) perspectives.
- **Document analysis.**



11.2 Identify Risks

Tools & Techniques

04

INTERPERSONAL AND TEAM SKILLS

05

PROMPT LISTS

A prompt list is a predetermined list of risk categories that might give rise to individual project risks and that could also act as sources of overall project risk.

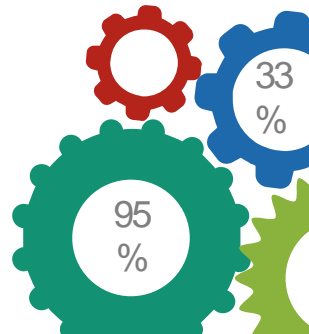
common strategic frameworks for identifying sources of overall project risk

- PESTLE (political, economic, social, technological, legal, environmental),
- TECOP (technical, environmental, commercial, operational, political), or
- VUCA (volatility, uncertainty, complexity, ambiguity).

06

MEETINGS

(often called a risk workshop).



Strengths

list your:

- + advantages
- + unique and low-cost resources
- + factors mean that you "get the sale"

Weakness

list your:

- + disadvantages, limitations
- + what could you improve
- + factors lose you sales

Internal

SWOT

Opportunities

list your:

- + chances to improve performance
- + good opportunities can you spot

Threats

list your:

- + external trouble for the business
- + obstacles do you face
- + what your competitors are doing

External

01 **RISK REGISTER**

The risk register captures details of identified individual project risks. include :

- List of identified risks.
- Potential risk owners.
- List of potential risk responses.

02 **RISK REPORT**

03 **PROJECT DOCUMENTS UPDATES**

- Assumption log.
- Issue log..
- Lessons learned register



Risk Register

Risk ID	Risk	Responses	Root Cause	Categories
R001	Threat of Being Hacked	Firewall; Intrusion Detection SW	Poorly designed security; Outdated tech	Security

Fragment of Risk Register

11.3 Perform Qualitative Risk Analysis

Inputs

- .1 Project management plan
 - Risk management plan
- .2 Project documents
 - Assumption log
 - Risk register
 - Stakeholder register
- .3 EEF
- .4 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Data gathering
 - Interviews
- .3 Data analysis
 - Risk data quality assessment
 - Risk probability and impact assessment
 - Assessment of other risk parameters
- .4 Interpersonal and team skills
 - Facilitation
- .5 Risk categorization
- .6 Data representation
 - Probability and impact matrix
 - Hierarchical charts
- .7 Meetings

Outputs

- .1 Project documents updates
 - Assumption log
 - Issue log
 - Risk register
 - Risk report

11.3 Perform Qualitative Risk Analysis Input

- 01 **PROJECT MANAGEMENT PLAN**
 - Risk management plan
- 02 **PROJECT DOCUMENTS**
 - Assumption log
 - Risk register
 - Stakeholder register
- 03 **ENTERPRISE ENVIRONMENTAL FACTORS**
- 04 **ORGANIZATIONAL PROCESS ASSETS**



11.3 Perform Qualitative Risk Analysis Tools & Techniques

01 EXPERT JUDGMENT

02 DATA GATHERING

03 DATA ANALYSIS

Risk data quality assessment: evaluates the degree to which the data about individual project risks is accurate and reliable as a basis for qualitative risk analysis.

Risk probability and impact assessment: considers the likelihood that a specific risk will occur. Considers the potential effect project objectives (schedule, cost, quality, or performance). Impacts will be negative for threats and positive for opportunities.



11.3 Perform Qualitative Risk Analysis Tools & Techniques

Assessment of other risk parameters.

Consider other characteristics of risk, like:

- **Urgency.** The period of time within which a response to the risk is to be implemented in order to be effective. (A short period indicates high urgency.)
- **Proximity.** The period of time before the risk might have an impact on one or more project **objectives**. (A short period indicates high proximity.)
- **Dormancy.** The period of time that may elapse after a risk has occurred before its impact is **discovered**. (A short period indicates low dormancy.)
- **Manageability.** The ease with which the risk owner can manage the occurrence or impact of risk.
- **Detectability.** The ease with which the results of the risk occurring, or being about to occur, can be detected and recognized.
- **Controllability.** The degree to which the risk owner is able to control the risk's outcome.
- **Connectivity.** The extent to which the risk is related to other individual project risks.
- **Strategic impact.** The potential for the risk to have a positive or negative effect on the organization's strategic goals
- **Propinquity.** The degree to which a risk is perceived to matter by one or more stakeholders. Where a risk is perceived as very significant, propinquity is high.

04 INTERPERSONAL AND TEAM SKILLS



11.3 Perform Qualitative Risk Analysis Tools & Techniques

05 RISK CATEGORIZATION

Risks to the project can be categorized by sources of risk (RBS); or other useful categories (e.g., project phase, project budget, and roles and responsibilities)

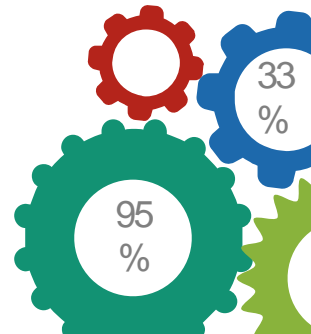
06 DATA REPRESENTATION

- ✓ **Probability and impact matrix.**
- ✓ **Hierarchical Charts**

Where risks have been categorized using more than two parameters.

Ex: Bubble chart which displays three dimensions of data, where each risk is plotted (bubble), and the three parameters are represented by the x-axis value, the y-axis value, and the bubble size.

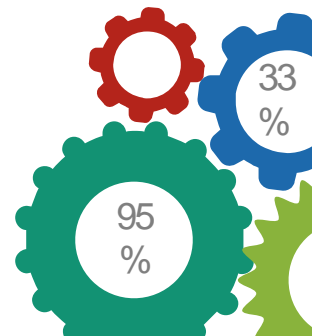
07 MEETINGS



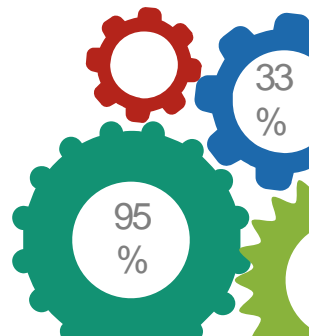
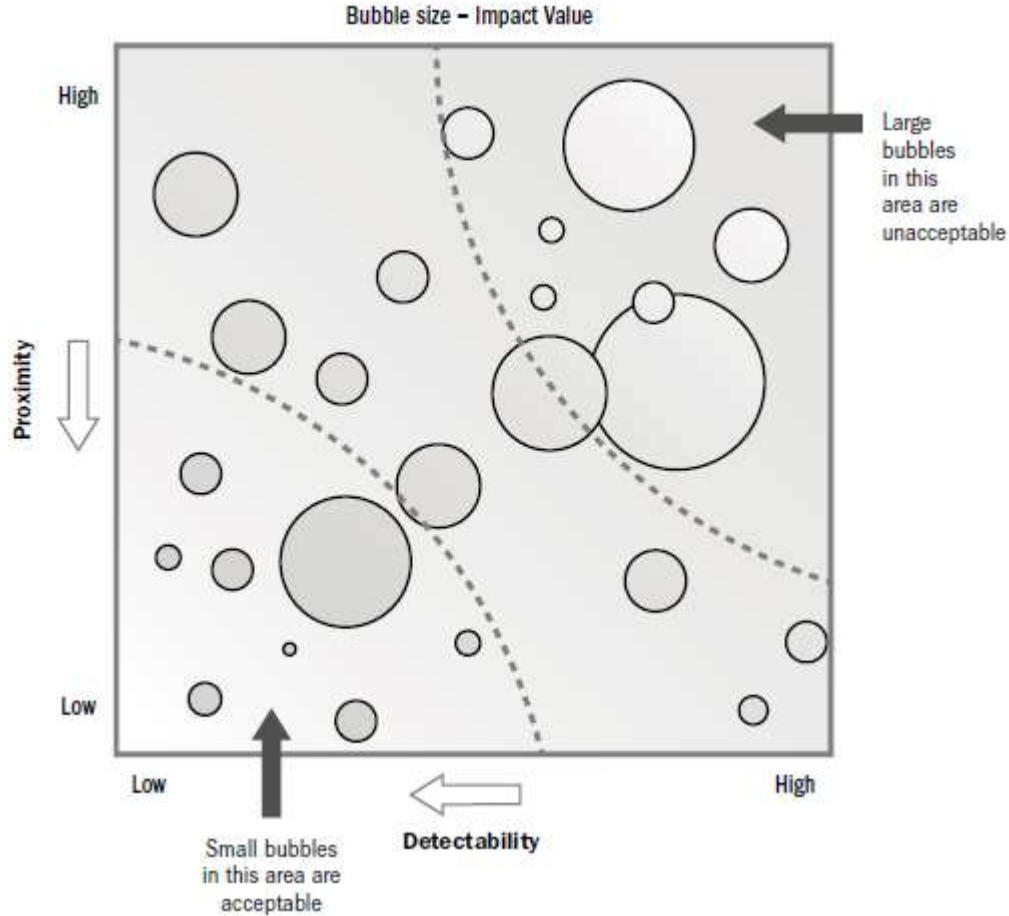
11.3 Perform Qualitative Risk Analysis Tools & Techniques

		Impact				
		Trivial	Minor	Moderate	Major	Extreme
Probability	Rare	Low	Low	Low	Medium	Medium
	Unlikely	Low	Low	Medium	Medium	Medium
	Moderate	Low	Medium	Medium	Medium	High
	Likely	Medium	Medium	Medium	High	High
	Very likely	Medium	Medium	High	High	High

Probability and impact matrix



11.3 Perform Qualitative Risk Analysis Tools & Techniques



11.3 Perform Qualitative Risk Analysis Output

01 PROJECT DOCUMENTS UPDATES

- Assumption log
- Issue log
- Risk register
- Risk report



11.4 Perform Quantitative Risk Analysis

Inputs

- .1 Project management plan
 - Risk management plan
 - Scope baseline
 - Schedule baseline
 - Cost baseline
- .2 Project documents
 - Assumption log
 - Basis of estimates
 - Cost estimates
 - Cost forecasts
 - Duration estimates
 - Milestone list
 - Resource requirements
 - Risk register
 - Risk report
 - Schedule forecasts
- .3 EEF
- .4 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Data gathering
 - Interviews
- .3 Interpersonal and team skills
 - Facilitation
- .4 Representations of uncertainty
- .5 Data analysis
 - Simulations
 - Sensitivity analysis
 - Decision tree analysis
 - Influence diagrams

Outputs

- .1 Project documents updates
 - Risk report

11.4 Perform Quantitative Risk Analysis Input

01 PROJECT MANAGEMENT PLAN

- Risk management plan
- Scope baseline
- Schedule baseline
- Cost baseline

02 PROJECT DOCUMENTS

- Assumption log
- Basis of estimates
- Cost estimates
- Cost forecasts
- Duration estimates
- Milestone list
- Resource requirements
- Risk register
- Risk report
- Schedule forecasts

03 ENTERPRISE ENVIRONMENTAL FACTORS

04 ORGANIZATIONAL PROCESS ASSETS



11.4 Perform Quantitative Risk Analysis Tools & Techniques

01 EXPERT JUDGMENT

02 DATA GATHERING

03 INTERPERSONAL AND TEAM SKILLS

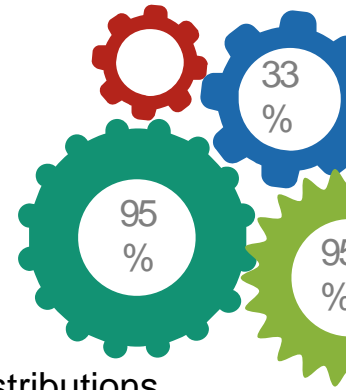
04 REPRESENTATIONS OF UNCERTAINTY

This may take several forms. triangular, normal, lognormal, beta, uniform, or discrete distributions. Care should be taken when selecting an appropriate probability distribution to reflect the range of possible values for the planned activity.

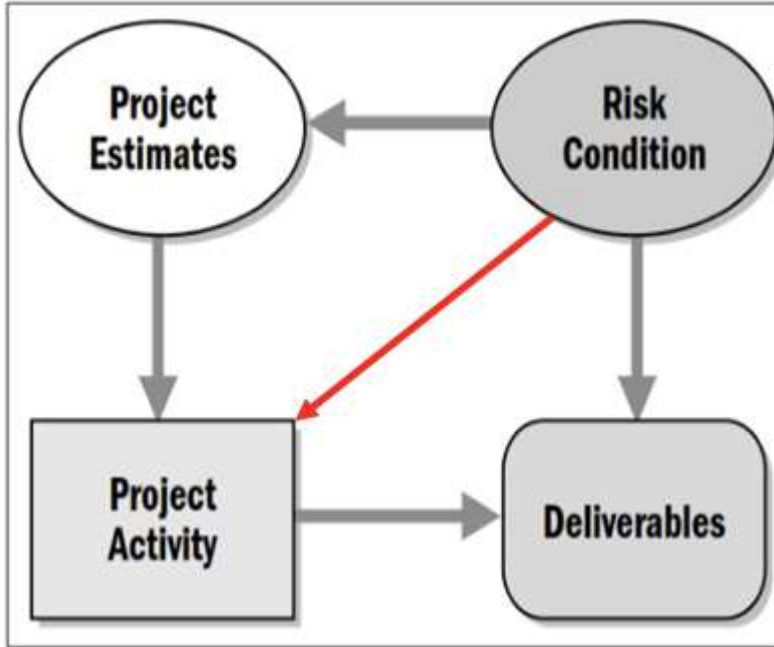
05 DATA ANALYSIS

Influence diagrams. represents a **project or situation** within the project as a set of entities, outcomes, and influences, together with the relationships and effects between them.

Simulation. Simulates the combined effects of individual project risks and other sources of uncertainty to evaluate their potential impact on achieving project objectives performed using a **Monte Carlo analysis**.



11.4 Perform Quantitative Risk Analysis Tools & Techniques



Influence Diagrams

Represents a **project or situation** within the project as a set of entities, outcomes, and influences, together with the relationships and effects between them.

11.4 Perform Quantitative Risk Analysis Tools & Techniques

Monte Carlo analysis

When running a Monte Carlo analysis for cost risk, the simulation uses the project cost estimates.

When running a Monte Carlo analysis for schedule risk, the schedule network diagram and duration estimates are used.

Computer software is used to iterate the quantitative risk analysis model. The input values (e.g., cost estimates, duration estimates, or occurrence of probabilistic branches)

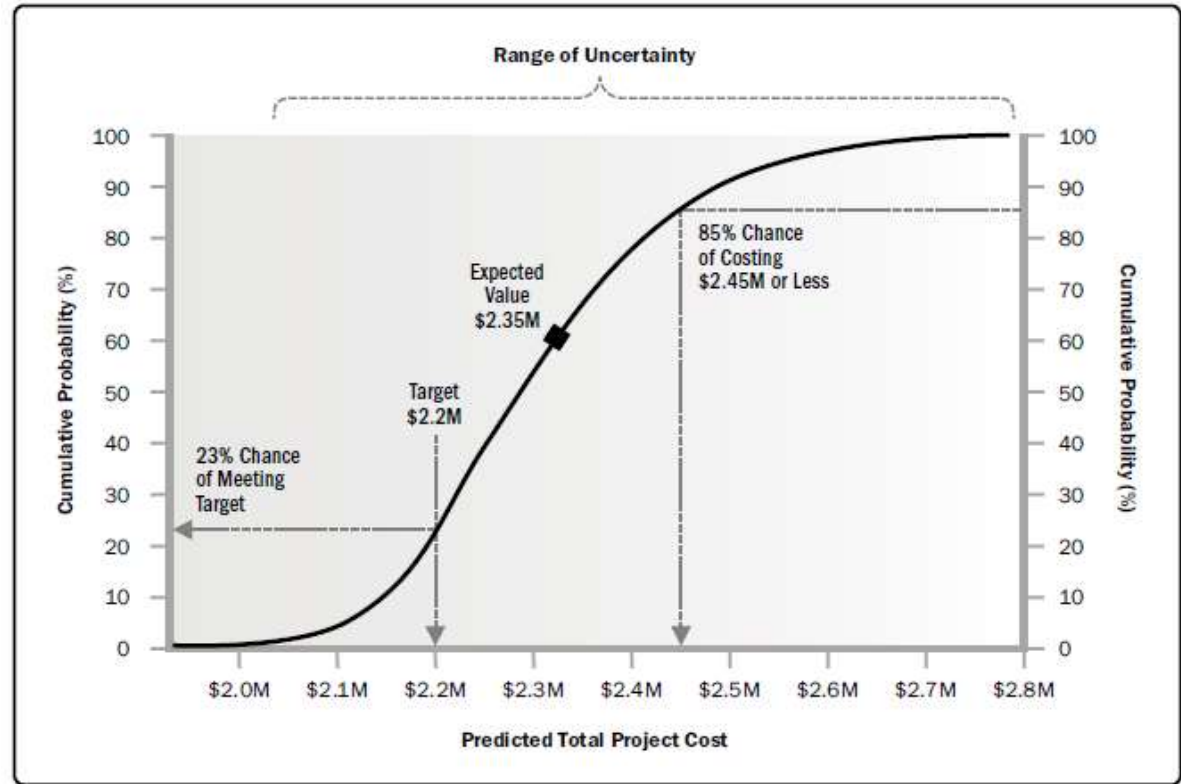
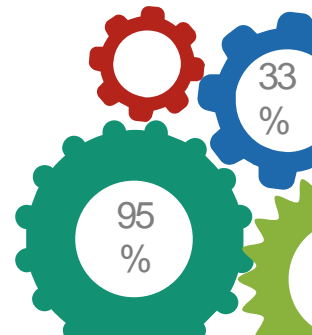
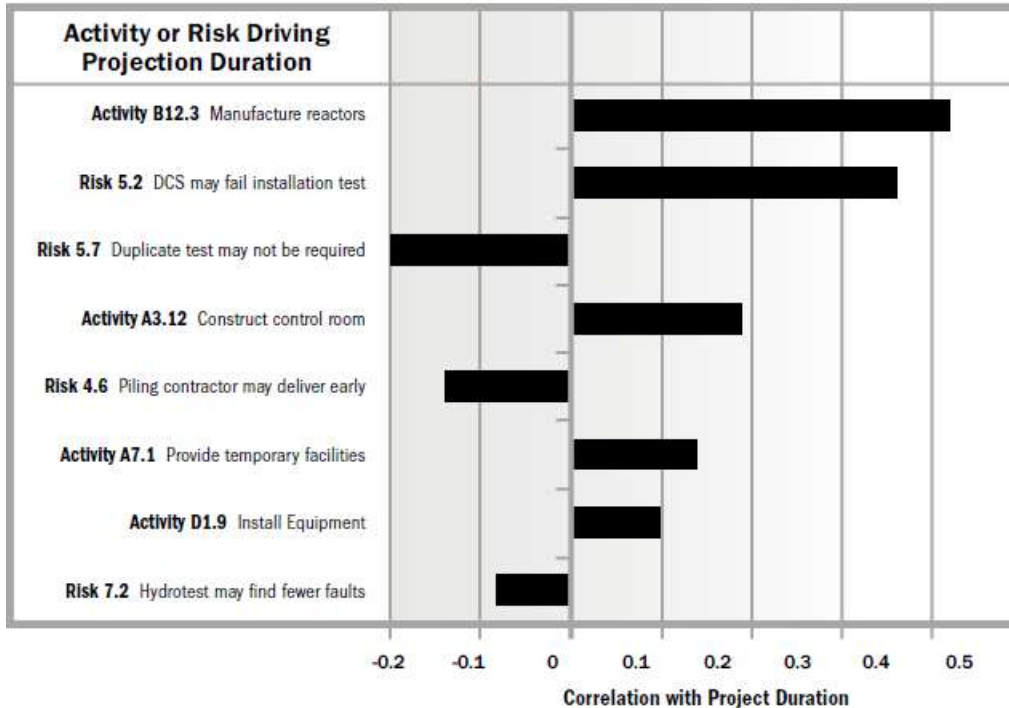


Figure 11-13. Example S-Curve from Quantitative Cost Risk Analysis

11.4 Perform Quantitative Risk Analysis Tools & Techniques

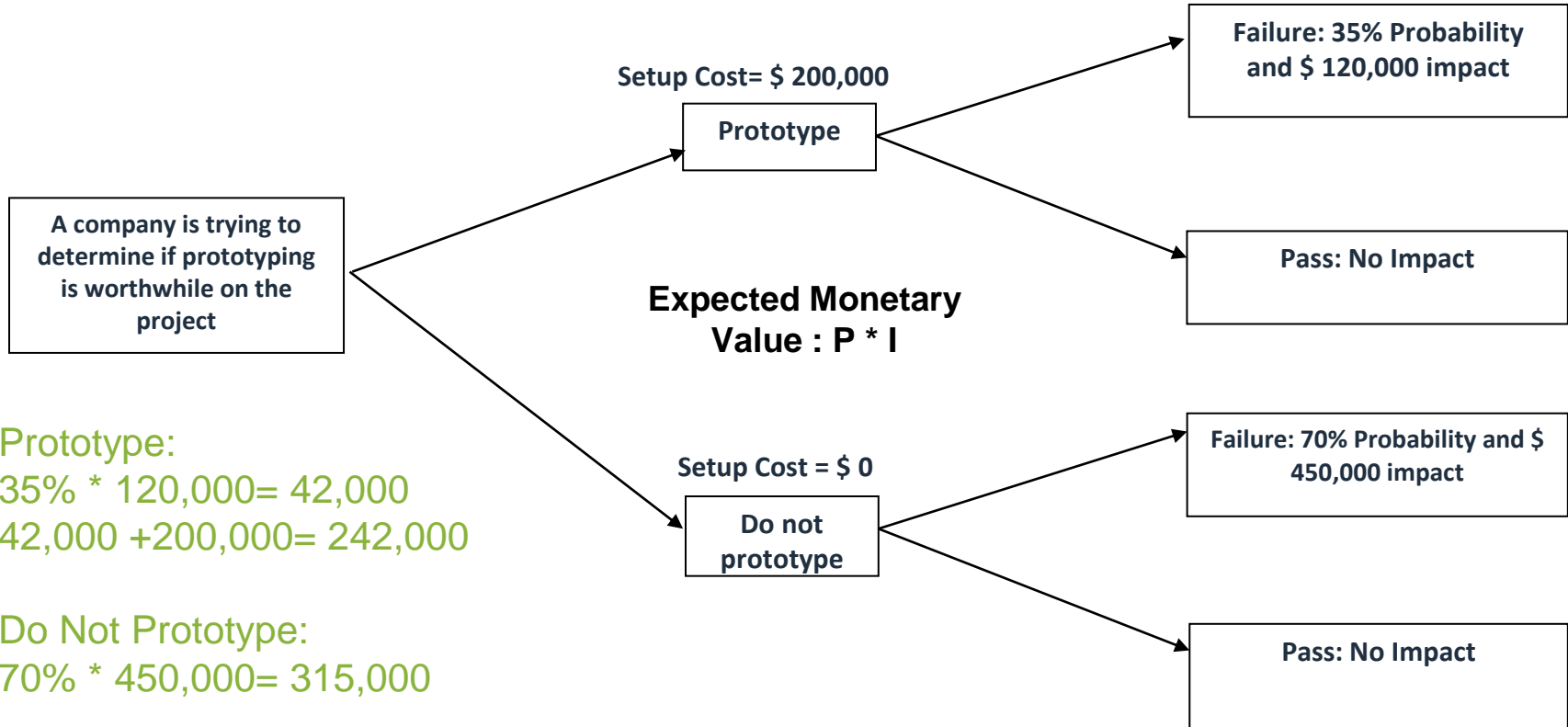
Sensitivity analysis. Helps to determine which individual project risks or other sources of uncertainty have the most potential impact on project outcomes.

TORNADO DIAGRAM



11.4 Perform Quantitative Risk Analysis Tools & Techniques

Decision tree analysis. used to support selection of the best of several alternative courses of action.



01 PROJECT DOCUMENTS UPDATES

- **Assessment of overall project risk exposure**
 - Chances of project success.
 - Degree of inherent variability remaining within the project at the time the analysis was conducted.
- **Detailed probabilistic analysis of the project.**
 - Amount of contingency reserve needed to provide a specified level of confidence;
 - Identification of individual project risks or other sources of uncertainty that have the greatest effect on the project critical path.
 - Major drivers of overall project risk, with the greatest influence on uncertainty in project outcomes.
- **Prioritized list of individual project risks.**
- **Trends in quantitative risk analysis results.**
- **Recommended risk responses.**



11.5 Plan Risk Responses

Inputs

- .1 Project management plan
 - Resource management plan
 - Risk management plan
 - Cost baseline
- .2 Project documents
 - Lessons learned register
 - Project schedule
 - Project team assignments
 - Resource calendars
 - Risk register
 - Risk report
 - Stakeholder register
- .3 EEF
- .4 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Data gathering
 - Interviews
- .3 Interpersonal and team skills
 - Facilitation
- .4 Strategies for threats
- .5 Strategies for opportunities
- .6 Contingent response strategies
- .7 Strategies for overall project risk
- .8 Data analysis
 - Alternatives analysis
 - Cost-benefit analysis
- .9 Decision making
 - Multicriteria decision analysis

Outputs

- .1 Change requests
- .2 Project management plan updates
 - Schedule management plan
 - Cost management plan
 - Quality management plan
 - Resource management plan
 - Procurement management plan
 - Scope baseline
 - Schedule baseline
 - Cost baseline
- .3 Project documents updates
 - Assumption log
 - Cost forecasts
 - Lessons learned register
 - Project schedule
 - Project team assignments
 - Risk register
 - Risk report

11.5 Plan Risk Responses Input

01 PROJECT MANAGEMENT PLAN

- Resource management plan
- Risk management plan
- Cost baseline

02 PROJECT DOCUMENTS

- Lessons learned register
- Project schedule
- Project team assignments
- Resource calendars
- Risk register
- Risk report
- Stakeholder register

03 ENTERPRISE ENVIRONMENTAL FACTORS

04 ORGANIZATIONAL PROCESS ASSETS



01 EXPERT JUDGMENT

02 DATA GATHERING

03 INTERPERSONAL AND TEAM SKILLS

04 STRATEGIES FOR THREATS

1. **Escalate.** appropriate when a threat is **outside** the scope of the project. PM determines who should be notified about the threat and communicates the details to it.
2. **Avoid.** when the project team acts to eliminate the threat or protect the project from its impact. appropriate for high-priority threats with a high probability of occurrence and a large negative impact.
3. **Transfer.** shifting ownership of a threat to a third party to manage the risk
4. **Mitigate.** action is taken to reduce the probability of occurrence and/or impact of a threat.
5. **Accept.** acknowledges the existence of a threat, but no proactive action is taken, appropriate for low-priority threats.

05 STRATEGIES FOR OPPORTUNITIES

1. **Escalate.**
2. **Exploit.** The exploit strategy may be selected for high-priority opportunities where the organization wants to ensure that the opportunity is realized. by ensuring that it definitely happens, increasing the probability of occurrence to 100%
3. **Share.** Sharing involves transferring ownership of an opportunity to a third party so that it shares some of the benefit if the opportunity occurs.
4. **Enhance.** used to increase the probability and/or impact of an opportunity.
5. **Accept.** Accepting an opportunity acknowledges its existence but no proactive action is taken. This strategy may be appropriate for low-priority opportunities.

06 CONTINGENT RESPONSE STRATEGIES

It is appropriate for the project team to make a response plan that will only be executed under certain predefined conditions.



07

STRATEGIES FOR OVERALL PROJECT RISK

1. Avoid
2. Exploit.
3. Transfer/share.
4. Mitigate/enhance.
5. Accept

08

DATA ANALYSIS

- Alternatives analysis
- Cost-benefit analysis.

09

DECISION MAKING

01 CHANGE REQUESTS

02 PROJECT MANAGEMENT PLAN UPDATES

- Schedule management plan
- Cost management plan
- Quality management plan
- Resource management plan
- Procurement management plan
- Scope baseline
- Schedule baseline
- Cost baseline

03 PROJECT DOCUMENTS UPDATES

- Assumption log
- Cost forecasts
- Lessons learned register
- Project schedule
- Project team assignments
- Risk register
- Risk report



11.6 Implement Risk Responses

Inputs

- .1 Project management plan
 - Risk management plan
- .2 Project documents
 - Lessons learned register
 - Risk register
 - Risk report
- .3 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Interpersonal and team skills
 - Influencing
- .3 PMIS

Outputs

- .1 Change requests
- .2 Project documents updates
 - Issue log
 - Lessons learned register
 - Project team assignments
 - Risk register
 - Risk report

11.6 Implement Risk Responses

Input

- 01 **PROJECT MANAGEMENT PLAN**
 - Risk management plan

- 02 **PROJECT DOCUMENTS**
 - Lessons learned register
 - Risk register
 - Risk report

- 03 **ORGANIZATIONAL PROCESS ASSETS**



- 01 **EXPERT JUDGMENT**
- 02 **INTERPERSONAL AND TEAM SKILLS**
 - Influencing
- 03 **PROJECT MANAGEMENT INFORMATION SYSTEM**



01 CHANGE REQUESTS

02 PROJECT DOCUMENTS UPDATES

- Issue log
- Lessons learned register
- Project team assignments
- Risk register
- Risk report



11.7 Monitor Risks

Inputs

- .1 Project management plan
 - Risk management plan
- .2 Project documents
 - Issue log
 - Lessons learned register
 - Risk register
 - Risk report
- .3 Work performance data
- .4 Work performance reports

Tools & Techniques

- .1 Data analysis
 - Technical performance analysis
 - Reserve analysis
- .2 Audits
- .3 Meetings

Outputs

- . 1 Work performance information
- .2 Change requests
- .3 Project management plan updates
 - Any component
- .4 Project documents updates
 - Assumption log
 - Issue log
 - Lessons learned register
 - Risk register
 - Risk report
- .5 OPA updates

11.7 Monitor Risks Input

- 01 **PROJECT MANAGEMENT PLAN**
 - Risk management plan

- 02 **PROJECT DOCUMENTS**
 - Issue log
 - Lessons learned register
 - Risk register
 - Risk report

- 03 **WORK PERFORMANCE DATA**

- 04 **WORK PERFORMANCE REPORTS**





01

DATA ANALYSIS

- **Technical performance analysis.** compares technical accomplishments during project execution to the schedule of technical achievement.
- **Reserve analysis.** compares the amount of the contingency reserves remaining to the amount of risk remaining to determine if the remaining reserve is adequate

02

AUDITS

03

MEETINGS



- 01 **WORK PERFORMANCE INFORMATION**
Change requests

- 02 **PROJECT MANAGEMENT PLAN UPDATES**
 - Any component

- 03 **PROJECT DOCUMENTS UPDATES**
 - Assumption log
 - Issue log
 - Lessons learned register
 - Risk register
 - Risk report

- 04 **ORGANIZATIONAL PROCESS ASSETS UPDATES**





12. PROJECT PROCUREMENT MANAGEMENT



Presented by:

Nasser Al Mohimeed

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer

PROJECT PROCUREMENT MANAGEMENT

Project Procurement Management includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team



Project Procurement . Includes the management and control processes required to develop and administer agreements such as contracts, purchase orders, memoranda of agreements (MOAs), or internal service level agreements (SLAs).

Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Schedule Management		6.1 Plan Schedule 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule Management		6.6 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Logistics and supply chain management.

- **Long-lead items** may be procured in advance of other procurement contracts to meet the planned project completion date.
- It is possible to begin contracting for these **long-lead materials, supplies, or equipment** **before the final design** of the end product itself is completed based on **the known requirements** identified in the top-level design.

Technology and stakeholder relations.

- Use of technology including webcams to improve **stakeholder communications** and relations.
- The **progress** on the project can be viewed on the Internet by all stakeholders.
- Video data can also be stored, allowing analysis if a claim arises.

Trial engagements.

- Some projects will engage several **candidate sellers** for initial deliverables and work products on a paid basis before making the full commitment to a larger portion of the project scope.
- This **accelerates momentum** by allowing the buyer to **evaluate** potential partners, while simultaneously making progress on project work.

Key concepts for Project Procurement Management

TAILORING CONSIDERATIONS

- **Complexity of procurement.**
- **Physical location**
- **Governance and regulatory environment.**
- **Availability of contractors**



Contracts Type

Firm Fixed Price Contracts

Firm Fixed Price (FFP)

Fixed Price Incentive Fee (FPIF)

Fixed Price Economic Price Adjustment (FPEPA)

Cost Reimbursable Contracts (CR)

Cost Plus Fixed Fee (CPFF)

Cost Plus Incentive Fee Contracts (CPIF)

Cost Plus Award Fee Contracts (CAF)

Time and Material Contracts (T&M)

Marge of above two contracts types.

12.1 Plan Procurement Management

Input

- .1 Project charter
- .2 Business documents
 - Business case
 - Benefits management plan
- .3 Project management plan
 - Scope management plan
 - Quality management plan
 - Resource management plan
 - Scope baseline
- .4 Project documents
 - Milestone list
 - Project team assignments
 - Requirements documentation
 - Requirements traceability matrix
 - Resource requirements
 - Risk register
 - Stakeholder register
- .5 EEF
- .6 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Data gathering
 - Market research
- .3 Data analysis
 - Make-or-buy analysis
- .4 Source selection analysis
- .5 Meetings

Outputs

- .1 Procurement management plan
- .2 Procurement strategy
- .3 Bid documents
- .4 Procurement statement of work
- .5 Source selection criteria
- .6 Make-or-buy decisions
- .7 Independent cost estimates
- .8 Change requests**
- .9 Project documents updates
 - Lessons learned register
 - Milestone list
 - Requirement documentation
 - Requirements traceability matrix
 - Risk register
 - Stakeholder register
- .10 OPA updates



12.1 Plan Procurement Management

Typical steps might be:

1. Prepare the procurement statement of work (SOW) or terms of reference (TOR).
2. Prepare a high-level cost estimate to determine the budget.
3. Advertise.
4. Identify a short list of qualified sellers.
5. Prepare and issue bid documents.
6. Prepare and submit proposals by the seller.
7. Conduct a technical evaluation of the proposals including quality.
8. Perform a cost evaluation of the proposals.
9. Prepare the final combined quality and cost evaluation to select the winning proposal.
10. Finalize negotiations and sign contract between the buyer and the seller.



12.1 Plan Procurement Management Input

01 PROJECT CHARTER

02 BUSINESS DOCUMENTS

- Business case
- Benefits management plan

03 PROJECT MANAGEMENT PLAN

- Scope management plan
- Quality management plan
- Resource management plan
- Scope baseline.

04 PROJECT MANAGEMENT PLAN.

- Milestone list.
- Project team assignments.
- Requirements documentation.
- Requirements traceability matrix.
- Resource requirements.
- Risk register.
- Stakeholder register.

05 ENTERPRISE ENVIRONMENTAL FACTORS

06 ORGANIZATIONAL PROCESS ASSETS



6.1 Plan Procurement Management Tools & Techniques

01 EXPERT JUDGMENT

02 DATA GATHERING

Market research includes examination of industry and specific seller capabilities.

03 DATA ANALYSIS

Make-or-buy analysis

04 SOURCE SELECTION ANALYSIS

- **Least cost.**
- **Qualifications only.**
- **Quality-based/highest technical proposal score.**
- **Quality and cost-based.**
- **Sole source.**
- **Fixed budget.**

05 Meeting

12.1 Plan Procurement Management Output

01 PROCUREMENT MANAGEMENT PLAN

02 PROCUREMENT STRATEGY

The objective of the procurement strategy is to determine:

1. **Delivery methods.**
2. **Contract payment types.**
3. **Procurement phases.**

03 BID DOCUMENTS

Bidding document can include:

- **Request for information (RFI):** is used when more information on the goods and services to be acquired, needed from the sellers.
- **Request for quotation (RFQ) :** used when more information is needed on *how vendors would satisfy the requirements and/or how much it will cost.*
- **Request for proposal (RFP).** is used when *there is a problem in the project and the solution is not easy to determine.*



12.1 Plan Procurement Management Output

04 PROCUREMENT STATEMENT OF WORK (SOW)

- The SOW describes the procurement item in sufficient detail (specifications, quantity desired, quality levels, performance data, period of performance, work location, and other requirements).
- The procurement SOW should be clear, complete, and concise.
- Terms of reference (TOR) is sometimes used when contracting for services.
- SOW, a TOR typically includes these elements:
 - **Tasks the contractor** is required to perform as well as specified coordination requirements;
 - **Standards the contractor** will fulfill that are applicable to the project;
 - **Data that needs** to be submitted for approval;
 - **Detailed list** of all data and services that will be provided to the contractor by the buyer
 - **Definition** of the schedule for initial submission and the review/approval time required.

05 SOURCE SELECTION CRITERIA



12.1 Plan Procurement Management

Output

- 06 **MAKE-OR-BUY DECISIONS**
- 07 **INDEPENDENT COST ESTIMATES**
- 08 **CHANGE REQUESTS**
- 09 **PROJECT DOCUMENTS UPDATES.**
 - Lessons learned register.
 - Milestone list.
 - Requirements documentation.
- 10 **ORGANIZATIONAL PROCESS ASSETS UPDATES**

- Requirements traceability matrix.
- Risk register.
- Stakeholder register.

12.1 Plan Procurement Management

Table 12-1. Comparison of Procurement Documentation

Procurement Management Plan	Procurement Strategy	Statement of Work	Bid Documents
<p>How procurement work will be coordinated and integrated with other project work, particularly with resources, schedule, and budget</p> <p>Timetable for key procurement activities</p> <p>Procurement metrics to manage the contract</p> <p>Responsibilities of all stakeholders</p> <p>Procurement assumptions and constraints</p> <p>Legal jurisdiction and currency used for payment</p> <p>Information on independent estimates</p> <p>Risk management issues</p> <p>Prequalified sellers, if applicable</p>	<p>Procurement delivery methods</p> <p>Type of agreements</p> <p>Procurement phases</p>	<p>Description of the procurement item</p> <p>Specifications, quality requirements and performance metrics</p> <p>Description of collateral services required</p> <p>Acceptance methods and criteria</p> <p>Performance data and other reports required</p> <p>Quality</p> <p>Period and place of performance</p> <p>Currency; payment schedule</p> <p>Warranty</p>	<p>Request for information (RFI), Request for quote (RFQ), Request for proposal (RFP)</p>

12.2 Conduct Procurement Management

Input

- .1 Project management plan
 - Scope management plan
 - Requirements management plan
 - Communications management plan
 - Risk management plan
 - Procurement management plan
 - Configuration management plan
 - Cost baseline
- .2 Project documents
 - Lessons learned register
 - Project schedule
 - Requirements documentation
 - Risk register
 - Stakeholder register
- .3 Procurement documentation
- .4 Seller proposals
- .5 EEF
- .6 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Advertising
- .3 Bidder conferences
- .4 Data analysis
 - Proposal evaluation
- .5 Interpersonal and team skills
 - Negotiation

Outputs

- .1 Selected sellers
- .2 Agreements
- .3 Change requests
- .4 Project management plan updates
 - Requirements management plan
 - Quality management plan
 - Communications management plan
 - Risk management plan
 - Procurement management plan
 - Scope baseline
 - Schedule baseline
 - Cost baseline
- .5 Project documents updates
 - Lessons learned register
 - Requirements documentation
 - Requirements traceability matrix
 - Resource calendars
 - Risk register
 - Stakeholder register
- .6 OPA updates

12.2 Conduct Procurement Management Input - 1

01

PROJECT MANAGEMENT PLAN

- Scope management plan
- Requirements management plan
- Communications management plan
- Risk management plan
- Procurement management plan
- Configuration management plan
- Cost baseline

02

PROJECT DOCUMENTS

- Lessons learned register.
- Project schedule.
- Requirements documentation.
- Risk register.
- Stakeholder register.





12.2 Conduct Procurement Management Input

03 PROCUREMENT DOCUMENTATION

- Bid documents.
- Procurement statement of work.
- Independent cost estimates.
- Source selection criteria.

04 SELLER PROPOSALS

- If the seller is going to submit a [price proposal](#), good practice is to require that it be [separate](#) from the technical proposal.
- The evaluation body reviews each submitted proposal according to the source selection criteria and selects the seller that can best satisfy the buying organization's requirements.

05 ENTERPRISE ENVIRONMENTAL FACTORS(EEF).

06 ORGANIZATIONAL PROCESS ASSETS (OPA).

12.2 Conduct Procurement Management Tools & Techniques

01

EXPERT JUDGMENT

02

ADVERTISING

- Advertising is communicating with potential users of a product, service, or result.
- Existing lists of potential sellers often can be expanded by placing advertisements in general circulation publications such as selected newspapers or in specialty trade publications.
- Most government jurisdictions require public advertising or online posting of pending government contracts.

03

BIDDER CONFERENCES

- (also called contractor conferences, vendor conferences, and pre-bid conferences) are meetings between the buyer and prospective sellers prior to proposal submittal.
- They are used to ensure that all prospective bidders have a clear and common understanding of the procurement and no bidders receive preferential treatment.



12.2 Conduct Procurement Management Tools & Techniques

04

DATA ANALYSIS

- **Proposal evaluation.** to ensure they are **complete and respond** in full to the bid documents, procurement statement of work, source selection criteria, and any other documents that went out in the bid package.

05

INTERPERSONAL AND TEAM SKILLS

- **Negotiation**

12.2 Conduct Procurement Management **Outputs**

01 **SELECTED SELLERS**

- The selected sellers are those who have been judged to be in a competitive range based on the outcome of the proposal or bid evaluation.
- Final approval of complex, high-value, high-risk procurements will generally require organizational senior management approval prior to award.

02 **AGREEMENTS**

A **contract** is a **mutually binding agreement** that obligates the seller to provide the specified products, services, or results; obligates the buyer to compensate the seller; and represents a legal relationship that is subject to remedy in the courts.

The major components in an agreement document :

Procurement statement of work - Schedule, milestones, or date - Performance reporting - Pricing and payment terms - Inspection, quality, and acceptance criteria - Warranty & support - Incentives and penalties - Insurance - Subordinate subcontractor approvals - General terms and conditions - Change request handling - Termination clause

03 **CHANGE REQUESTS.**





AGREEMENTS

Agreements are used to define initial intentions for a project.

Agreements may take the form of contracts, memorandums of understanding (MOUs), service level agreements (SLA), letters of agreement, letters of intent, verbal agreements, email, or other written agreements.





04

PROJECT MANAGEMENT PLAN UPDATES

- Requirements management plan.
- Quality management plan.
- Communications management plan.
- Risk management plan.
- Procurement management plan.
- Scope baseline.
- Schedule baseline.
- Cost baseline.

05

PROJECT DOCUMENTS UPDATES

- Lessons learned register.
- Requirements documentation.
- Requirements traceability matrix.
- Resource calendars.
- Risk register.
- Stakeholder register.

06

ORGANIZATIONAL PROCESS ASSETS UPDATES

12.3 Control Procurement Management

Input

- Project management plan
 - Requirements management plan
 - Risk management plan
 - Procurement management plan
 - Change management plan
 - Schedule baseline
- .2 Project documents
 - Assumption log
 - Lessons learned register
 - Milestone list
 - Quality reports
 - Requirements documentation
 - Requirements traceability matrix
 - Risk register
 - Stakeholder register
- .3 Agreements
- .4 Procurement documentation
- .5 Approved change requests
- .6 Work performance data
- .7 EEF
- .8 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Claims administration
- .3 Data analysis
 - Performance reviews
 - Earned value analysis
 - Trend analysis
- .4 Inspection
- .5 Audits

Outputs

- .1 Closed procurements**
- .2 Work performance information
- .3 Procurement documentation updates
- .4 Change requests
- .5 Project management plan updates
 - Risk management plan
 - Procurement management plan
 - Schedule baseline
 - Cost baseline
- .6 Project documents updates
 - Lessons learned register
 - Resource requirements
 - Requirements traceability matrix
 - Risk register
 - Stakeholder register
- .7 OPA updates



12.3 Control Procurement Management Input

01

PROJECT MANAGEMENT PLAN

- Requirements management plan.
- Risk management plan.
- Procurement management plan.
- Change management plan.
- Schedule baseline.

02

PROJECT DOCUMENTS

- Assumption log.
- Lessons learned register.
- Milestone list.
- Quality reports.
- Requirements documentation.
- Requirements traceability matrix.
- Risk register.
- Stakeholder register.

03

AGREEMENTS



12.3 Control Procurement Management **Input**

- 04 **PROCUREMENT DOCUMENTATION**
- 05 **APPROVED CHANGE REQUESTS**
- 06 **WORK PERFORMANCE DATA**
- 07 **ENTERPRISE ENVIRONMENTAL FACTORS**
- 08 **ORGANIZATIONAL PROCESS ASSETS**





12.3 Control Procurement Management Tools & Techniques

01

EXPERT JUDGMENT

02

CLAIMS ADMINISTRATION

- The **contested changes are called claims**. When they cannot be resolved, they become disputes and finally appeals.
- Claims are documented, processed, monitored, and managed throughout the contract life cycle, usually in accordance with the terms of the contract.
- If the parties themselves do not resolve a claim, it may have to be handled in accordance with alternative dispute resolution (ADR) typically following procedures established in the contract.
- Settlement of all claims and disputes through negotiation is the preferred method.

03

DATA ANALYSIS

- **Performance Reviews**. Measure, compare, and analyze quality, resource, schedule, and cost performance against the agreement.
- **Earned Value Analysis (EVA)**.
- **Trend Analysis**. Trend analysis can develop a forecast estimate at completion (EAC)

12.3 Control Procurement Management Tools & Techniques

04 **INSPECTION**
a structured review of the **work being performed** by the contractor.

- 05 **AUDITS**
- A structured review of the **procurement process**.
 - Rights and obligations related to audits should be described in the procurement contract.
 - Resulting audit observations should be brought to the attention of the buyer's project manager and the seller's project manager for adjustments to the project, when necessary.



12.3 Control Procurement Management Output

01

CLOSED PROCUREMENTS

- The buyer, usually through its authorized procurement administrator, provides the seller with formal written notice that the contract has been completed.
- Requirements for formal procurement closure are usually defined in the terms and conditions of the contract and are included in the procurement management plan.
- Typically, all deliverables should have been provided on time and meet technical and quality requirements, there should be no outstanding claims or invoices, and all final payments should have been made.
- The project management team should have approved all deliverables prior to closure.

02

WORK PERFORMANCE INFORMATION

How a seller is performing by comparing the deliverables received, the technical performance achieved, and the costs incurred and accepted against the SOW budget for the work performed.

12.3 Control Procurement Management Output

03 **PROCUREMENT DOCUMENTATION UPDATES**

- Includes the contract with all supporting schedules, requested unapproved contract changes, and approved change requests.
- Procurement documentation also includes any seller-developed technical documentation and other work performance information such as deliverables, seller performance reports and warranties, financial documents including invoices and payment records, and the results of contract-related inspections.

04 **PROJECT MANAGEMENT PLAN UPDATES**

- Risk management plan.
- Procurement management plan.
- Cost baseline.
- Schedule baseline.





12.3 Control Procurement Management Output

05

PROJECT DOCUMENTS UPDATES

- Lessons learned register.
- Resource requirements.
- Requirements traceability matrix.
- Risk register.
- Stakeholder register.

06

ORGANIZATIONAL PROCESS ASSETS UPDATES

- Payment schedules and requests.
- Seller performance evaluation documentation
- Prequalified seller lists updates.
- Lessons learned repository.
- Procurement file.



PROJECT STAKEHOLDER MANAGEMENT

Project Stakeholder Management includes the processes required to identify the people, groups, or organizations that **could impact or be impacted by the project**, to analyze stakeholder expectations and their impact on the project, and to develop appropriate management strategies for effectively engaging stakeholders in project decisions and execution.



Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Schedule Management		6.1 Plan Schedule 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule Management		6.6 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Key concepts for Project Stakeholder Management

TAILORING CONSIDERATIONS

- ✓ Stakeholder diversity.
- ✓ Complexity of stakeholder relationships.
- ✓ Communication technology.



13.1 Identify Stakeholders

Input

1. Project charter
- .2 Business documents
 - Business case
 - Benefits management plan
- .3 Project management plan
 - Communications management plan
 - Stakeholder engagement plan
- .4 Project documents
 - Change log
 - Issue log
 - Requirements documentation
- .5 Agreements
- .6 EEF
- .7 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Data gathering
 - Questionnaires and surveys
 - Brainstorming
- .3 Data analysis
 - Stakeholder analysis
 - Document analysis
- .4 Data representation
 - Stakeholder mapping/
representation
- .5 Meetings

Outputs

- .1 Stakeholder register
- .2 Change requests
- .3 Project management plan updates
 - Requirements management plan
 - Communications management plan
 - Risk management plan
 - Stakeholder engagement plan
- .4 Project documents updates
 - Assumption log
 - Issue log
 - Risk register

13.1 Identify Stakeholders Input

- 01 **PROJECT CHARTER**
- 02 **BUSINESS DOCUMENTS**
 - Business case.
 - Benefits management plan.
- 03 **PROJECT MANAGEMENT PLAN**
 - Communications management plan.
 - Stakeholder engagement plan.
- 04 **PROJECT DOCUMENTS**
 - Change log
 - Issue log
 - Requirements documentation
- 05 **AGREEMENTS**
- 06 **ENTERPRISE ENVIRONMENTAL FACTORS**
- 07 **ORGANIZATIONAL PROCESS ASSETS**



13.1 Identify Stakeholders Tools & Techniques

01 Expert judgment.

02 DATA GATHERING.

- ❖ **Questionnaires and surveys.** Can include one-on-one, reviews, focus group sessions, or other mass information collection techniques.
- ❖ **Brainstorming.** used to identify stakeholders can include both brainstorming and brain writing.
 - **Brainstorming.** A general data-gathering and creativity technique that elicits input from groups such as team members or subject matter experts.
 - **Brain writing.** A refinement of brainstorming that allows individual participants time to consider the question(s) individually before the group creativity session is held. The information can be gathered in face-to-face groups or using virtual environments supported by technology.



13.1 Identify Stakeholders Tools & Techniques

03 DATA ANALYSIS

✓ Stakeholder analysis.

It results in a list of stakeholders and relevant information such as their positions in the organization, roles on the project, “stakes,” expectations, attitudes (their levels of support for the project), and their interest in information about the project.

- Interest.
- Rights
- Ownership.
- Knowledge.
- Contribution.

✓ **Document analysis.** Assessing the available project documentation and lessons learned from previous projects to identify stakeholders and other supporting information.

13.1 Identify Stakeholders Tools & Techniques

04 DATA REPRESENTATION

❖ Stakeholder mapping/ representation.

A method of categorizing stakeholders using various methods to assist the team in building relationships with the identified project stakeholders. Include:

1. Power/interest grid, power/influence grid, or impact/influence grid.

- Group stakeholders according to their level of authority (power), level of concern about the project's outcomes (interest), ability to influence the outcomes of the project (influence), or ability to cause changes to the project's planning or execution.

2. Stakeholder cube.

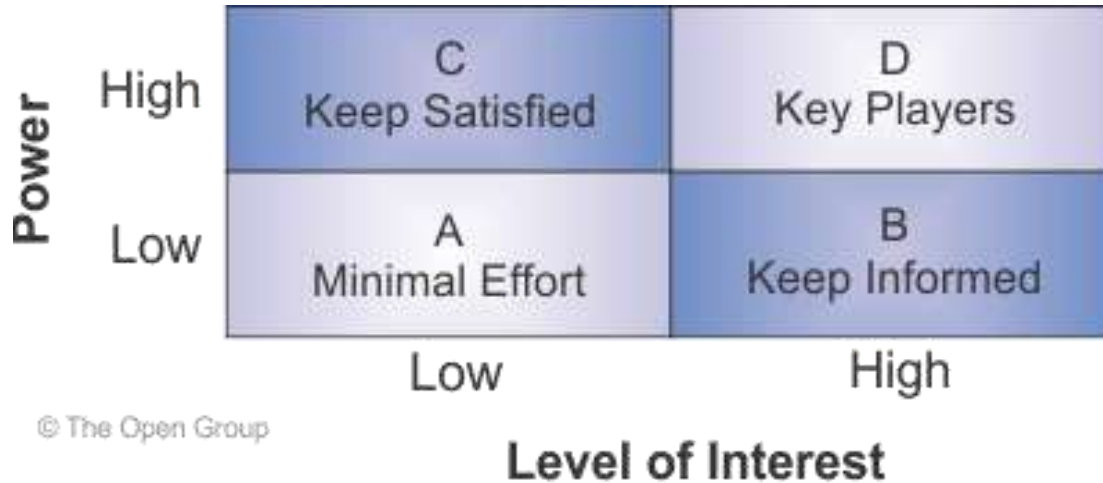
- This is a **refinement of the grid models** previously mentioned.

3. Saliency model.

- Describes classes of stakeholders based on assessments of their power, influence, urgency
- The saliency model is useful for **large complex communities** of stakeholders or where there are complex networks of relationships within the community.



13.1 Identify Stakeholders Tools & Techniques



13.1 Identify Stakeholders Tools & Techniques

4. Directions of influence.

Classifies stakeholders according to their influence on the work of the project or the project team itself. As the following :

- ❖ **Upward**: senior management of the performing organization or customer organization, sponsor, and steering committee.
- ❖ **Downward**: the team or specialists contributing knowledge or skills in a temporary capacity,
- ❖ **Outward**: stakeholder groups and their representatives outside the project team, such as suppliers, government departments, the public, end-users, and regulators.
- ❖ **Sideward**: the peers of the project manager, such as other project managers or middle managers who are in competition for scarce project resources or who collaborate with the project manager in sharing resources or information.

5. Prioritization.

Necessary for projects with **a large number of stakeholders**, where the membership of the stakeholder community is **changing frequently**, or when the relationships between stakeholders and the project team or within the stakeholder community are **complex**.

13.1 Identify Stakeholders **Output**

01 **STAKEHOLDER REGISTER**

This document contains information about identified stakeholders

- **Identification information.** Name, organizational position, location and contact details, and role on the project.
- **Assessment information.** Major requirements, expectations, potential for influencing project outcomes, and the phase of the project life cycle where the stakeholder has the most influence or impact.
- **Stakeholder classification.** Internal/external, impact/influence/power/interest, upward/downward/outward/ sideward, or any other classification model chosen by the project manager.

02 **CHANGE REQUESTS**



13.1 Identify Stakeholders **Output**

03 PROJECT MANAGEMENT PLAN UPDATES

- ✓ Requirements management plan.
- ✓ Communications management plan.
- ✓ Risk management plan.
- ✓ Stakeholder engagement plan.

04 PROJECT DOCUMENTS UPDATES

- ✓ Assumption log.
- ✓ Issue log.
- ✓ Risk register.



13.2 Plan Stakeholder Engagement

Inputs

- .1 Project charter
- .2 Project management plan
 - Resource management plan
 - Communications management plan
 - Risk management plan
- .3 Project documents
 - Assumption log
 - Change log
 - Issue log
 - Project schedule
 - Risk register
 - Stakeholder register
- .4 Agreements
- .5 EEFs
- .6 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Data gathering
 - Benchmarking
- .3 Data analysis
 - Assumption and constraint analysis
 - Root cause analysis
- .4 Decision making
 - Prioritization/ranking
- .5 Data representation
 - Mind mapping
 - Stakeholder engagement assessment matrix
- .6 Meetings

Outputs

- .1 Stakeholder engagement plan

13.2 Plan Stakeholder Engagement Input

01 PROJECT CHARTER

02 PROJECT MANAGEMENT PLAN

- Resource management plan
- Communications management plan
- Risk management plan

03 Project documents

- Assumption log
- Change log
- Issue log
- Project schedule
- Risk register
- Stakeholder register

04 ENTERPRISE ENVIRONMENTAL FACTORS

05 ORGANIZATIONAL PROCESS ASSETS



13.2 Plan Stakeholder Engagement Input

04 AGREEMENTS

05 ENTERPRISE ENVIRONMENTAL FACTORS

06 ORGANIZATIONAL PROCESS ASSETS



13.2 Plan Stakeholder Engagement Tools & Techniques

01 Expert judgment

02 DATA GATHERING

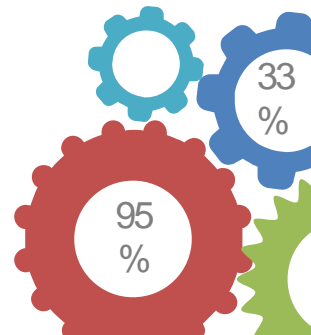
Benchmarking. The results of stakeholder analysis are compared with information from other organizations or other projects that are considered to be world class.

03 DATA ANALYSIS

- ✓ **Assumption and constraint analysis** : Analysis of current assumptions and constraints may be conducted in order to tailor appropriate engagement strategies.
- ✓ **Root cause analysis** : identifies underlying reasons for the level of support of project stakeholders in order to select the appropriate strategy to improve their level of engagement.

04 DECISION MAKING

- ✓ **Prioritization/Ranking techniques** : Stakeholder requirements need to be prioritized and ranked, as do the stakeholders themselves. Stakeholders with the most interest and the highest influence are often prioritized at the top of the list.



13.2 Plan Stakeholder Engagement Tools & Techniques

05

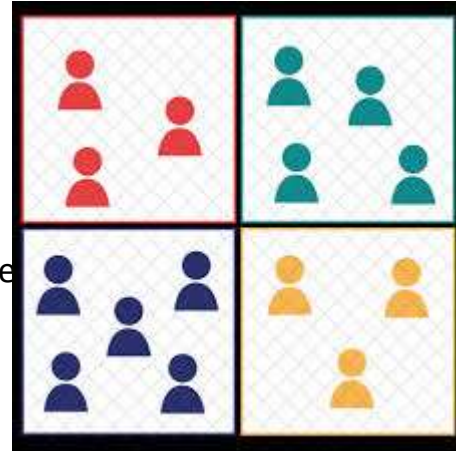
DATA REPRESENTATION

- **Mind mapping**
- **Stakeholder engagement assessment matrix.**

Supports comparison between the current engagement levels of stakeholders and the desired engagement levels required for successful project delivery.

The engagement level of stakeholders can be classified as follows:

- **Unaware.** Unaware of the project and potential impacts.
- **Resistant.** Aware of the project and potential impacts but resistant to any change that may occur as a result of the work or outcomes of the project. These stakeholders will be unsupportive of the work or outcomes of the project.
- **Neutral.** Aware of the project, but neither supportive nor unsupportive.
- **Supportive.** Aware of the project and potential impacts and supportive of the work and its outcomes.
- **Leading.** Aware of the project and potential impacts and actively engaged in ensuring that the project is a success.



13.2 Plan Stakeholder Engagement Tools & Techniques

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Stakeholder 1	C			D	
Stakeholder 2			C	D	
Stakeholder 3				D C	

Figure 13-6. Stakeholder Engagement Assessment Matrix

13.2 PLAN STAKEHOLDER ENGAGEMENT Output 1

01

STAKEHOLDER ENGAGEMENT PLAN

- ✓ A component of the project management plan that identifies the strategies and actions required to promote productive involvement of stakeholders in decision making and execution.
- ✓ It can be formal or informal and highly detailed or broadly framed, based on the needs of the project and the expectations of stakeholders.
- ✓ The stakeholder engagement plan may include but is not limited to specific strategies or approaches for engaging with individuals or groups of stakeholders.



13.3 MANAGE STAKEHOLDER ENGAGEMENT

Inputs

- .1 Project management plan
 - Communications management plan
 - Risk management plan
 - Stakeholder engagement plan
 - Change management plan
- .2 Project documents
 - Change log
 - Issue log
 - Lessons learned register
 - Stakeholder register
- .3 EEFs
- .4 OPA

Tools & Techniques

- .1 Expert judgment
- .2 Communication skills
 - Feedback
- .3 Interpersonal and team skills
 - Conflict management
 - Cultural awareness
 - Negotiation
 - Observation/conversation
 - Political awareness
- .4 Ground rules
- .5 Meetings

Outputs

- .1 Change requests
- .2 Project management plan updates
 - Communications management plan
 - Stakeholder engagement plan
- .3 Project documents updates
 - Change log
 - Issue log
 - Lessons learned register
 - Stakeholder register

13.3 MANAGE STAKEHOLDER ENGAGEMENT **Input**

01 PROJECT MANAGEMENT PLAN

- ✓ Communications management plan.
- ✓ Risk management plan.
- ✓ Stakeholder engagement plan.
- ✓ Change management plan.

02 PROJECT DOCUMENTS

- ✓ Change log.
- ✓ Issue log.
- ✓ Lessons learned register.
- ✓ Stakeholder register.

03 ENTERPRISE ENVIRONMENTAL FACTORS (EEFs).

04 ORGANIZATIONAL PROCESS ASSETS (OPA).



13.3 MANAGE STAKEHOLDER ENGAGEMENT Tools & Techniques 1

01 EXPERT JUDGMENT

02 COMMUNICATION SKILLS

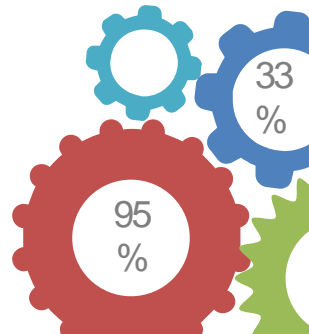
- ✓ The methods of communication identified for each stakeholder in the communications management plan are applied during stakeholder engagement management.
- ✓ The project management team uses feedback to assist in understanding stakeholder reaction to the various project management activities and key decisions.
- ✓ Feedback may be collected in the following ways:
 - Conversations; both formal and informal.
 - Issue identification and discussion.
 - Meetings.
 - Progress reporting.
 - Surveys.



13.3 MANAGE STAKEHOLDER ENGAGEMENT Tools & Techniques 1

03 INTERPERSONAL AND TEAM SKILLS

- ❖ **Conflict management.** The project manager should ensure that conflicts are resolved in a timely manner.
- ❖ **Cultural awareness.** is used to help the project manager and team to communicate effectively by considering cultural differences and the requirements of stakeholders.
- ❖ **Negotiation.** is used to achieve support or agreement that supports the work of the project or its outcomes and to resolve conflicts within the team or with other stakeholders.
- ❖ **Observation/conversation.** is used to stay in touch with the work and attitudes of project team members and other stakeholders.
- ❖ **Political awareness.** is achieved through understanding the power relationships within and around the project.



13.3 MANAGE STAKEHOLDER ENGAGEMENT Tools & Techniques

04 GROUND RULES

Defined in the team charter set the expected behavior for project team members, as well as other stakeholders, with regard to stakeholder engagement.

05 MEETINGS



13.3 MANAGE STAKEHOLDER ENGAGEMENT Output

01 CHANGE REQUESTS

02 PROJECT MANAGEMENT PLAN UPDATES

- ✓ Communications management plan.
- ✓ Stakeholder engagement plan.

03 PROJECT DOCUMENTS UPDATES

- ✓ Change log.
- ✓ Issue log.
- ✓ Lessons learned register
- ✓ Stakeholder register.



13.4 MONITOR STAKEHOLDER ENGAGEMENT

Inputs

- .1 Project management plan
 - Resource management plan
 - Communications management plan
 - Stakeholder engagement plan
- .2 Project documents
 - Issue log
 - Lessons learned register
 - Project communications
 - Risk register
 - Stakeholder register
- .3 Work performance data
- .4 EEFs
- .5 OPA

Tools & Techniques

- .1 Data analysis
 - Alternatives analysis
 - Root cause analysis
 - Stakeholder analysis
- .2 Decision making
 - Multicriteria decision analysis
 - Voting
- .3 Data representation
 - Stakeholder engagement assessment matrix
- .4 Communication skills
 - Feedback
 - Presentations
- .5 Interpersonal and team skills
 - Active listening
 - Cultural awareness
 - Leadership
 - Networking
 - Political awareness
- .6 Meetings

Outputs

- .1 Work performance information
- .2 Change requests
- .3 Project management plan updates
 - Resource management plan
 - Communications management plan
 - Stakeholder engagement plan
- .4 Project documents updates
 - Issue log
 - Lessons learned register
 - Risk register
 - Stakeholder register

13.4 MONITOR STAKEHOLDER ENGAGEMENT Input

- 01 **Project management plan**
 - ✓ Resource management plan.
 - ✓ Communications management plan.
 - ✓ Stakeholder engagement plan.
- 02 **Project documents**
 - ✓ Issue log.
 - ✓ Lessons learned register.
 - ✓ Project communications.
 - ✓ Risk register.
 - ✓ Stakeholder register.
- 03 **WORK PERFORMANCE DATA**
- 04 **ENTERPRISE ENVIRONMENTAL FACTORS.**
- 05 **ORGANIZATIONAL PROCESS ASSETS.**



13.4 MONITOR STAKEHOLDER ENGAGEMENT Tools & Techniques 1

01

DATA ANALYSIS

- Alternatives analysis.
- Root cause analysis.
- Stakeholder analysis.

02

DECISION MAKING

- Multicriteria decision analysis.
- Voting.

03

DATA REPRESENTATION

- Stakeholder Engagement Assessment Matrix.



13.4 MONITOR STAKEHOLDER ENGAGEMENT Tools & Techniques 2

04 COMMUNICATION SKILLS

- **Feedback.** is used to ensure that the information to stakeholders is received and understood.
- **Presentations.** provide clear information to stakeholders.

05 INTERPERSONAL AND TEAM SKILLS

- **Active listening.** is used to reduce misunderstandings and other miscommunication.
- **Cultural awareness.** Cultural awareness and cultural sensitivity help the project manager to plan communications based on the cultural differences and requirements of stakeholders and team members.
- **Leadership.** Successful stakeholder engagement requires strong leadership skills to communicate the vision and inspire stakeholders to support the work and outcomes of the project.
- **Networking.** ensures access to information about levels of engagement of stakeholders.
- **Political awareness.** is used to understand the strategies of the organization, understand who wields power and influence in this arena, and to develop an ability to communicate with these stakeholders.

06 MEETINGS

13.4 MONITOR STAKEHOLDER ENGAGEMENT **Output**

01 WORK PERFORMANCE INFORMATION

02 CHANGE REQUESTS

03 PROJECT MANAGEMENT PLAN UPDATES

- Resource management plan.
- Communications management plan.
- Stakeholder engagement plan.

04 PROJECT DOCUMENTS UPDATES

- Issue log.
- Lessons learned register.
- Risk register.
- Stakeholder register.





THANKS!!!



ناصر بن إبراهيم بن سعد المحميد

PMO Director, ISO 21500 Lead Project Manager
Certified Project Managers Trainer