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# **Project Management Professional**

## ***Module 1 and 2: Introduction and Project Life cycle***

**PMBOK 5<sup>th</sup> Edition**

# Welcome!

# Workshop Agenda

- Introduction PMI and PMP
- Organizational influences and project life cycle
- Project Management processes
- Integration Management
- Scope Management
- Time Management
- Cost Management
- Quality Management
- Human Resource Management
- Communication Management
- Risk Management
- Procurement Management
- Stakeholder Management



# What are Projects?

'A project is a temporary endeavour undertaken to create a unique product, service or result'  
(PMBOK 5<sup>th</sup> edition statement)

Characteristics of a project

- Has a start and end date
- Creates a Unique product, service or result
- Usually follows progressive elaboration and Rolling wave planning

Examples of projects include but not limited to:

- Developing a new application or service
- Change in the structure, staffing or style of an organization
- Effectively migrating applications on to Public cloud environment
- Constructing a building or a datacenter
- Implementing a process or procedures.



# Projects Vs Operations

Projects	Operations
Temporary	Ongoing
Unique product	Standard product
Has start and end date	Indefinite
Heterogeneous teams	Homogenous teams

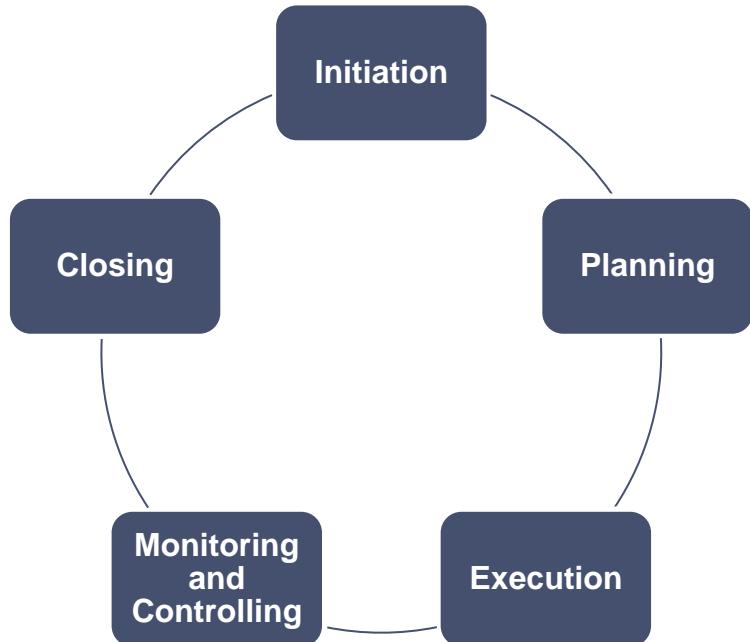
Both involve employees.  
 Both typically have limited resources: people, money, or both.  
 Both are hopefully designed, executed, and managed by someone in charge.



# Project Management

Project management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements.

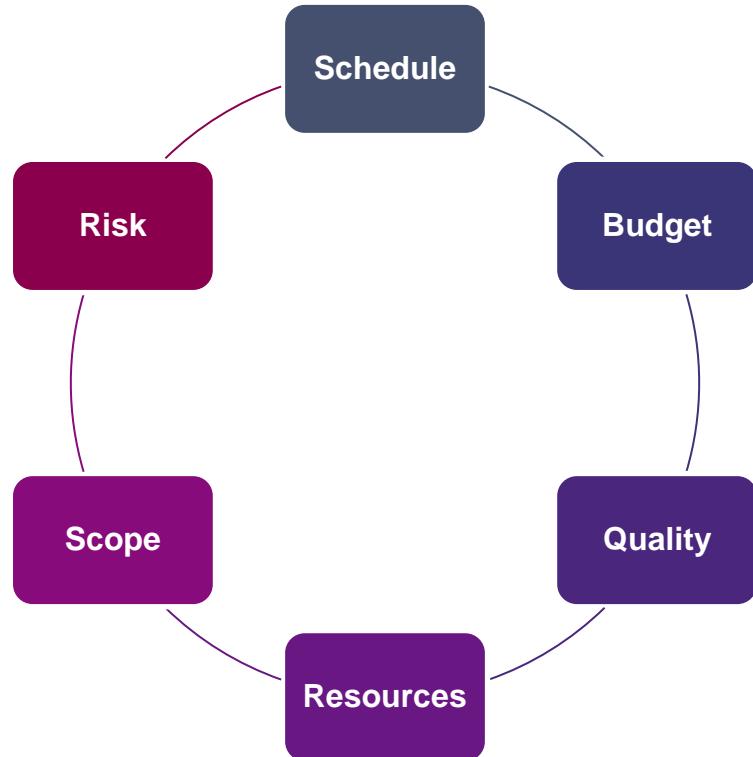
Project Management is accomplished through the application and integration of the five process groups of Project management .



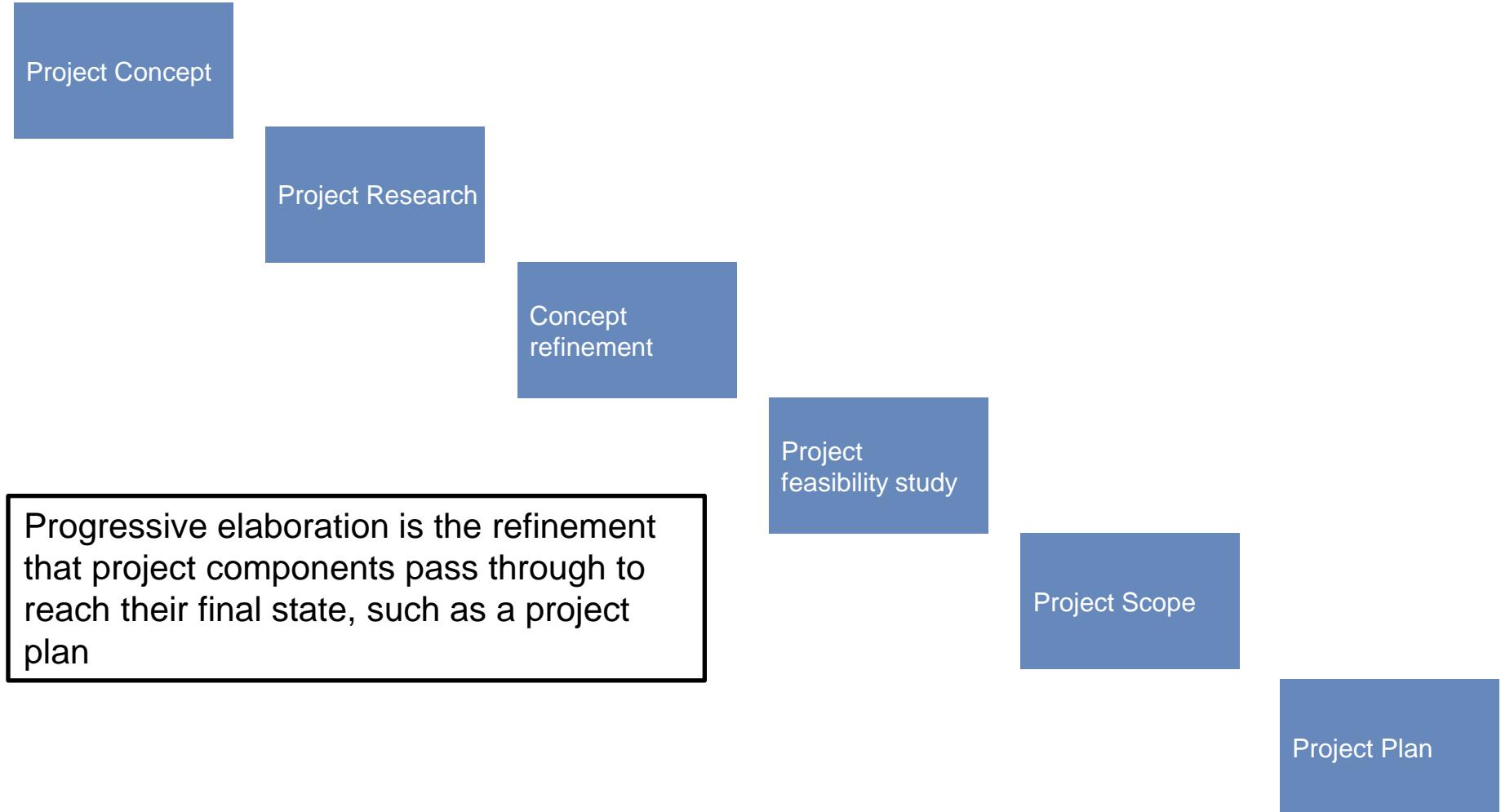
# Project Constraints

Managing a project typically includes:

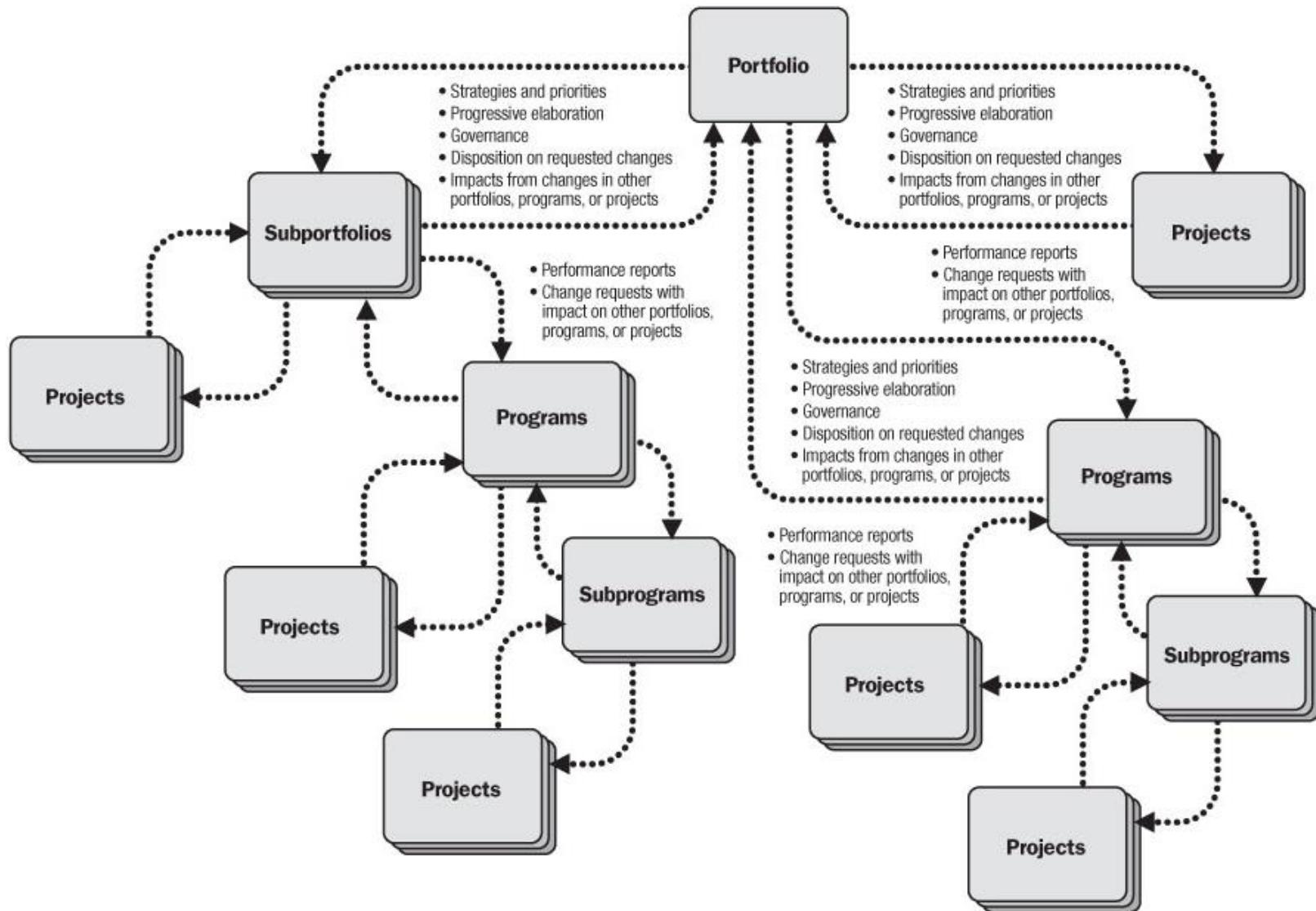
- Identifying requirements
- Addressing the various needs, concerns and expectations of stakeholders as the project is planned and carried out.
- Balancing the project constraints.



# Progressive Elaboration



# Portfolio, program, and project management



## Organizational Project Management

	Projects	Programs	Portfolios
Scope	Projects have defined objectives. Scope is progressively elaborated throughout the project life cycle.	Programs have a larger scope and provide more significant benefits.	Portfolios have an organizational scope that changes with the strategic objectives of the organization.
Change	Project managers expect change and implement processes to keep change managed and controlled.	Program managers expect change from both inside and outside the program and are prepared to manage it.	Portfolio managers continuously monitor changes in the broader internal and external environment.
Planning	Project managers progressively elaborate high-level information into detailed plans throughout the project life cycle.	Program managers develop the overall program plan and create high-level plans to guide detailed planning at the component level.	Portfolio managers create and maintain necessary processes and communication relative to the aggregate portfolio.
Management	Project managers manage the project team to meet the project objectives.	Program managers manage the program staff and the project managers; they provide vision and overall leadership.	Portfolio managers may manage or coordinate portfolio management staff, or program and project staff that may have reporting responsibilities into the aggregate portfolio.
Success	Success is measured by product and project quality, timeliness, budget compliance, and degree of customer satisfaction.	Success is measured by the degree to which the program satisfies the needs and benefits for which it was undertaken.	Success is measured in terms of the aggregate investment performance and benefit realization of the portfolio.
Monitoring	Project managers monitor and control the work of producing the products, services, or results that the project was undertaken to produce.	Program managers monitor the progress of program components to ensure the overall goals, schedules, budget, and benefits of the program will be met.	Portfolio managers monitor strategic changes and aggregate resource allocation, performance results, and risk of the portfolio.

# Project Management Office



Primary goal of PMO is to support project managers in a variety of ways which may include, but are not limited to:

- Managing shared resources
- Coordinating communication across all projects
- Identifying and developing project management methodology, best practices and standards
- Coaching and training
- Monitoring compliance
- Developing and managing organization process assets (Templates, policies, procedures and shared documents)

# Types of PMO

**Supportive.** Supportive PMOs provide a consultative role to projects by supplying templates, best practices, training, access to information and lessons learned from other projects. This type of PMO serves as a project repository. The degree of control provided by the PMO is low.

**Controlling.** Controlling PMOs provide support and require compliance through various means. Compliance may involve adopting project management frameworks or methodologies, using specific templates, forms and tools, or conformance to governance. The degree of control provided by the PMO is moderate.

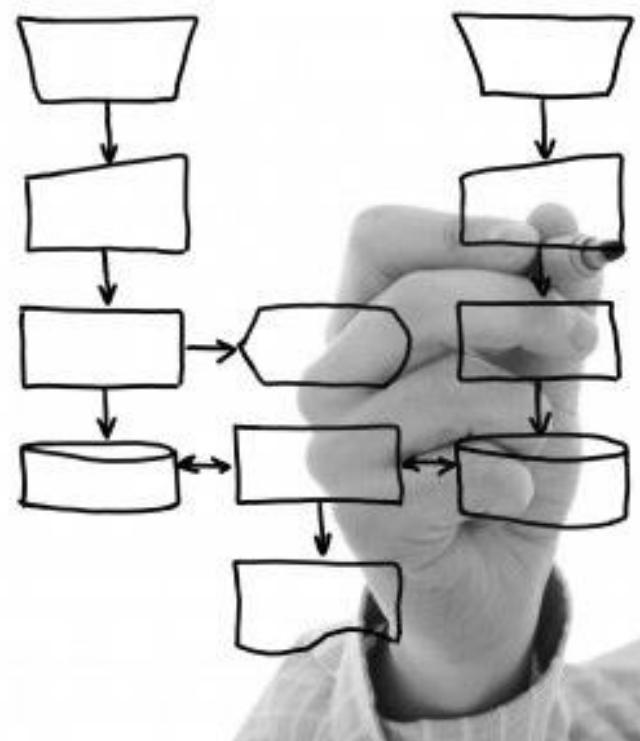
**Directive.** Directive PMOs take control of the projects by directly managing the projects. The degree of control provided by the PMO is high.

# Business Value

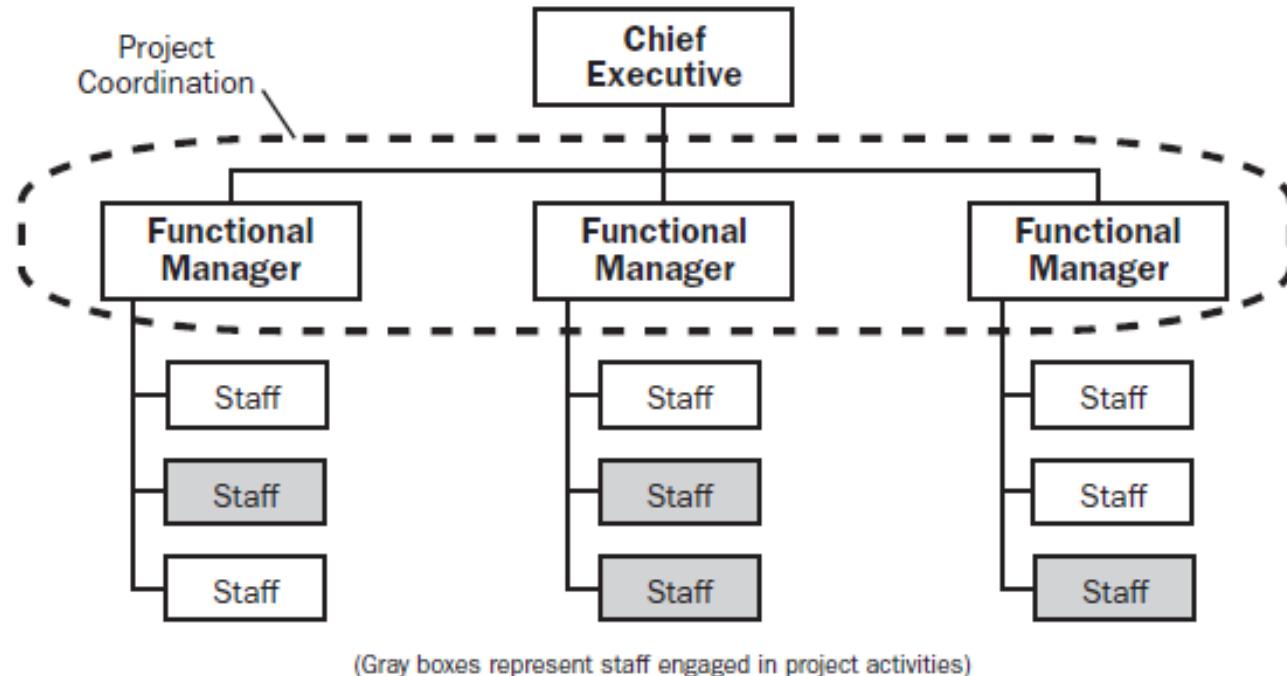
- Business value is sum of tangible and intangible elements.
- Examples of tangible elements include monetary assets, fixtures, stockholder equity, and utility. Examples of intangible elements include good will, brand recognition, public benefit, and trademarks
- Successful business value realization begins with comprehensive strategic planning and management.
- To bridge the gap between organizational strategy and successful business value realization, the use of portfolio, program, and project management techniques is essential

# Organization Structure

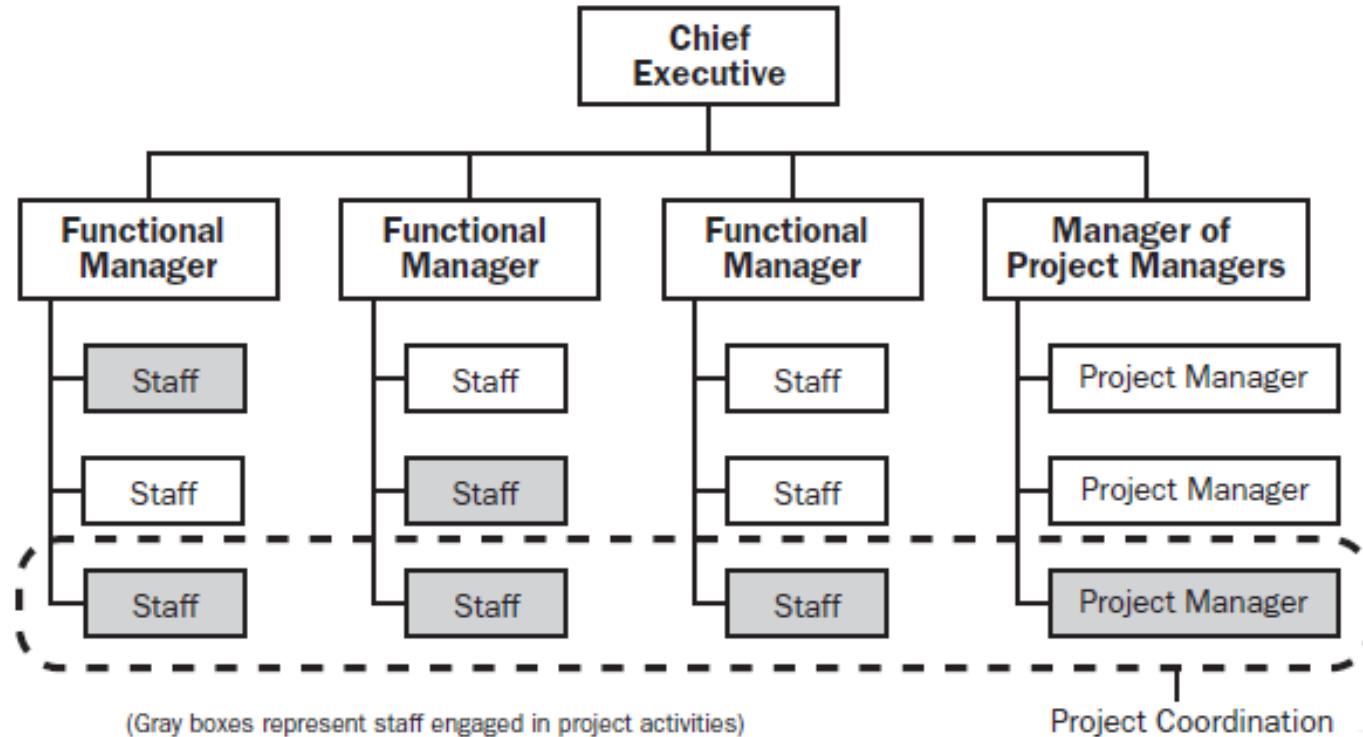
- Projectized organization
- Functional organization
- Matrix organization
- Composite organization



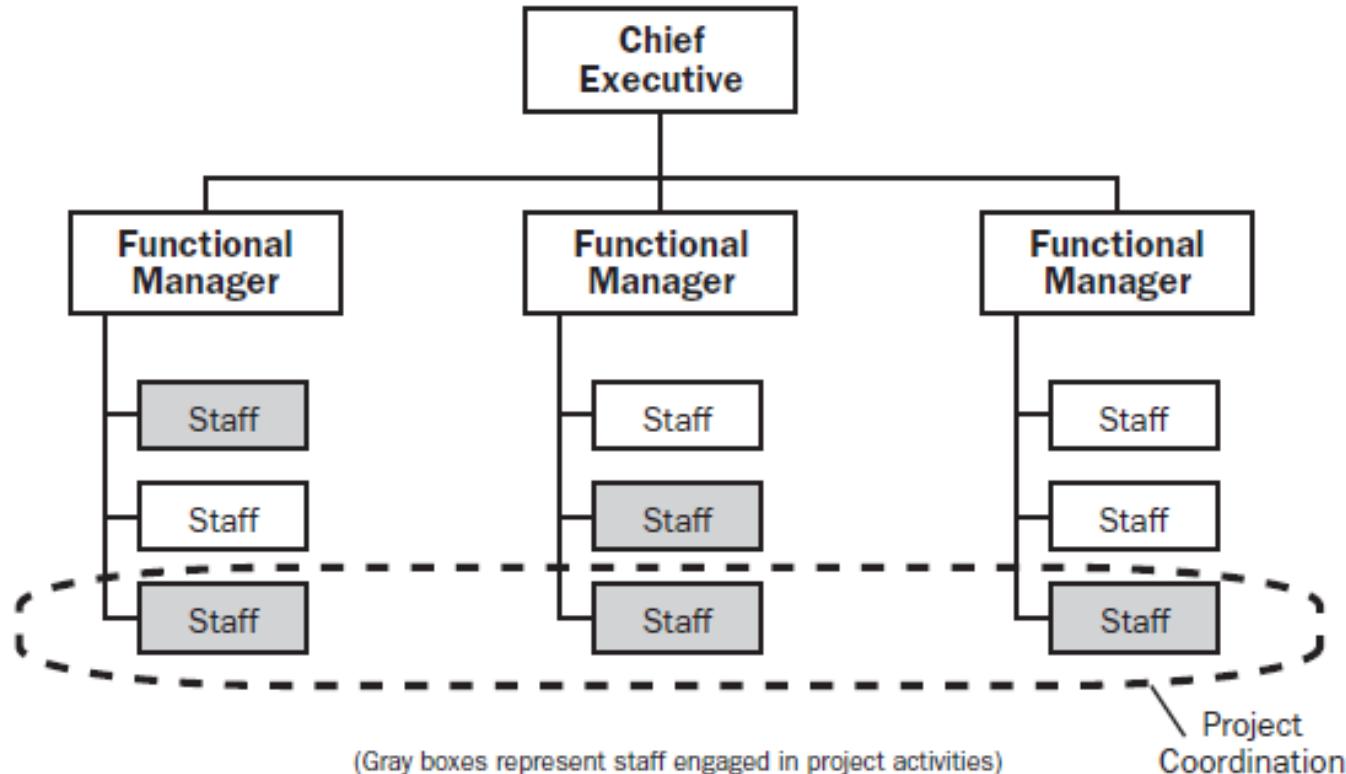
# Classic Functional Organization



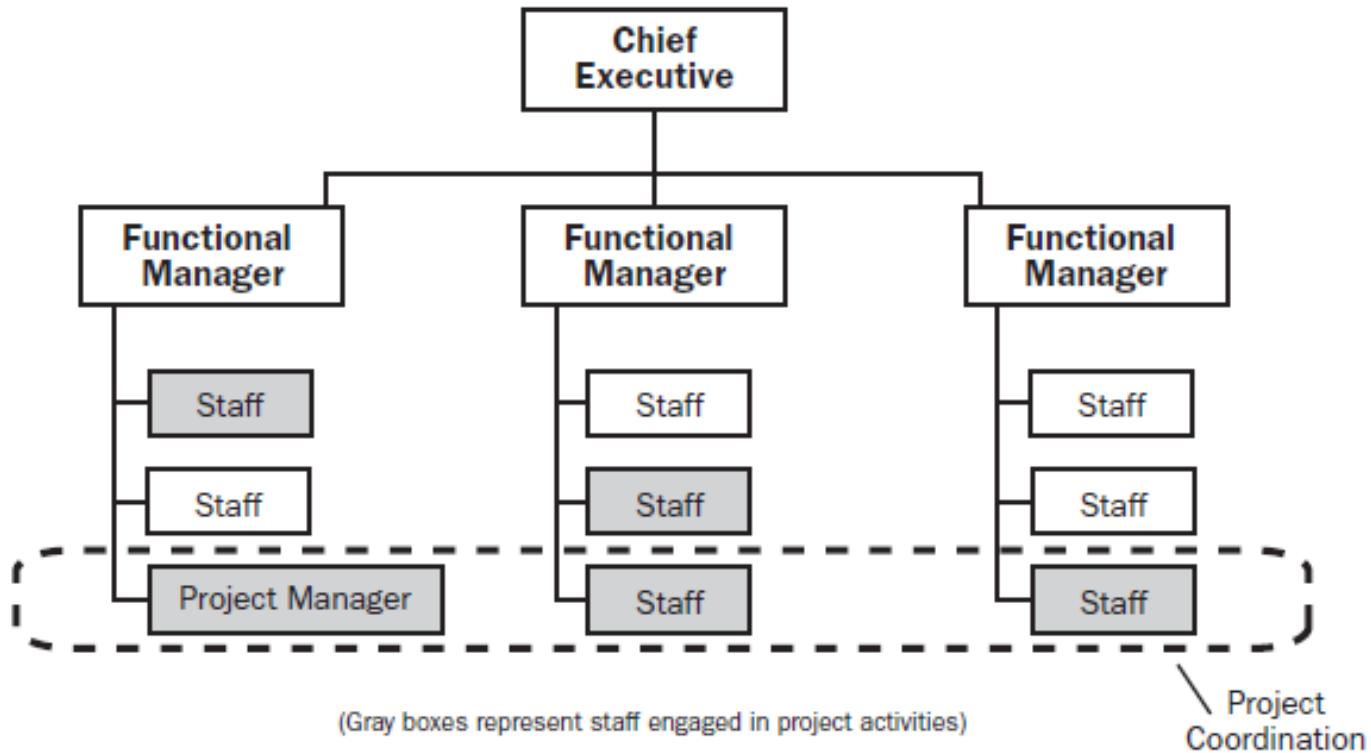
# Strong Matrix Organization



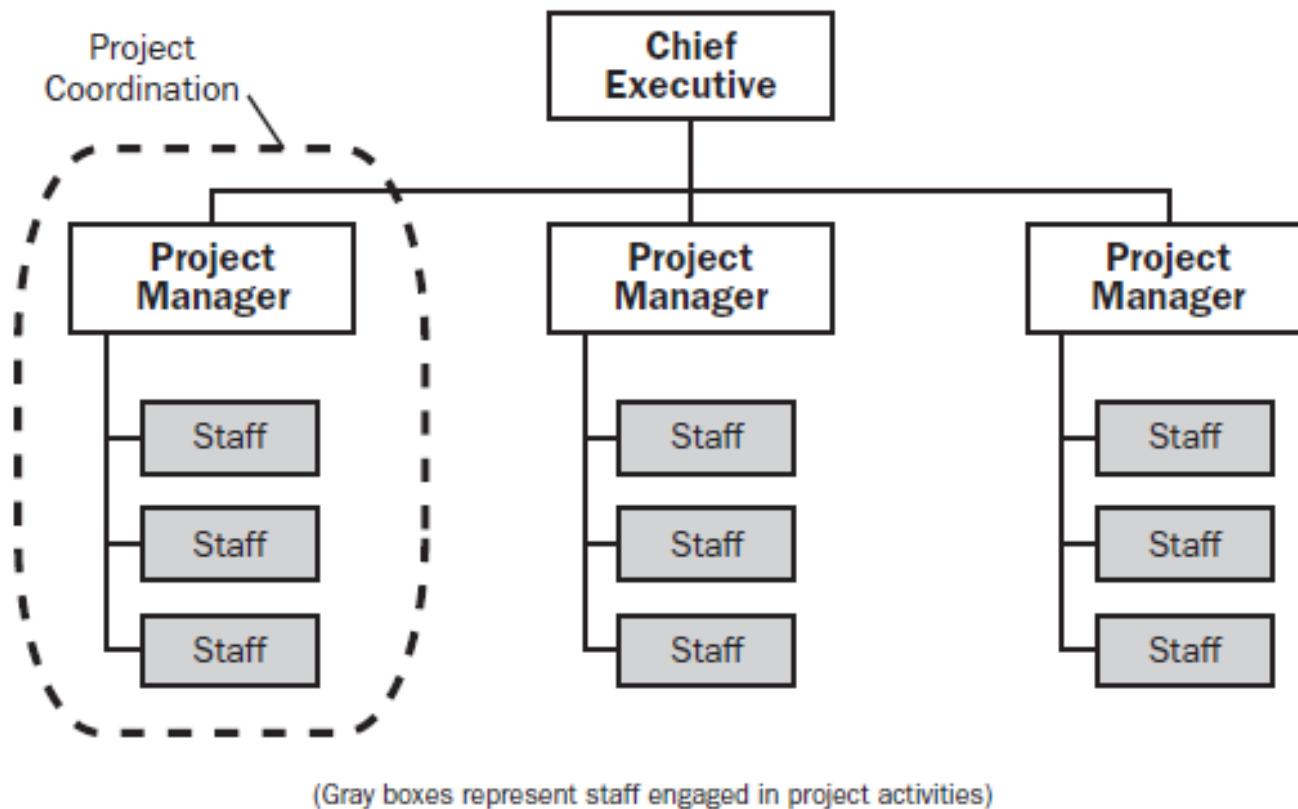
# Weak Matrix Organization



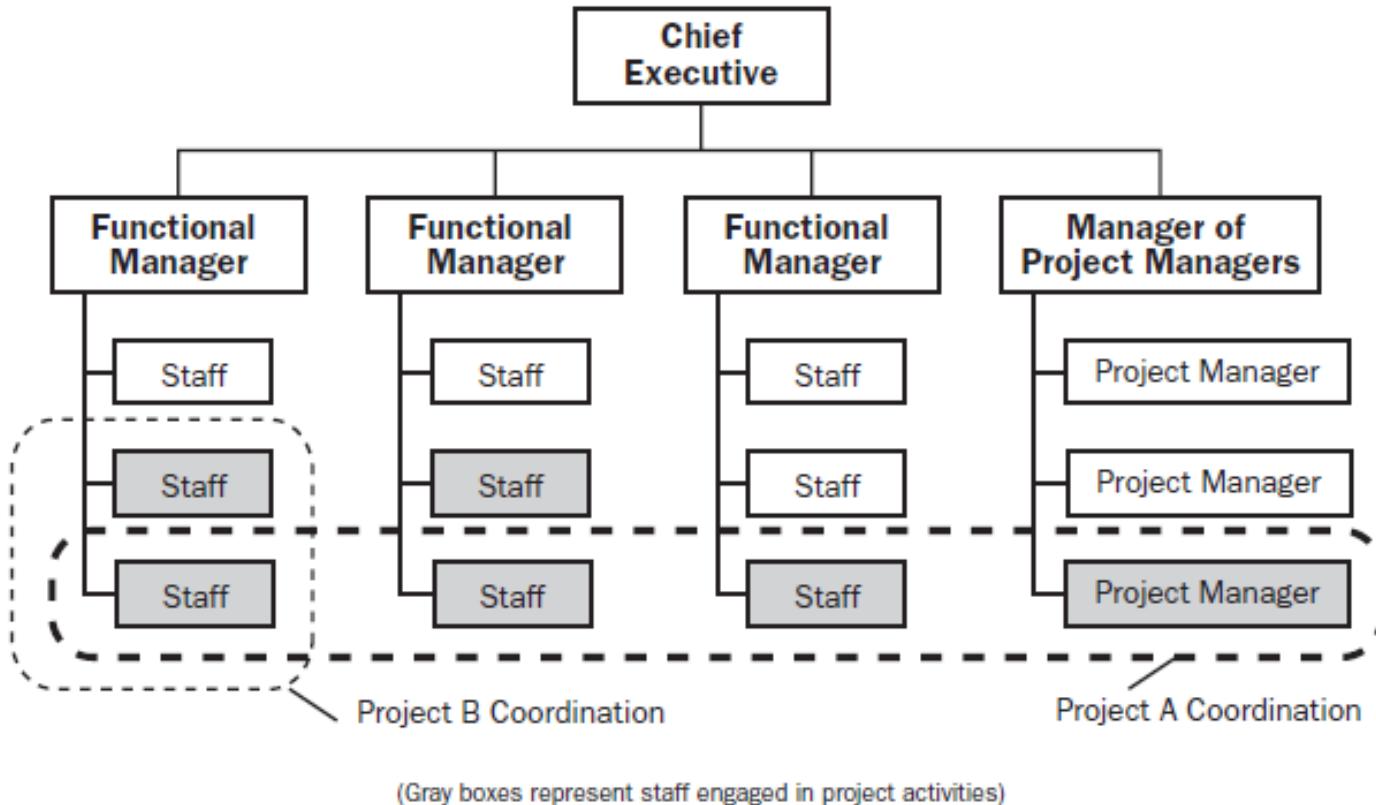
# Balanced Matrix Organization



# Projectized Organization



# Composite Organization



# Influence of Org Structures on Projects

Project Characteristics \ Organization Structure	Functional	Matrix			Projectized
		Weak Matrix	Balanced Matrix	Strong Matrix	
Project Manager's Authority	Little or None	Low	Low to Moderate	Moderate to High	High to Almost Total
Resource Availability	Little or None	Low	Low to Moderate	Moderate to High	High to Almost Total
Who manages the project budget	Functional Manager	Functional Manager	Mixed	Project Manager	Project Manager
Project Manager's Role	Part-time	Part-time	Full-time	Full-time	Full-time
Project Management Administrative Staff	Part-time	Part-time	Part-time	Full-time	Full-time

# Enterprise Environment Factors

Enterprise Environmental Factors refer to both internal and external environmental factors that influence success of the project.

Example:

- Organizational culture, structure and processes
- Infrastructure and human resources
- Company work authorization system
- Government or industry standards
- Stakeholder risk tolerances
- Political climate
- Commercial databases
- Project management information systems

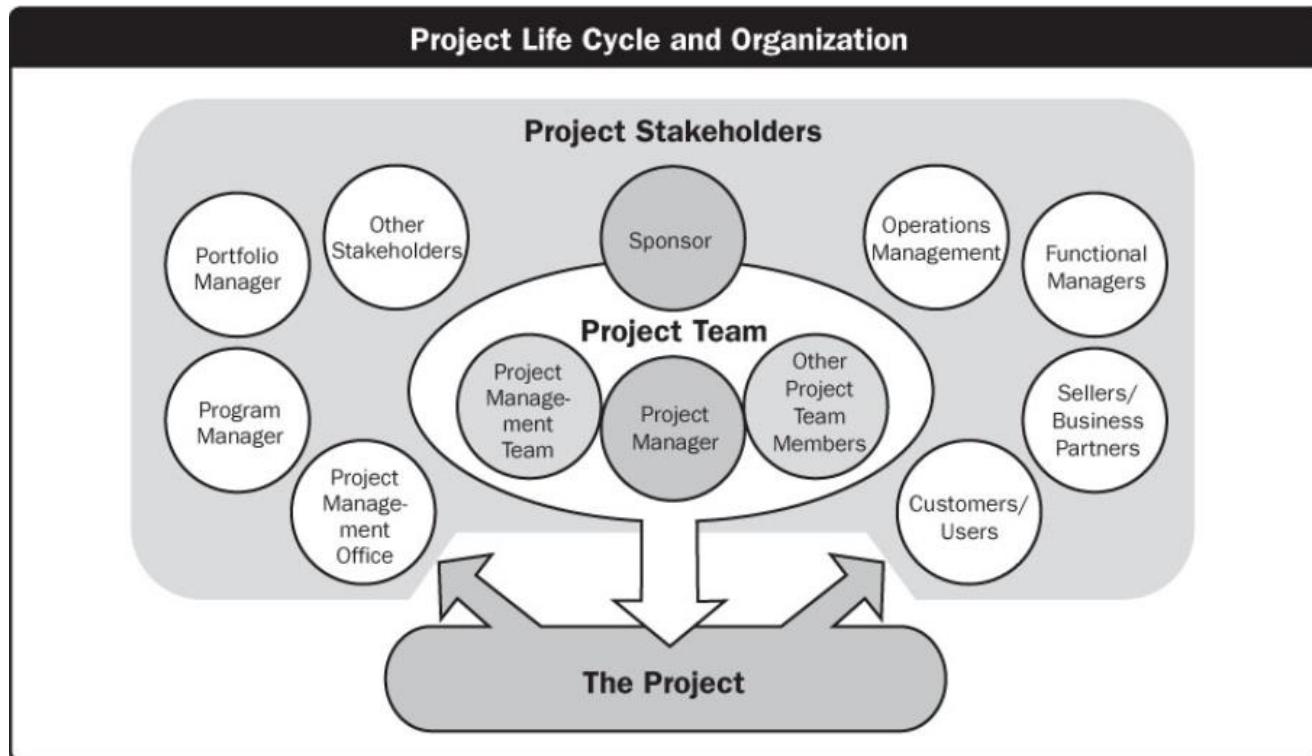


# Organizational process assets

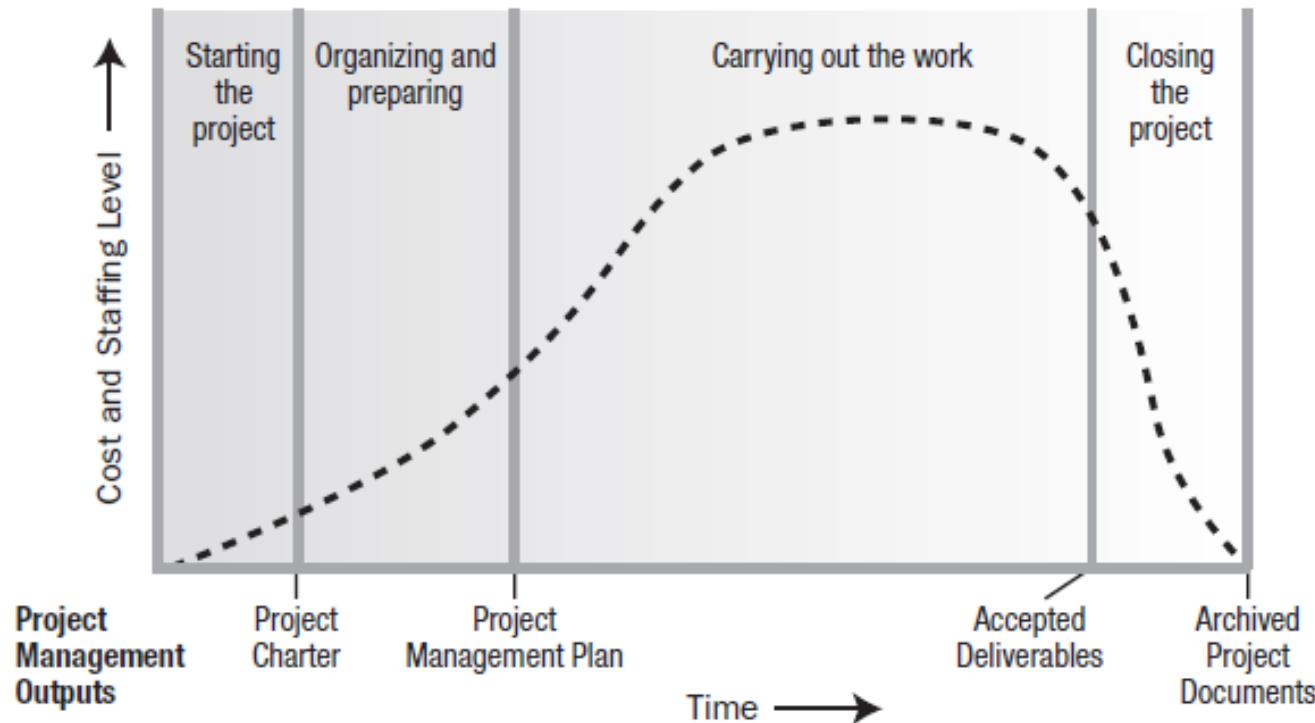
- Policies and standards
- Financial Control Procedures
- Change Control Procedures
- Metrics and guidelines
- Historical information/Knowledge databases



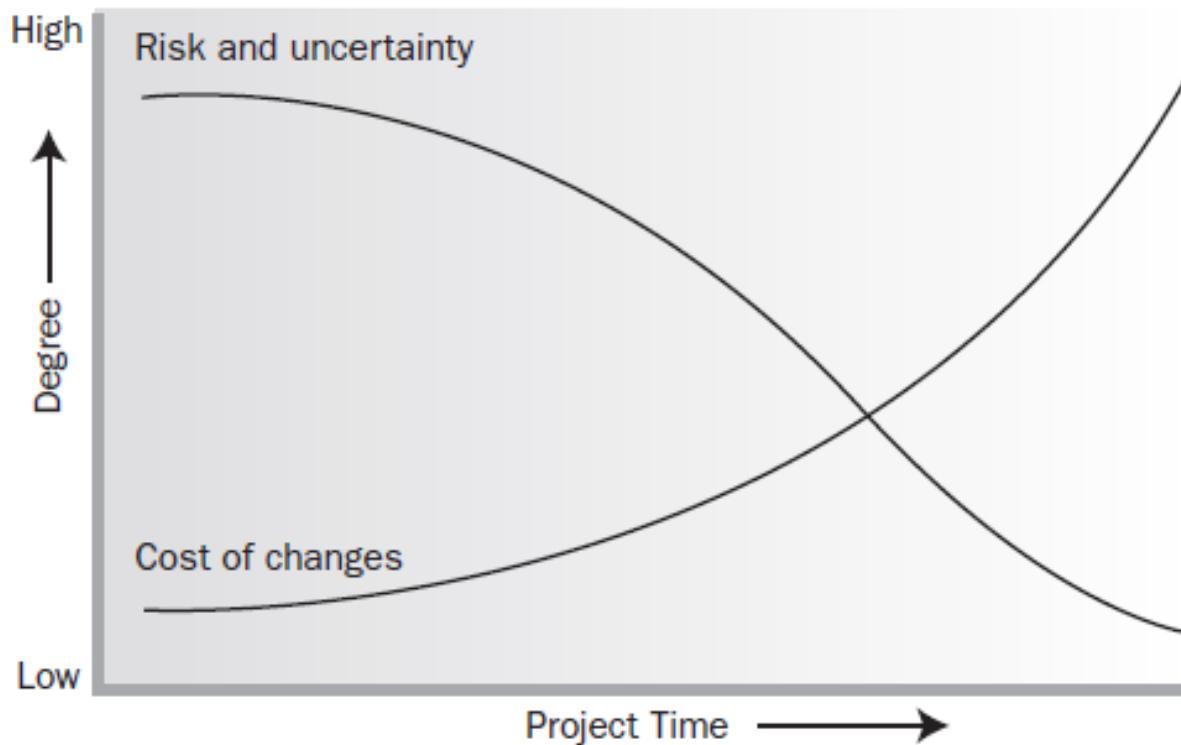
# Project Stakeholder



# Project Lifecycle



# Impact of variable on the Project time





**Time for a Break!**



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# **Project Management Professional**

## ***Module 3: Project Management processes***

**PMBOK 5<sup>th</sup> Edition**

# Project Processes



**A process** is a set of interrelated actions and activities performed to create a pre-specified product, service, or result.

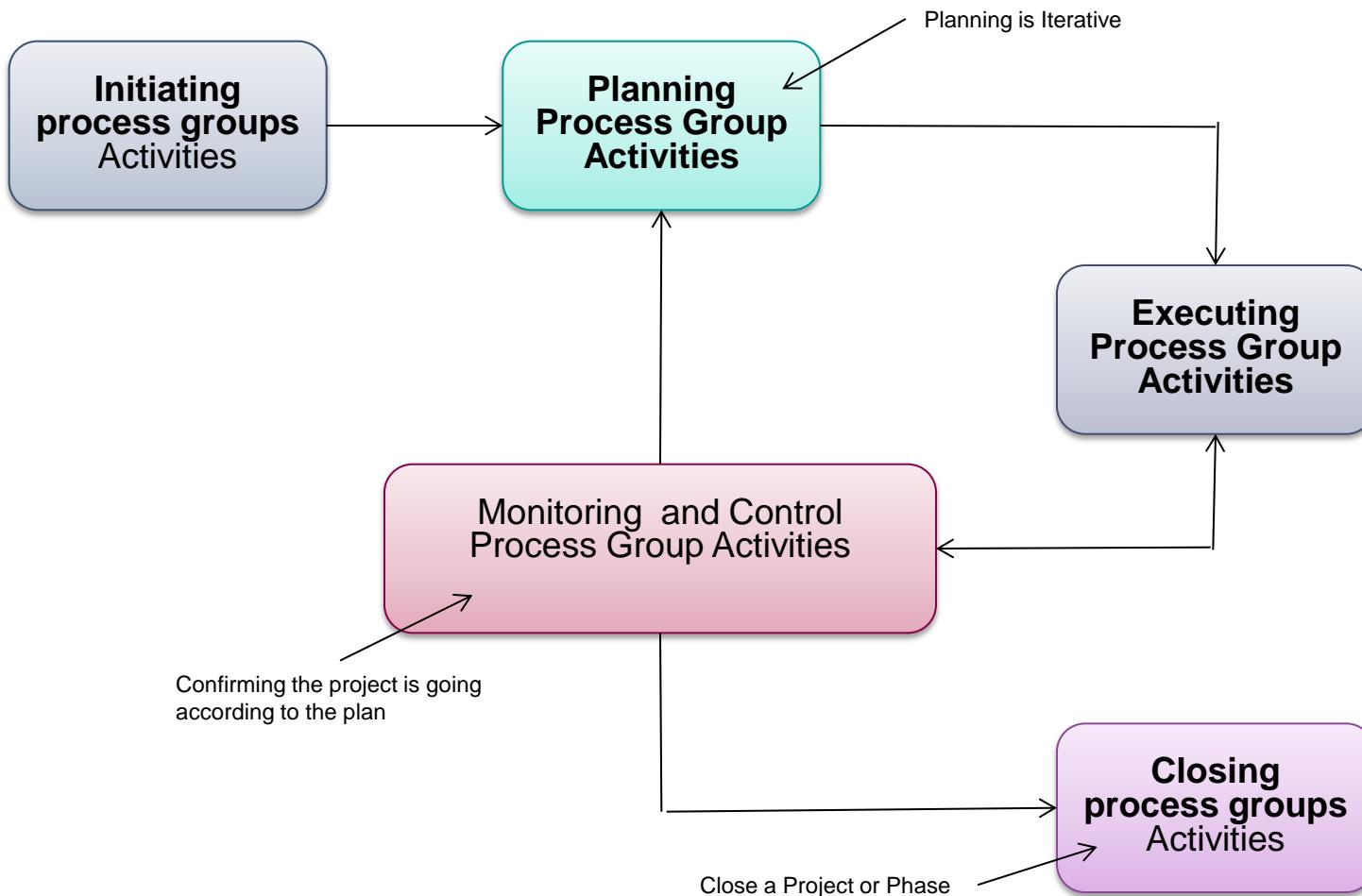
Each process is characterized by its inputs, the tools and techniques that can be applied, and the resulting outputs.

**Projects management processes**

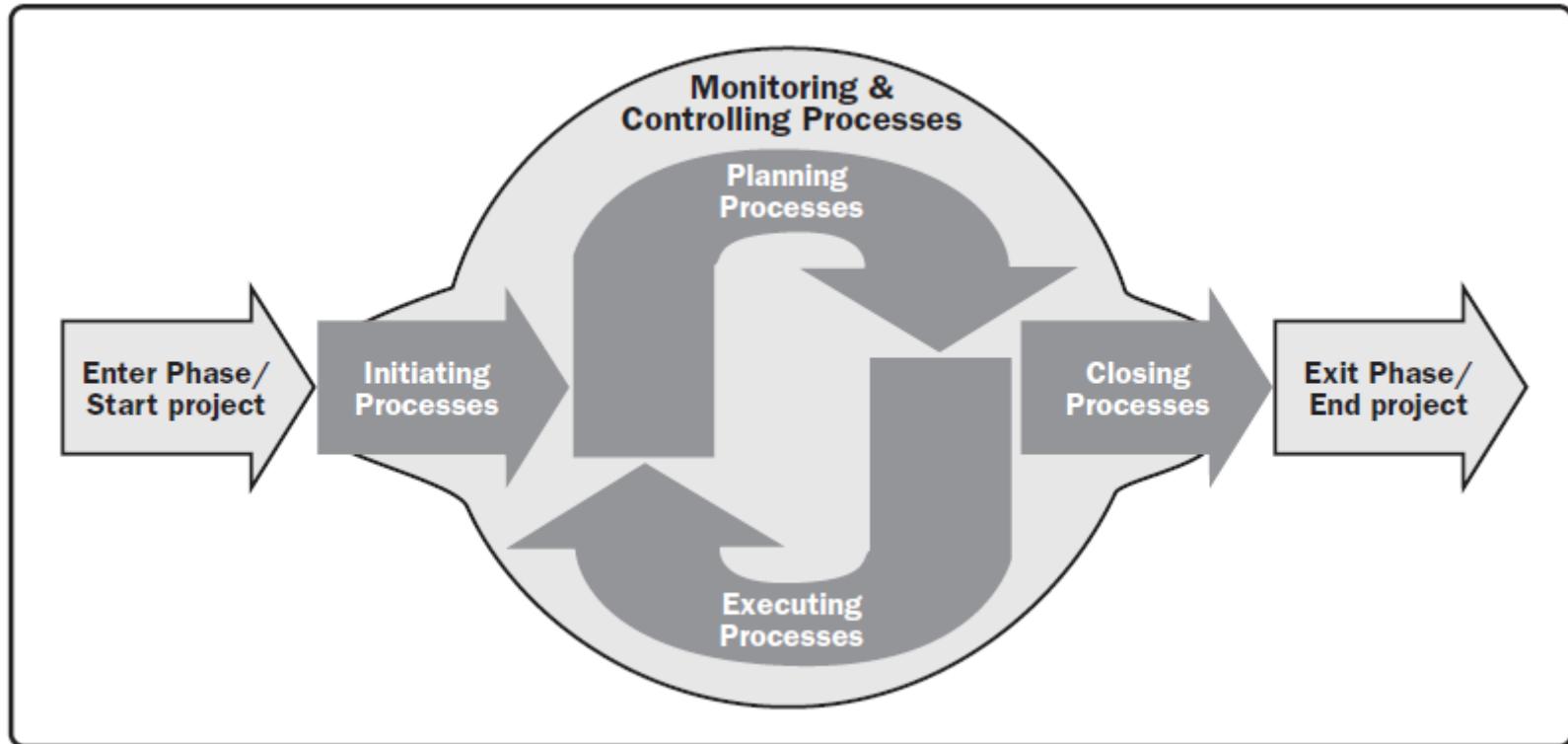
**Product-oriented processes**



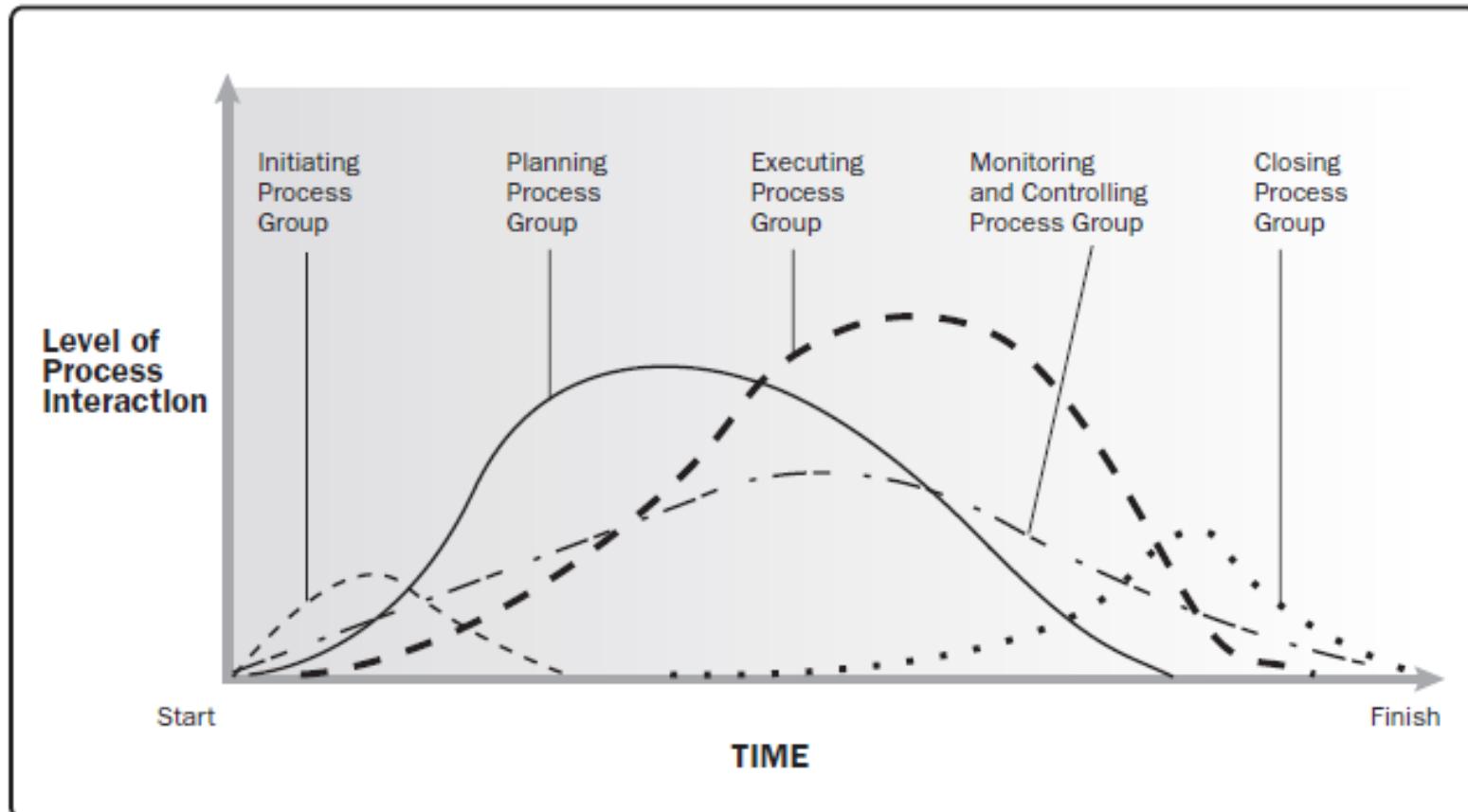
# Process Groups



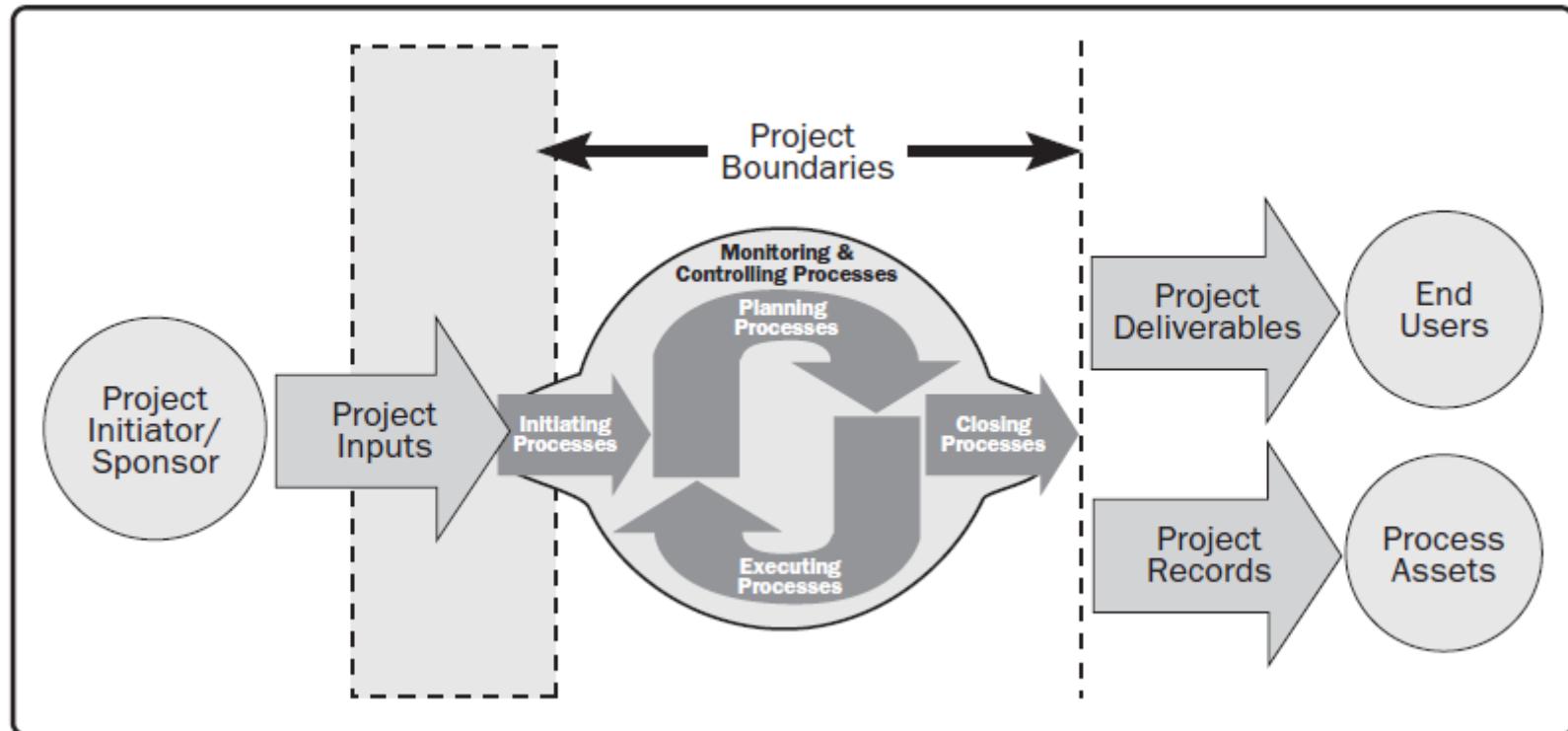
# Common process interactions



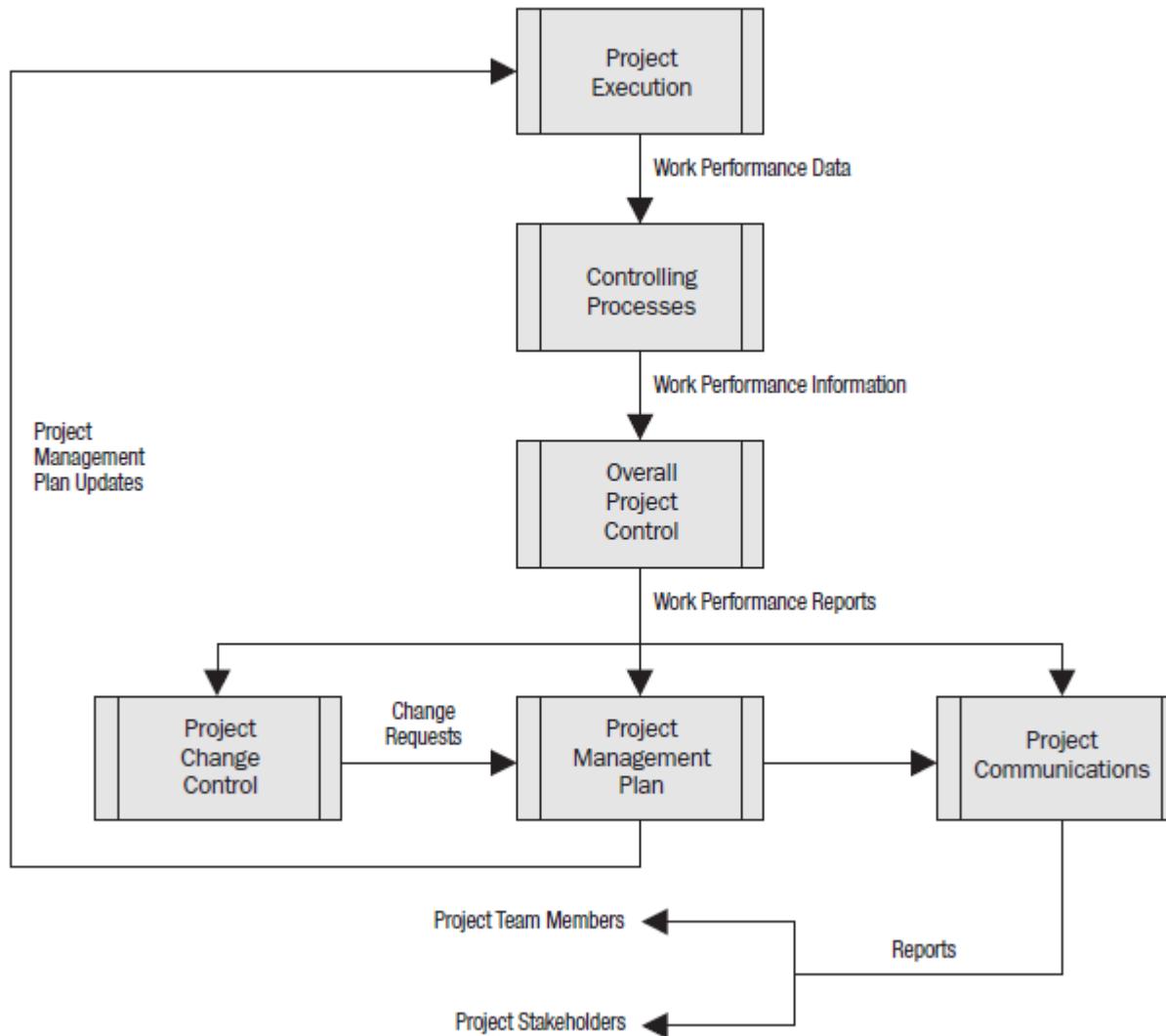
# Process group interactions



# Project Boundaries



# Project Information



Project Integration Management	Project Scope Management	Project Time Management	Project Cost Management	Project Quality Management
<ul style="list-style-type: none"> <li>• Develop Project Charter</li> <li>• Develop Project Management plan</li> <li>• Direct and Manage project Work</li> <li>• Monitor and control project work</li> <li>• Perform integrated change control</li> <li>• Close project or phase</li> </ul>	<ul style="list-style-type: none"> <li>• Plan Scope Management</li> <li>• Collect Requirements</li> <li>• Define Scope</li> <li>• Create WBS</li> <li>• Validate Scope</li> <li>• Control Scope</li> </ul>	<ul style="list-style-type: none"> <li>• Plan schedule Management</li> <li>• Define Activities</li> <li>• Sequence Activities</li> <li>• Estimate Activity Resources</li> <li>• Estimate Activity durations</li> <li>• Develop Schedule</li> <li>• Control Schedule</li> </ul>	<ul style="list-style-type: none"> <li>• Plan Cost Management</li> <li>• Estimate Cost</li> <li>• Determine Budget</li> <li>• Control Costs</li> </ul>	<ul style="list-style-type: none"> <li>• Plan quality Management</li> <li>• Perform Quality Assurance</li> <li>• Control Quality</li> </ul>
Project Human Resource Management	Project Communication Management	Project Risk Management	Project Procurement Management	Project Stakeholder Management
<ul style="list-style-type: none"> <li>• Plan Human Resource Management</li> <li>• Acquire Project team</li> <li>• Develop Project team</li> <li>• Manage project team</li> </ul>	<ul style="list-style-type: none"> <li>• Plan communications Management</li> <li>• Manage Communications</li> <li>• Control Communications</li> </ul>	<ul style="list-style-type: none"> <li>• Plan Risk Management</li> <li>• Identify Risks</li> <li>• Perform Qualitative Risk Analysis</li> <li>• Perform Quantitative Risk Analysis</li> <li>• Plan Risk Responses</li> <li>• Control Risks</li> </ul>	<ul style="list-style-type: none"> <li>• Plan Procurement Management</li> <li>• Conduct procurements</li> <li>• Control procurements</li> <li>• Close Procurements</li> </ul>	<ul style="list-style-type: none"> <li>• Identify Stakeholders</li> <li>• Plan Stakeholder Management</li> <li>• Manage Stakeholder Engagement</li> <li>• Control Stakeholder Engagement</li> </ul>



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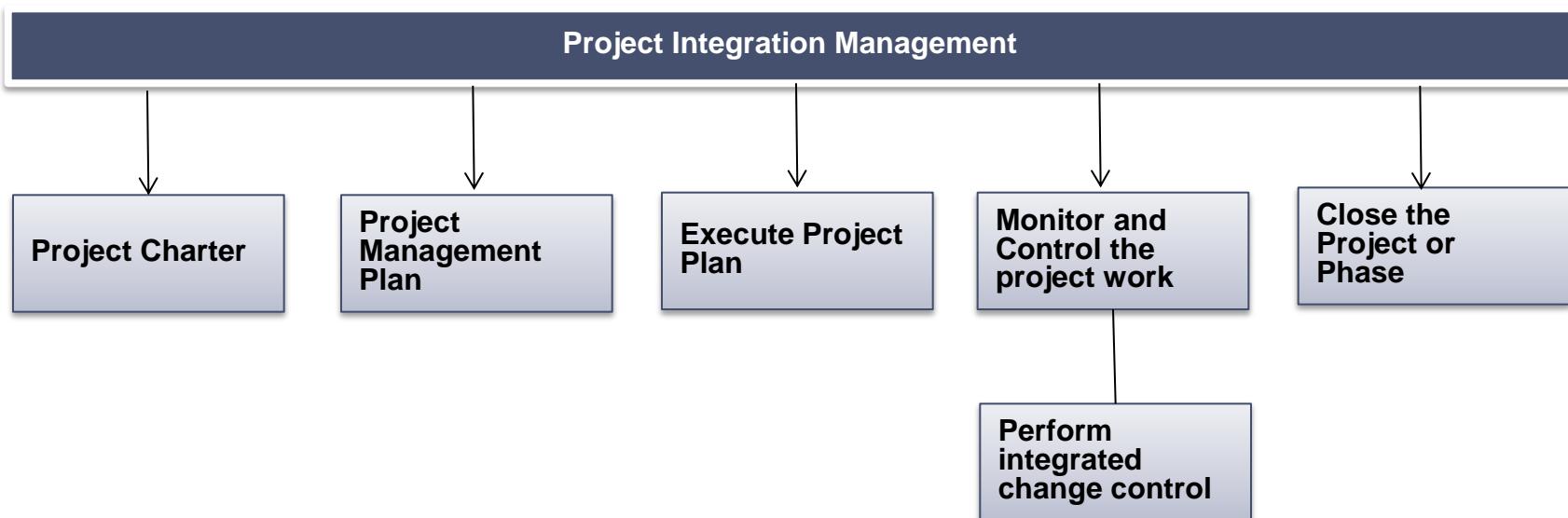
# **Project Management Professional**

## ***Module 4: Project Integration Management***

**PMBOK 5<sup>th</sup> Edition**

# Project integration management processes

Integration management consists of the processes to integrate the actions across knowledge areas and process groups



# Develop Project Charter

Develop Project Charter is the process of developing a document that formally **authorizes the existence of a project** and provides the project manager with the authority to apply organizational resources to project activities.



# Project statement of work

SOW is a narrative description of products, services , or results to be delivered by a project. For internal projects, project initiator or sponsor provides the statement of work based on business needs, product or service requirements.

For external projects, SOW can be received from the customer as part of the bid document (i.e. Request for proposal, RFI or Request for Bid) or as part of a contract.

SOW references the following:

- Business Need
- Product scope statement
- Strategic plan – Organization's strategic vision, goals and objectives and may contain high level mission statement.

# Business Case

Business case is used to justify the resources and the capital investment required by the project. Business case will answer following questions:

- Why is this project required?
- How will the project solve issues or opportunities facing the organization?
- What is the recommended solution?
- How are we recovering the costs?
- What will happen if we do not execute the project?
- How much money, people and time is required to complete the project?

# Agreement, enterprise environment factors and organization process assets

**Agreements** are used to define initial intentions for a project. Agreements may take the form of contracts, memorandums of understanding (MOUs), SLA, letter of agreements, letter of intent, verbal agreements, email or other written agreements.

**Enterprise environment factors** include, but not limited to:

- Governmental standards, industry standards, or regulations (e.g. codes of conduct, quality standards, or worker protection standards),
- Organizational culture and structure, and
- Marketplace conditions.

**Organizational process assets** include, but are not limited to:

- Organizational standard processes, policies, and process definitions,
- Templates (e.g., project charter template), and
- Historical information and lessons learned knowledge base

# Tools and Techniques

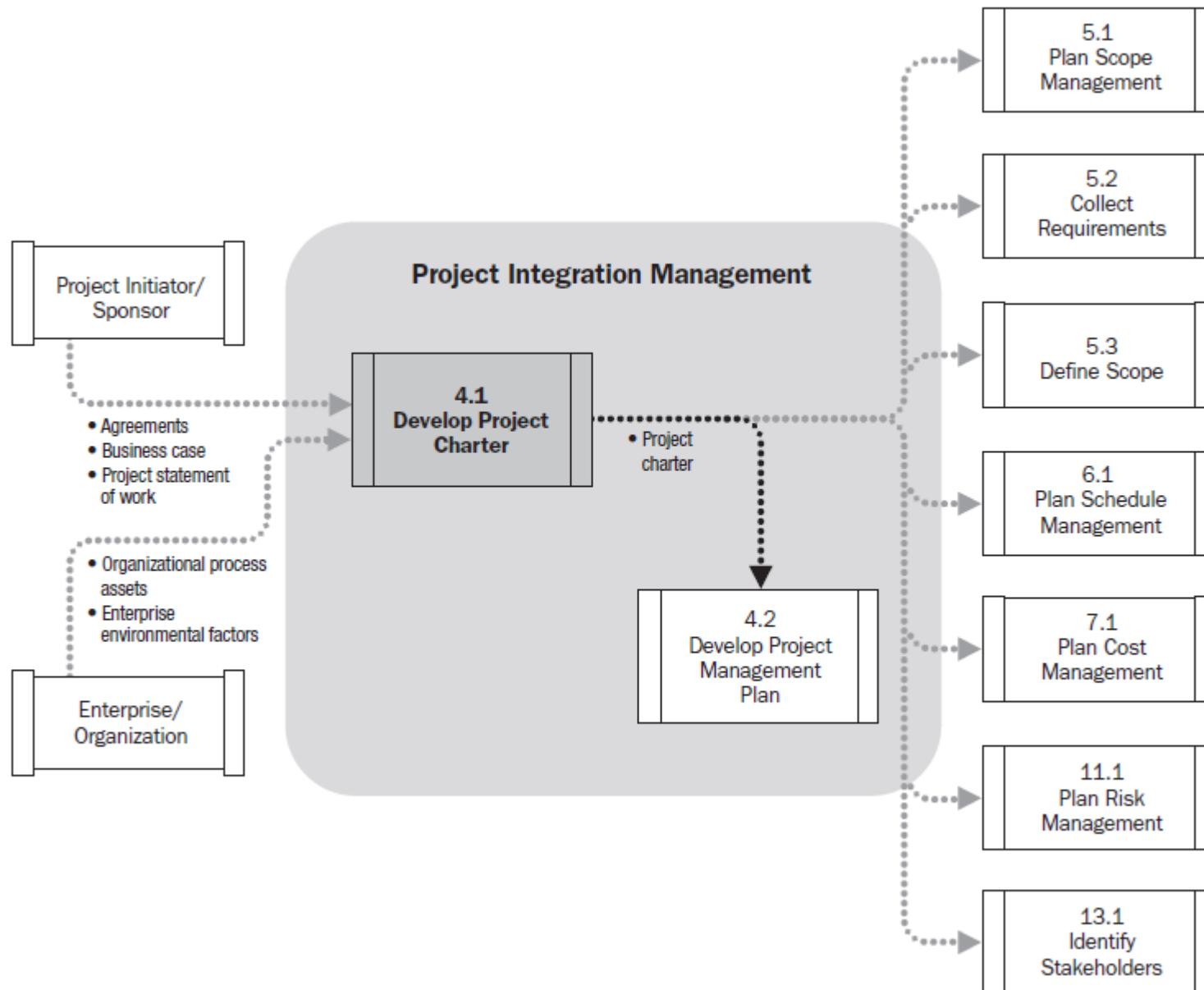
Expert judgment is often used to assess the inputs used to develop the project charter.

## Sources:

Other units within the organization  
Consultants  
Stakeholders, including customers or sponsors  
Professional and technical associations  
Industry groups  
Subject matter experts (SME), and  
Project management office (PMO).

## Facilitation Techniques

Brainstorming  
conflict resolution  
problem solving and  
management meeting.



# Project Charter

Project charter may include the following:

- Project purpose or justification
- Measurable project objectives and related success criteria,
- High-level requirements, Assumptions and constraints
- High-level project description, boundaries and High-level risk
- Summary milestone schedule, Summary budget and Stakeholder list
- Project approval requirements (i.e., what constitutes project success who decides the project is successful, and who signs off on the project)
- Assigned project manager, responsibility, and authority level, and
- Name and authority of the sponsor or other person(s) authorizing the project charter.



# Project selection method

- Benefits Measurement methods
  - Murder Boards
  - Scoring Models
  - Benefit/Cost Ratios (BCR)
  - The Payback Period
  - Discounted Cash flow
  - Internal Rate of Return (IRR)



## Benefits / Cost ratio (BCR)

- Cost - Benefits analysis involves estimating tangible and intangible costs and benefits (returns) of various projects and products.
- If  $BCR > 1$ , then the project is considered to be financially viable.



## Return on Investment

- ROI provides a way to compare the net profitability to the investment required.
- Common ROI % formula is  
 $(\text{Average Annual profit}/\text{Total Investment}) * 100$



## ROI Example

	Cash Inflow	Cash Outflow	Return
Cash Invested		35000	
1 <sup>st</sup> Year result	11,000	2000	9000
2 <sup>nd</sup> Year result	15,000	3000	12,000
3 <sup>rd</sup> Year result	20,000	5000	15,000
Average Profit $(9+12+15)/3=12$			12,000
ROI= $(12,000/35000)*100$			34.28%

## Payback Period

- Payback Period is the time taken to pay back the initial cash invested on the project.
- Shorter the payback period the more desirable the Project.



Year	Cash Flow Project A	Cash Flow Project B
1	-100,000	-100,000
2	50,000	20,000
3	25000	25000
4	★ 25000	25000
5	15000	★ 30000
6	15000	50000

## Discounted Cash flow

- Discounted cash flow accounts for the time and value of money.

- Future Value :

$$FV = PV(1+r)^n$$

- Present Value

$$PV = FV / (1+r)^n$$
 Where:

FV is Future Value

PV is Present Value

r is the interest rate

n is the number of time periods (years, quarters)



## Net Present Value (NPV)

- NPV is the difference of discounted benefits and expenses occurring over the period of time.
  - If  $NPV < 0$ , No real profit is occurring
  - If  $NPV > 1$ , it is a profitable project



## Internal Rate of Return (IRR)

- IRR is a complex formula to calculate when the PV of the cash flow equals to original investment.
- Projects with higher IRR are better than low IRRs

## Calculating Net Present Value (NPV)

Project A	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Benefit	0	2000	3000	4000	5000	14000
Cost	5000	1000	1000	1000	1000	9000
					Cashflow	5000

Project B	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Benefit	1000	2000	4000	4000	4000	15000
Cost	2000	2000	2000	2000	2000	10000
					Cashflow	5000

PV Table

# of Years	5%	10%	15%	20%
1	0.9524	0.9091	0.8696	0.8333
2	0.907	0.8264	0.7561	0.6944
3	0.8638	0.7513	0.6575	0.5787
4	0.8227	0.683	0.5718	0.4823
5	0.7835	0.6209	0.4972	0.4019

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Project A	-5000	1000	2000	3000	4000	5000
Discounted Cash Flow	-4545.5	826.4	1502.6	2049	2483.6	2316.1
Project B	-1000	0	2000	2000	2000	5000
Discounted Cash Flow	-909.1	0	1502.6	1366	1241.8	3201.3



# Develop Project management plan



- Defines and documents how the project is executed,  
Monitored/controlled and closed

- The Project plan guides the project manager through the “execution, monitor/control and close” process groups.
- The project plan is designed to control the project.
- As a whole, the objective of the project plan is to communicate to the project team, stakeholders, and management how the project will be managed and controlled.
- Integrates all subsidiary management plans and baselines.
- Major inputs are project charter and outputs from all other planning processes.

# Develop Project Management Plan



# Project management plan contents

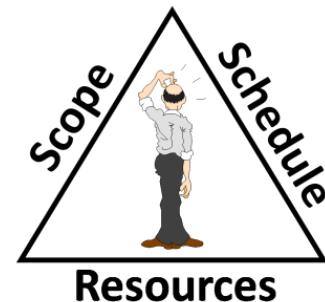
The project management plan is the document that describes how the project will be executed, monitored, and controlled.

Project baselines include, but are not limited to:

- Scope baseline ,
- Schedule baseline and
- Cost baseline

Subsidiary plans include, but are not limited to:

- Scope management plan
- Requirements management plan
- Schedule management plan
- Cost management plan
- Quality management plan
- Process improvement plan
- Human resource management plan
- Communications management plan
- Risk management plan
- Procurement management plan and
- Stakeholder management plan



# Project management plan contents contd..

Among other things, the project management plan may also include the following:

- Life cycle selected for the project and the processes that will be applied to each phase;
- Details of the tailoring decisions specified by the project management team;
- Description of how work will be executed to accomplish the project objectives;
- Change management plan that documents how changes will be monitored and controlled;
- Configuration management plan that documents how configuration management will be performed;
- Requirements and techniques for communication among stakeholders; and
- Key management reviews for content, the extent of, and timing to address, open issues and pending decisions.

# Communicate the project plan

A kickoff meeting for a new project is required to communicate the plan to all stakeholders. This will energize the group and establishes a common purpose.

- Define project objectives and goals
- Walk everyone through the project plan
- Empower the team to take responsibilities
- Explain communication plan – when and how often the project status meetings will be conducted



# Project plan and project documents

Project Management Plan	Project Documents	
Change management plan	Activity attributes	Project staff assignments
Communications management plan	Activity cost estimates	Project statement of work
Configuration management plan	Activity duration estimates	Quality checklists
Cost baseline	Activity list	Quality control measurements
Cost management plan	Activity resource requirements	Quality metrics
Human resource management plan	Agreements	Requirements documentation
Process improvement plan	Basis of estimates	Requirements traceability matrix
Procurement management plan	Change log	Resource breakdown structure
Scope baseline • Project scope statement • WBS • WBS dictionary	Change requests	Resource calendars
Quality management plan	Forecasts • Cost forecast • Schedule forecast	Risk register
Requirements management plan	Issue log	Schedule data
Risk management plan	Milestone list	Seller proposals
Schedule baseline	Procurement documents	Source selection criteria
Schedule management plan	Procurement statement of work	Stakeholder register
Scope management plan	Project calendars	Team performance assessments
Stakeholder management plan	Project charter Project funding requirements Project schedule Project schedule network diagrams	Work performance data Work performance information Work performance reports

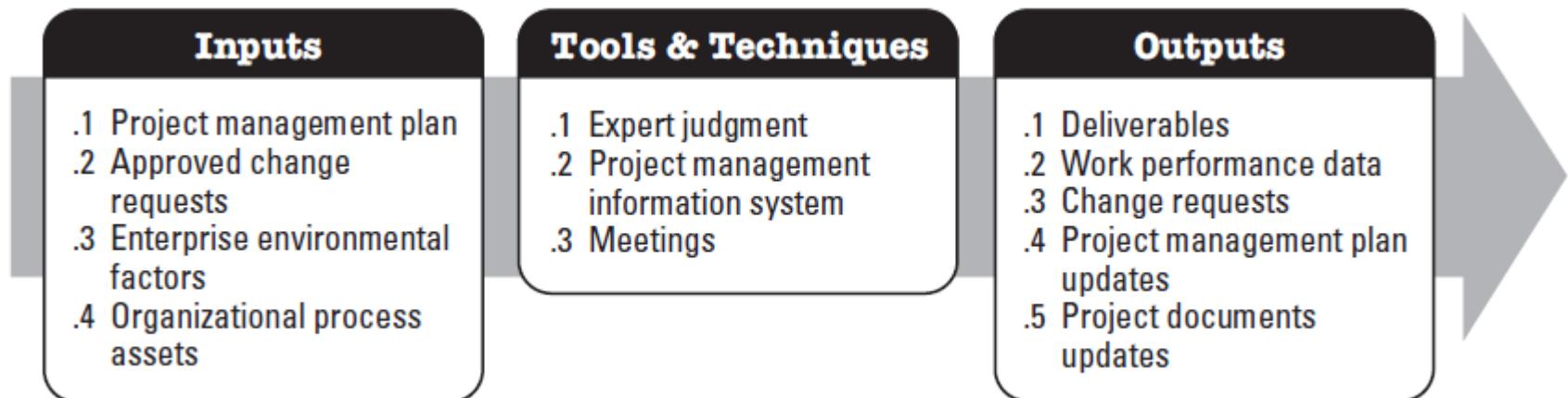
# Direct and Manage Project work

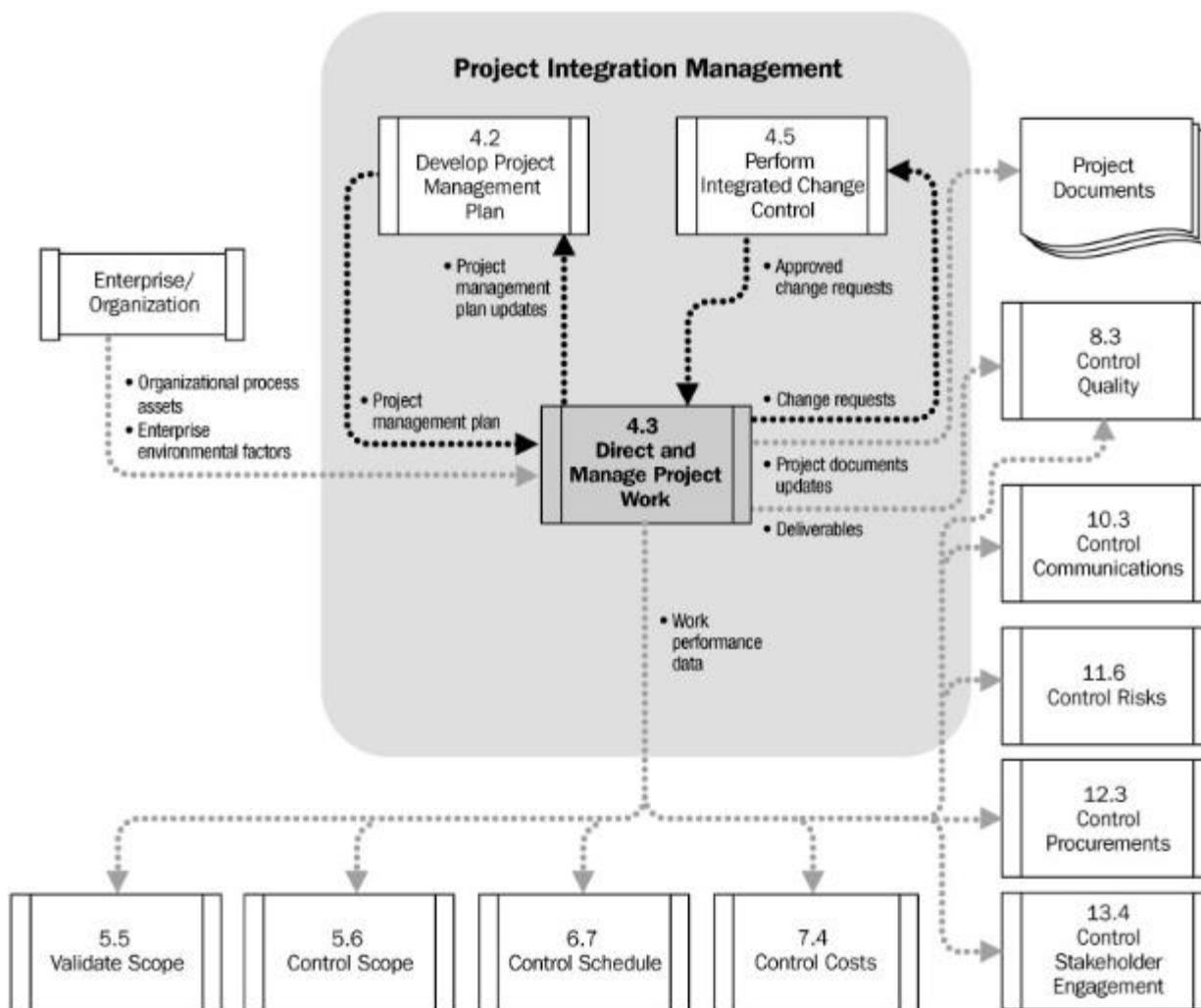


- The process of leading and performing the work defined in the project management plan and implementing approved changes to achieve the project's objectives.

- Perform activities defined in the project plan and create project deliverables
- Staff, train and manage the team members assigned to the project
- Implement the planned methods and standards
- Manage communication channels and generate data and status for forecasting
- Issue change requests and implement approved change requests
- Manage risks and implement risk response activities
- Manage sellers and suppliers
- Document lessons learned and implement process improvement activities

# Direct and Manage Project Work





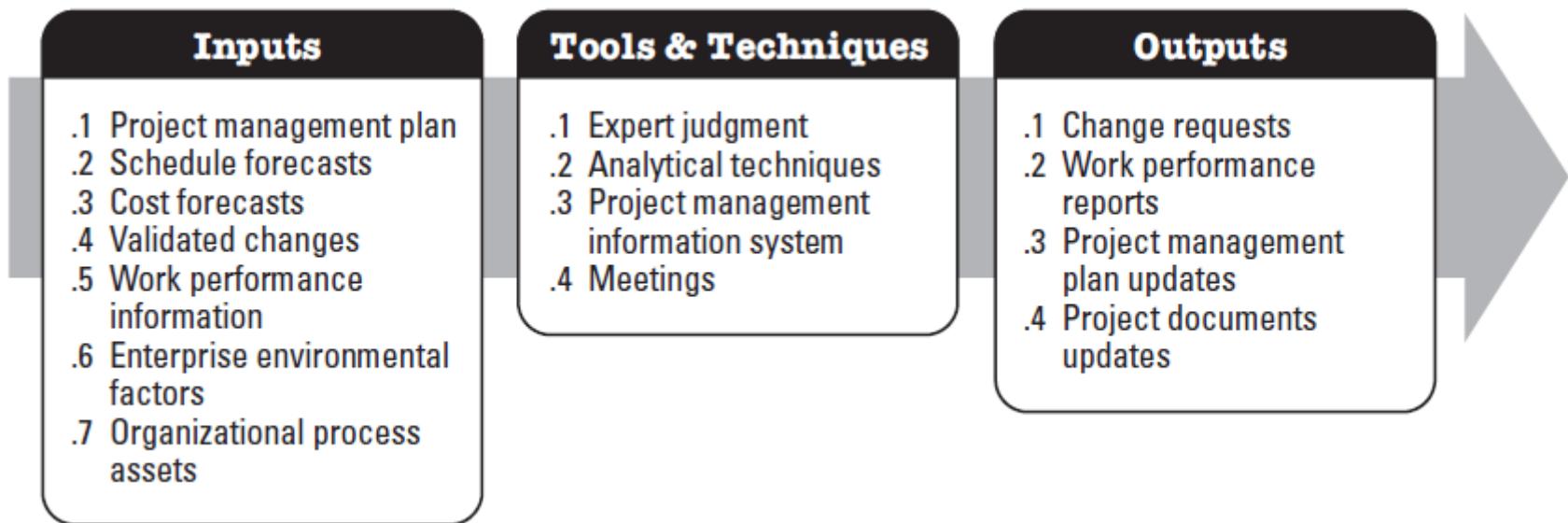
# Monitor and Control Project Work



- Process of tracking, reviewing, and regulating the progress to meet the performance objectives defined in the project management plan

- Comparing actual performance with project management plan
- Determine corrective and preventive actions are required and then recommend those actions
- Ensure risks are identified, their status is reported and risk response plans are executed
- Maintain an accurate, timely information base about products and their associated documents
- Status reporting, progress measurement and forecasting
- Update current cost and current schedule information
- Monitor implementation of approved changes

# Monitor and Control Project Work



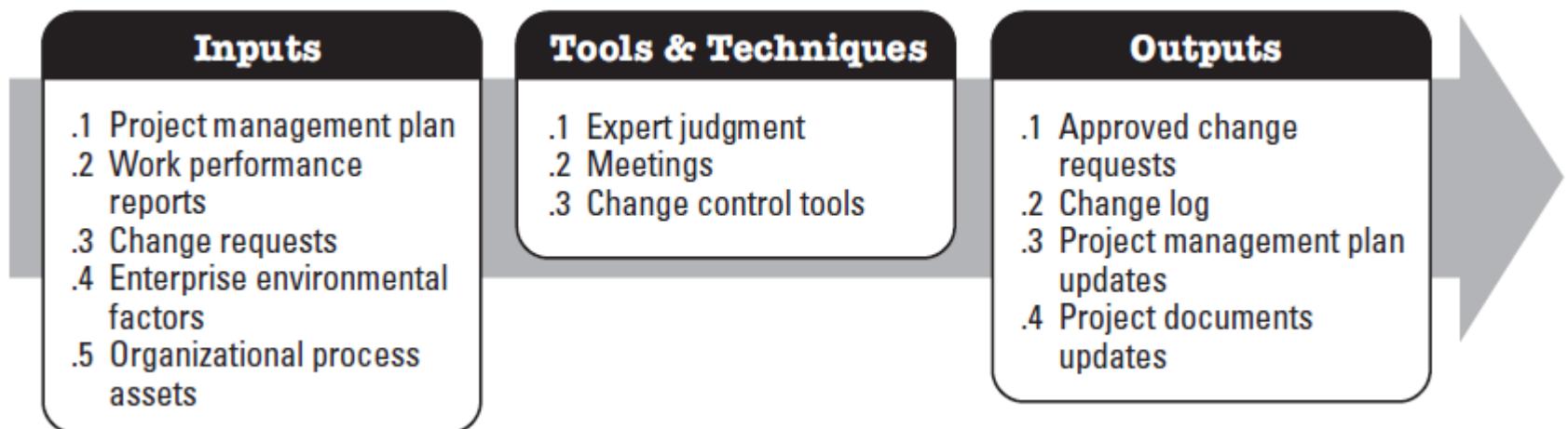
# Perform Integrated Change Control



- Process of reviewing all the change requests, approving/rejecting changes and managing changes.

- Review, analyze and approve change requests promptly.
- Ensure only approved changes are implemented.
- Managing approved changes.
- Coordinating changes across project life cycle (E.g. A Schedule change often impact cost, quality, resources, risk etc..).
- Documenting the complete Impact of change requests.

# Perform Integrated Change Control



PLAN B

~~PLAN A~~



# Configuration Management

•A Configuration management system provides a standardized , effective and efficient way to centrally manage approved changes and baselines within a project.

- Configuration Identification
- Configuration status accounting
- Configuration verification and audit

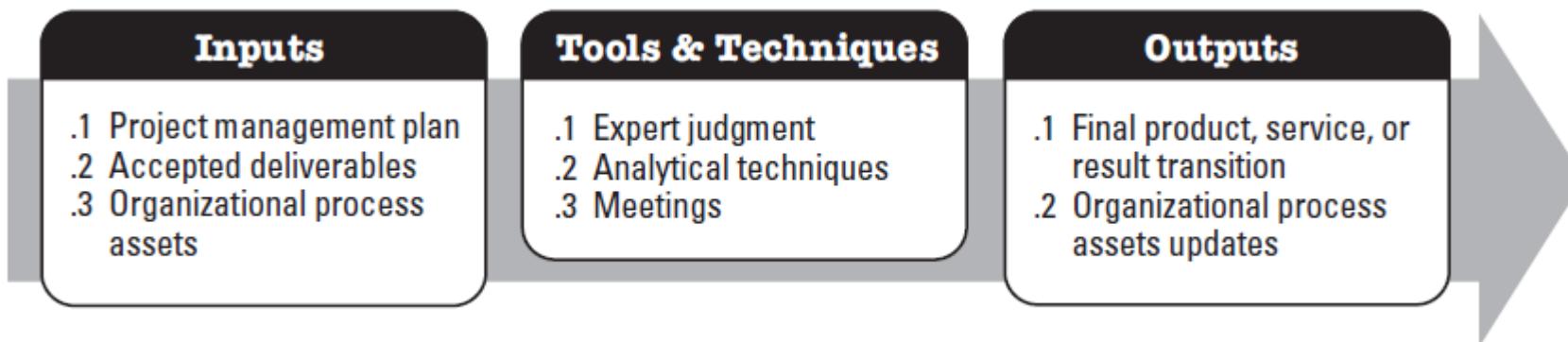


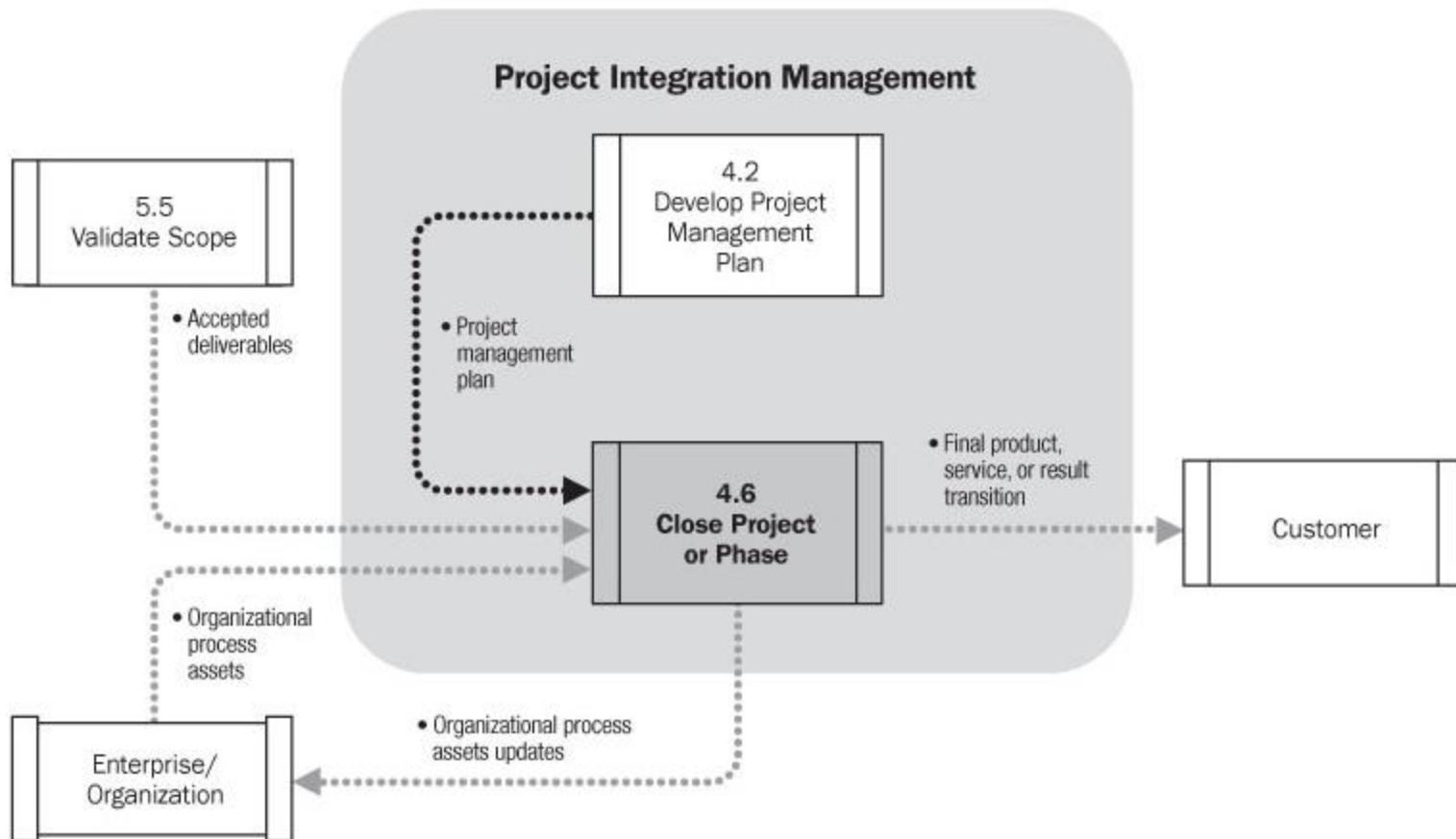
# Close Project or Phase



- Process of finalizing all activities across all of the project management process groups to formally complete the project or phase.
- Activities necessary to satisfy completion or exit criteria for the phase or project.
- Activities necessary to transfer the project's product, result or services to operations or to the next phase.
- Collect project or phase records, audit project success or failure, gather lesson learned and archive project information for future use.

# Close Project or Phase







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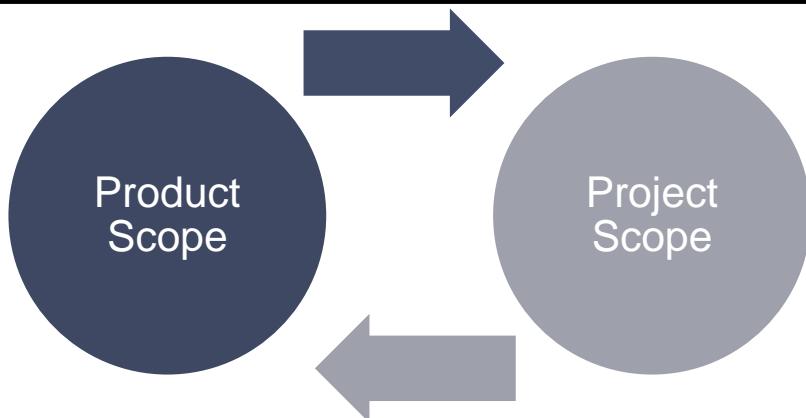
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## ***Module 5: Project Scope Management***

**PMBOK 5<sup>th</sup> Edition**

# Project Scope Management

- Define and Control what is and is not included in the project.
- Constantly checking to make sure all the work is completed
- Preventing Extra work being done (Gold plating).
- Addresses both the project scope and the product scope



- Project scope is based on the Product scope
- Project's execution completes the project scope, which in turn creates features and functions of the product scope

# Project Scope Management



Plan Scope Management—The process of creating a scope management plan that documents how the project scope will be defined, validated, and controlled.

Collect Requirements—The process of determining, documenting, and managing stakeholder needs and requirements to meet project objectives.

Define Scope—The process of developing a detailed description of the project and product.

Create WBS—The process of subdividing project deliverables and project work into smaller, more manageable components.

Validate Scope—The process of formalizing acceptance of the completed project deliverables.

Control Scope—The process of monitoring the status of the project and product scope and managing changes to the scope baseline.

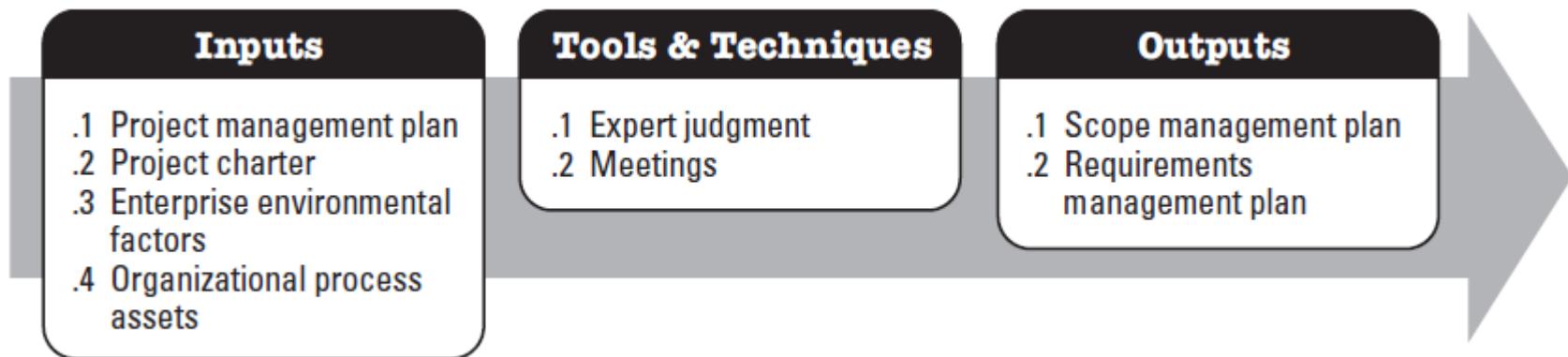
# Plan Scope Management



- The process of creating a scope management plan that documents how the project scope will be defined, validated, and controlled.

- Provides guidance and direction on how scope will be managed throughout the project.
- The scope management plan is a component of the project or program management plan that describes how the scope will be defined, developed, monitored, controlled, and verified.
- The scope management plan is a major input into the Develop Project Management Plan process, and the other scope management processes.
- The requirements management plan is a component of the project management plan that describes how requirements will be analyzed, documented, and managed.

# Plan Scope Management



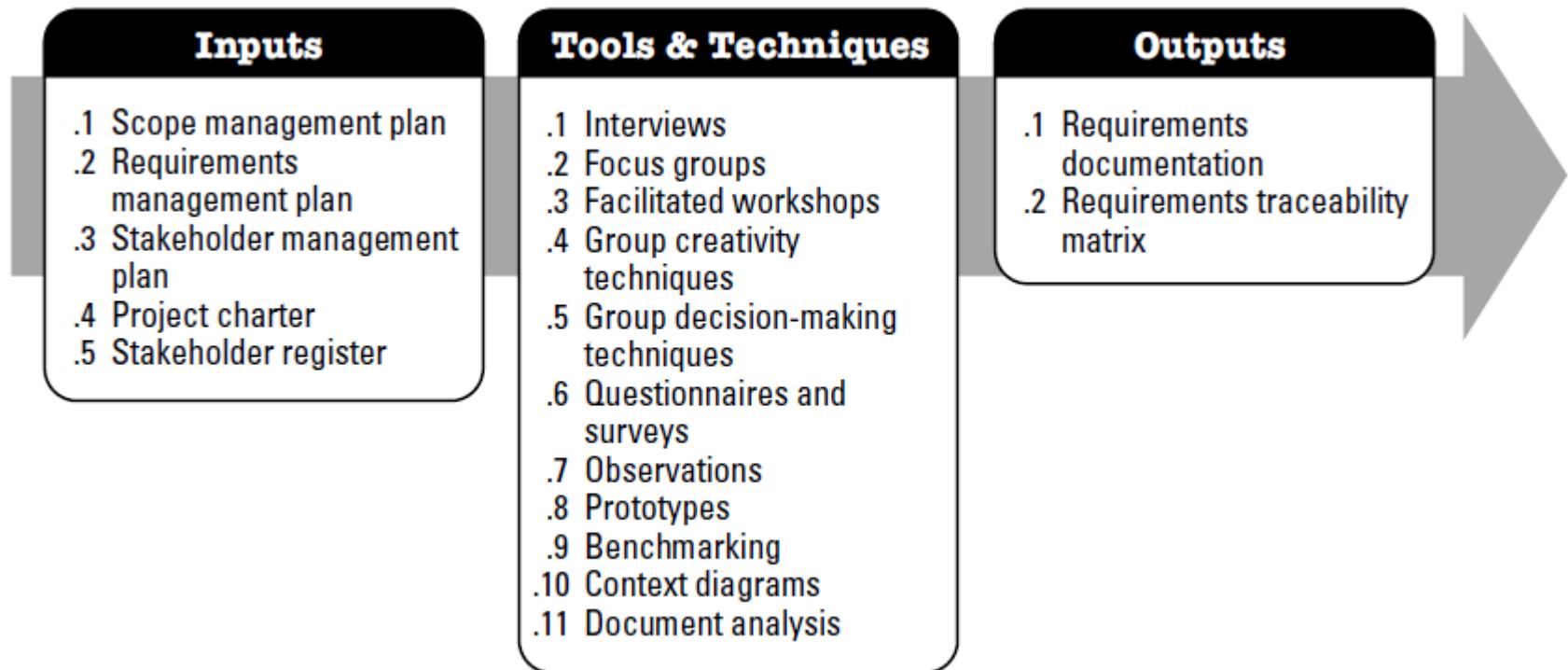
# Collect Requirement



- Collect Requirements is the process of determining, documenting, and managing stakeholder needs and requirements to meet project objectives.

- Provides the basis for defining and managing the project scope including product scope.
- Business requirements - the business issues or opportunities, and reasons why a project has been undertaken.
- Stakeholder requirements - needs of a stakeholder or stakeholder group.
- Solution requirements - features, functions, and characteristics of the product, service, or result.
  - Functional requirements
  - Nonfunctional requirements
- Transition requirements describe temporary capabilities.
- Project requirements - the actions, processes, or other conditions the project needs to meet.
- Quality requirements, which capture any condition or criteria needed to validate the successful completion of a project deliverable or fulfillment of other project requirements.

# Collect Requirement



# Tools and techniques

- **Interviews:** An approach to discover information from stakeholders by talking to them directly
- **Focus Groups:** Bring together stakeholders and SMEs to learn about their expectations about the product, service or result
- **Facilitated Workshops:** Focused sessions that bring key cross-functional stakeholders to define product requirements
- **Questionnaires and Surveys:** Set of questions designed to quickly accumulate information from a wide number of respondents
- **Observations:** Also called “Job Shadowing”. Direct way of viewing individuals in their environment and how they perform their jobs or tasks and carry out processes
- **Prototypes:** A method of obtaining early feedback on requirements by providing a working model of the expected product

# Tools and techniques

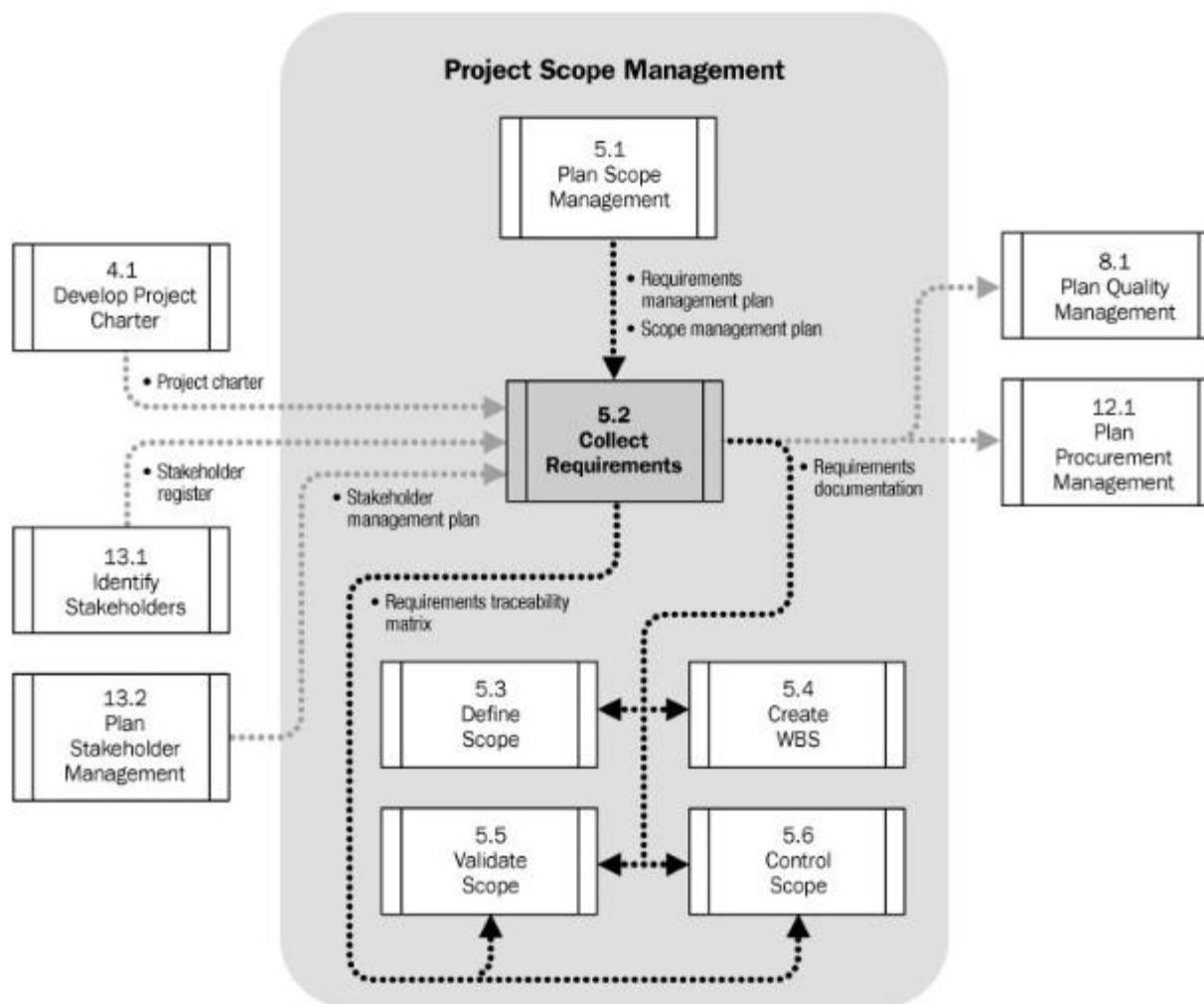
## Group Creativity Technique

- Brainstorming
- Nominal Group Technique
- Mind Mapping
- Affinity Diagram
- Delphi Technique

## Group Decision Making Technique

- Unanimity
- Majority
- Plurality
- Dictatorship





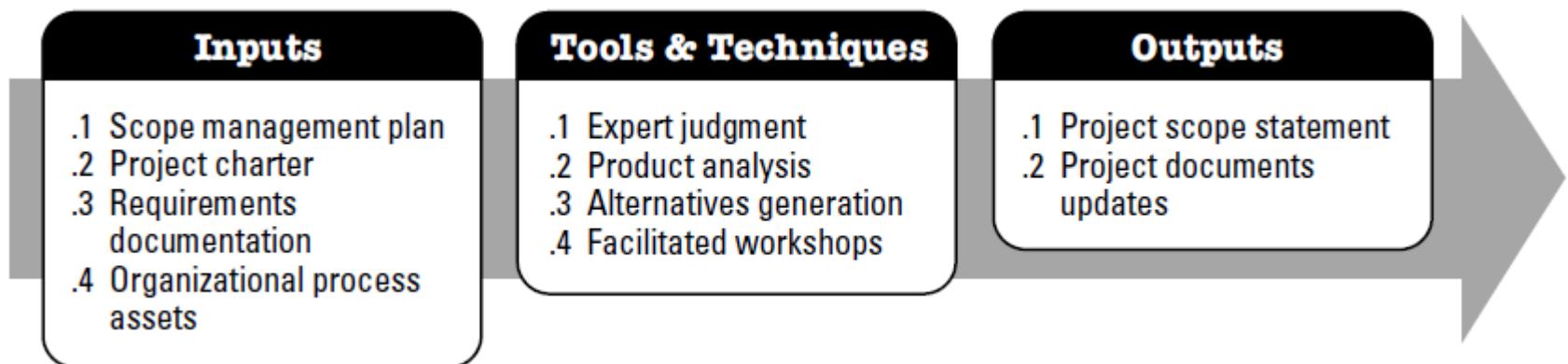
# Define Scope



- Process for developing detailed description of the project and product.

- It defines what work is needed to complete the project objectives
- It determines what is included in the project
- It serves as a guide to determine what work is not needed to complete the project objectives
- It serves as a point of reference for what is not included in the project

# Define Scope



# Tools and techniques

- Product Analysis Analyzing the product the project will create. Specifically, it involves understanding all facets of the product, its purpose, how it works, and its characteristics.
- Alternatives Identification Method of creating alternative solutions to the project's needs.
  - Brain storming
  - Lateral thinking

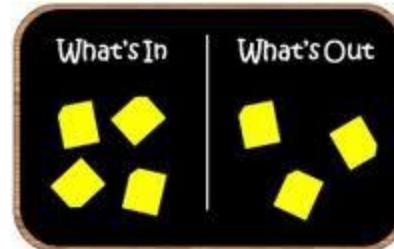
# Project Scope statement

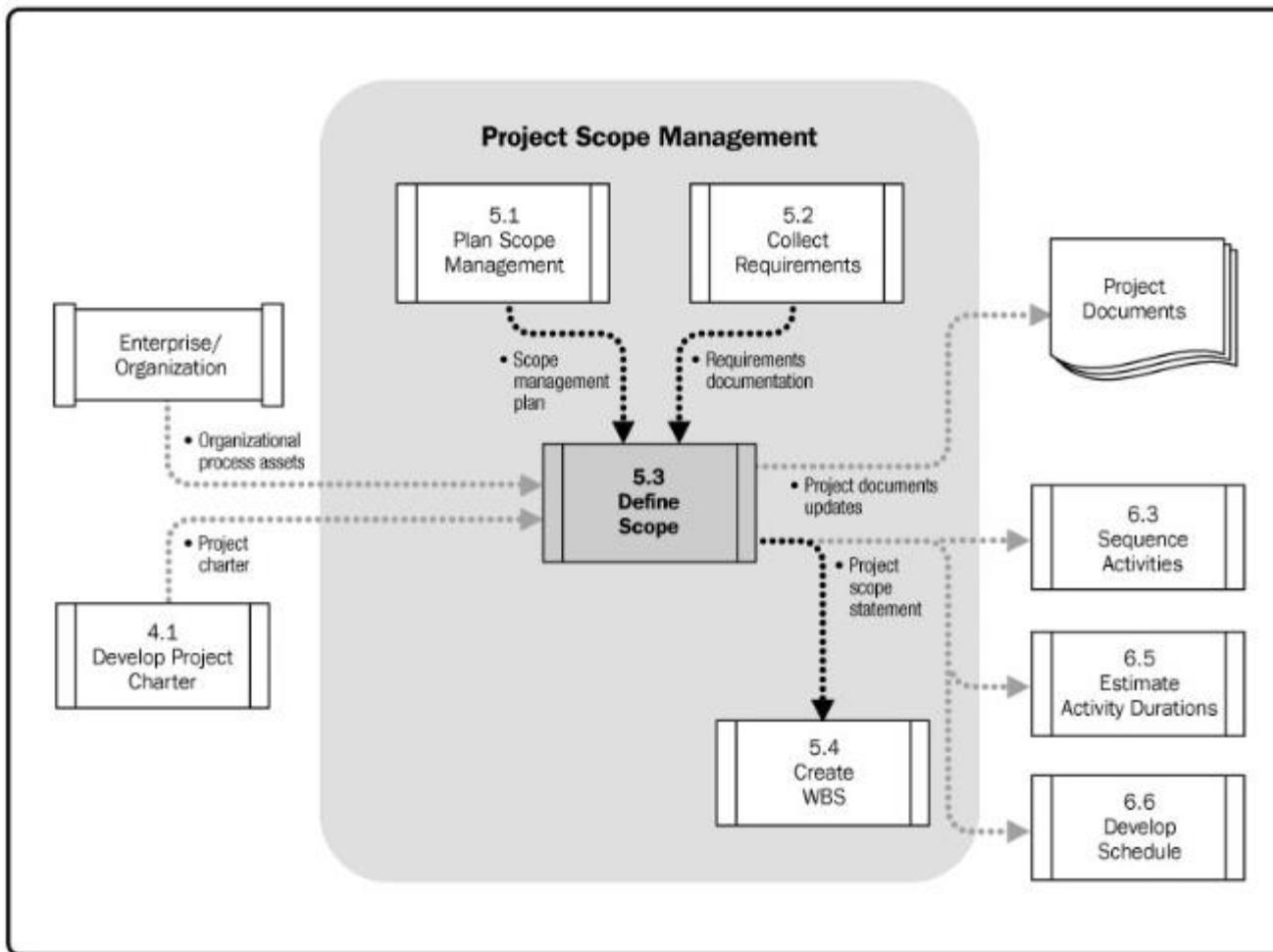
## Project Charter

- Project purpose or justification
- Measurable project objectives and related success criteria
- High-level requirements
- High-level project description
- High-level risks
- Summary milestone schedule
- Summary budget
- Stakeholder list
- Project approval requirements (what constitutes success, who decides it, who signs off)
- Assigned project manager, responsibility, and authority level
- Name and authority of the sponsor or other person(s) authorizing the project charter

## Project Scope Statement

- Project scope description (progressively elaborated)
- Acceptance criteria
- Project deliverables
- Project exclusions
- Project constraints
- Project assumptions





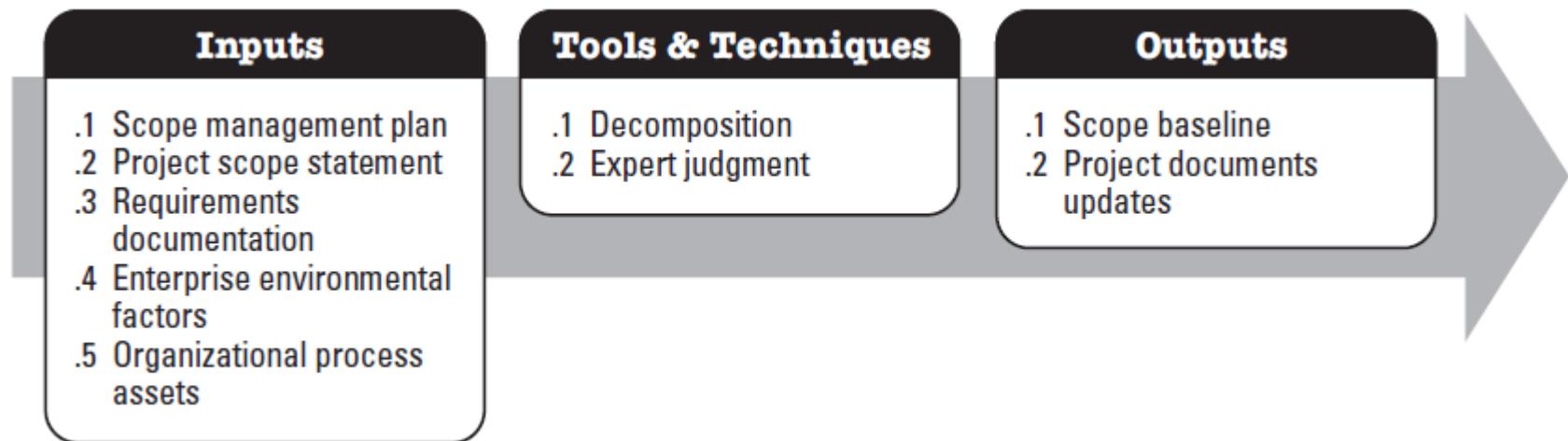
# Create WBS



- Process of subdividing project deliverables into smaller, more manageable components

- WBS serves as a foundation for planning, estimating, and project control
- It visualizes the entire project
- Work not included in the WBS is not part of the project
- It builds team consensus and buy-in to the project
- The WBS serves as a control mechanism to keep the project on track
- It allows for accurate cost and time estimates

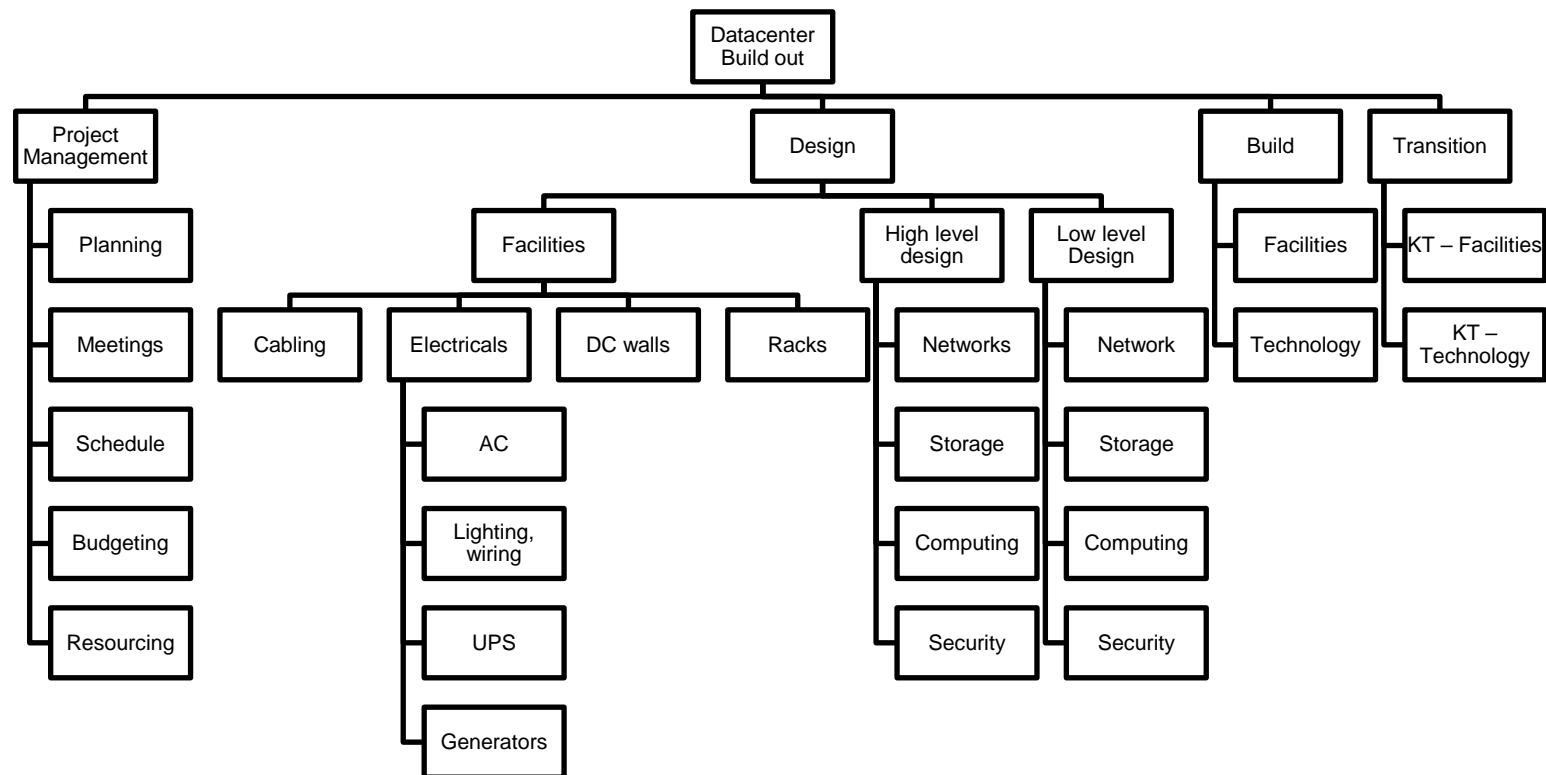
# Create WBS



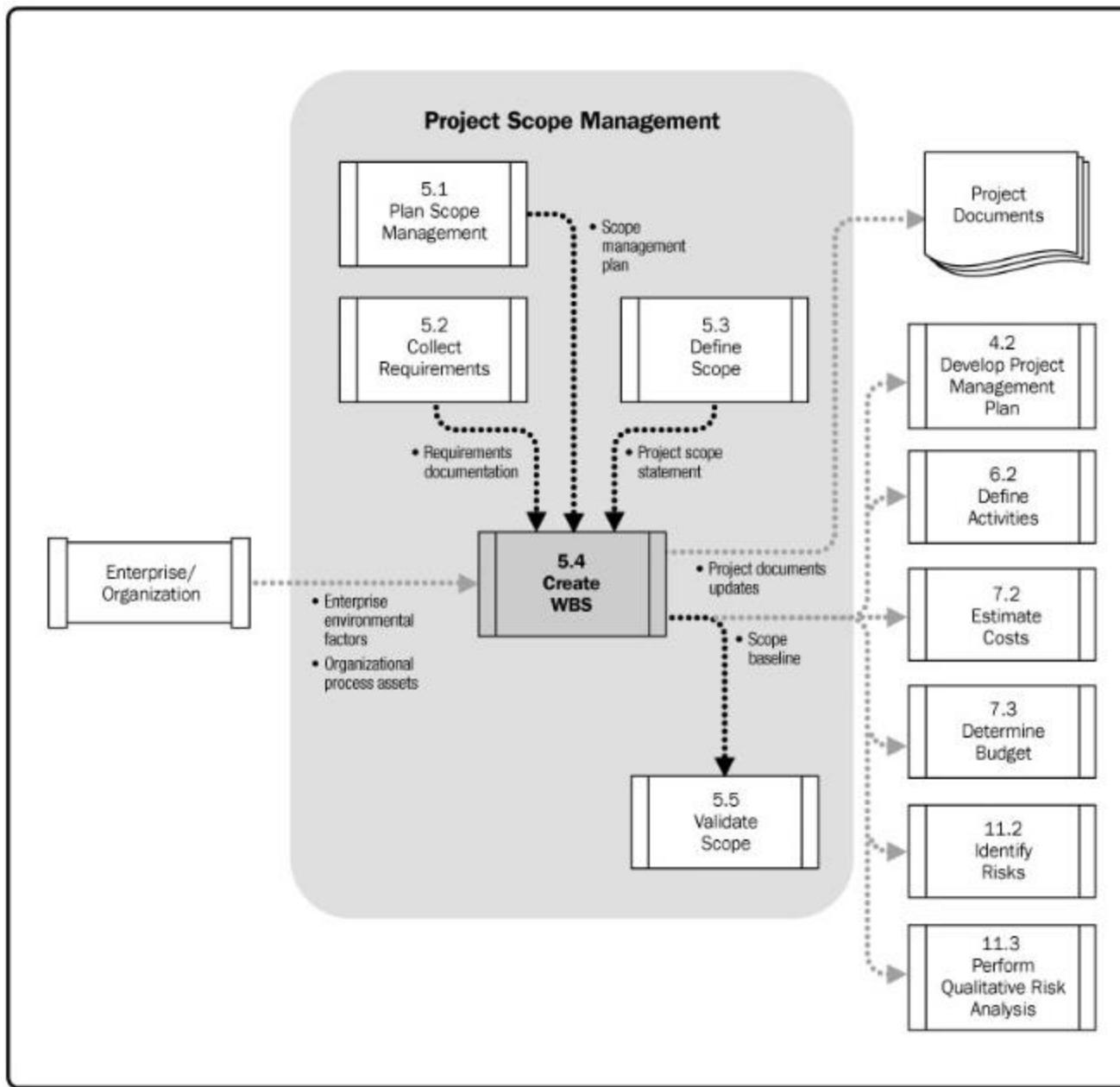
# Tools and Techniques

- Decomposition Decomposition is the subdivision project deliverables into smaller, more manageable components until the work and deliverables are defined to the work package level.
  - Identifying and analyzing the deliverables and related work
  - Structuring and organizing the WBS
  - Decomposing the upper WBS into lower level detailed components
  - Developing and assigning identification codes to the WBS components, and
  - Verifying that the degree of decomposition of the work is necessary and sufficient
- Start with Project phases – Major Deliverables-Subprojects/Work packages

# Sample WBS



- WBS Dictionary is a document that supports WBS. It provides more detailed information about the WBS components:
  - Description of work
  - Responsible organization
  - List of milestones
  - Associated Activities
  - Resources required
  - Cost estimates
  - Quality requirements
  - Acceptance criteria
  - Technical references
  - Contract information
- Scope Baseline: Scope baseline contains Scope statement, WBS and WBS Dictionary



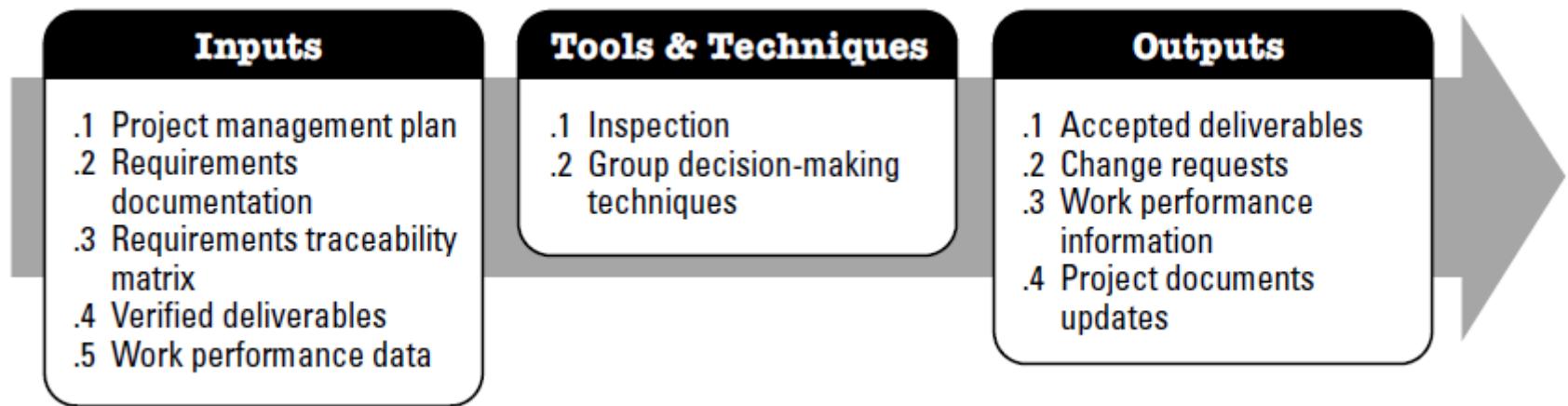
# Validate WBS



- Process of formalizing acceptance of completed project deliverables

- Reviewing deliverables with the customer or sponsor to ensure that they are completed satisfactorily.
- Obtain formal acceptance from customer or sponsor on the completed deliverables
- Scope validation differs from quality control. Scope validation focuses on acceptance of the deliverables , while quality control focuses on correctness of the deliverables.
- Quality control is generally performed before scope validation.

# Validate Scope



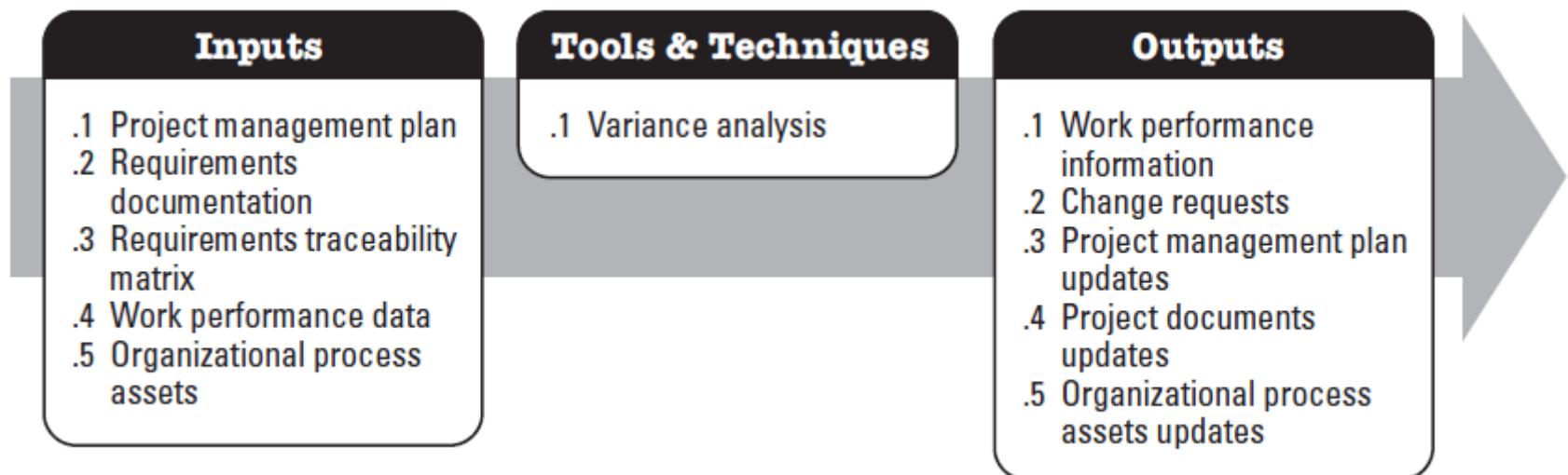
# Control Scope



- Process of monitoring the status of the project and product scope and managing the changes to the scope baseline

- Ensures all the requested changes and recommended preventive and corrective actions are processed through “Integrated change control” process
- Project scope control is also used to manage the actual changes when they occur
- Reduces the Scope creep (uncontrolled changes)
- Triggers for scope change can come from multiple sources

# Control Scope





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# **Project Management Professional**

## ***Module 6: Project Time Management***

**PMBOK 5<sup>th</sup> Edition**

# Project Time Management

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



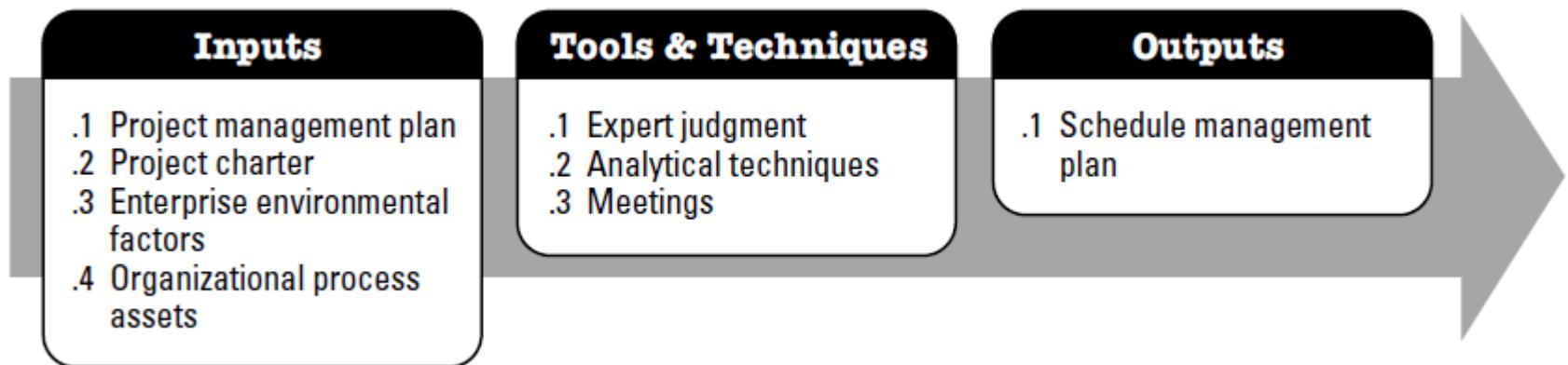
# Plan Schedule Management

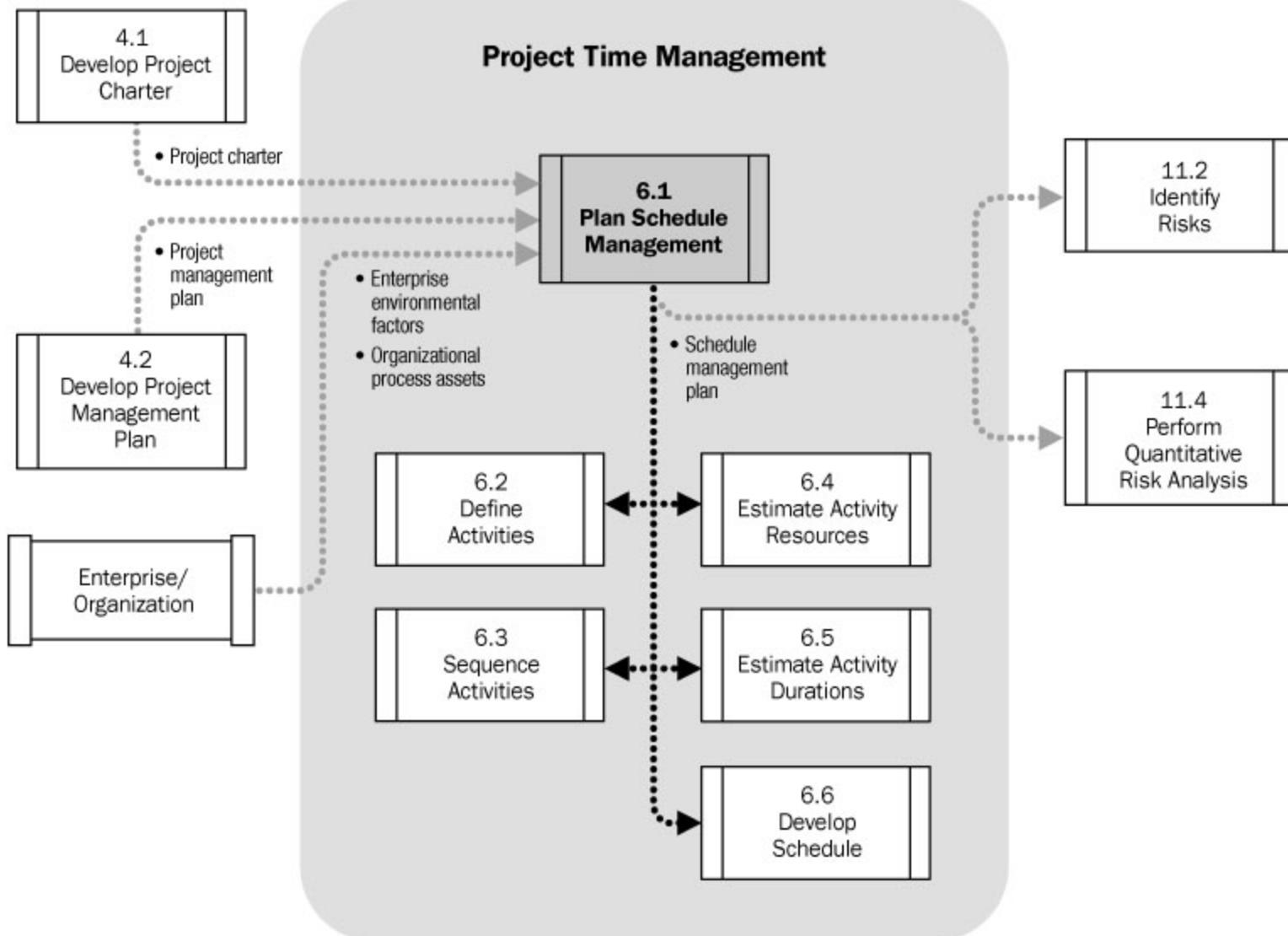


- The process of establishing the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule.

- Provides guidance and direction on how the project schedule will be managed throughout the project.
- Schedule Management plan is a component of the project management plan.

# Plan Schedule Management





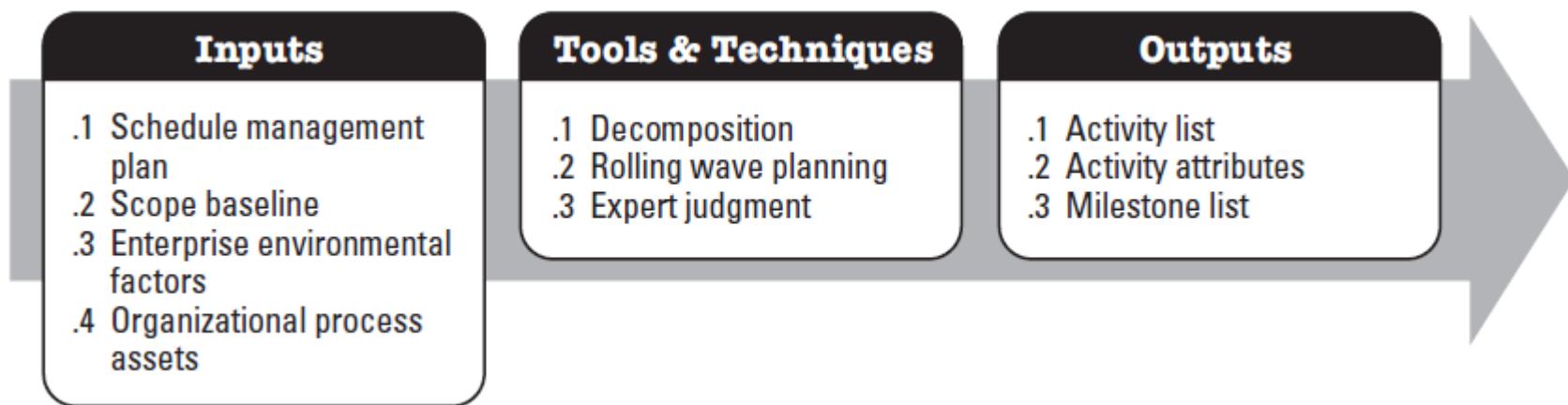
# Define Activities



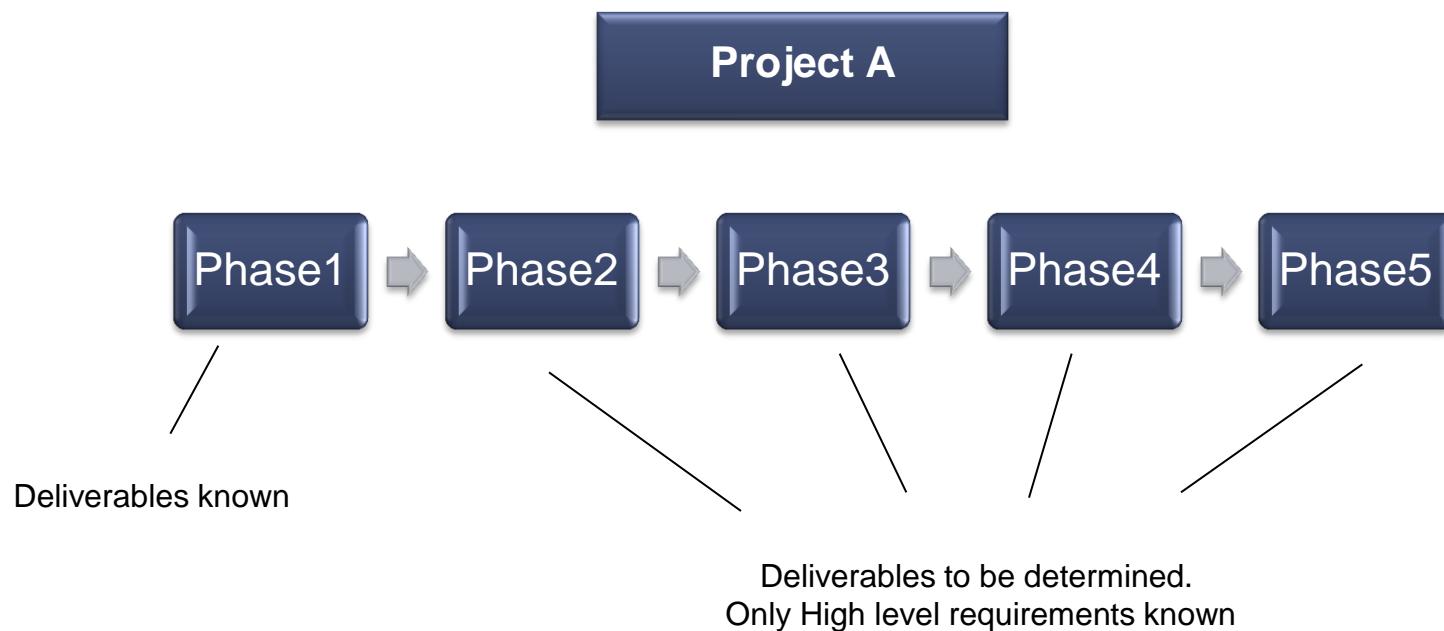
- Process for identifying the specific actions required to be performed to produce the project deliverables

- Project work packages are typically decomposed into smaller components called activities
- Activities provide basis for estimating, scheduling, executing, monitoring and control the project work

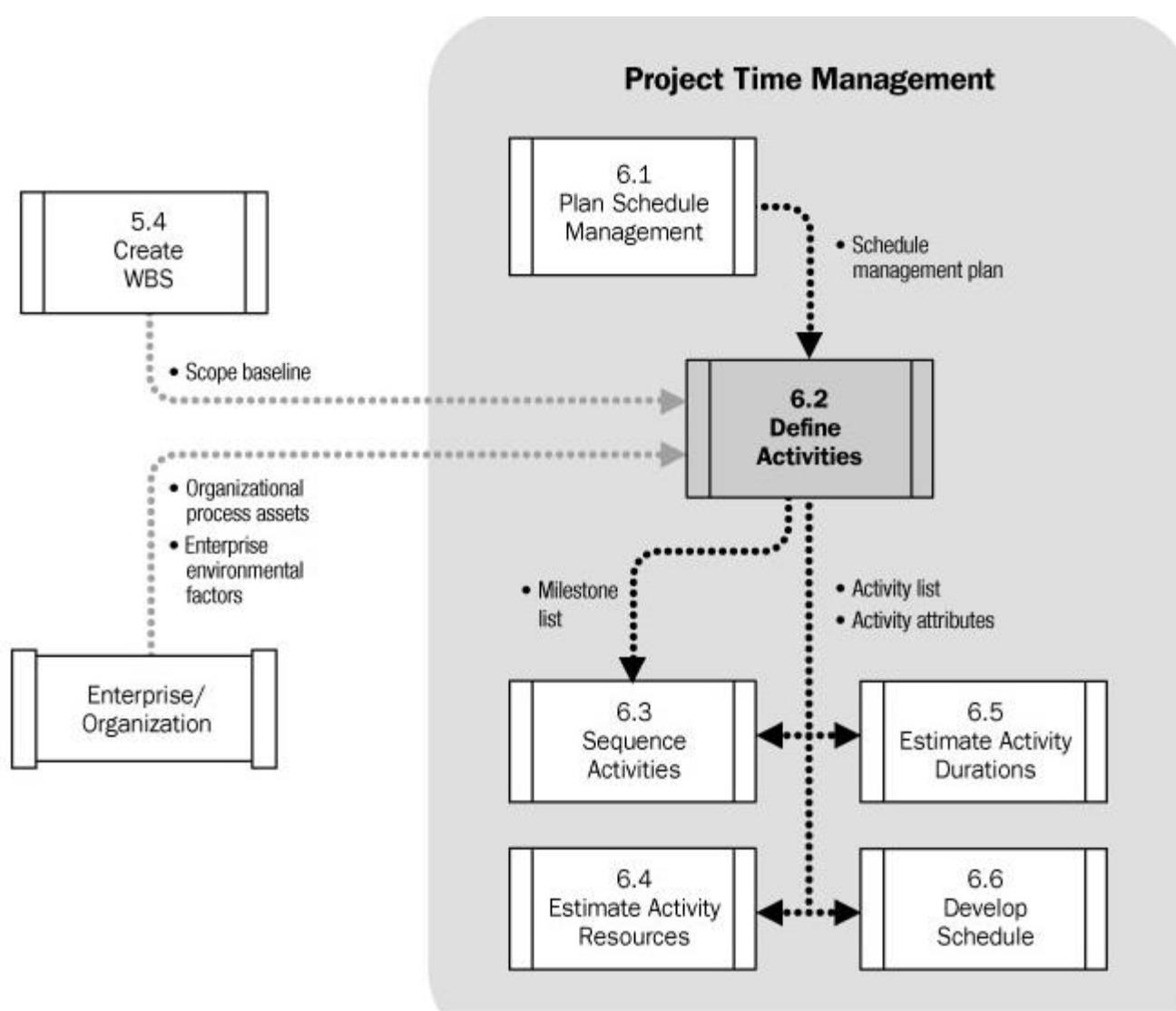
# Define Activities



# Rolling wave planning



- Activity List Includes all activities that needs to be performed on a Project
- Activity Attributes is an additional document of activity list, includes:
  - Activity name and description
  - Activity ID
  - WBS identifier
  - Relationships
  - Leads and lags
  - Resource requirements
  - Imposed dates
  - Constraints and assumptions
  - Additional information
- Milestones can be mandatory or optional. Milestones are “zero duration” activities.



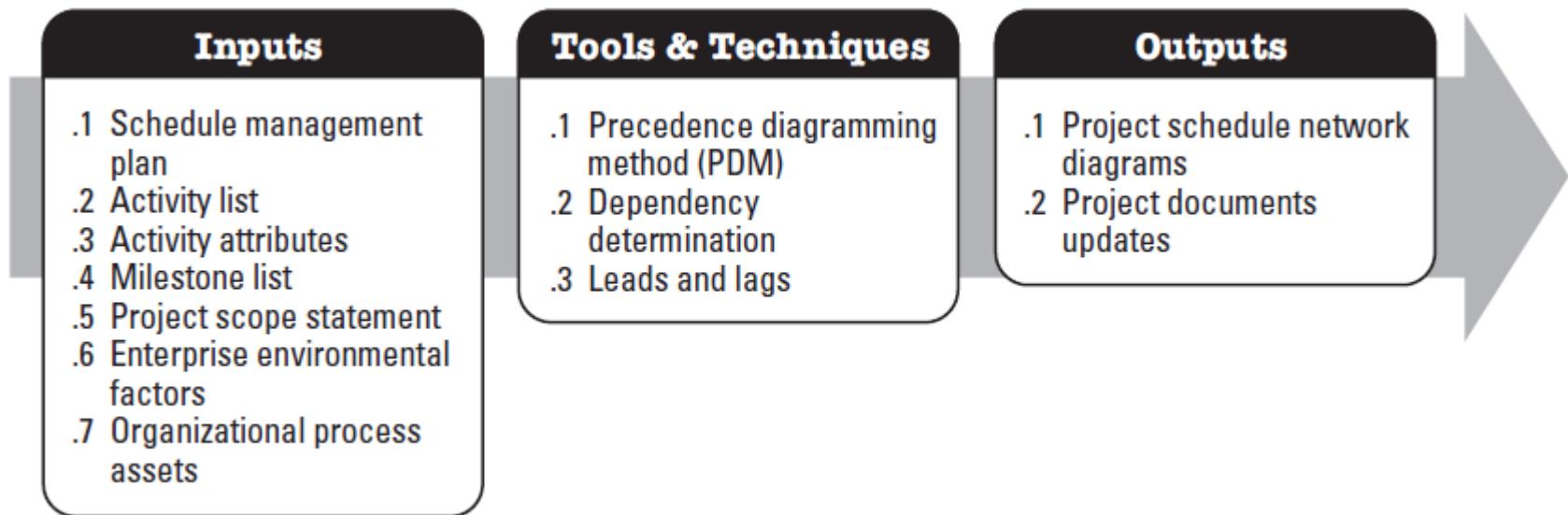
# Sequence Activities



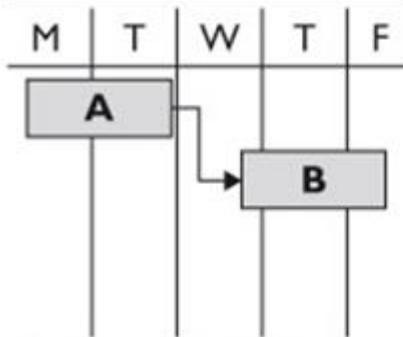
- Process for identifying and documenting relationships among project activities

- Each activity except the first and the last are connected to at least one predecessor or one successor.
- Leads and lags gives us a realistic and achievable project schedule
- Sequence can be performed by using project management software or manual techniques

# Sequence Activities

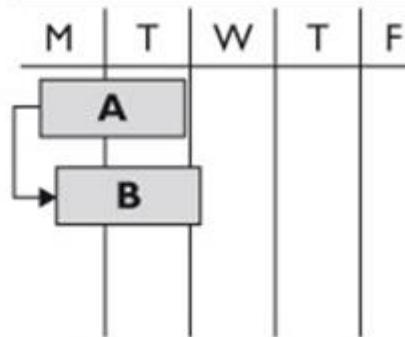


### Finish-to-Start



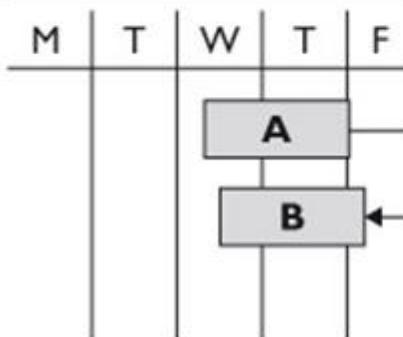
Task A must finish before  
Task B can start

### Start-to-Start



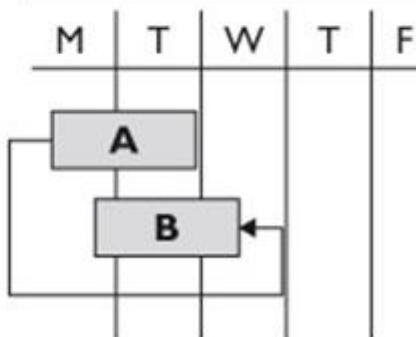
Task A must start before  
Task B can start

### Finish-to-Finish

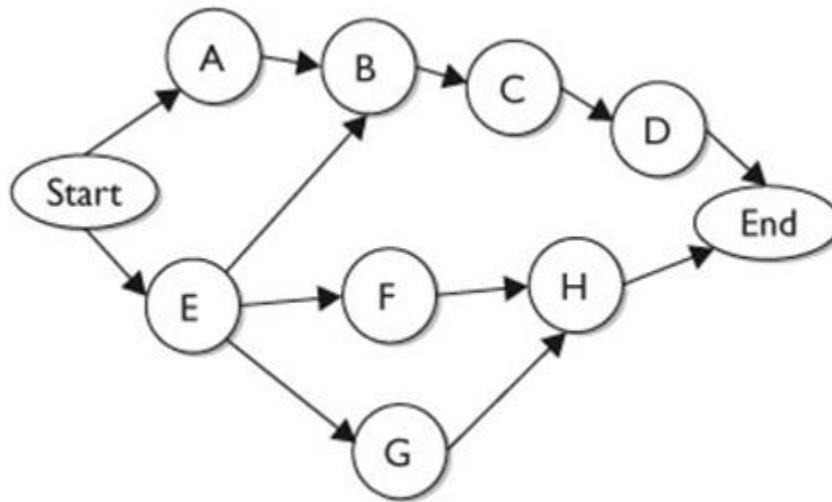


Task A must finish before  
Task B can finish

### Start-to-Finish



Task A must start before  
Task B can finish



### Precedence Diagramming Method(PDM)

- Also called as Activity-on-Node(AON) diagrams
- Activities are represented by boxes/circles
- Arrows show relationships between activities
- Can show four types of logical dependencies – FS,SS,SF and FF

# Dependency Determination

Mandatory Dependencies/Hard logic	Inherent nature of work Ex: Foundation activity has to complete before constructing a wall
Discretionary Dependencies/Preferred logic/soft logic	Activities are executed in order because of best practices or conditions unique to the project work Ex: Design review has to complete before build phase. Here review task can be mandatory or Optional based on the project nature
External dependencies	As the name implies, these are dependencies outside of the project's control. Ex: Approvals from Government agencies.

# Leads and Lags



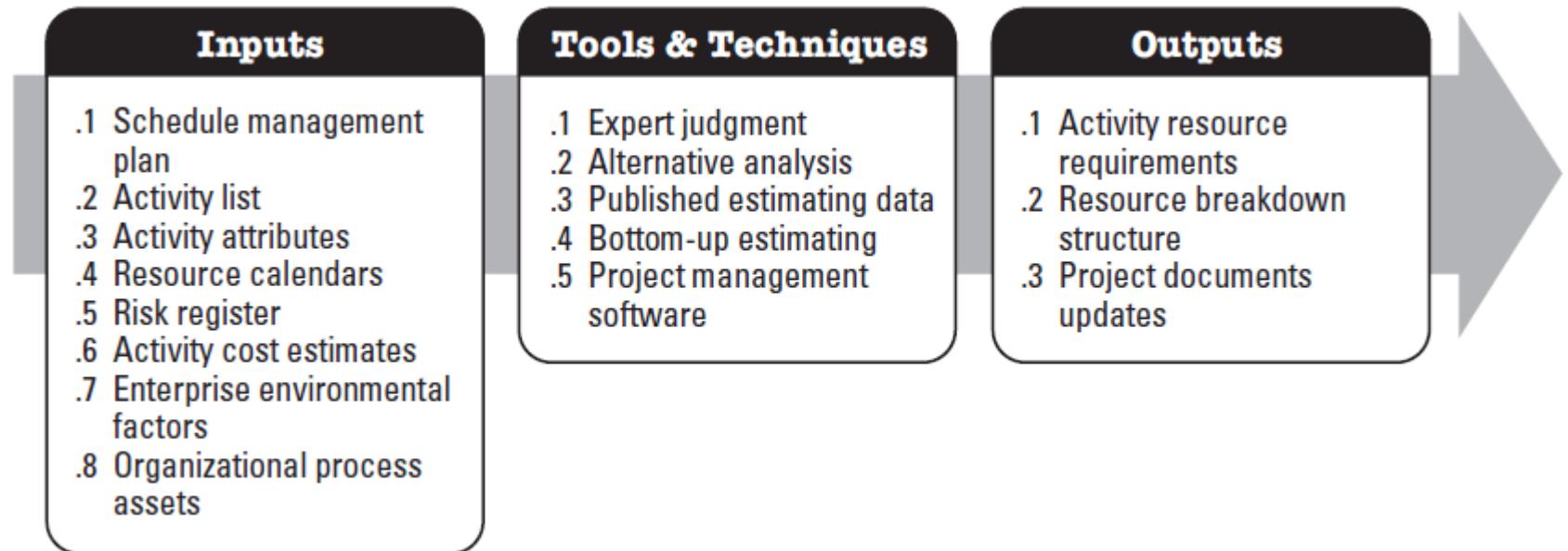
# Estimate Activity resources



- Process of estimating type and quantities of material, people or equipments required to perform each activity.

- Resources include materials, equipment, and people. After working out the sequence of the activities, we have to determine which resources are needed for each activity, as well as how much of each resource.
- Resource calendar is a good source of information for estimating resources
- Activity resource requirement and Resource breakdown structure (RBS) are the major outputs of this process

# Estimate Activity Resources



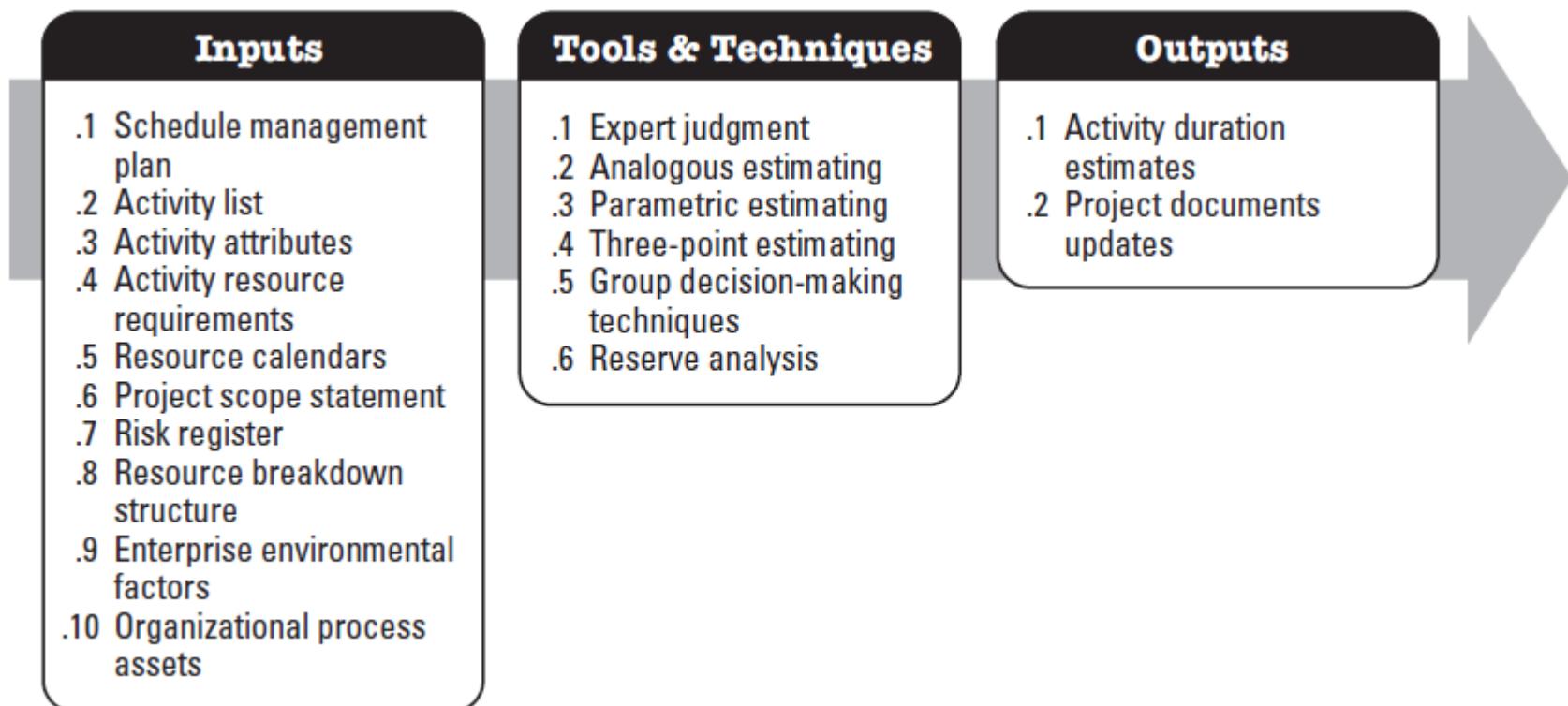
# Estimate Activity Duration



- Process of estimating the number of work periods needed to complete individual activities with estimated resources.

- The Duration estimate is progressively elaborated.
- The Duration Estimates are expressed “work periods” – could be Weeks or Days or Months
- Project Team is the best source for duration Estimating – however the project manager needs to take account the risk factors, cost estimates and buffers.

# Estimate Activity Duration



- Analogous Estimating uses parameters such as duration, budget, size and complexity from a previous similar project, as the basis for estimating.
- Parametric Estimating uses a statistical methods and tend to be more accurate as compared to analogous estimates but time consuming.
- Three point estimates (PERT Analysis)
  - Most likely( $t_M$ )
  - Optimistic( $t_O$ )
  - Pessimistic( $t_P$ )
    - Triangular Distribution =  $t_E = (tO + tM + tP) / 3$
    - Beta Distribution = 
$$t_E = \frac{t_0 + 4t_M + t_P}{6}$$
- Reserve Analysis Duration Estimates may include Contingency reserves.

# Develop Schedule

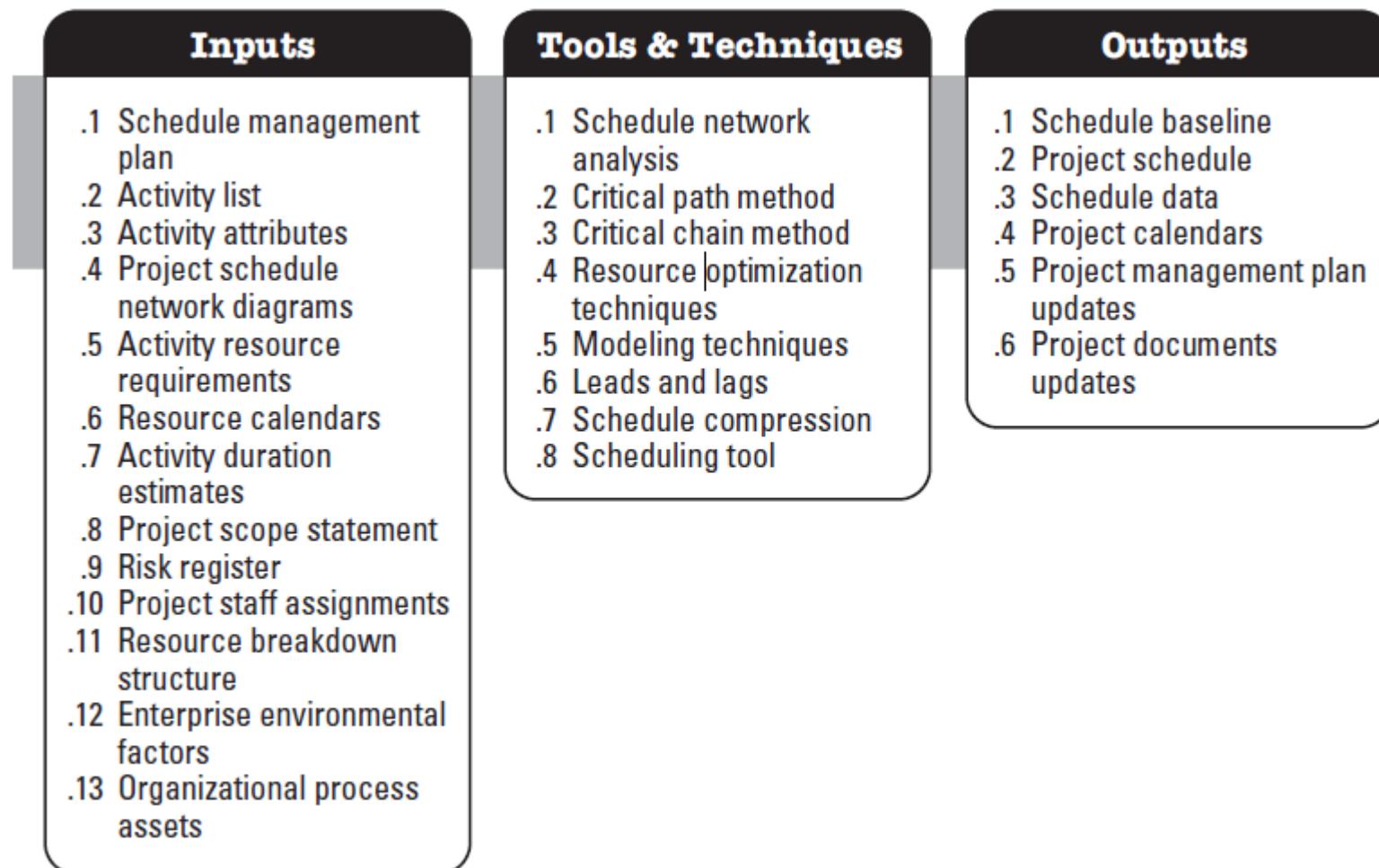


GOAL

- Process of analyzing activity sequences, durations, resource requirements, and schedule constraints to create project schedule.

- Developing an acceptable project schedule is often an iterative process.
- It determines the planned start and finish dates for project activities and milestones.
- Approved project schedule can serve as a baseline to track progress.
- Revising and maintaining a realistic schedule continues throughout the project as work progresses.

# Develop Schedule



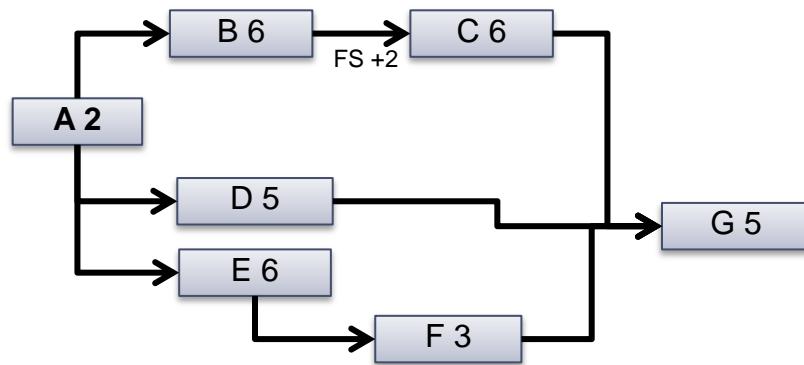
# Schedule constraints

Start no earlier than (SNET)	This constraint requires that the project or activity not start earlier than the predetermined date
Start no later than (SNLT)	This constraint requires the activity to begin by a predetermined date
Finish no later than (FNLT)	This constraint requires the project or activity to finish by a predetermined date
Finish no earlier than (FNET)	This constraint requires the activity to be in motion up until the predetermined date

## Critical path characteristics

- Longest path in the network and the minimum time in which project can be completed
- There can be more than one critical path, more they are – more risky for project manager
- Critical path can change as the project progresses
- To reduce project duration, reduce the duration of critical path activities
- Delays in non-critical activities can result in additional critical paths
- Critical Chain Method: Resource-constrained critical path is known as Critical chain.CCM modifies the project schedule to account for limited resources.
- Resource leveling: Resource leveling is necessary when resources have been over-allocated, such as
  - when a resource is assigned to two or more activities during the same time period.
  - When resources are available at certain times or only available at limited quantities

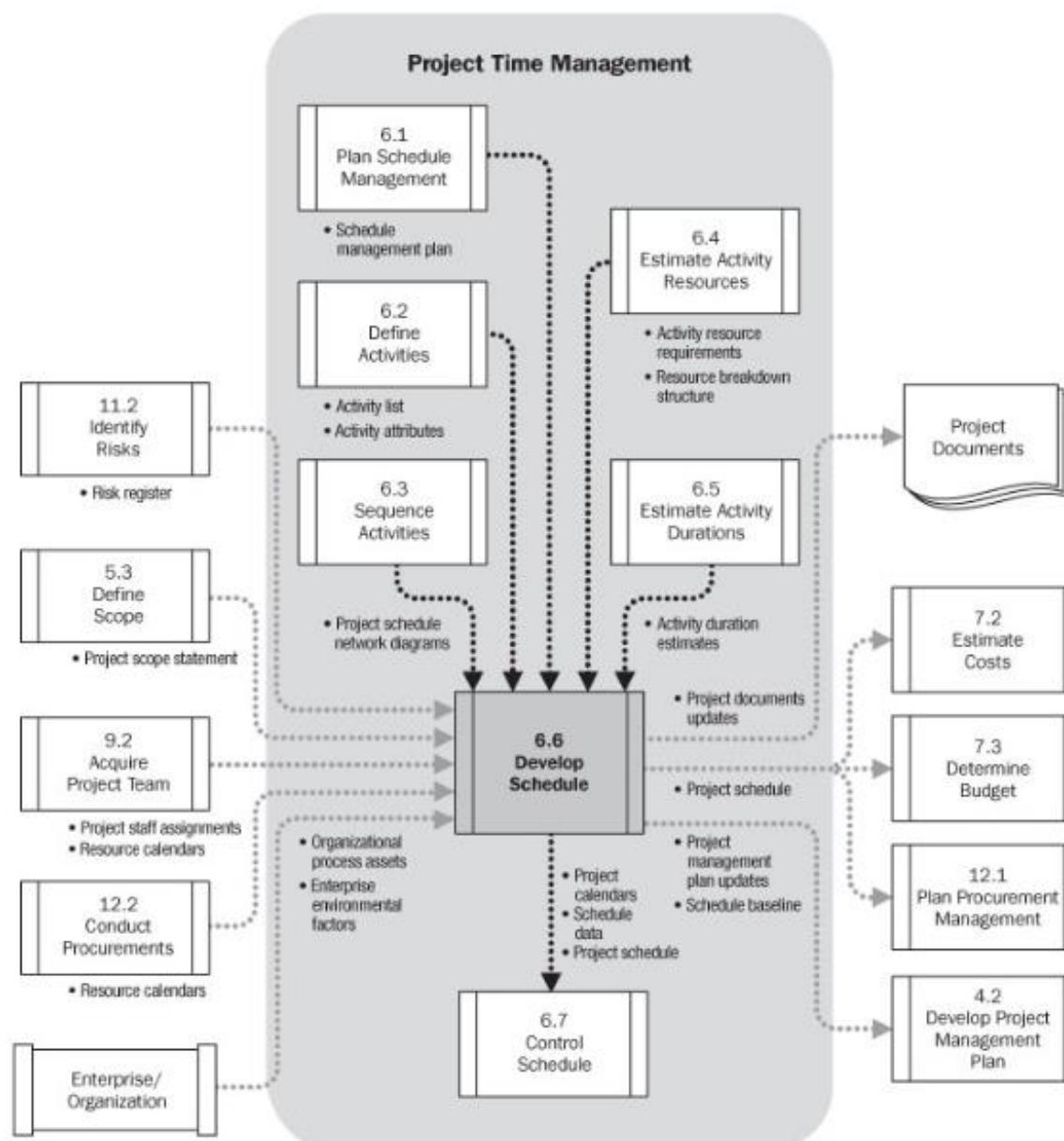
# Critical path calculation - Example



Activity	Duration	Predecessor	ES	EF	Successor	LS	LF	Float
A	2	-	0	2	B,D,E	0	2	0
B	6	A	2	8	C	2	8	0
C	6	B+2	10	16	G	10	16	0
D	5	A	2	7	G	11	16	9
E	6	A	2	8	F	7	13	5
F	3	E	8	11	G	13	16	5
G	5	C, D, F	16	21	-	16	21	0

# Schedule analysis

- What-if Scenario analysis: This is an analysis of the question “what if the situation represented by scenario “X’ happens?”, such as
  - Delaying major component delivery
  - Strike or a change in the approval process
  - Extending duration of some activities..etc.
- Helps in calculating multiple project durations with different assumptions
- The most common technique is Monte Carlo analysis
- Schedule Compression: Schedule compression shortens the project schedule without reducing the scope.
  - Crashing: This approach adds more resources to activities on the critical path to complete the project earlier
  - Fast-tracking: This method changes the relationship of activities. With fast-tracking, activities that would normally be done in sequence are allowed to be done in parallel or with some overlap.



# Control Schedule

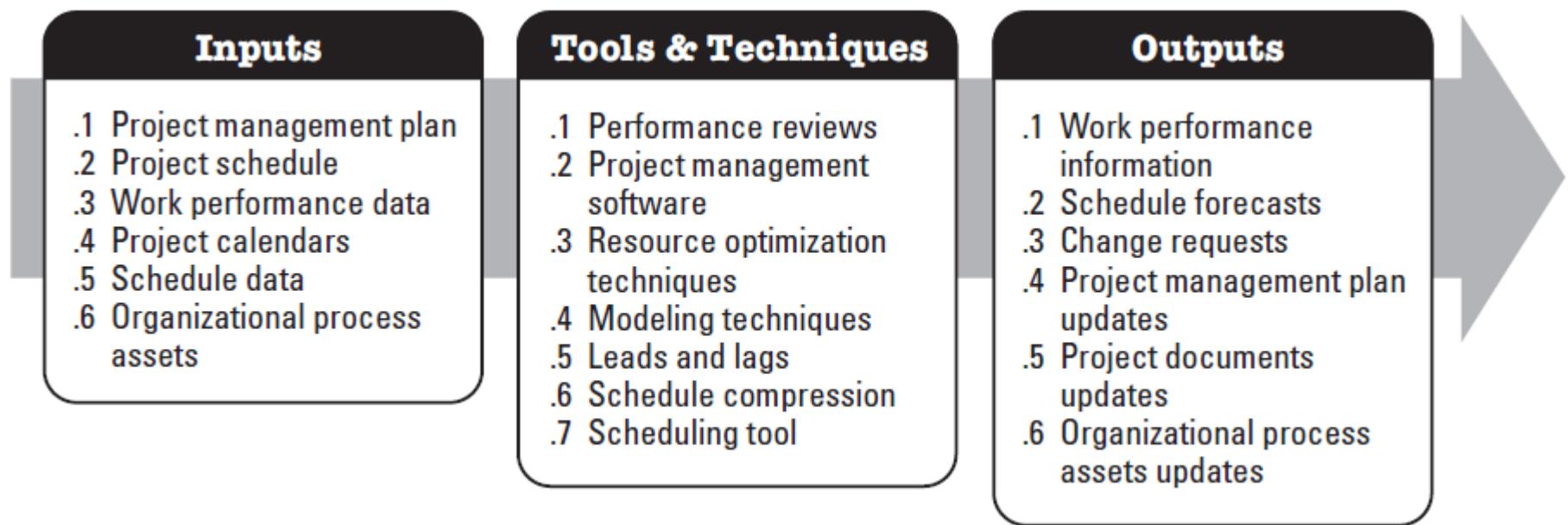


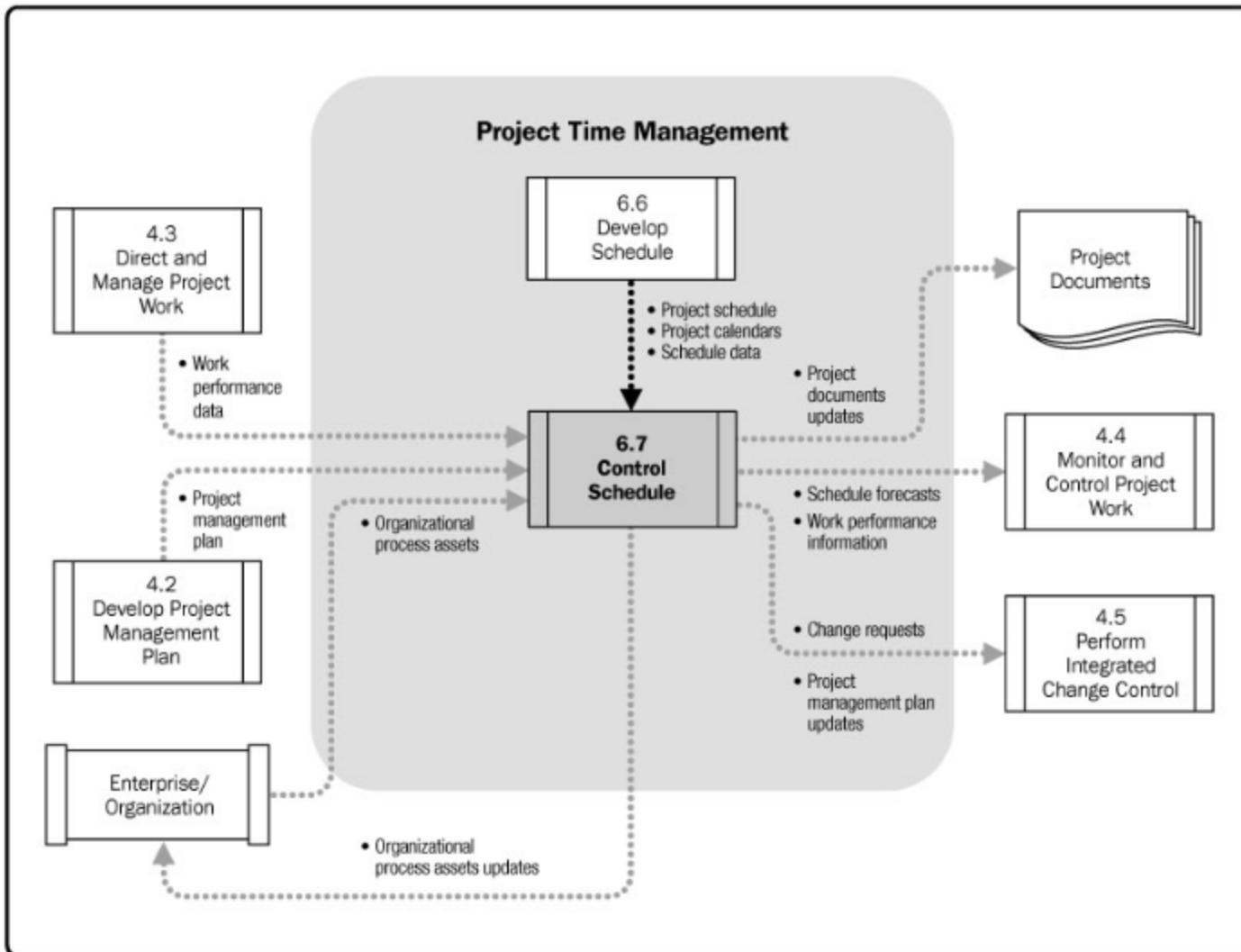
- Process of monitoring the status of the project to update project progress and manage changes to the schedule Baseline.

Schedule control is concerned with:

- Determining the current status of the project schedule
- Influencing the factors that create schedule changes
- Determining the project schedule has changed and,
- Managing the actual changes as they occur

# Control Schedule







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# **Project Management Professional**

## ***Module 7: Project Cost Management***

**PMBOK 5<sup>th</sup> Edition**

# Project Cost Management

Project Cost Management includes processes required to manage costs so that project can be completed within the approved budget.



Plan Cost Management—The process that establishes the policies, procedures, and documentation for planning, managing, expending, and controlling project costs.

Estimate Costs—The process of developing an approximation of the monetary resources needed to complete project activities.

Determine Budget—The process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline.

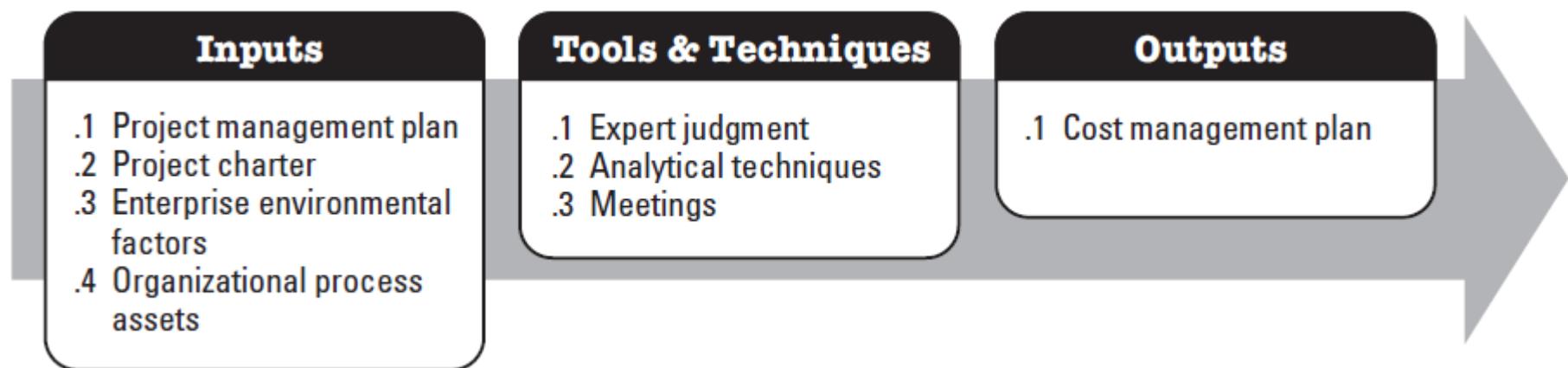
Control Costs—The process of monitoring the status of the project to update the project costs and managing changes to the cost baseline.

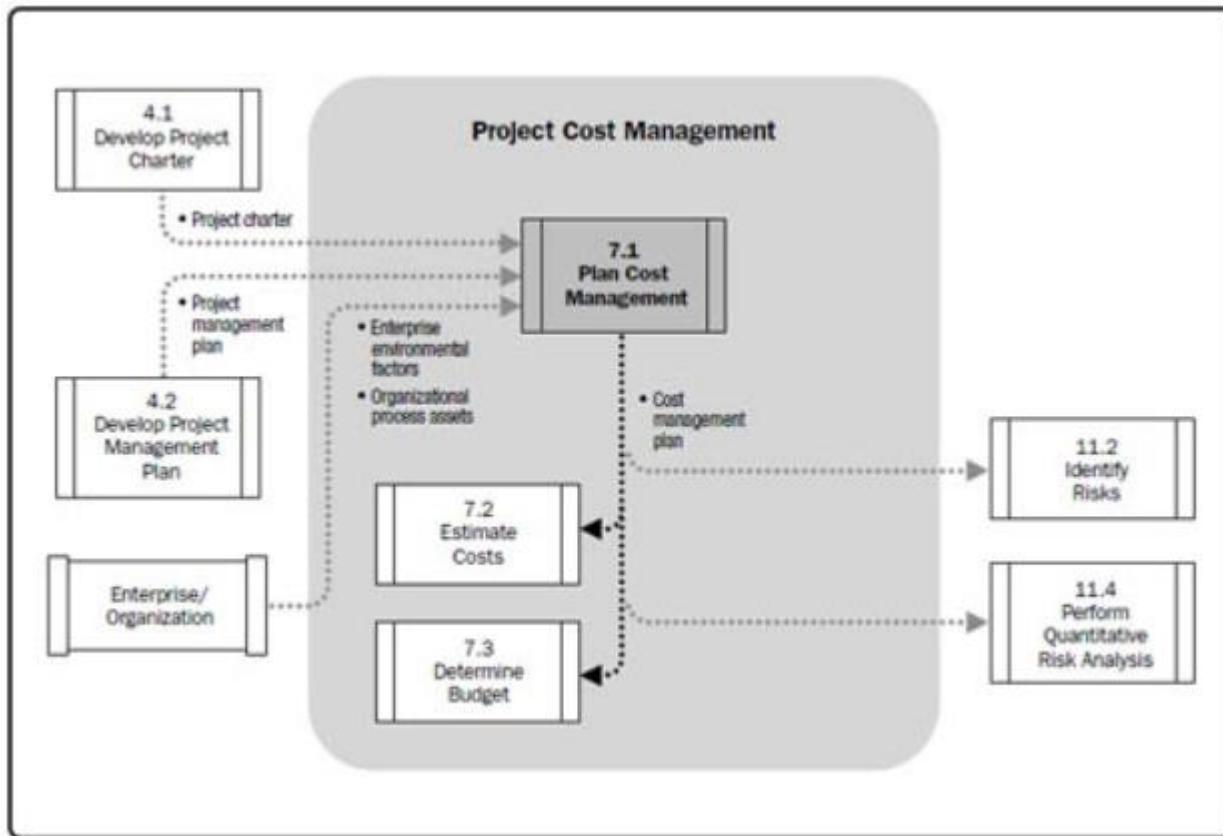
# Plan cost management



- The process that establishes the policies, procedures, and documentation for planning, managing, expending, and controlling project costs..
- Provides guidance and direction on how the project costs will be managed throughout the project.

# Plan Cost Management



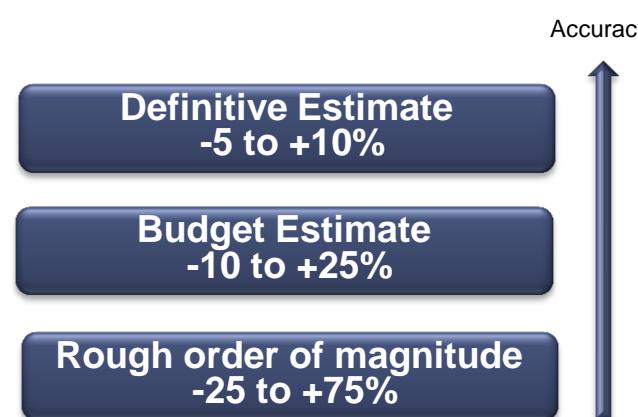


# Estimate Costs

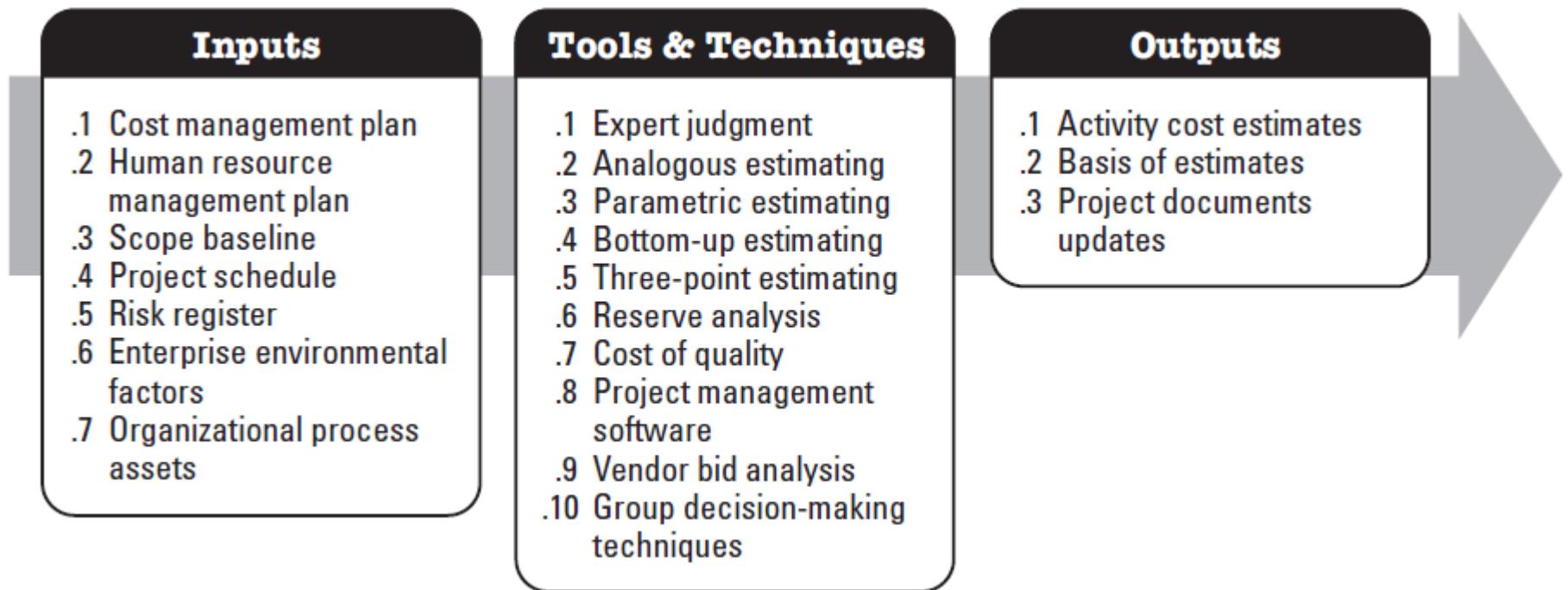


- The process of developing approximation of the monetary resources needed to complete the project.

- Costs trade-off and risks must be considered, such as make or buy, buy or lease and shared resources in order to achieve optimal costs for the project
- The accuracy of a project estimate will increase as the project progresses.



# Estimate Costs



# Tools and Techniques

Analogous Estimating: Relies on historical information to predict the cost of the current project. It is also called as Top- down estimating.

Parametric Estimating: Uses a mathematical model based on known parameters to predict the cost of the project. Ex. Cost per cubic yard, cost per unit etc..

Bottom-Up Estimating: Starts from zero, accounts for each component in the WBS and arrives at a sum for the project.

Vendor Bid Analysis: Sometimes, Vendor bids can be used for estimation if the work is contracted out.

COQ (Cost of Quality): Is the cost the project must spend to meet expected level of quality within a project

Costs can be averaged with PERT or Three point estimates.

### Example

#### Triangular Distribution

Optimistic - \$500

Most likely - \$550

Pessimistic - \$750

$$(500 + 550 + 750) / 3 = \$600$$

#### Beta Distribution

Optimistic - \$500

Most likely - \$550

Pessimistic - \$750

$$(500 + (4*550) + 750) / 6 = \$575$$

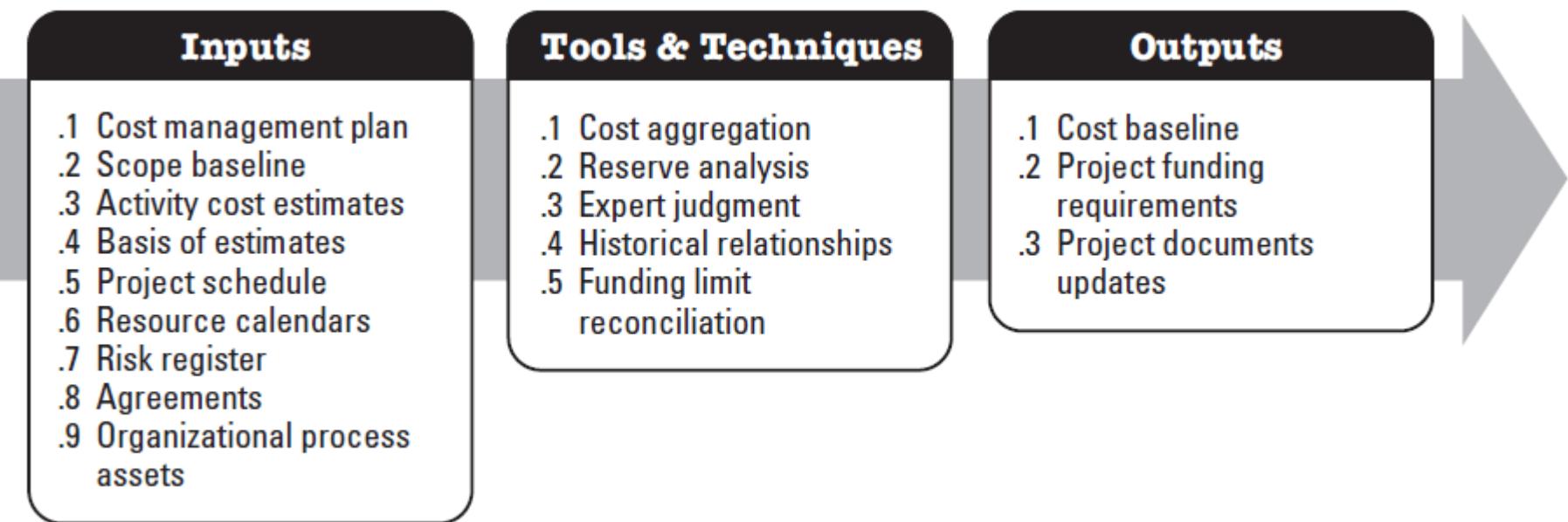
# Determine Budget



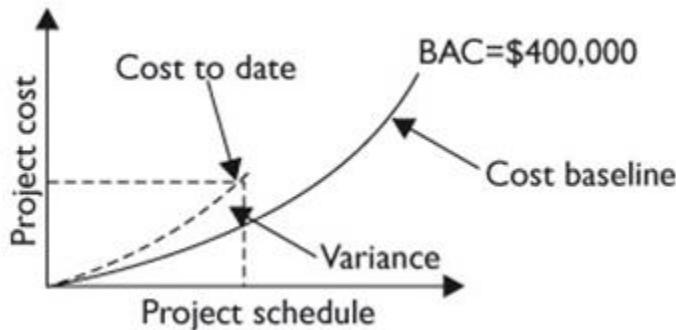
- The process of aggregating the estimated costs of individual activities to establish an authorized cost baseline.

- Project budgets constitute the funds authorized to execute the project.
- Project cost performance will be measured against the authorized budget.
- This baseline includes all the costs excludes management reserves

# Determine Budget

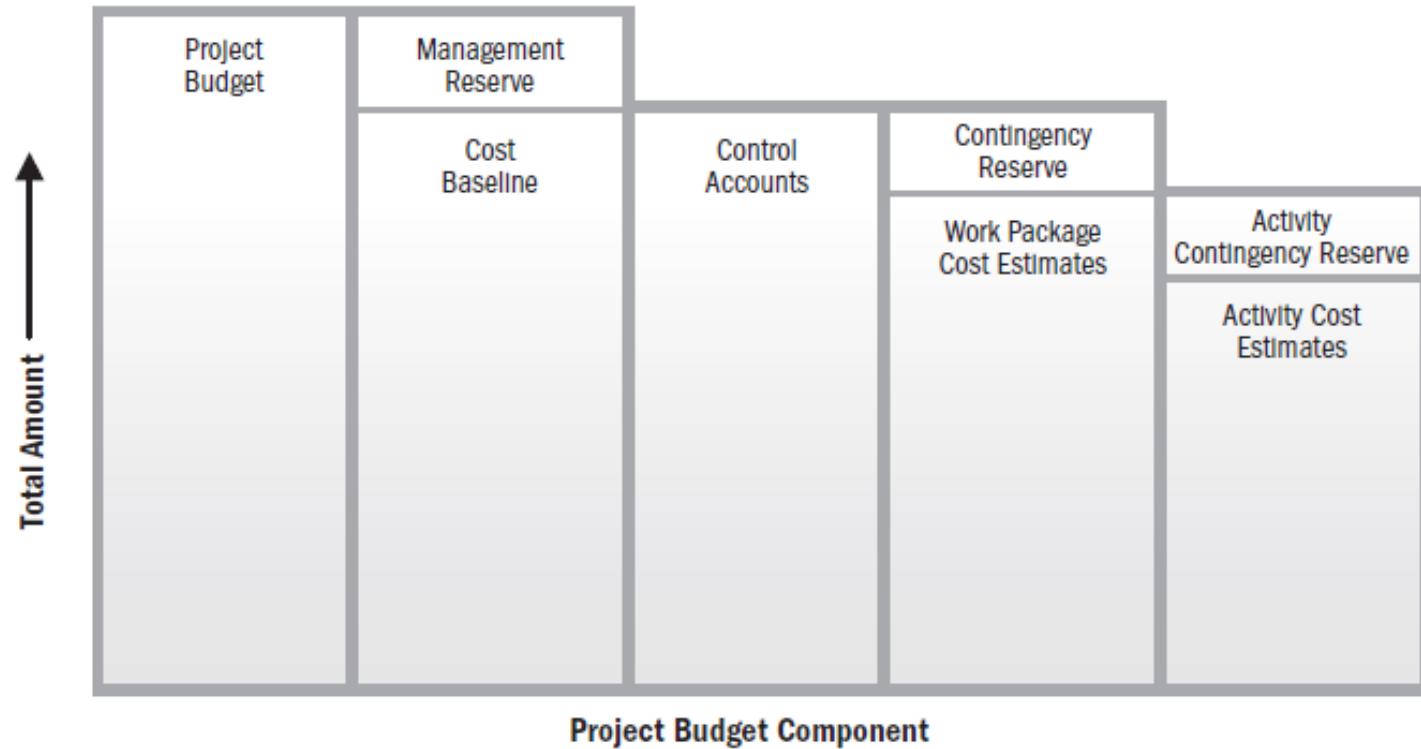


## Cost Performance Baseline



- Cost performance baseline is a time phased budget that will be used to measure, monitor and control the overall cost performance on the project.
- It is also known as Performance Measurement Baseline (PMB).
- The shape of the cost baseline is like a Flat “S” – so its known as an S curve.

# Project Budget



# Control Costs

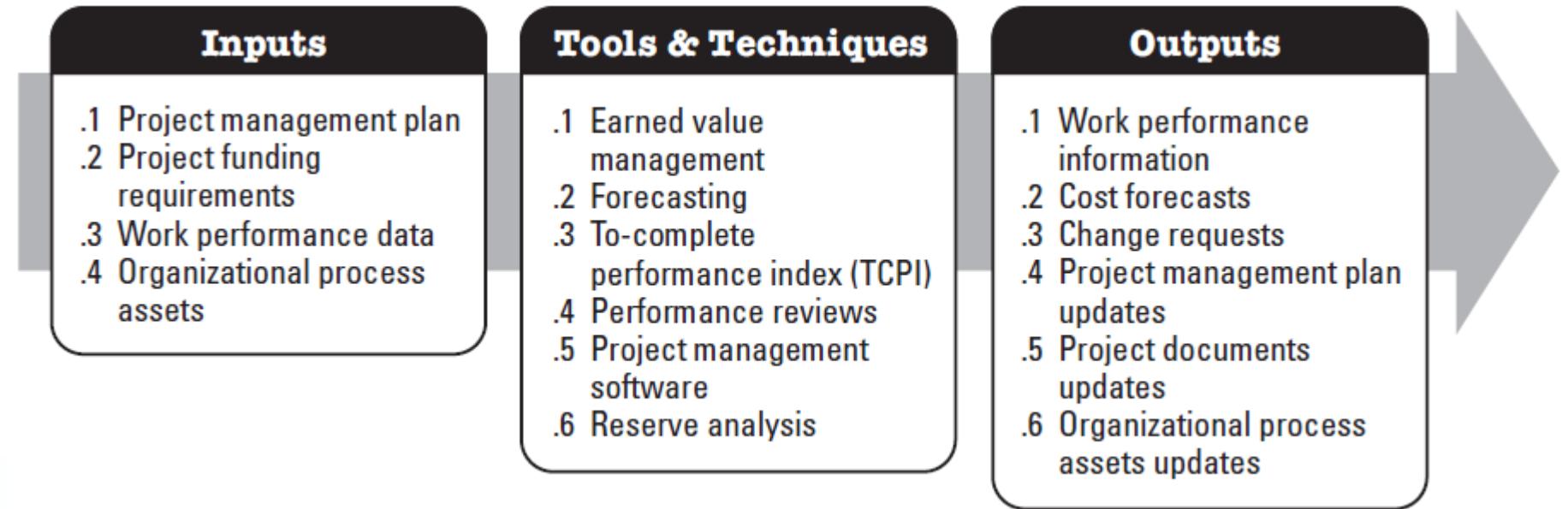


- Monitoring the status of the project to update the project budget and managing changes to the cost baseline.

Cost control includes:

- Influencing the factors that create changes to the authorized cost baseline
- Ensuring that all change requests are acted on in a timely manner
- Managing the actual changes as and when they occur
- Ensuring cost expenditures do not exceed the authorized budget
- Monitoring cost performance
- Bring cost overruns within acceptable limits

# Control Costs



# Earned Value Management

EVM is a powerful tool for measuring cost and schedule performance and reporting.

- It integrates scope, cost and schedule measures to help the project team evaluate the project's performance
- It enables the project manager to know the % of work completed and the value of the completed work
- It is a quantitative technique to assessing and predicting Project progress



## The Planned Value (PV)

- The Budgeted cost of work scheduled

## The Actual Cost (AC)

- The Actual cost of work performed

## Earned Value (EV)

- The Budgeted cost of work performed
- Signifies the value of the work performed

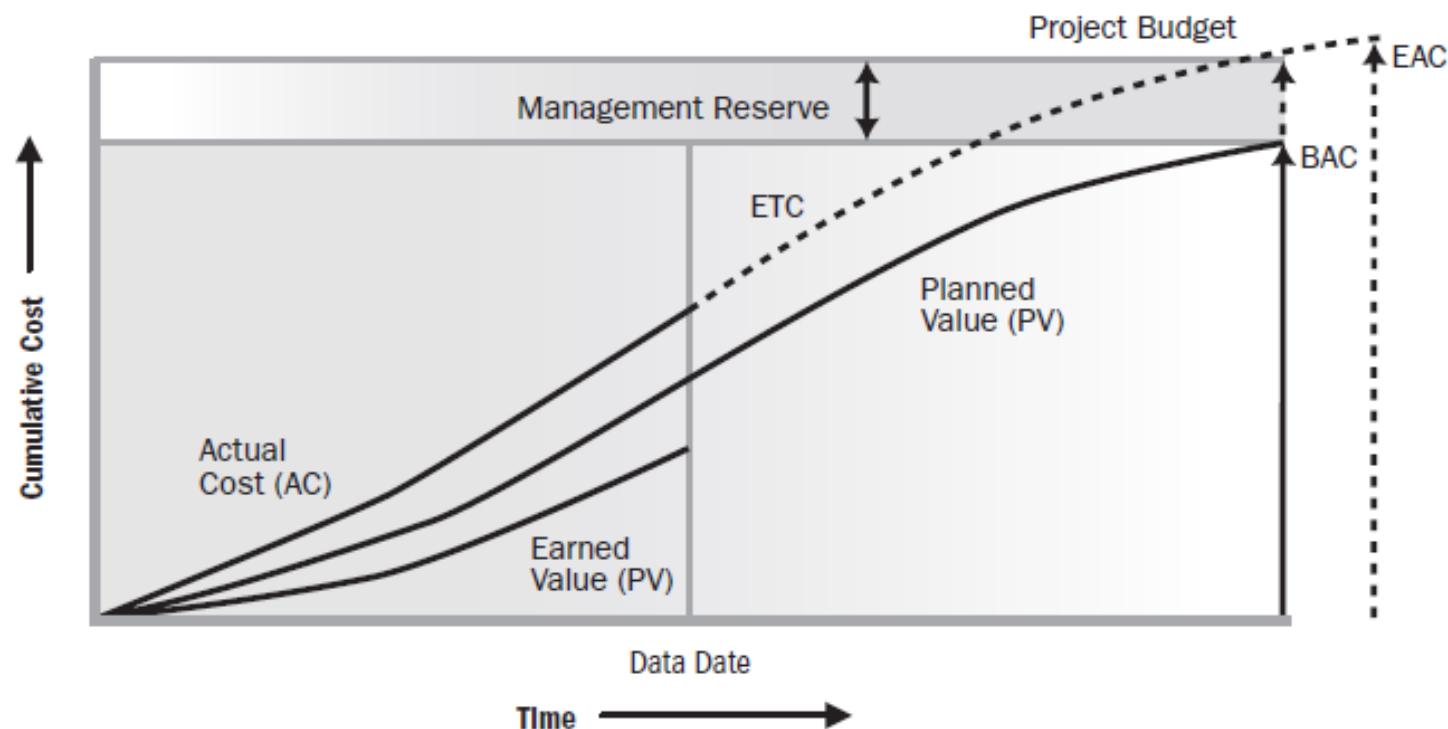
Budget at Completion (BAC): It is sum of all the budgets allocated to the Project.

Estimate at Completion (EAC): It is new likely total cost of the project

Estimate to complete (ETC): Likely cost of remaining work in the project

Variance at completion (VAC): The Difference between BAC and EAC

# EV, PV and AC



# Schedule and Cost Variance

Schedule Variance (SV):

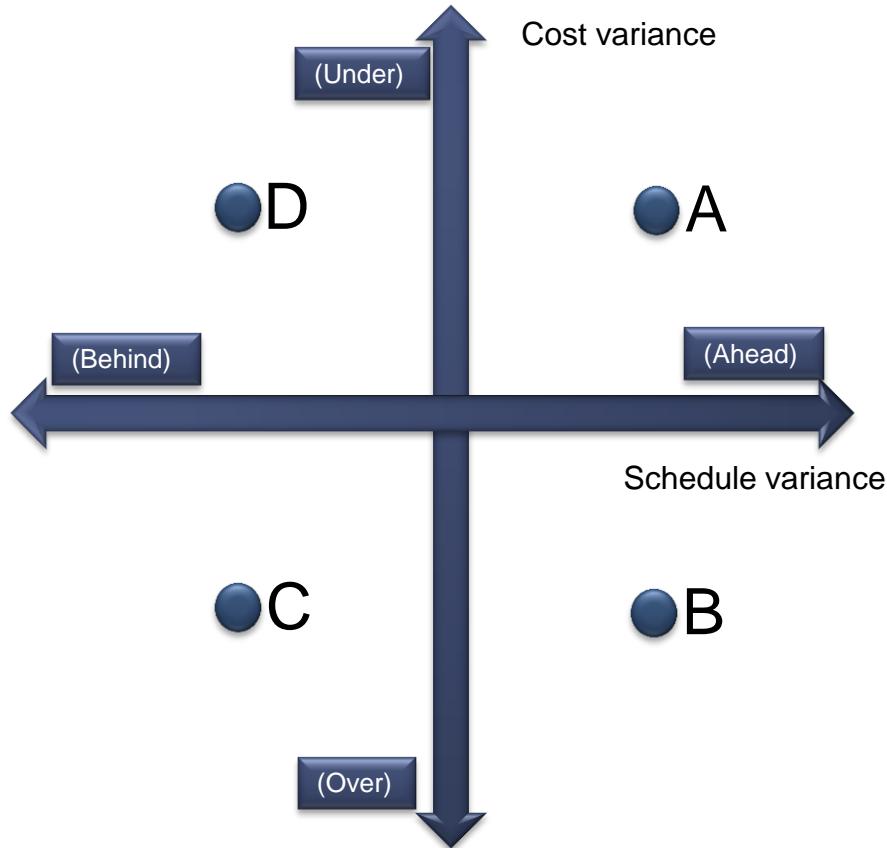
$$SV = EV - PV$$

A negative variance indicates a schedule overrun condition, positive variance is favourable to the project.

Cost Variance (CV):

$$CV = EV - AC$$

A negative variance indicates a cost overrun condition, positive variance is favourable to the project



Schedule Performance Index (SPI): It is an indication of the efficiency with which the Project is utilizing Scheduled resources

$$\text{SPI} = \text{EV}/\text{PV}$$

If SPI > 1 , we have a favourable performance. Project is ahead of schedule

If SPI < 1 , Project is behind the schedule

Cost Performance Index (CPI): It is an Indication of the efficiency with which the project is utilizing the budget

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

If CPI > 1 , Productivity is more than what was expected

If CPI < 1 , Performance is poor, productivity is less

## Estimate At Completion – Forecasting techniques

EAC is calculated in multiple ways – to get a range of estimates, like:

$$EAC = AC + ETC$$

$$EAC = AC + (BAC - EV)$$

$$EAC = BAC/CPI$$

$$EAC = AC + (BAC - EV)/CPI * SPI$$

## TCPI Techniques (To-Complete Performance Index)

TCPI is the target projection of the Cost performance to be achieved on the remaining work.

$$TCPI = (BAC - EV) / (BAC - AC) \quad (\text{This is based on BAC})$$

$$TCPI = (BAC - EV) / (EAC - AC) \quad (\text{If new EAC is approved by the management})$$

# Cost elements

Term	Description	Example
Capital cost	Investment in project specific capital assets. These assets can be treated as depreciable expense for the taxation purposes	Building/ Equipments/Servers etc
Cost of Capital	Cost of raising capital	Capital raised from banks, funding agencies etc.
Direct Cost	Costs that are incurred specifically for a project	Salary of Project members, material costs
Indirect Cost	Shared cost, normally shared with all the projects	Salaries of top executives, Seat charges, rentals..
Opportunity cost	Cost of choosing one alternative and therefore giving up the potential benefits of the alternate project	Choosing a line of business over another
Return on Investment	A value return as profit from a project	Profit from setting up a datacenter
Sunk costs	Money irrevocably spent on project	Money spent for project selection
Fixed cost	Cost incurred irrespective of the volumes produced	Machine costs
Variable cost	These cost vary based on the project conditions.	Supply and demand of materials



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# **Project Management Professional**

## ***Module 8: Project Quality Management***

**PMBOK 5<sup>th</sup> Edition**

# Project Quality Management



Project Quality Management includes processes and activities of the performing organization that determine the quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken.

**Plan Quality Management:** The process of identifying quality requirements and/or standards for the project and its deliverables and documenting how the project will demonstrate compliance with quality requirements.

**Perform Quality Assurance:** The process of auditing the quality requirements and the results from quality control measurements to ensure that appropriate quality standards and operational definitions are used.

**Perform Quality Control:** The process of monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes.

## •**Quality Vs Grade**

Grade refers to intrinsic features of the product and quality refers to meeting of customer requirements.

## •**Accuracy Vs Precision**

Precision is consistency that the value of repeated measurements are clustered and have little scatter.

Accuracy is correctness that the measured value is closure to the true value

## •**Quality Policy**

Quality policy is the intended direction of an organization as set by top management with regards to quality

## •**Project quality management**

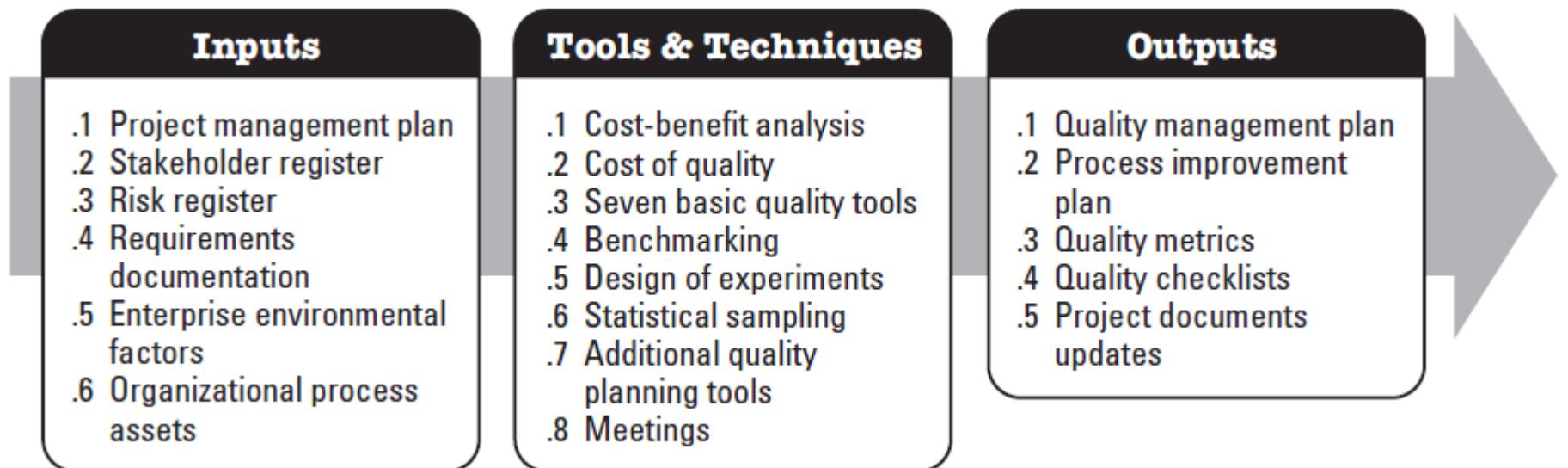
PQM should address both project and product quality requirements.

# Plan Quality Management



- The process of identifying quality requirements and/or standards for the project and its deliverables and documenting how the project will demonstrate compliance with quality requirements.
- Standards and Regulations which are applicable to the Organization must be factored in the project quality plan.
- The degree and rigor of acceptance criteria can change with respect to the extent of applicability of Quality for the Project/Product.
- Major outputs include the quality management plan, quality metrics, checklists and process improvement plan.

# Plan Quality Management



# Tools and Techniques

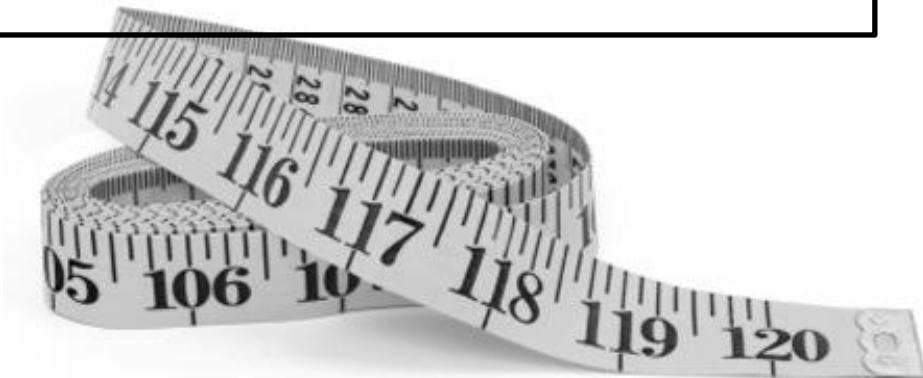
Cost -Benefit Analysis: The project team has to balance the benefits of the quality management activities Vs the costs of the quality management activities.

Benchmarking: Comparing actual or planned Project practices to “best in class” or competitors.

Design on Experiments (DOE): The DOE approach relies on statistical what-if scenarios to determine what variables within a project will result in the best outcome.

Cost of Quality (COQ):Expense of all the activities within a project that are undertaken to ensure its quality.

- Cost of conformance to requirements
- Cost of non-conformance



## 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

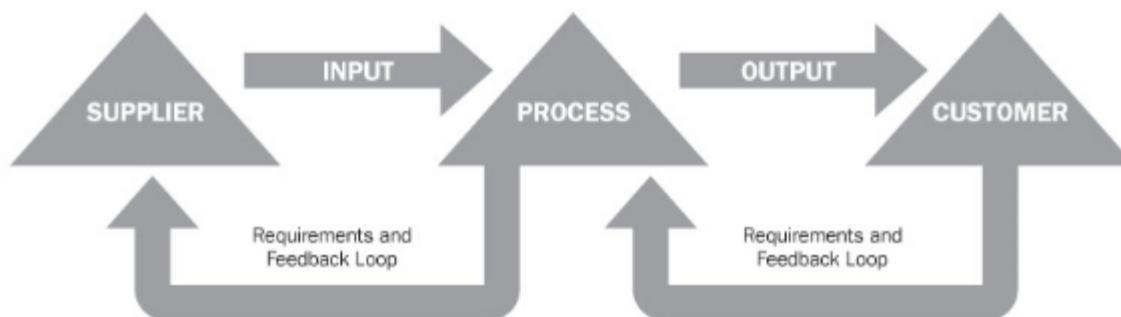
(Failures found by the customer)

- Liabilities
- Warranty work
- Lost business

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

# SIPOC Model

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



Requirements List	Measurements List	Requirements List	Measurements List
• _____	• _____	• _____	• _____
• _____	• _____	• _____	• _____
• _____	• _____	• _____	• _____
• _____	• _____	• _____	• _____

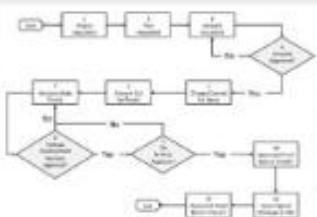
NOTE: The components of this diagram are flexible and can take any direction depending upon the circumstance.

# Seven basic Quality tools

Cause & Effect Diagram



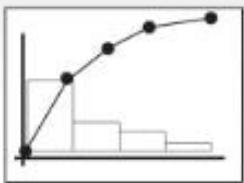
Flowcharts



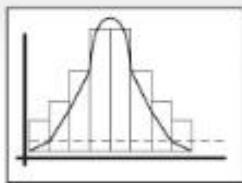
Checklists

Category	Strokes	Frequency
Attribute 1		
Attribute 2		
Attribute ...		
Attribute n		

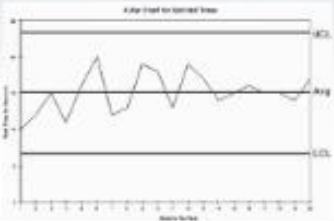
Pareto Diagrams



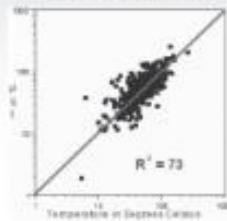
Histograms



Control Charts



Scatter Diagrams



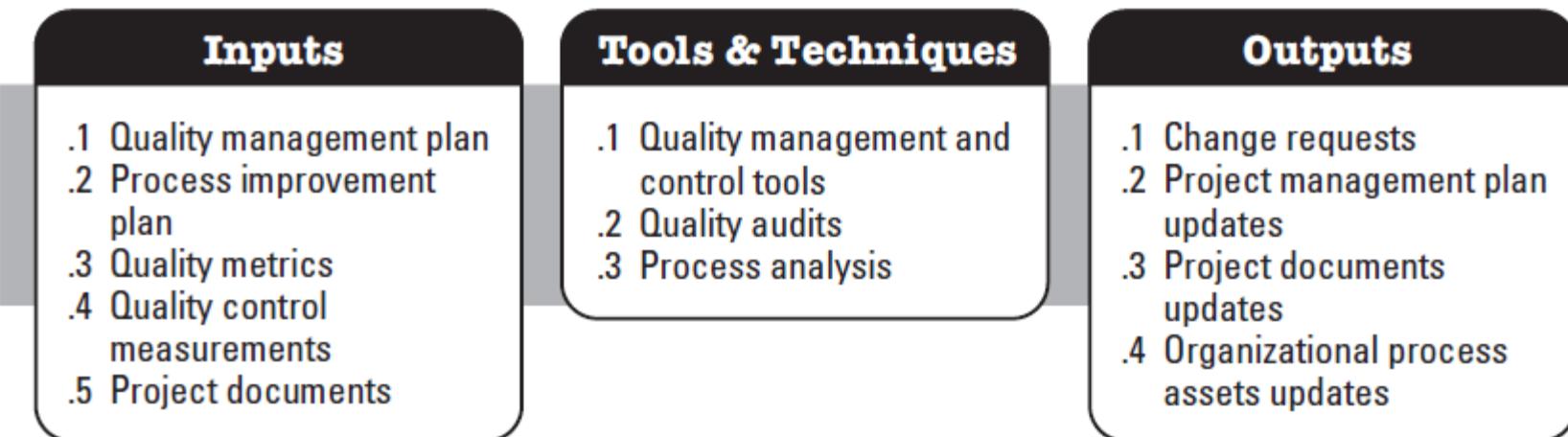
# Perform Quality Assurance



- Audit the quality requirements and results to ensure appropriate quality standards and operational definitions are used.

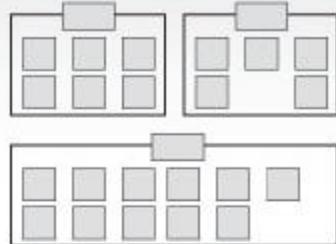
- Perform Quality Assurance is primarily done during the executing process group of the project. It is concerned with:
  - Determining whether standards have been met.
  - There is continuous improvement
  - Deficiencies corrected
- Two types of QA
  - Internal QA Assurance provided to management and the project team
  - External QA Assurance provided to the external customers of the project

# Perform Quality Assurance

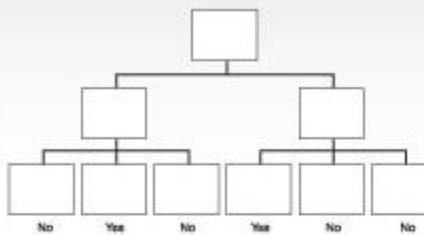


## Quality management and control tools

**Affinity Diagram**



**PDPC**



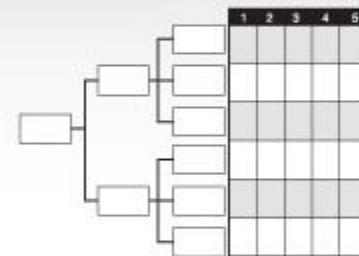
**Interrelationship Digraph**



**Tree Diagrams**



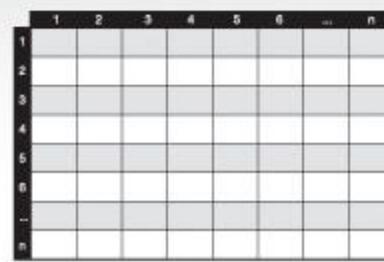
**Prioritization Matrices**



**Network Diagrams**



**Matrix Diagrams**



**Quality Audit:** Structured, independent review to determine whether project activities comply with organizational and project policies, processes and procedures.

1. Identify all the good/best practices being implemented.
2. Identify all the gaps and shortcomings.
3. Share good practices followed in other projects in the organization or industry.
4. Quality improvements and reduced cost of quality.
5. Confirm the implementation of approved changes, defect repair, corrective actions and preventive actions.

**Process Analysis:** Follows performance improvement plan to identify needed improvements. It includes root cause analysis to identify specific improvements.

# Control quality



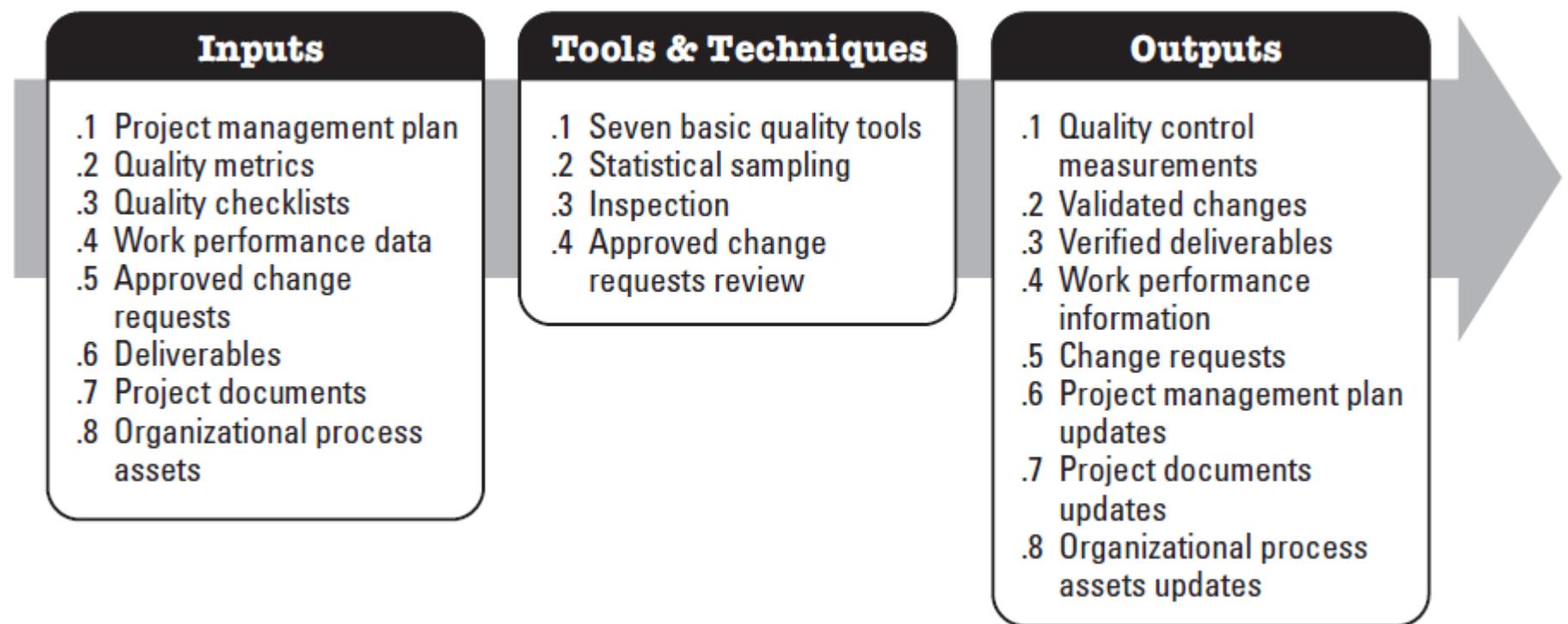
- The process of monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes.

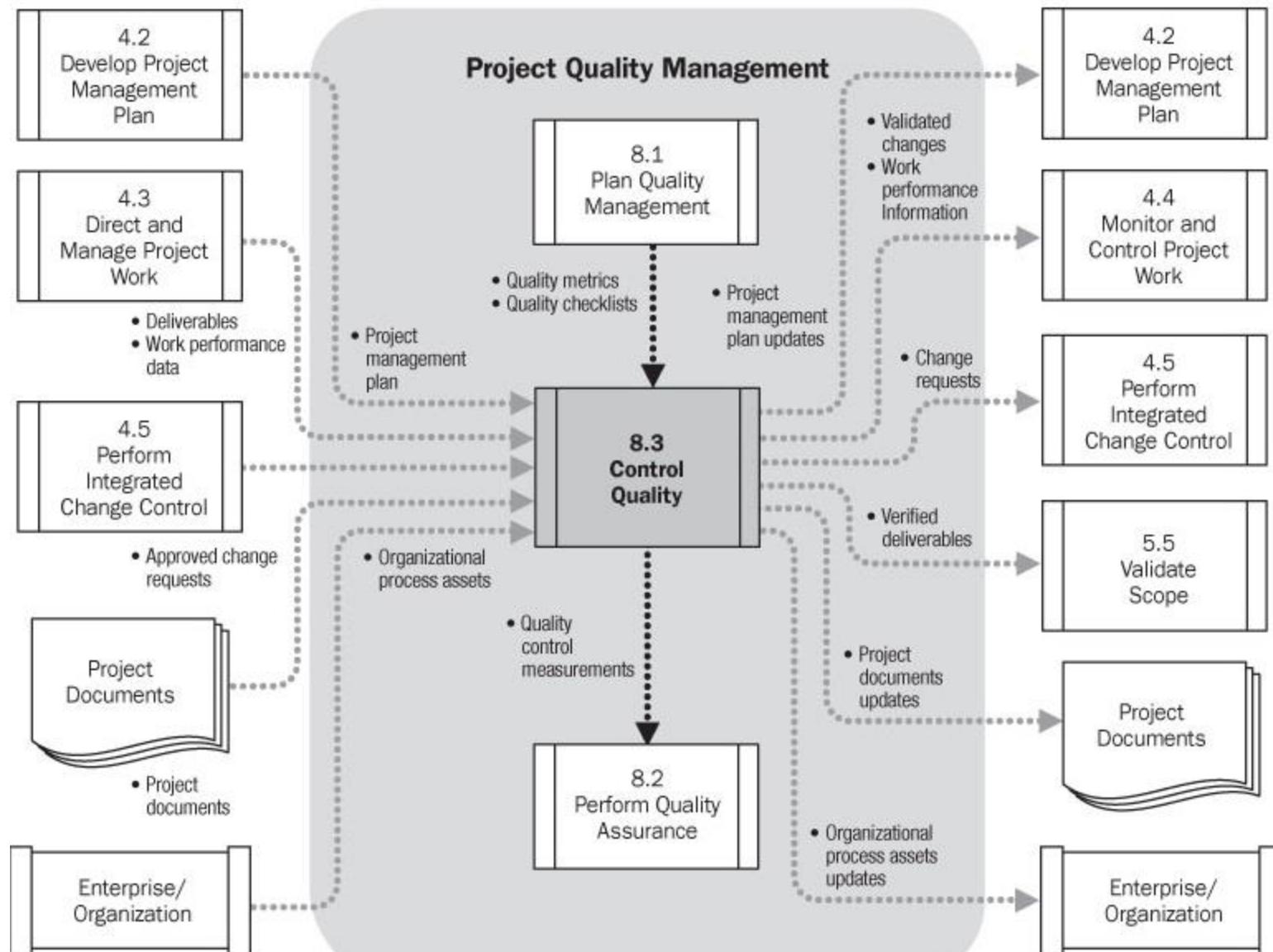
- Quality control activities identify causes for poor process or product quality and recommend and/or take corrective actions to eliminate them.
- Approved change requests gets validated in this process.
- Conduct statistical quality control, such as sampling and probability.
- Inspect the product to keep errors away from the customer.

## Key terms

- Prevention (keeping errors out of the process) and inspection (Keeping errors out of the hands of the customer)
- Attribute sampling (the result either conforms or non-conforms) and variable sampling (the result is rated on a continuous scale)
- Tolerances (Specified range of acceptable results) and control limits (thresholds, which can indicate whether the process is out of control)

# Control Quality







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# **Project Management Professional**

## ***Module 9: Project Human Resource Management***

**PMBOK 5<sup>th</sup> Edition**

# Project Human Resource Management



Project Human resource Management includes processes that organize , manage, and lead the project team.

**Develop Human resource plan:** The process of identifying and documenting project roles, responsibilities, required skills, reporting relationships, and creating a staffing management plan.

**Acquire Project team:** The process of confirming human resource availability and obtaining the team necessary to complete project activities.

**Develop Project Team:** The process of improving competencies, team member interaction, and overall team environment to enhance project performance.

**Manage Project Team:** The process of tracking team member performance, providing feedback, resolving issues, and managing changes to optimize project performance.

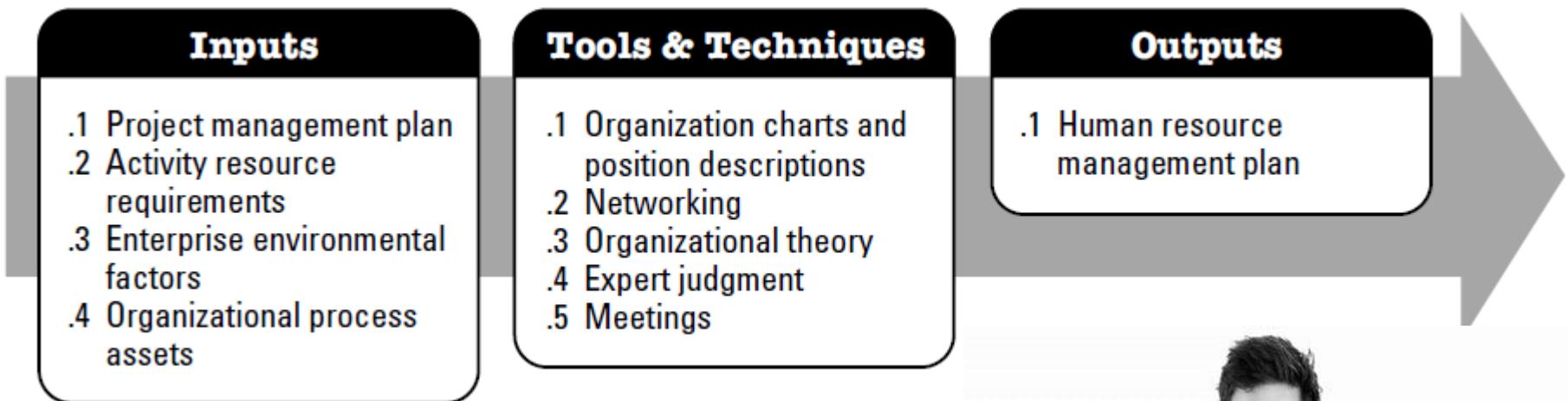
# Develop Human Resource plan



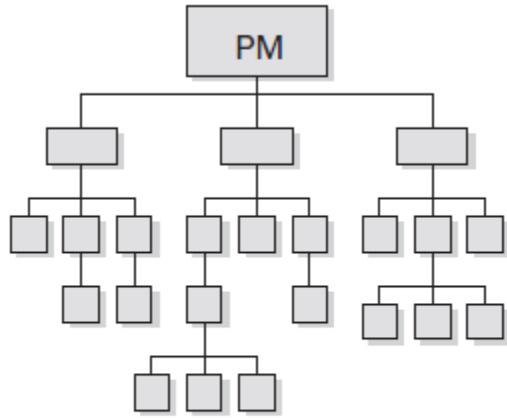
- The Process of identifying and documenting project roles and responsibilities, and required skills, reporting relationships, and creating a staffing management plan.

- Major input for this process is the activity resource requirements from the time management knowledge area
- The project manager has to reconcile Org charts and position descriptions while preparing the project staffing plan
- Project roles can be on individual basis or group basis

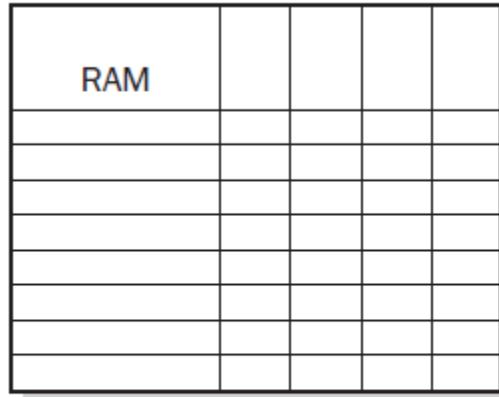
# Plan Human Resource Plan



## Organizational charts and position descriptions



## Hierarchical-type Organization Chart



## Matrix-based Responsibility Chart

Role \_\_\_\_\_

Responsibilities \_\_\_\_\_  
\_\_\_\_\_

Authority \_\_\_\_\_  
\_\_\_\_\_

## Text-oriented Format

**Networking:** Includes formal and informal interactions within the organization.

Organizational theory: Knowledge of individual and group behavior. Project managers rely on these theories to identify weakness and strength, guide the project team, and move the project forward.

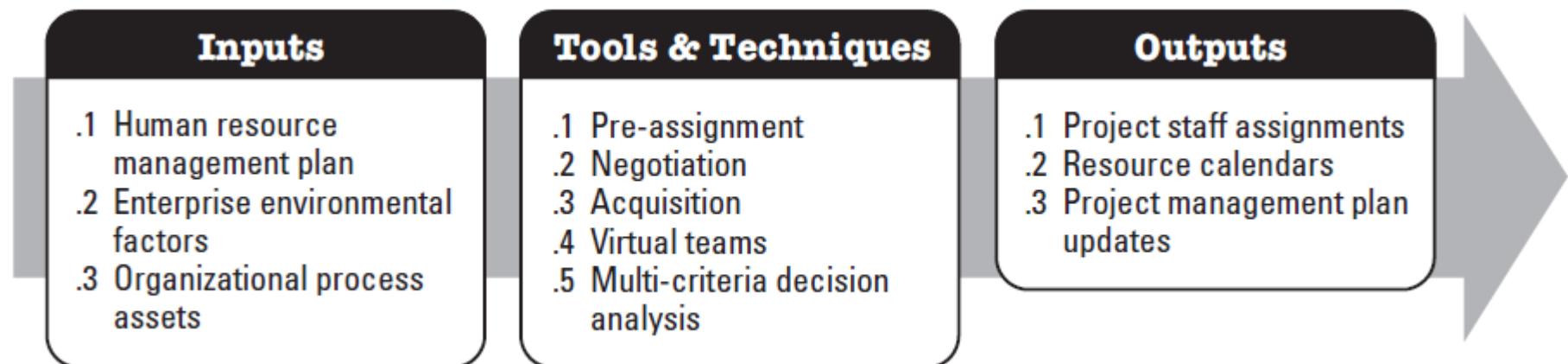
# Acquire Project Team



- The Process of confirming human resource availability and obtaining the team necessary to complete the project work.

- The project manager and the team should effectively negotiate and influence others who are in a position to provide the required human resources for the project.
- Failure to acquire the necessary human resources may affect project schedules, budget, customer satisfaction, quality and risks.
- If human resources are not available due to constraints, the project manager may be required to assign alternative resources.

# Acquire Project Team



# Tools and Techniques

Virtual teams: can include members from different cities/geography, external agencies working for the same project.

Pre-assignment: In some cases – the staff member gets ‘automatically’ assigned to the slot against a particular position. This could be due to client request or the only one available with specific skills.

Acquisition: In case, resources are not available, project manager may required to acquire the resources from other sources. (Hire/Recruit)

Negotiation: Most projects require the project manager to negotiate for resources. He is likely to negotiate for resources with functional managers or with other project managers.

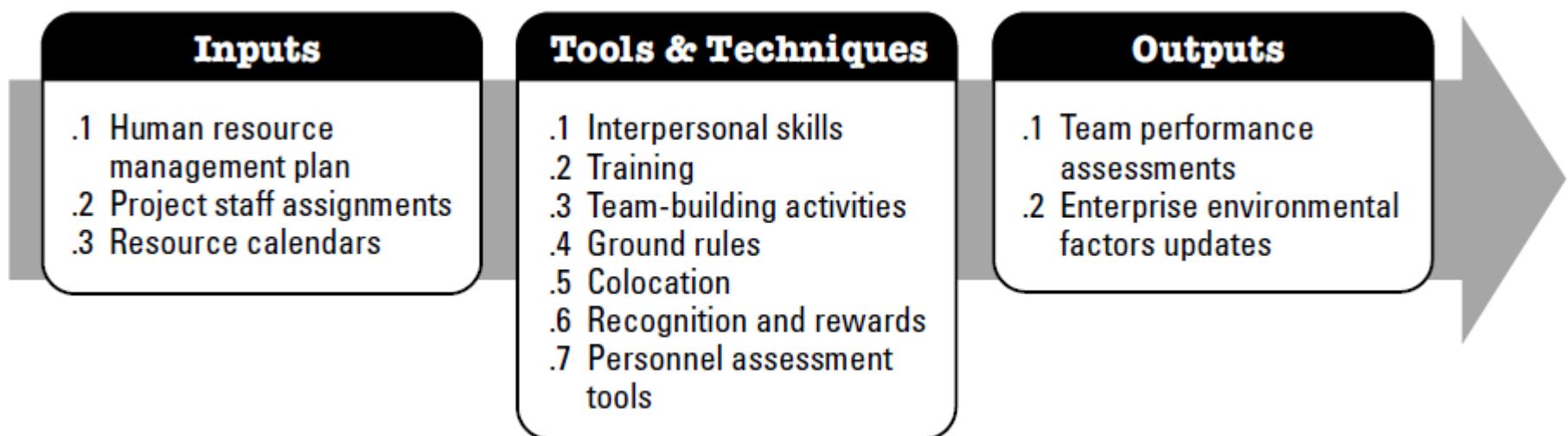
# Develop project team



- The Process of improving competencies, team interaction, and the overall team environment to enhance the project performance.

- Improve knowledge and skills of the project team members to increase their ability to complete project deliverables, while lowering costs, reducing schedule and improving quality
- Improve feelings of trust and agreement among team members in order to raise morale, lower conflict, and increase team work.
- Allow cross training and mentoring between team members to share knowledge and expertise.

# Develop Project Team



**Interpersonal skills:** These are sometimes known as “soft skills”. Skills such as empathy, influence, creativity, and group facilitation are valuable assets when managing the project team.

**Training:** Learn new technology or soft skills.

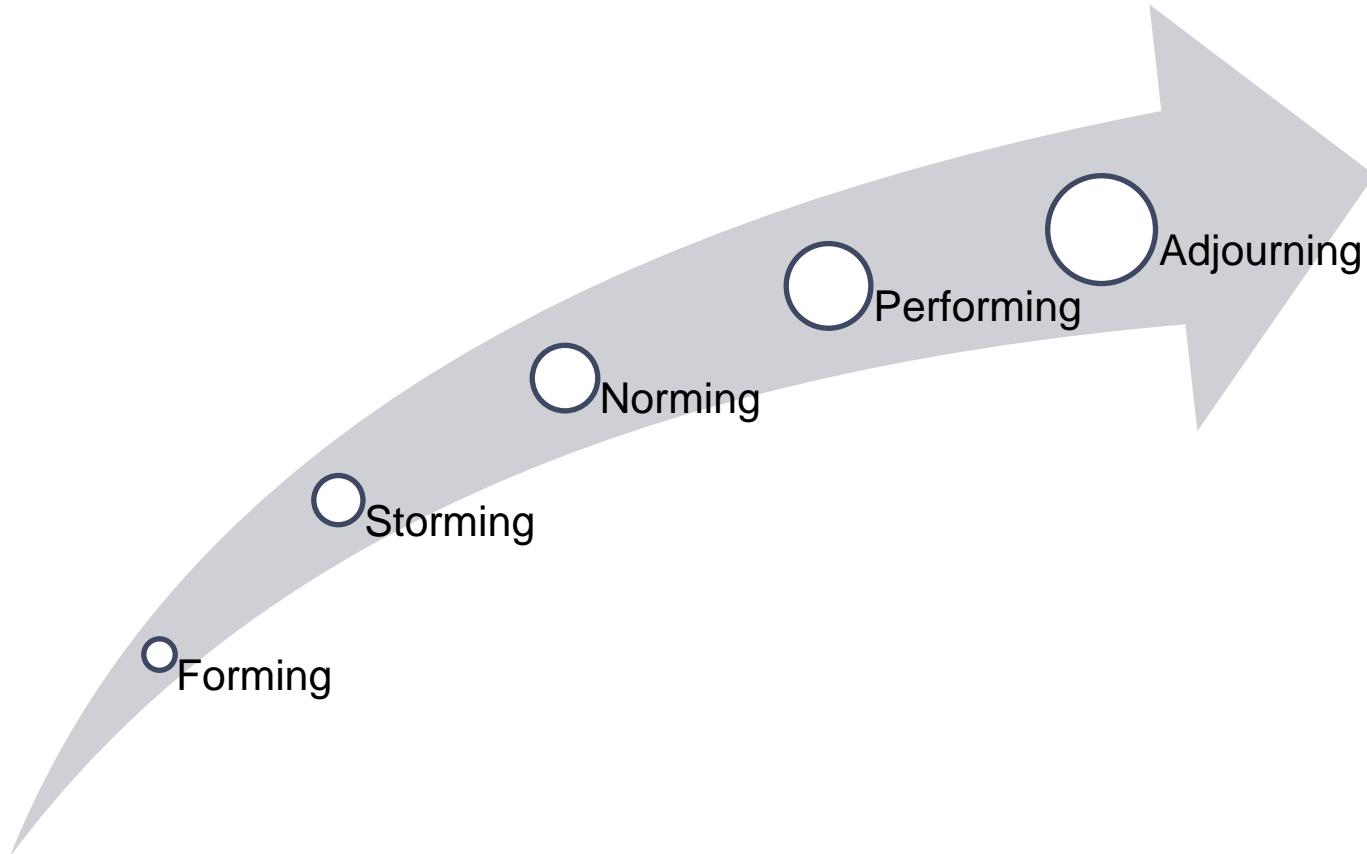
**Team building activities** can be as a part regular scheduled meetings or in off site locations. Very useful in the context of virtual teams.

**Ground rules** are set by the project manager to ensure minimum discipline in the project team.

**Co-location** refers to placement of team members in the same physical location for better “bonding” .

**Team performance assessment** could be a formal or informal one. This is to measure how effective the applied team development activities have been in enhancing the skills of the team members.

# Five Stages of team development



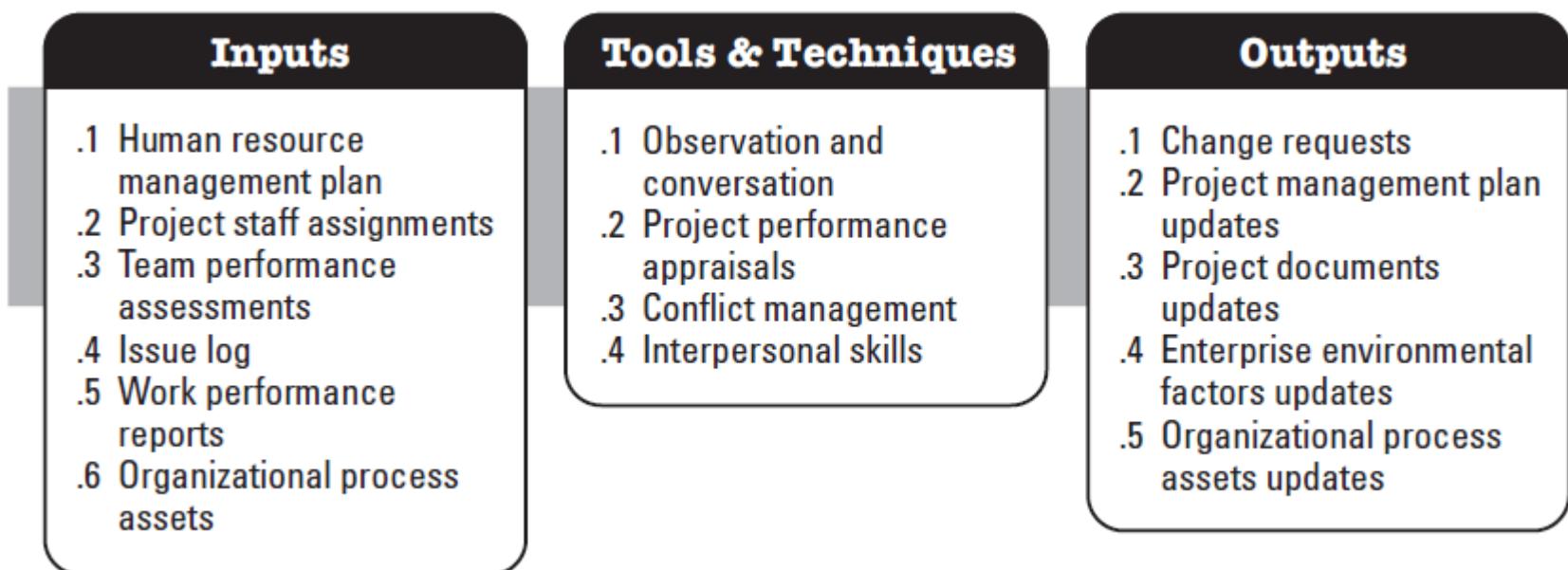
# Manage team



- The Process of tracking team member performance, providing feedback, resolving issues, and managing changes to optimize project performance.

- Tracking individual project team member's performance.
- Providing feedback to the project team members about their performance and project work.
- Finding solutions and facilitating conversations to find solutions for project issues
- Managing changes to the project and project processes to improve overall project performance.
- Providing communication to all stakeholders.

# Manage project team



# Conflict resolution styles

**Withdrawal** Retreating from actual or potential disagreements and conflict situations.

Appropriate only in certain situations such as when a “cooling-off” period is needed.

**Smoothing** De-emphasizes differences and emphasizes commonalities. Keeps the atmosphere friendly.

**Compromising** This approach requires both parties give up something. The decision made is blend of both sides of the argument.

**Forcing** The person with power makes the difference. Offers only win-lose situation.

**Confronting** Directly addresses disagreements. Provides a solution but time consuming.

**Collaborating/Problem solve** Incorporating multiple viewpoints and insights from differing perspectives; Leads to consensus and commitment.

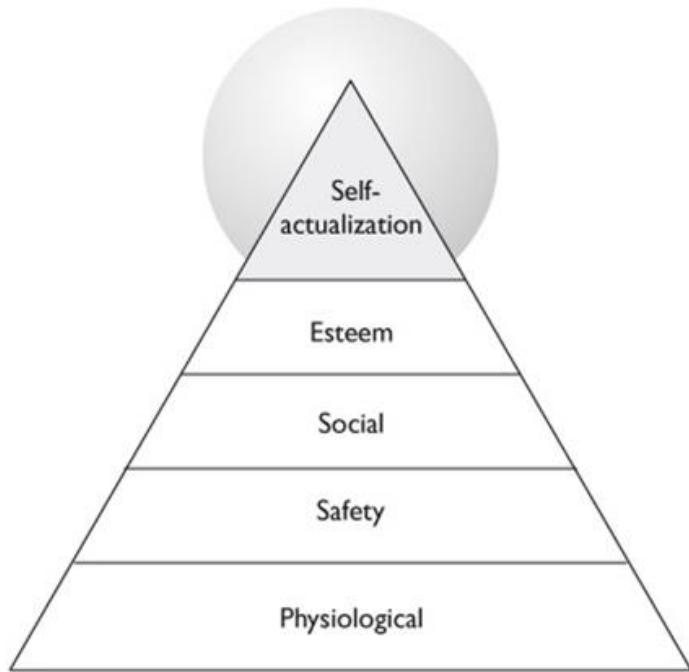
# Interpersonal Skills

Power	Definition
Expert	The project manager is an expert with the technology the project focuses on.
Reward	The project manager can reward the project team members.
Coercive	The project manager can punish the project team members.
Formal	The project manager is formally assigned to the role of project manager.
Referent	The project team knows the project manager. The project manager refers to the person who assigned him to the role of project manager.

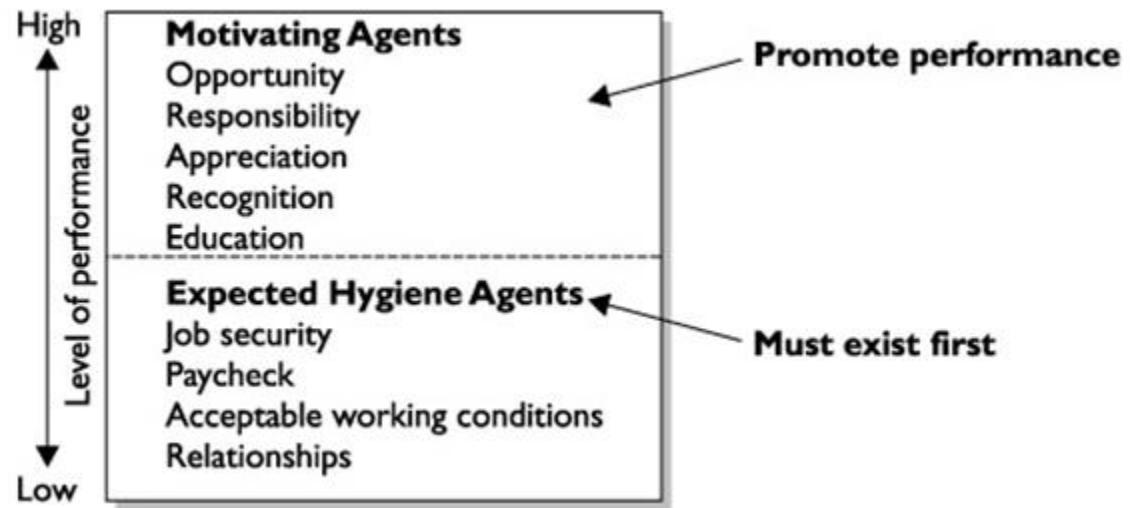


Style	Definition
Autocratic	Project Manager makes all of the decisions.
Democratic	The project team is involved in the decision-making process
Laissez faire	Problems posed to the team for discussion and information gathering. Team makes the decision.
Exceptional	Project manager only pays attention to the top 10% and the bottom 10% of the project team performers.

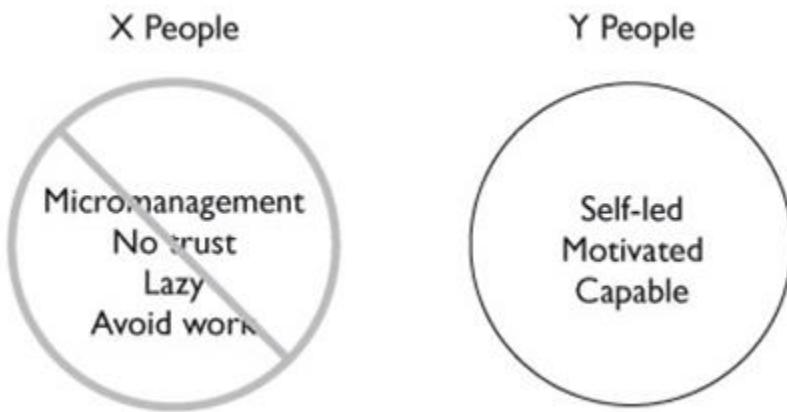
PM Role	Function
Leader	Conceptualize and articulate the project vision, Motivate Team members, and Represent the team to stakeholders
Manager	Create project administrative structure, track compliance, and report status to stakeholders
Facilitator	Communicate clearly, both verbally and in writing, resolve conflicts, and acquire project resources
Mentor	Help team members identify possibilities for problem solving and career path development, Display genuine interest in team members performance and development



Maslow's Hierarchy of Needs



Herzberg's Theory of Motivation



McGregor's Theory X and Y

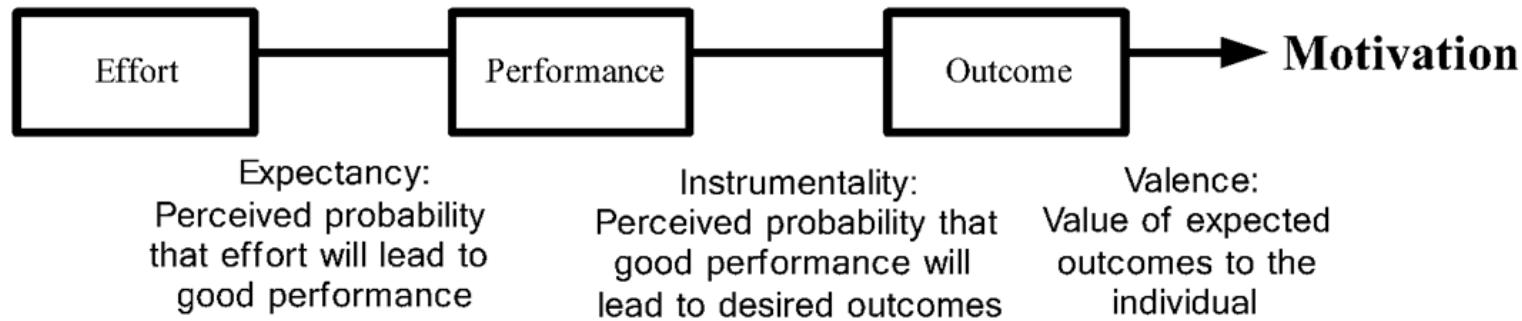
### Ouchi's Theory Z

- Lifetime commitment
- Collective decision making
- Individual Responsibility
- Informal control with formalized performance measure
- Holistic concern for the employee

## McClelland's Theory of Needs

- Need for achievements
- Need for affiliation
- Need for Power

## Expectancy Theory





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# **Project Management Professional**

## ***Module 10: Project Communication Management***

**PMBOK 5<sup>th</sup> Edition**

# Project Communication management



Project Communication Management includes processes required to ensure timely and appropriate generation, collection, distribution, storage, retrieval, and ultimate disposition of project information.

**Plan Communication Management** :The process of developing an appropriate approach and plan for project communications based on stakeholder's information needs and requirements, and available organizational assets.

**Manage Communication** : The process of creating, collecting, distributing, storing, retrieving and the ultimate disposition of project information in accordance with the communications management plan.

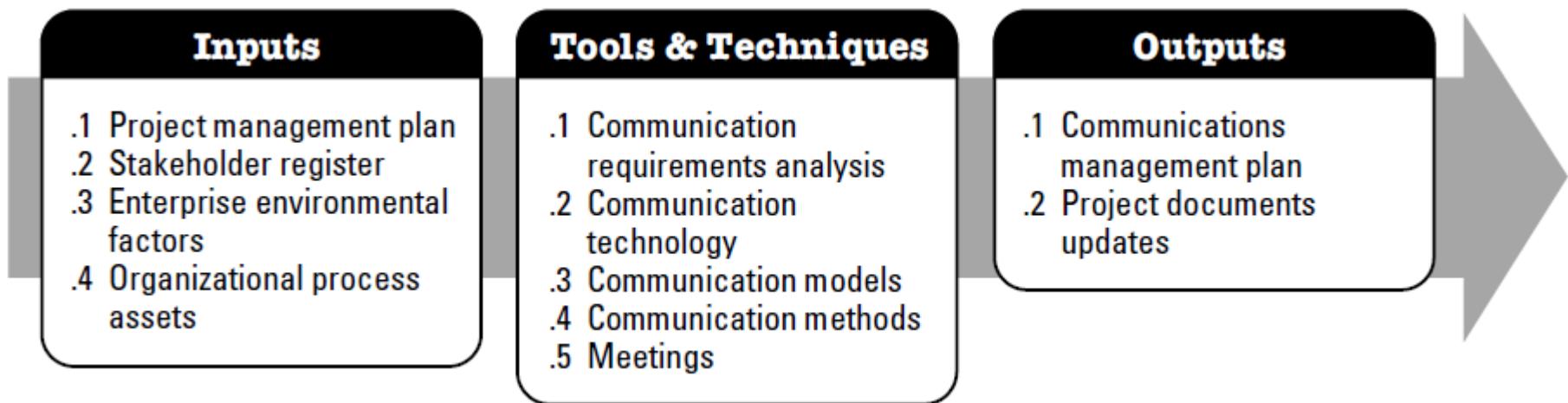
**Control Communications** : The process of monitoring and controlling communications throughout the entire project life cycle to ensure the information needs of the project stakeholders are met.

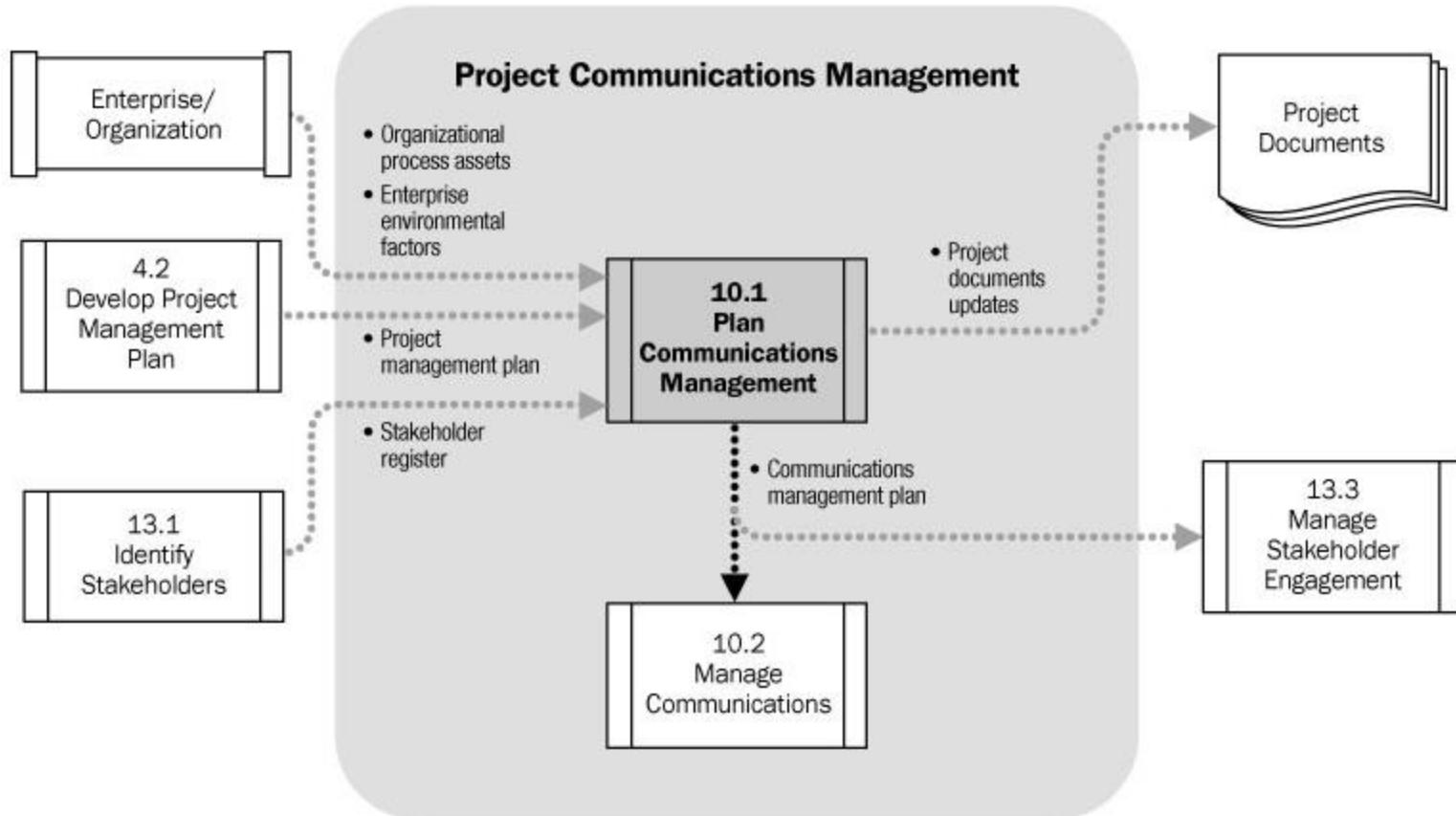
# Plan Communication management



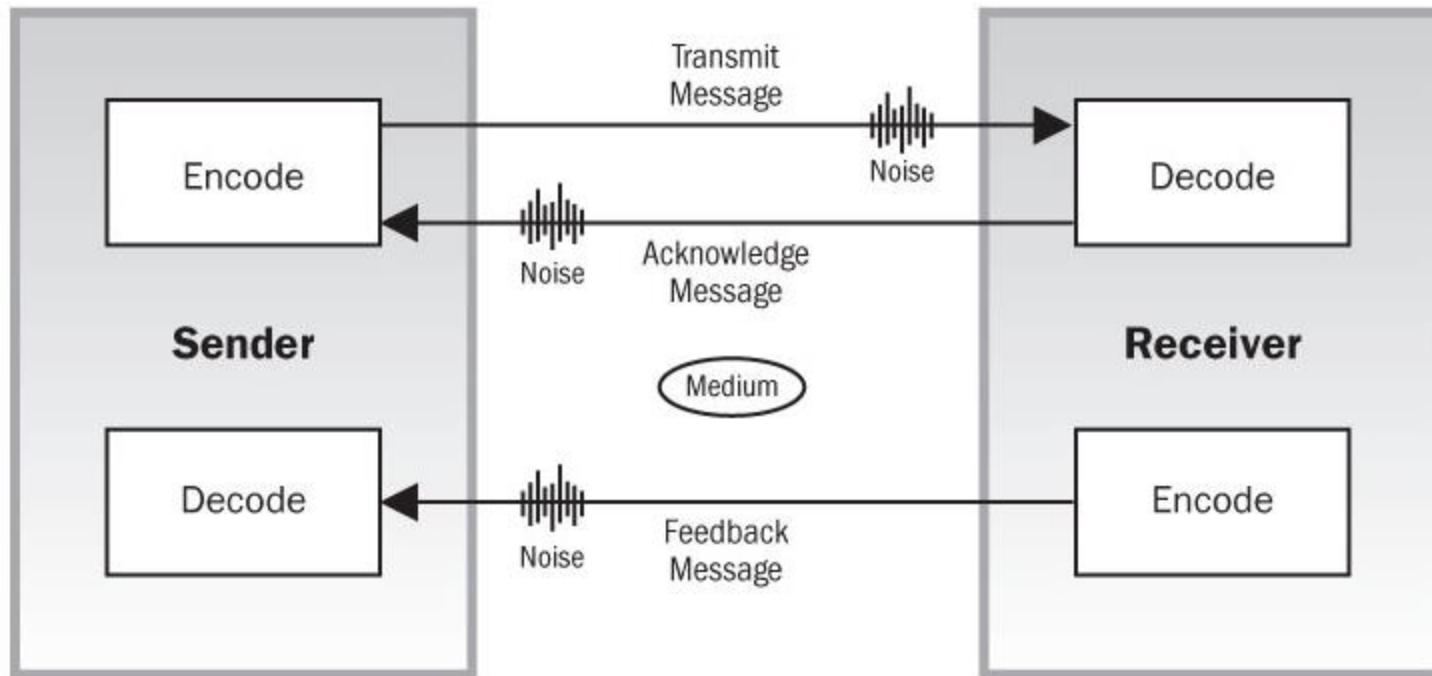
- The process of developing an appropriate approach and plan for project communications based on stakeholder's information needs and requirements, and available organizational assets..
- Key benefit of this process is that it identifies and documents the approach to communicate most effectively and efficiently with stakeholders.

# Plan Communication Management





## Basic Communication Model



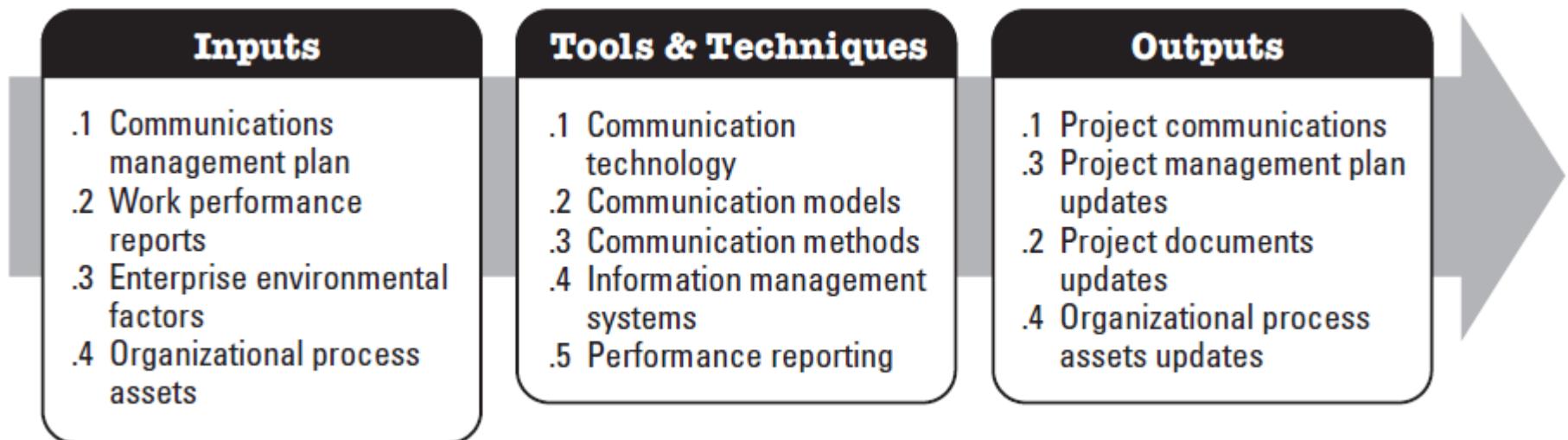
# Manage Communications



- The process of creating, collecting, distributing, storing, retrieving and the ultimate disposition of project information in accordance with the communications management plan.

- Enables and efficient and effective communications flow between project stakeholders.
- Ensures that the information being communicated to project stakeholders has been appropriately generated, as well as received and understood. It also provides opportunities for stakeholders to make requests for further information, clarification, and discussion.

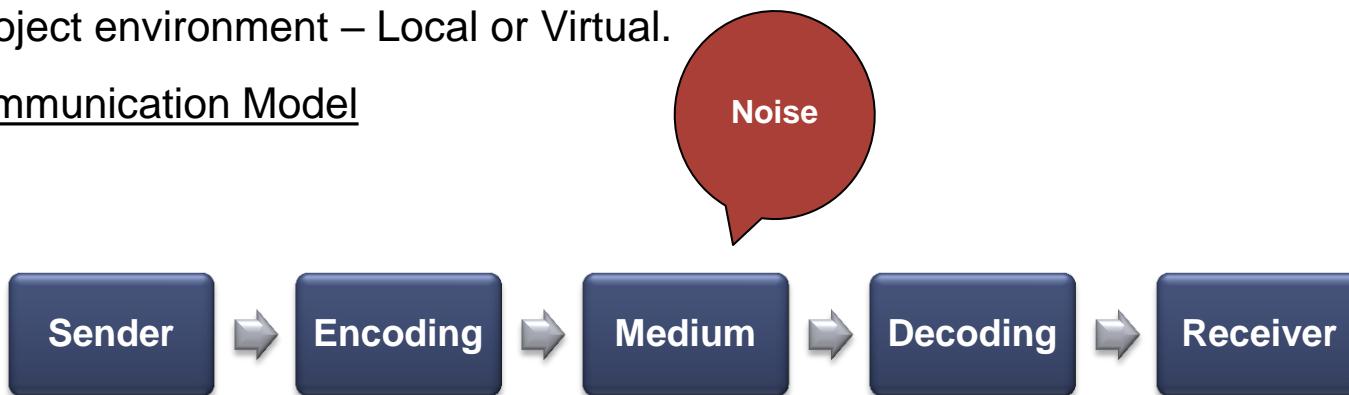
# Manage Communications

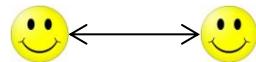


# Factors affecting the communications technology

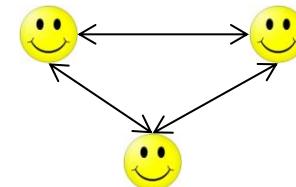
- Frequency and the immediacy of information requirements of various stakeholders.
- Access to communication tools by the stakeholders
- Experience of the Project team members to use the technology
- Project length – Sometimes available technology may change if the project duration too long.
- Project environment – Local or Virtual.

## Communication Model

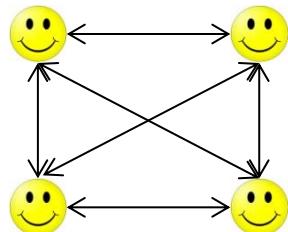




With N = 2  
1 channel



With N = 3  
3 channel



With N = 4  
6 channel

No of communication channels is  
Calculated as =  $N(N-1) / 2$

## Communication Methods

- Individual and group meetings, video and audio conferences, computer chats and other remote communication methods are used for information distribution.

## Information distribution tools

- Hard-copy documents, press releases and electronic databases.
- Electronic communication and conferencing tools, such as e-mail, fax, voice mail, telephone, video and web conferencing and web sites.
- Project management software

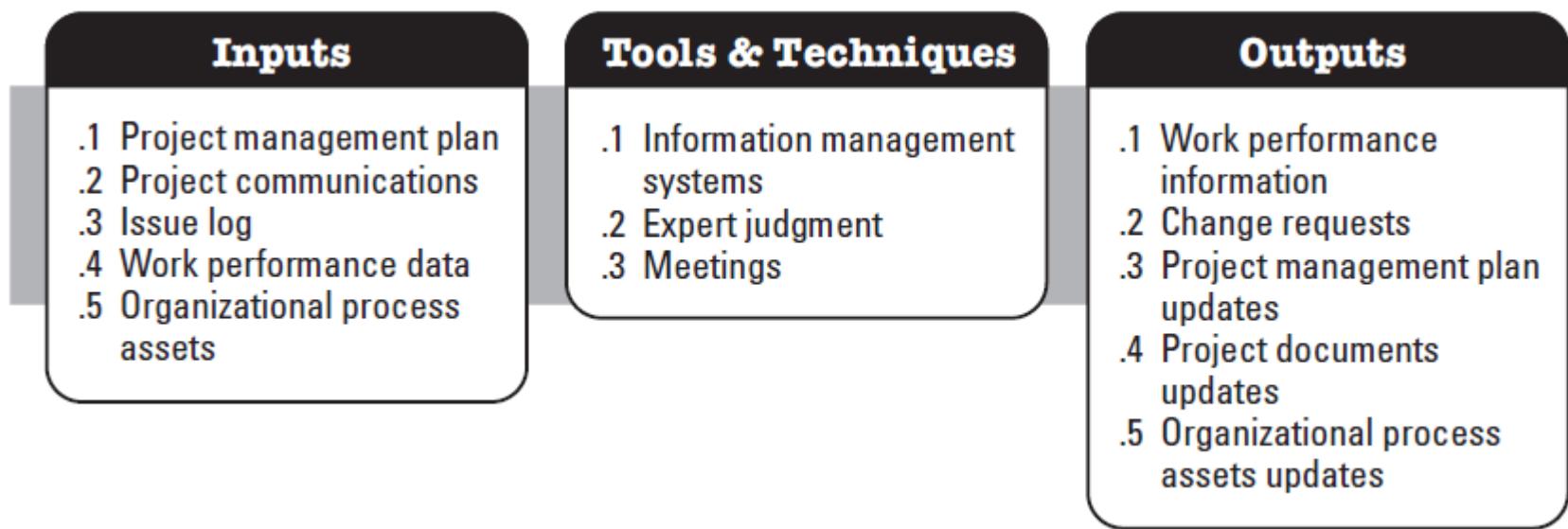
# Control Communications



- The process of monitoring and controlling communications throughout the entire project life cycle to ensure the information needs of the project stakeholders are met.

- Ensures an optimal information flow among all communication participants, at any moment in time.
- The Control Communications process can trigger an iteration of the Plan Communications Management and/or Manage Communications processes.

# Control Communications





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# **Project Management Professional**

## ***Module 11: Project Risk Management***

**PMBOK 5<sup>th</sup> Edition**

# Project Risk Management



A Project risk is an uncertain event or condition that can have a positive or negative impact on the project.



[Plan Risk Management](#)—The process of defining how to conduct risk management activities for a project.

[Identify Risks](#)—The process of determining which risks may affect the project and documenting their characteristics.

[Perform Qualitative Risk Analysis](#)—The process of prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact.

[Perform Quantitative Risk Analysis](#)—The process of numerically analyzing the effect of identified risks on overall project objectives.

[Plan Risk Responses](#)—The process of developing options and actions to enhance opportunities and to reduce threats to project objectives.

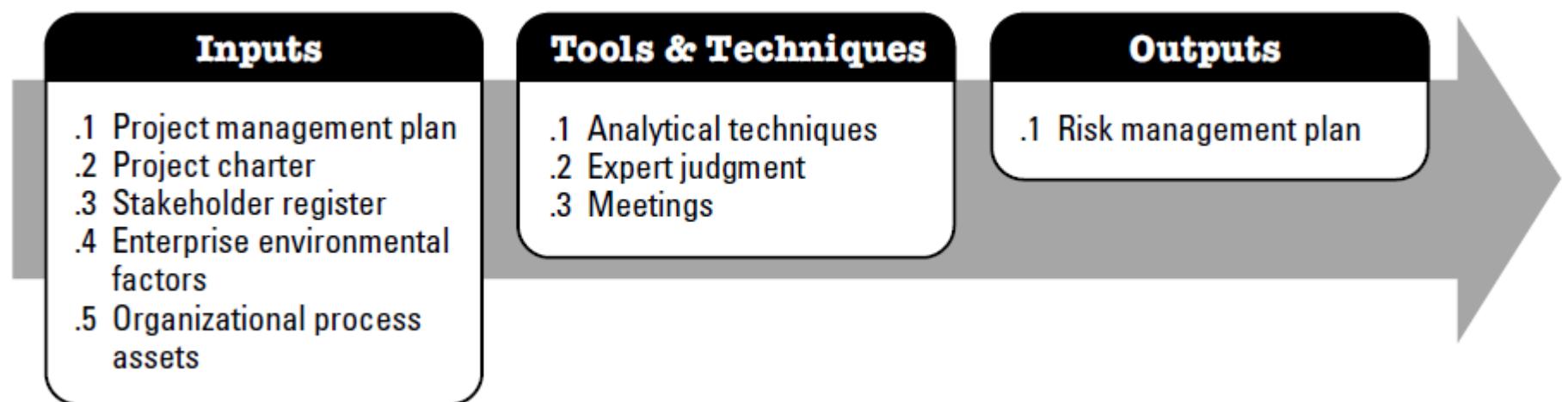
[Control Risks](#)—The process of implementing risk response plans, tracking identified risks, monitoring residual risks, identifying new risks, and evaluating risk process effectiveness throughout the project.

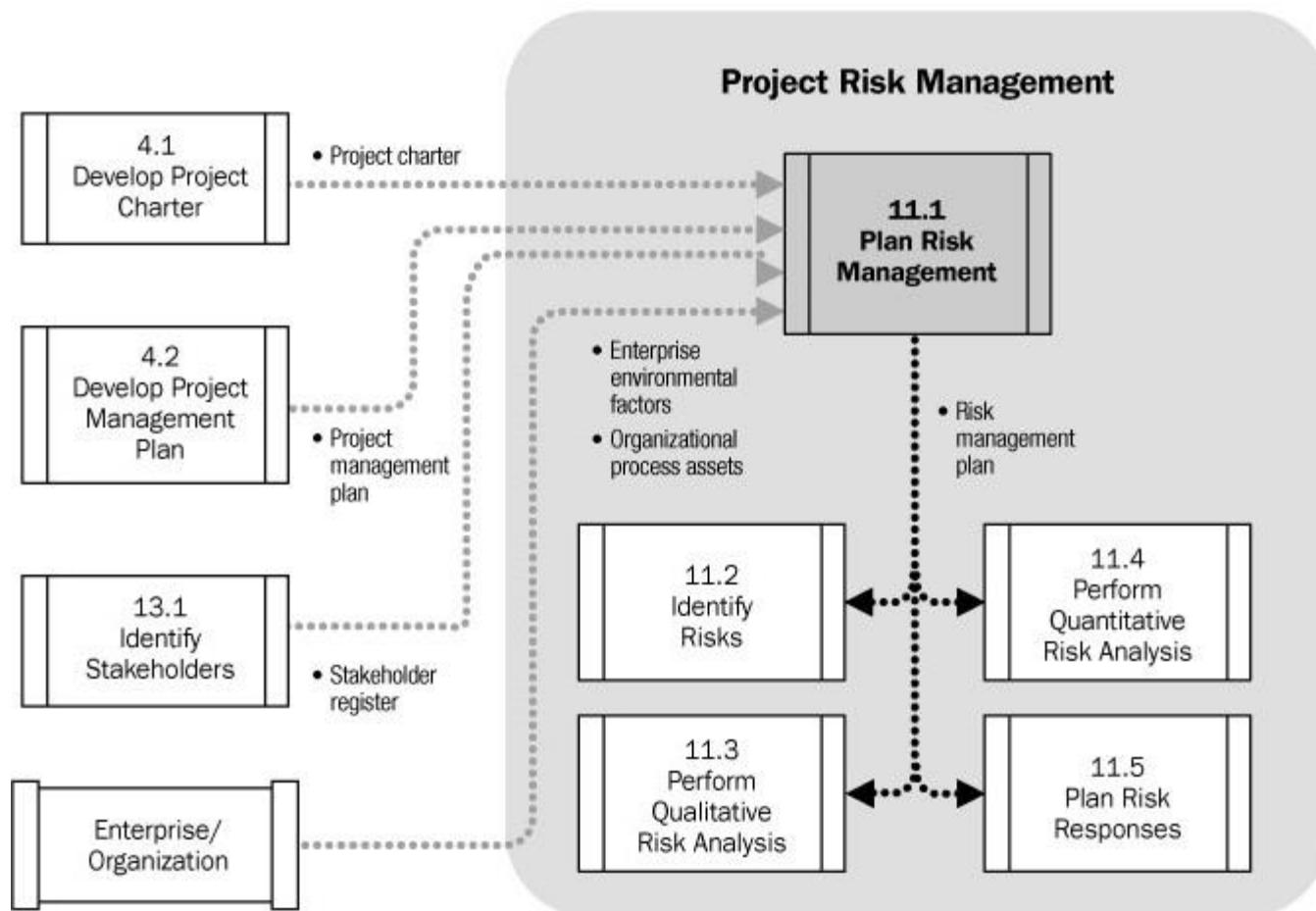
# Plan Risk Management



- The Process of defining how to conduct risk management activities for a project.
- Careful planning enhances the probability of success for the five other risk management processes.
- This process begins as a project is conceived and should be completed early during project planning.

# Plan Risk Management





## **Creating the Risk Management Plan:**

Risk management plan templates, Policies and tolerance level of the stakeholders aid the creation of risk management plan.

Through planning meetings, the risk management plan is created.

### **Attendees:**

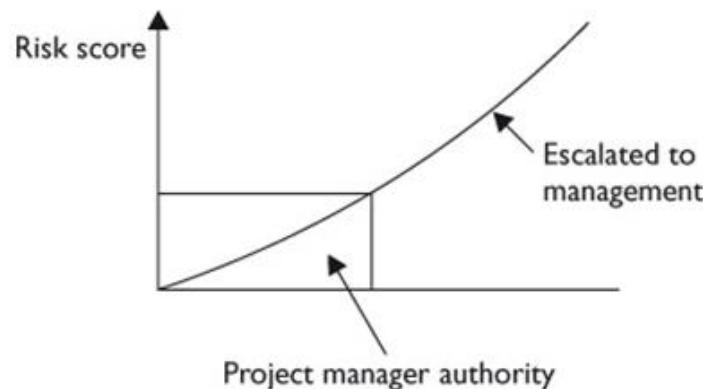
- The project manager
- Project team leaders
- Key stakeholders
- Personal specific to risk management
- Anyone who has the input to risk management plan

Goal of the meeting is to define:

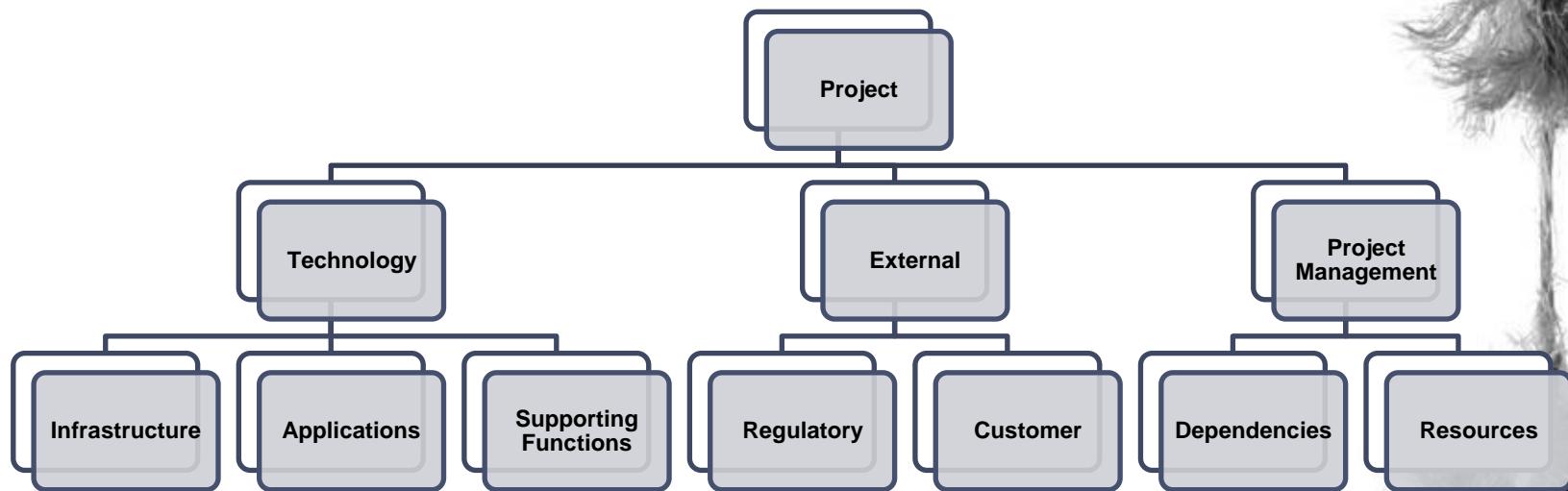
- The project's risk management activities
- The costs of risk elements
- Risk Schedule activities
- The assignment of risk responsibilities
- The reliance on templates for risk categories
- Definitions for the level of risk
- The relevant risk probability and impact matrix

## Risk Management Plan Contents:

- Methodology – Approaches, tools and data sources to be used for RM.
- Roles and Responsibilities for RM.
- Budgeting – Establishing a budget for RM activities to be included in the cost baseline.
- Timing – How often RM will be done in the project lifecycle.
- Risk reporting categories (RBS) – Reporting formats/definitions of risk Probability and Impact.
- Risk analysis scoring – Risks scoring system for qualitative and quantitative analysis.



## Sample – Risk Breakdown structure (RBS)



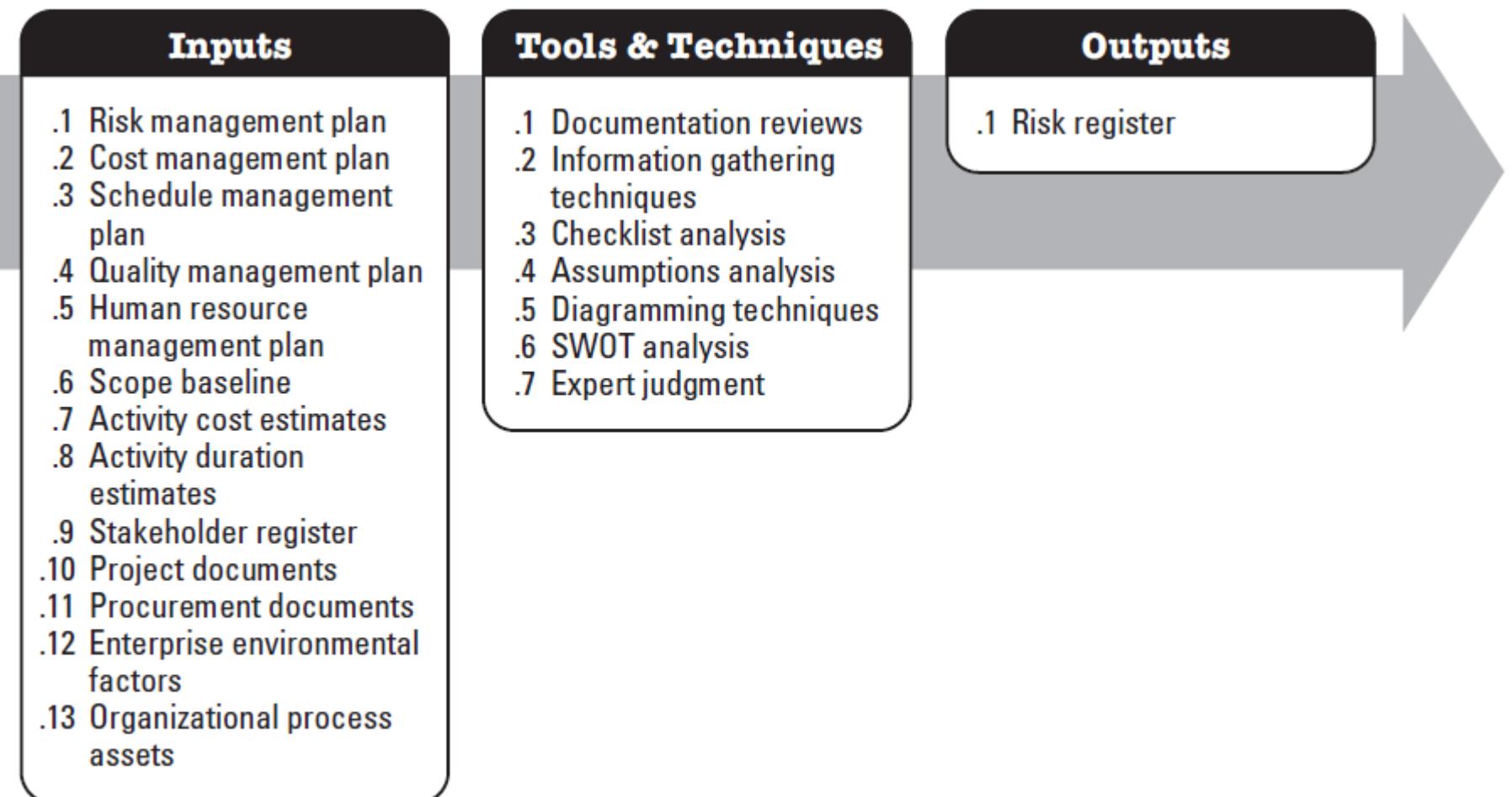
# Identify Risks



- The Process of determining which risks may affect the project and documenting their characteristics.

- Identifying Risks is an iterative process because new risks may evolve or become known as the project progresses through its life cycle.
- This exercise can be completed by Project Manager, the project team, a risk management team and even SMEs.
- Even people outside of the project can contribute to the risk identification.

# Identify Risks



Brainstorming – is useful to tap ideas from multiple sources or building on one's ideas.

Delphi Techniques –Relates to iterative convergence of ideas from different stakeholders.

SWOT – Strength, Weakness, Opportunities and Threats – A management technique to identify positive and negative factors.

Interviewing stakeholders and Project managers could be an excellent method of identifying risks in the project based on interviewees experiences.

Checklist – The lowest level of RBS can serve as checklist for risk identification or even the risk register of previous similar project can be used as a checklist.

Assumption analysis – Assumption analysis is the process of examining the assumptions to see what risks may stem from false assumptions.

## Risks Event / Impact matrix



## Risk Register contents

- List of Identified risks, their descriptions, WBS and other Project elements impacted.
- List of potential impacts and likely responses.
- The root causes of risks.
- Unplanned risk categories

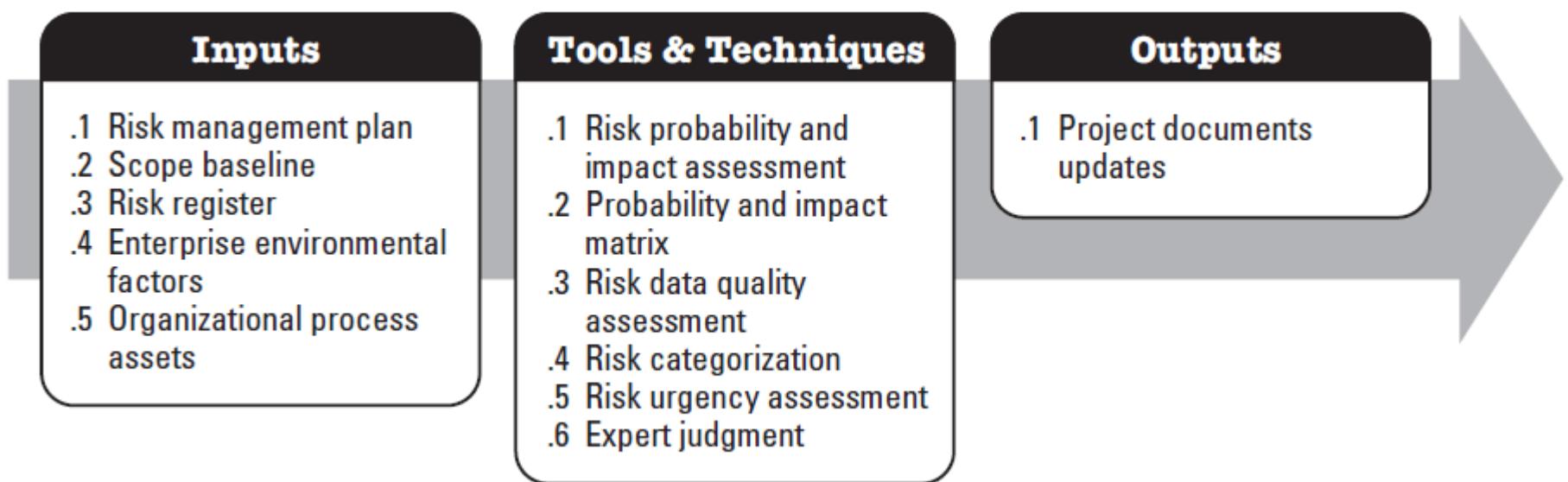
# Perform Qualitative Risk Analysis



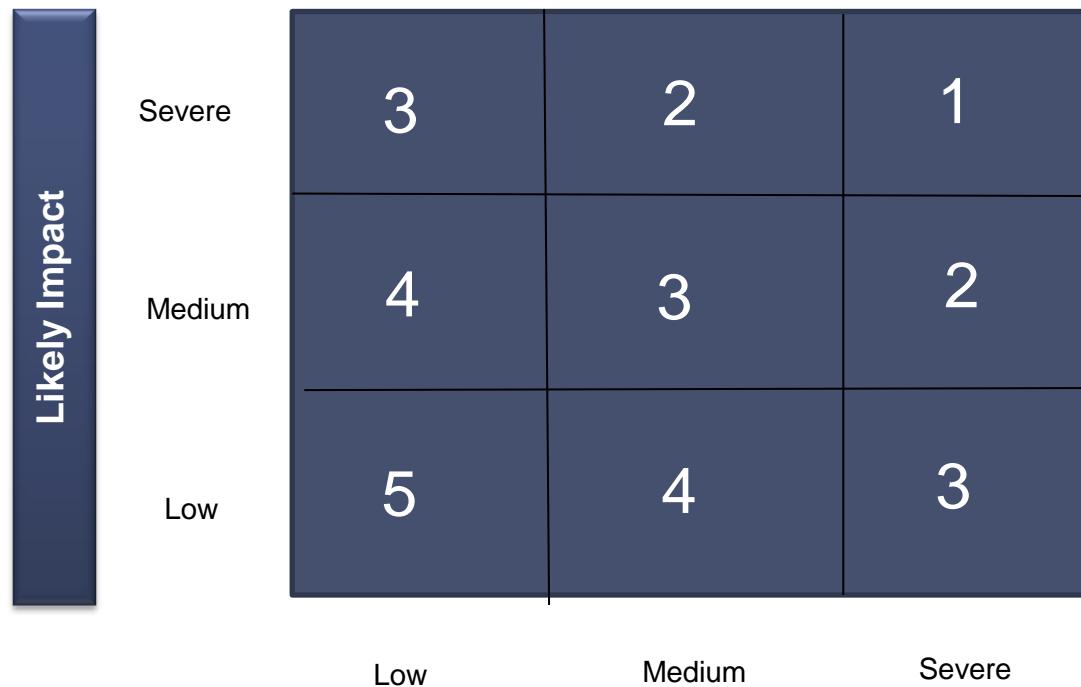
- The Process of Prioritizing the risks for further analysis or action by assessing and combining their probability of occurrence and Impact.

- Assess the priority of identified risks using their probability, likelihood of occurrence and the Impact.
- Establish definitions of the levels of probability and impact.
- This process can lead into Perform Quantitative Risks Analysis.
- The output is still the risk register (with updates)

# Perform Qualitative Risk analysis



## A Probability - Impact Matrix



Likely Probability of occurrence

## Definition of impact scale

	Low	Medium	High
Budget	<10% cost increase	10-20% increase	>20% increase
Schedule	<5%	5 – 20%	>20%
Scope	Minor areas of scope affected	Major areas of scope affected	Deliverables unaccepted
quality	Quality degradation barely noticeable	Quality reduction requires sponsors approval	Deliverable is effectively useless

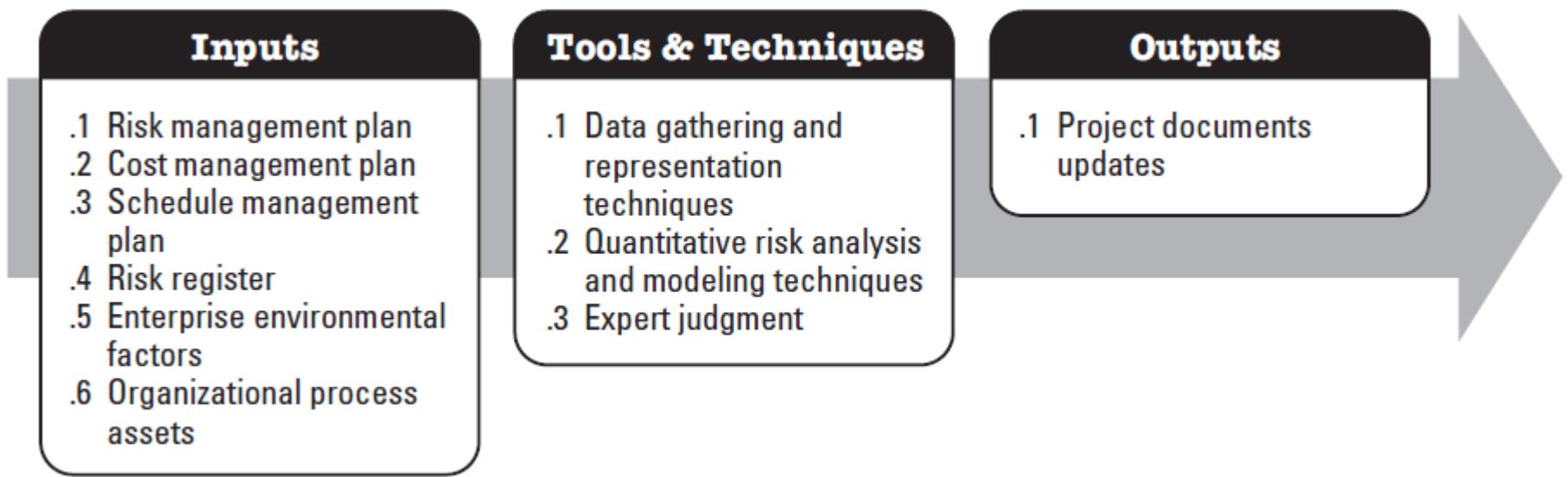
# Perform Quantitative Risk analysis



- The Process of numerically analyzing the effect of identified risks on overall project objectives.

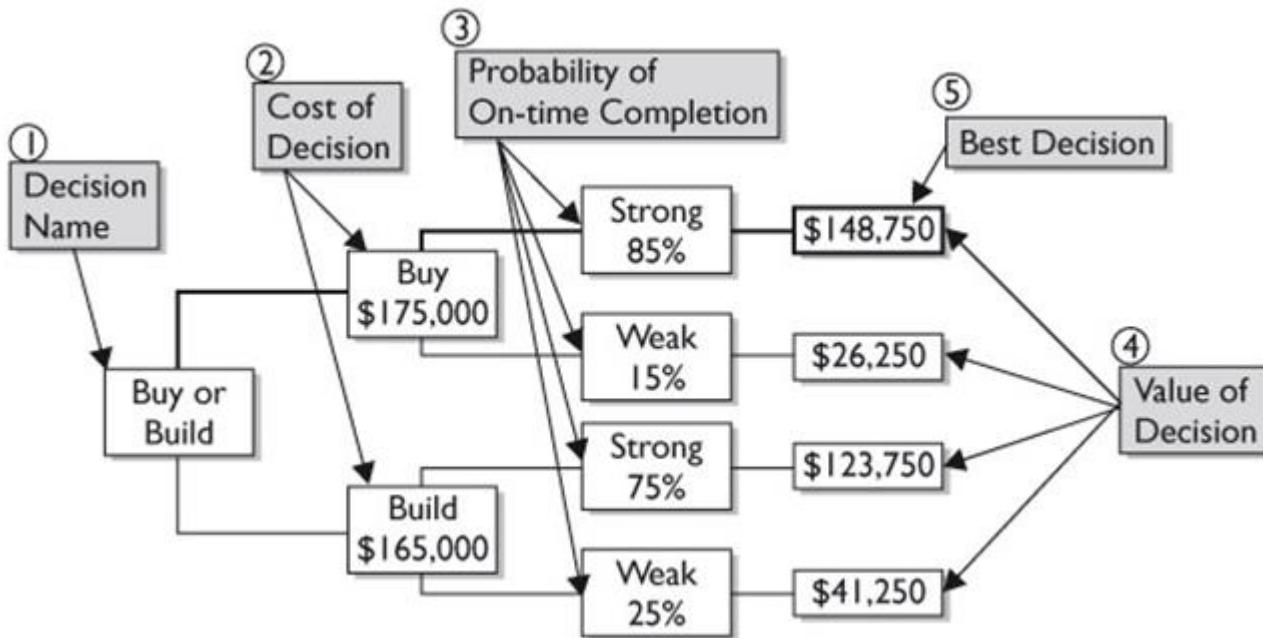
- Ascertain the likelihood of reaching project success and reaching a particular project objective.
- Determine the likely amount for contingency reserve needed for the project.
- Determine risks with largest impact on the project.

# Perform Quantitative Risk Analysis



Quint Wellington Redwood

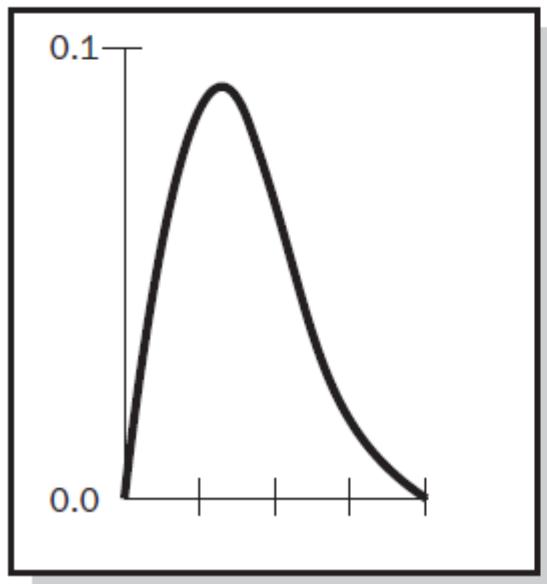
# Earned Monetary Value (RMV)



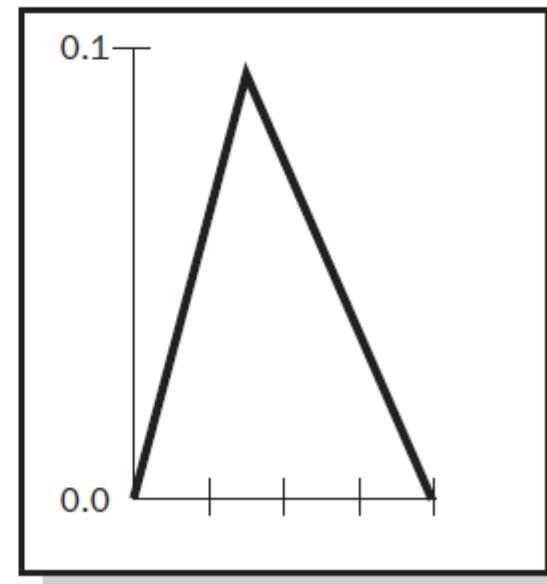
## Probability Distribution

Example:

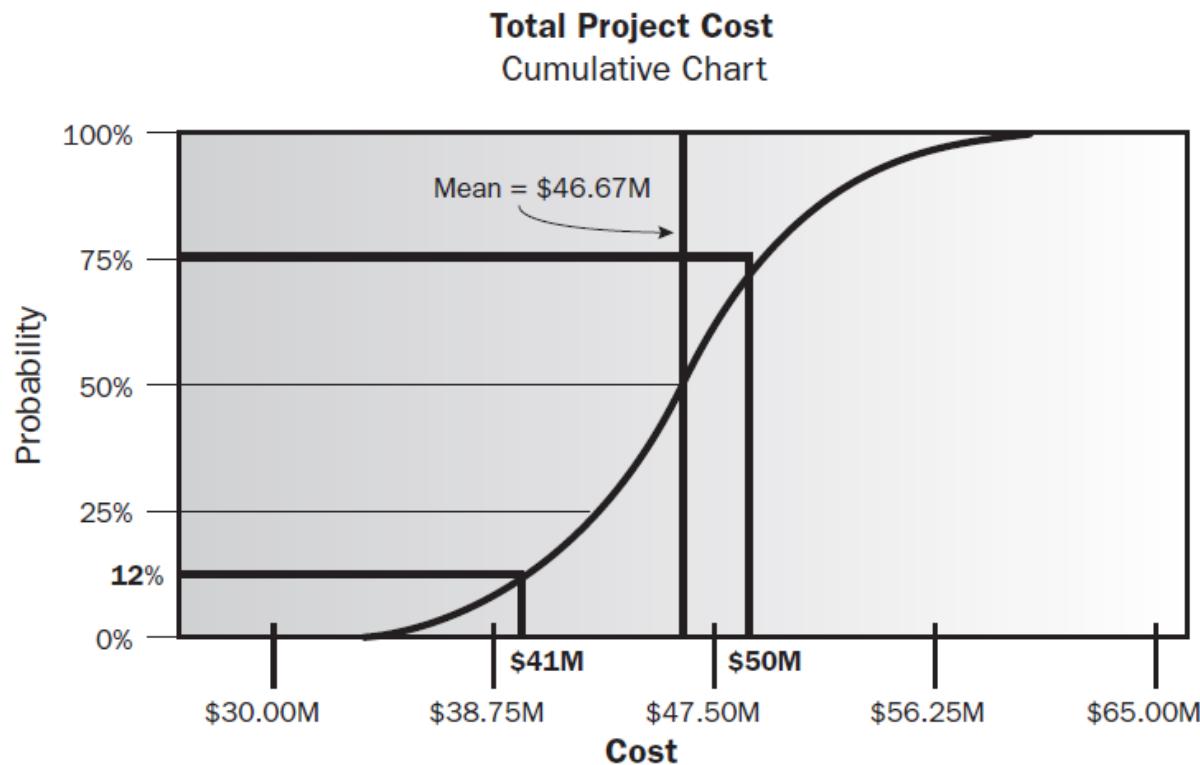
**Beta Distribution**



**Triangular Distribution**



## Modeling and Simulation



# Plan Risk Responses



- The Process of developing options and actions to enhance opportunities and to reduce threats to project objectives.

- It follows qualitative and quantitative risk analysis processes.
- Identification and assignment of one person (Risk response owner) to take responsibility for each agreed and funded risk response.
- Planned risk responses must be appropriate to the significance of the risks and realistic within the project context.

# Plan Risk Responses



## Strategies for negative risks or threats

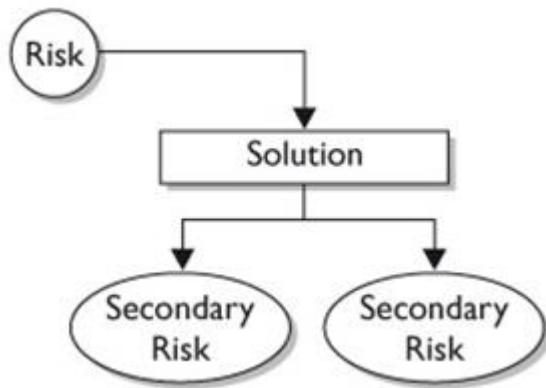
- Avoid – Eliminate the threat by eliminating the cause.
- Transfer – Make another party responsible for the risks.
- Mitigate – Reduce the probability of the impact of the a threat, there by making it a smaller risk
- Accept – Accepting the risks because no other action is feasible.
  - Passive acceptance – No action
  - Active acceptance – Establish contingency reserve

## Strategies for Positive risks or opportunities

- Exploit – Ensuring the opportunity occurs.
- Share – Allocate ownership of the opportunity to a third party.
- Enhance – Maximizing the ‘size’ of the opportunity. i.e. Increase the likelihood of the risk event
- Accept – Accepting the risks.

Residual Risks - Risks that may remain after risk planning, avoidance, transfer, or mitigation.

Secondary Risks – Risks stem from risk responses.

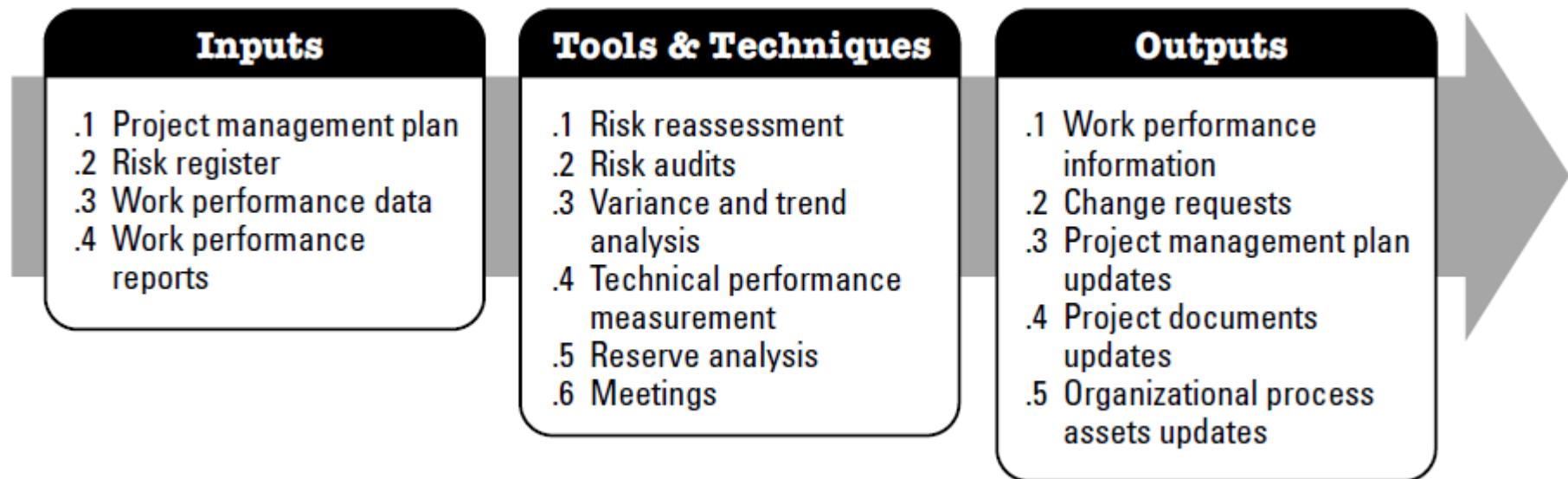


# Control Risks



- The Process of Implementing risk response plans, tracking identified risks, monitoring residual risks, identifying new risks and evaluating risk process effectiveness throughout the project.
- Conform risk responses and implemented as planned.
- Determine effectiveness of risk responses and if new responses are needed.
- Determine effect of project progression on the risks.
- Monitor triggers and project for new risks.

# Control Risks



## Key Tools for Monitoring and Control

- Risk Reassessment
- Risk Audit
- Variance and Trend Analysis
- Technical Performance Measurement
- Reserve Analysis
- Status Meetings



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# **Project Management Professional**

## ***Module 12: Project Procurement Management***

**PMBOK 5<sup>th</sup> Edition**

# Project Procurement Management



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

**Plan Procurement Management** – The process of documenting project purchasing decisions, specifying the approach, and identifying potential sellers.

**Conduct Procurements** – The process of obtaining seller responses, selecting a seller, and awarding a contract.

**Control Procurements** – The process of managing procurement relationships, monitoring contract performance, and making changes and corrections as appropriate.

**Close Procurement** – The process of completing each project procurement.

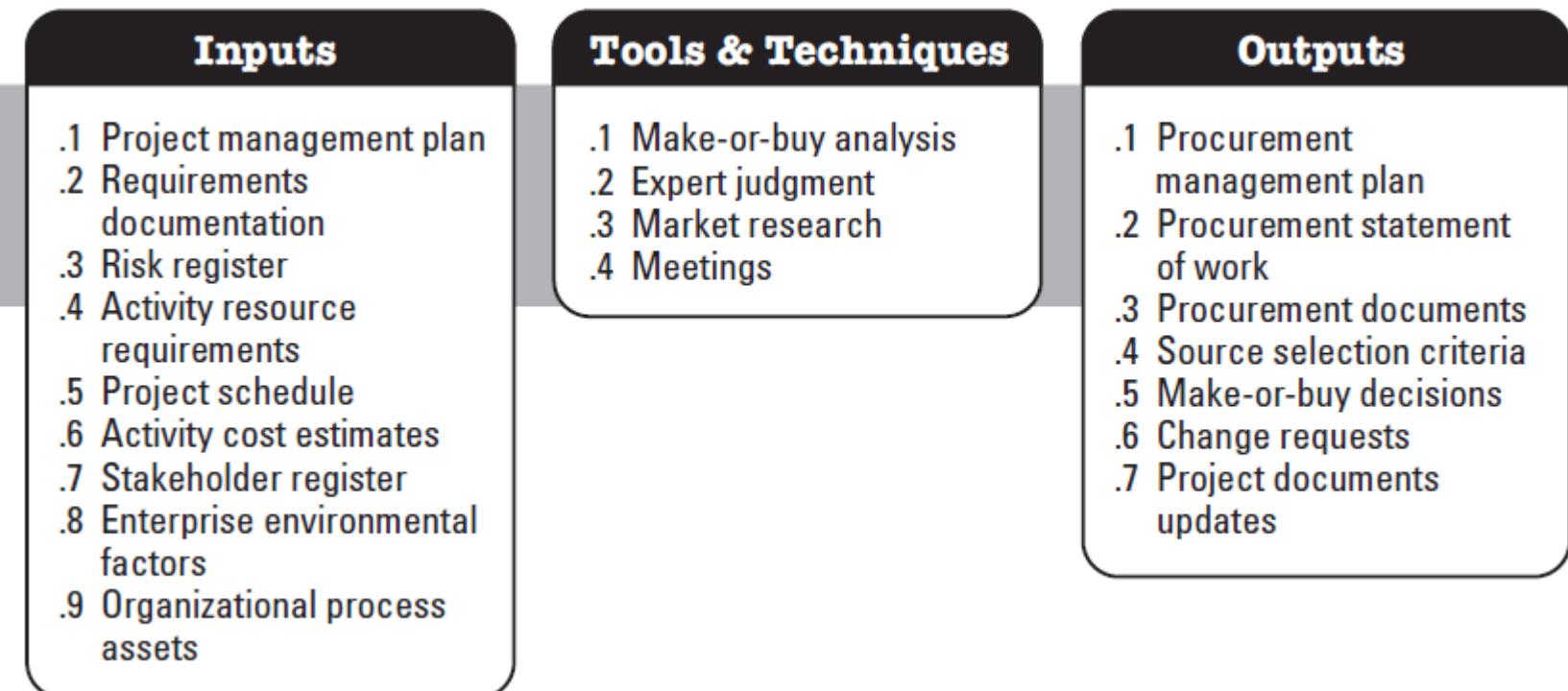
# Plan Procurement Management



- The Process of documenting project purchasing decisions, specifying the approach, and identifying potential sellers.

- Identification of project needs which can be met by acquiring products, services or results outside the project organization.
- How much to procure..
- When to procure..
- Environment Factors and organizational process assets are the key inputs for planning procurement.

# Plan Procurement Management



# Types of Contract

Fixed-Price Contracts Also known as lump sum contracts are agreements that define a total price for the product the seller is to provide. Seller to assume the risk of cost overruns.

- Firm Fixed-Price contract (FFP)
- Fixed-Price incentive fee contract (FPIF)
- Fixed-Price with economic price adjustment contract (FPEPA)

Cost-Reimbursable Contracts These contracts pay the seller for the product. Buyer to assume the risk of cost overruns.

- Cost plus fixed fee (CPFF)
- Cost plus incentive fee (CPIF)
- Cost plus award fee (CPAF)

Time and Material Contracts (T&M) Price assigned for the time and materials provided by the Seller. These contracts should have NTE clause (Not-to-exceed) to put a ceiling on the procured work.

### Procurement management plan contents:

- Finalizes the products to be procured
- Identifies which products to be procured and how
- Identifies the likely types of contracts to be used
- Specifies the criteria by which the sellers will be selected
- States if Independent Estimates will be used during proposal evaluation
- Reporting requirements
- Procurement lead times and identifying pre-qualified sellers if needed.
- Procurement metrics

## Statement of Work (SOW)

Areas typically addressed by a sow are:

- Purpose
- Scope of work
- Location of the work performed
- Period
- Deliverable schedule
- Applicable standards
- Acceptance criteria
- Special requirement

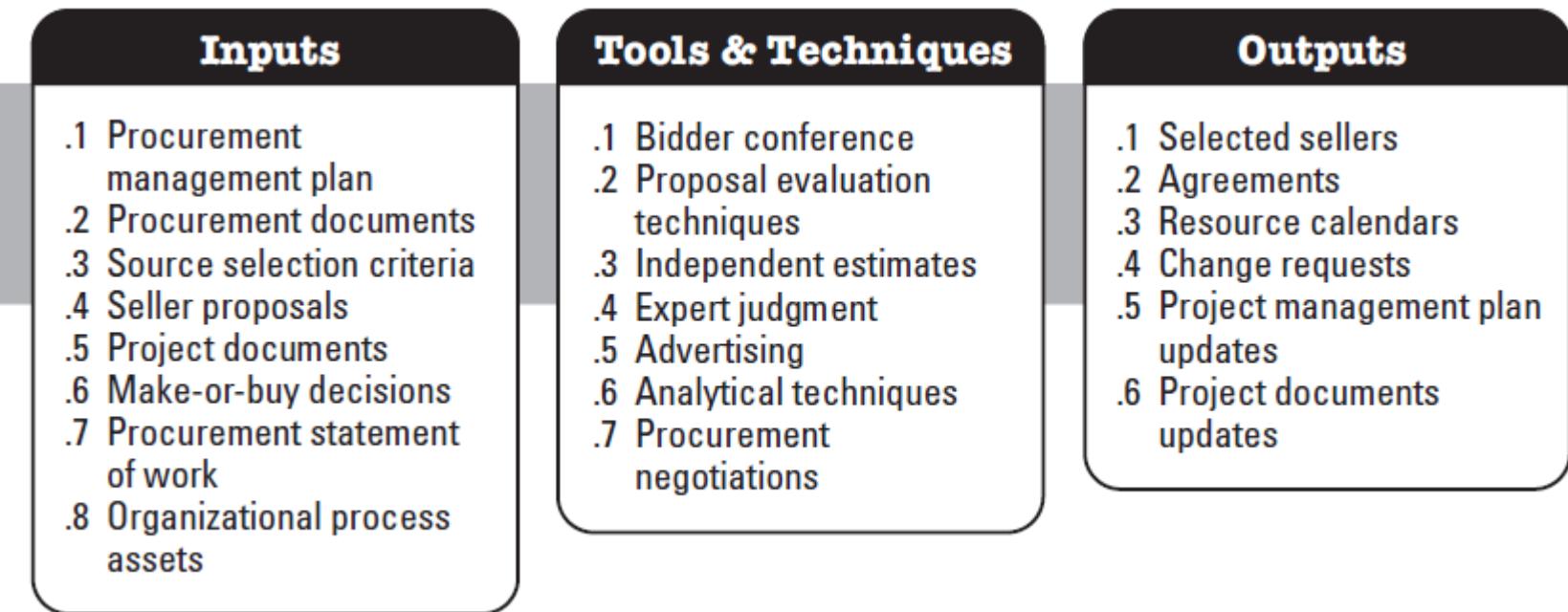
# Conduct Procurement



- The Process of obtaining seller responses, selecting a seller and awarding a contract.

- The team will receive bids or proposals and will apply previously defined selection criteria to select one or more sellers.
- This process can repeat in a major procurement items. (requesting responses, evaluations)

# Conduct Procurement



<b>Document</b>	<b>Purpose</b>
Bid	From seller to buyer. Price is the determining factor in the decision-making process.
Quotation	From seller to buyer. Price is the determining factor in the decision-making process.
Proposal	From seller to buyer. Other factors—such as skill sets, reputation, and ideas for the project solution—may be used in the decision-making process.
Invitation for bid (IFB)	From buyer to seller. Requests the seller to provide a price for the procured product or service.
Request for quote (RFQ)	From buyer to seller. Requests the seller to provide a price for the procured product or service.
Request for proposal (RFP)	From buyer to seller. Requests the seller to provide a proposal to complete the procured work or to provide the procured product.

**Qualified Sellers list** – Usually, the purchase departments maintain list of preferred vendors (based on past experience) of various commodities or services

**Bidder conferences** – Enable the buyer and the set of sellers to come together in a forum for clarification of the procurement needs.

**Independent Estimates** – also called as “should cost” estimates. SMEs from performing organization or external organization will estimate what the cost should be.

**Proposal evaluation technique** Like Weighting systems, screening systems can be applied to shortlist sellers.

**Weighting systems** A weighting system creates a matrix, weights are assigned to the values of proposals and each proposal is scored.

**A screening system** is a tool that filters or screens out Vendors that don't qualify for the Contract based on some minimum qualification parameters.

## Proposals

Proposals are seller prepared documents

- Portray seller's ability to deliver the requested services
- It is formal and legal offer in response to the Buyer's request
- Can be supplemented by additional material or oral presentations

## Typical source selection process

- Screening off of “unqualified” Vendors
- Consideration of Technical / Commercial Proposals of screened vendors
- Explicit consideration on any risks associated
- Application weighted Ranking system
- Comparison with “Should cost” Estimates
- Conduct negotiations and final source selection
- Negotiations can cover multiple aspects and are subject to elaborate processes

## Typical contract contents

- SOW
- Schedule/period of performance
- Roles and responsibilities
- Pricing and payment criteria
- Acceptance criteria
- Warranty and product support clauses
- Change request handling procedures
- Payment procedures
- Termination and dispute handling mechanism

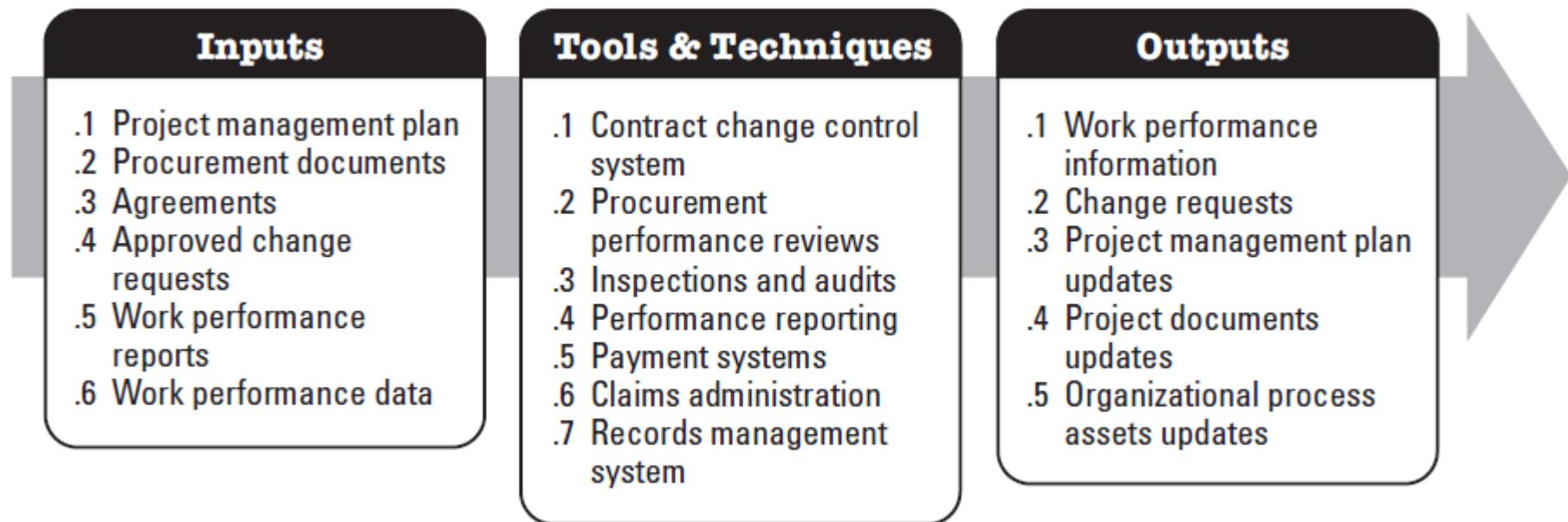
# Control Procurement



- The Process of managing procurement relationships, monitoring contract performance, and making changes and corrections as needed.

- Both buyer and seller will administer the procurement for similar purposes.
- Ensure seller's performance meets procurement requirements and the buyer performs according to the terms of the legal contract.
- Usually this is performed by a separate function inside the organization.

# Control Procurement



**Contract change control system**— Approved Change Requests in the Contract are processed through established Contract change control system.

**Reviews and Audits** – These are proactive actions performed by the Buyer usually at Seller's premises and supported by the seller.

**Payment System** – These are usually handled by Finance department. Payment for the sellers are processed as per the payment policies.

**Performance reporting** – It is a communication between Project manager and the management about how seller is performing against the contract.

**Claim Administration** – Sometimes, buyer and sellers are in disagreement on who should pay for the change. Resolution may come from negotiation, mediation or any method as defined by the contract

**Records Management System** – This is part Project management information system which tracks the contract documents.

# Close Procurement



- The Process of completing each project procurement. It supports close project phase, since it involves verification that all work and deliverables were acceptable.
- Finalizing open claims, updating records to reflect final results and archiving such information for future use.

# Close Procurement



Auditing Procurement Process Lessons learning process – What went well and what did not in procurement management. Record the lessons learned so that other projects can learn.

Negotiated settlements Termination of the contracts (when vendor does wrong or buyer does not need the service being provided). If the disputes cannot be resolved, third parties can resolve the issues (attorneys).



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# **Project Management Professional**

## ***Module 13: Project Stakeholder Management***

**PMBOK 5<sup>th</sup> Edition**

# Project Stakeholder Management



**Identify Stakeholders**—The process of identifying the people, groups, or organizations that could impact or be impacted by a decision, activity, or outcome of the project; and analyzing and documenting relevant information regarding their interests, involvement, interdependencies, influence, and potential impact on project success.

**Plan Stakeholder Management**—The process of developing appropriate management strategies to effectively engage stakeholders throughout the project life cycle, based on the analysis of their needs, interests, and potential impact on project success.

**Manage Stakeholder Engagement**—The process of communicating and working with stakeholders to meet their needs/expectations, address issues as they occur, and foster appropriate stakeholder engagement in project activities throughout the project life cycle.

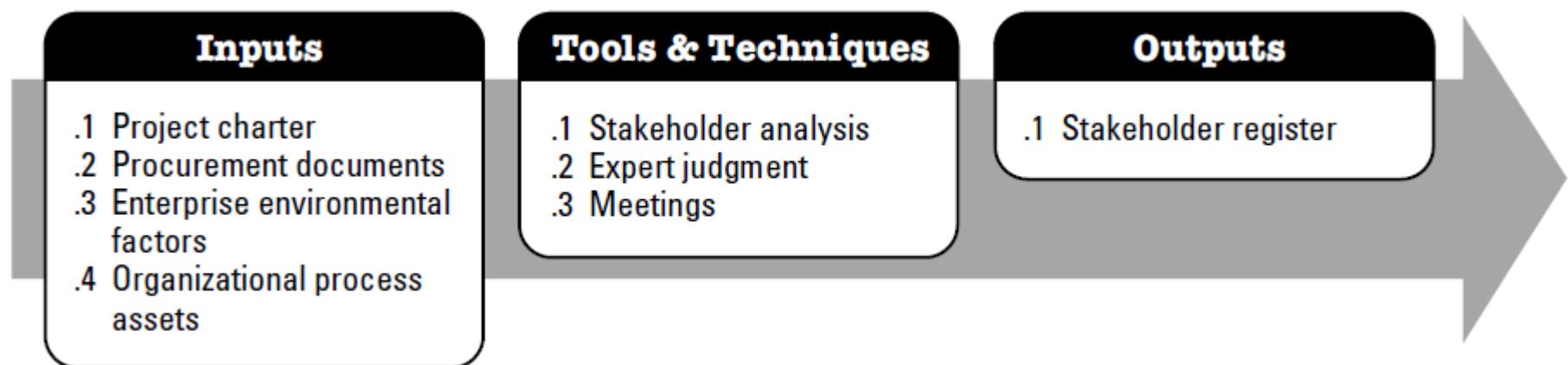
**Control Stakeholder Engagement**—The process of monitoring overall project stakeholder relationships and adjusting strategies and plans for engaging stakeholders.

# Identify Stakeholders

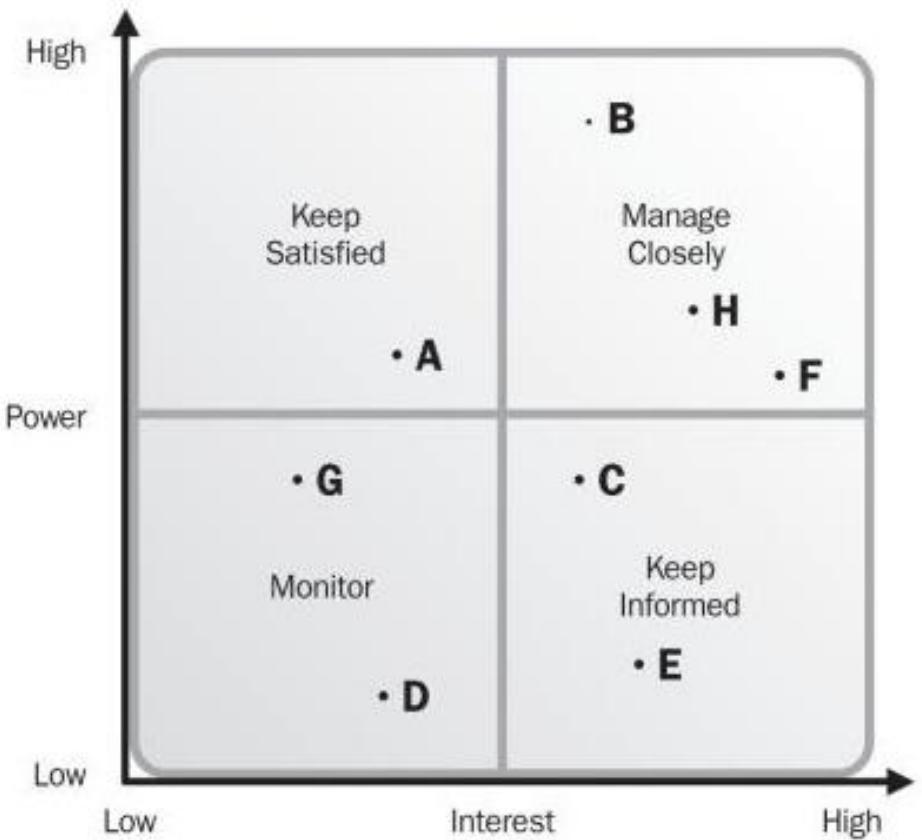


- The process of identifying the people, groups, or organizations that could impact or be impacted by a decision, activity, or outcome of the project; and analyzing and documenting relevant information regarding their interests, involvement, interdependencies, influence, and potential impact on project success.
- The key benefit of this process is that it allows the project manager to identify the appropriate focus for each stakeholder or group of stakeholders.

# Identify Stakeholders



# Stakeholder Analysis



Example Power/Interest Grid with stakeholders



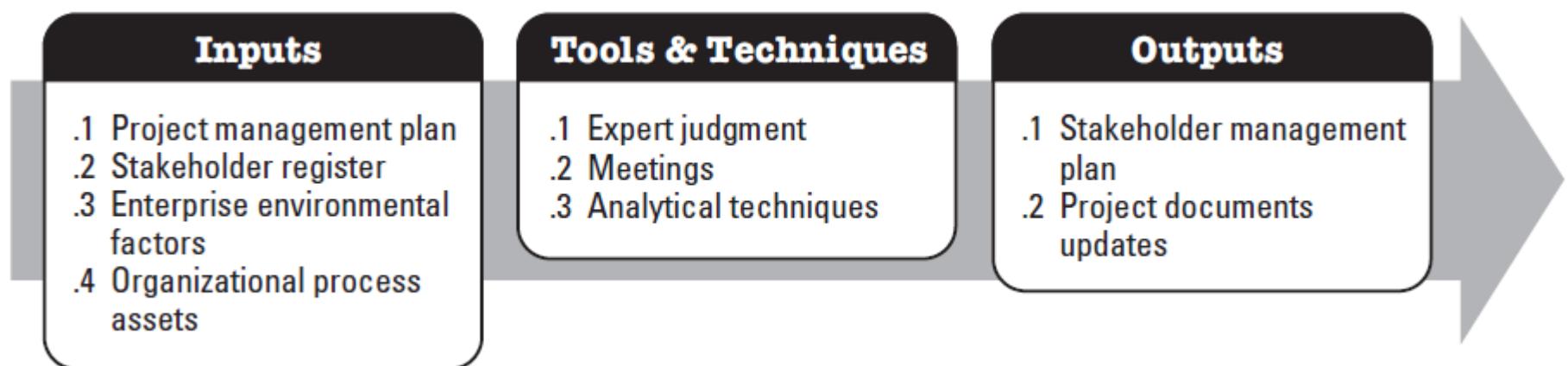
# Plan Stakeholder Management



- The process of developing appropriate management strategies to effectively engage stakeholders throughout the project life cycle, based on the analysis of their needs, interests, and potential impact on project success.

- The key benefit of this process is that it provides a clear, actionable plan to interact with project stakeholders to support the project's interests.
- Plan Stakeholder Management identifies how the project will affect stakeholders, which then allows the project manager to develop various ways to effectively engage stakeholders in the project, to manage their expectations, and to ultimately achieving the project objectives.

# Plan Stakeholder Management



## Stakeholders Engagement Assessment Matrix

<b>Stakeholder</b>	<b>Unaware</b>	<b>Resistant</b>	<b>Neutral</b>	<b>Supportive</b>	<b>Leading</b>
Stakeholder 1	C			D	
Stakeholder 2			C	D	
Stakeholder 3				D C	

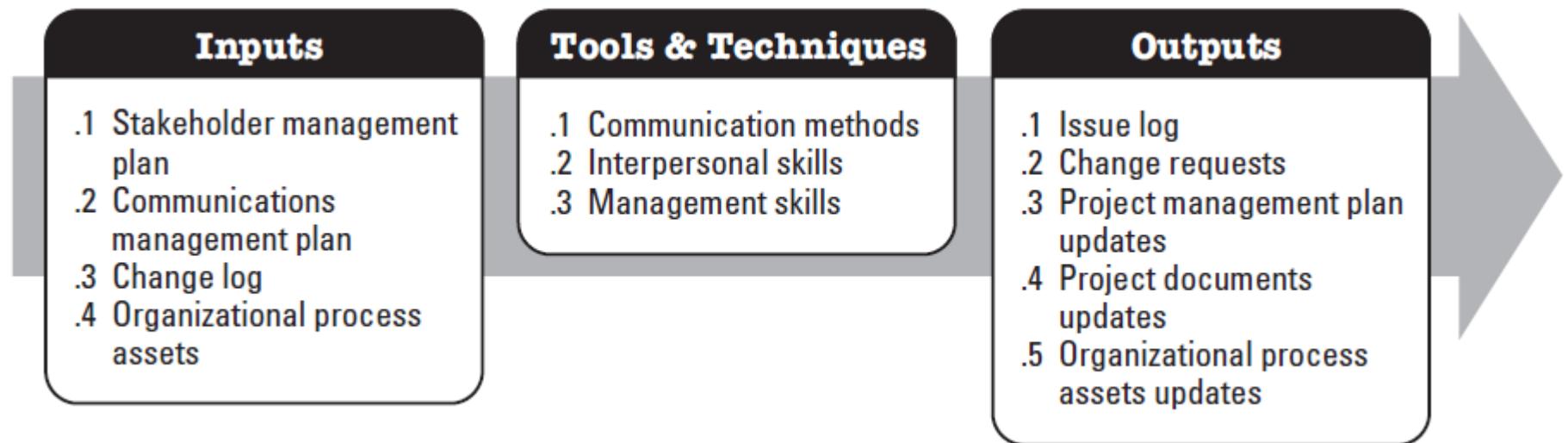
# Manage Stakeholder Engagements



- The process of communicating and working with stakeholders to meet their needs/expectations, address issues as they occur, and foster appropriate stakeholder engagement in project activities throughout the project life cycle.

- The key benefit of this process is that it allows the project manager to increase support and minimize resistance from stakeholders, significantly increasing the chances to achieve project success.
- Managing stakeholder engagement helps to increase the probability of project success by ensuring that stakeholders clearly understand the project goals, objectives, benefits, and risks.

# Manage Stakeholder Engagement



## Interpersonal Skills

The project manager applies interpersonal skills to manage stakeholders' expectations.

For example:

- Building trust,
- Resolving conflict,
- Active listening, and
- Overcoming resistance to change.

## Management Skills

The project manager applies management skills to coordinate and harmonize the group toward accomplishing the project objectives. For example:

- Facilitate consensus toward project objectives,
- Influence people to support the project,
- Negotiate agreements to satisfy the project needs, and
- Modify organizational behavior to accept the project outcomes.

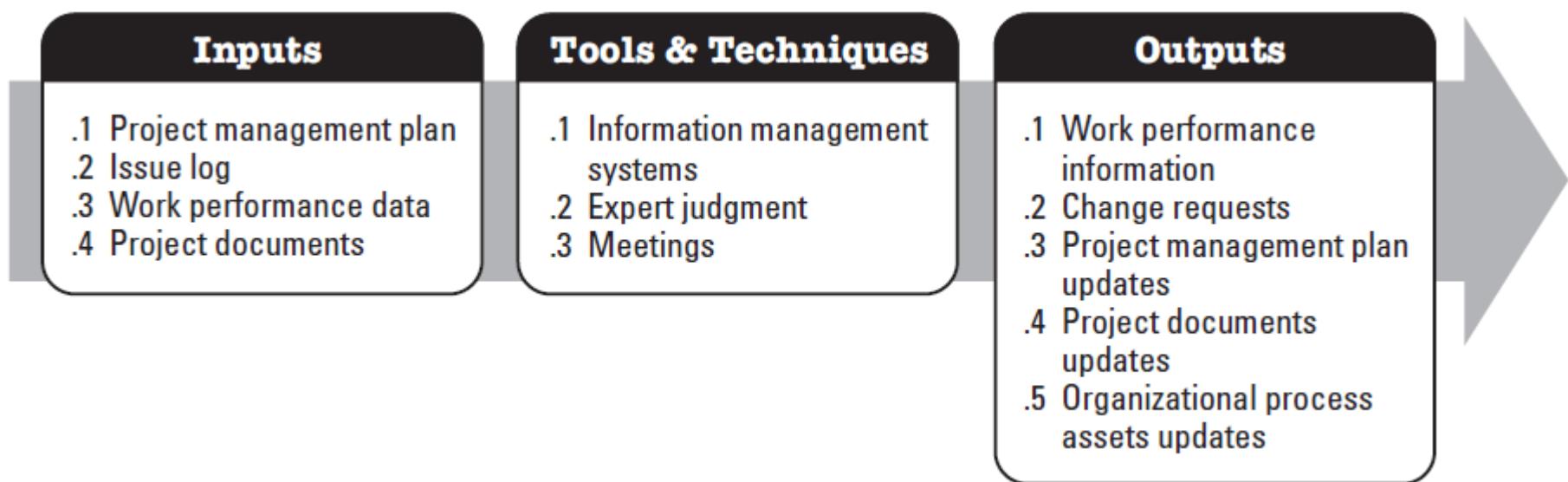
# Control Stakeholder Engagement



- The process of monitoring overall project stakeholder relationships and adjusting strategies and plans for engaging stakeholders

- The key benefit of this process is that it will maintain or increase the efficiency and effectiveness of stakeholder engagement activities as the project evolves and its environment changes.
- Stakeholder engagement activities are included in the stakeholder management plan and are executed during the life cycle of the project. Stakeholder engagement should be continuously controlled.

# Control Stakeholder Engagement



# Questions?

