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CAPM® Certification Training

Lesson 01: Introduction

This course is based on the Project Management Institute, *A Guide to the Project Management of Body of Knowledge (PMBOK® Guide)* – Sixth Edition.
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Objectives

- ▷ Define PMP® Certification, CAPM® and PMI®
- ▷ Identify the application requirements for the CAPM® examination
- ▷ List the guidelines to fill up CAPM® application
- ▷ Describe CAPM® exam outline and syllabus

What Are PMI and CAPM Certification

The following are important terms and concepts related to your certification:

- PMI: Project Management Institute
- CAPM: Certified Associate in Project Management
- PMP: Project Management Professional
- CCR: Continuing Certification Requirements
- PDU: Professional Development Unit
- *PMBOK® Guide: A Guide to the Project Management Body of Knowledge*
- *PMBOK® Guide* is a textbook for the PMP exam
- REP: Registered Education Provider



Figure 3-2. The PMI Talent Triangle®

- PMI is an organization; CAPM is a credential
- PMI conducts and supervises the PMP examinations
- Your CAPM credential is valid for 5 years after which you must retake the exam
- 23 PDUs are required every five years to maintain your CAPM certification

Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017. Page 57

Application Requirements for CAPM Certification Exam

Category	College/University Education	PM Training	Hours Leading and Directing Project Tasks
One	Secondary Diploma (<i>high school diploma, associate's degree or the global equivalent</i>)	N/A	1,500 hours
Two		23 Contact Hours	N/A

- Application can be submitted online at www.pmi.org
- PMI membership is USD \$129 to join (plus USD \$10 application fee)
- Renewal fee is USD \$129
- Exam costs are \$300 for non-members and \$225 for members.
- Once the exam fee is paid, PMI sends an Authorization Letter to take the exam at an authorized testing center
- Examination must be taken within a year of receiving the Authorization Letter
 - Note: Some applications are randomly selected for "audit"
- For more details, refer to the CAPM handbook on www.pmi.org

Guidelines to Complete the CAPM Application

Here are a few guidelines that will help you fill up your application:

- Become a PMI member before submitting the PMP application
- Enter your name and contact details accurately
- In the "project experience" field, enter just enough information to meet the eligibility criteria and reference PMI terms
- State the work done in brief — focus specifically on the work that you have done
- Contact all the "Primary Contacts" mentioned in your application before submitting it, and make sure they will be prepared to validate the experience if required during the audit
- If you are not sure, ask an existing PMP certified professional to review it before submitting

If your application gets picked for audit:

- Follow instructions received on email, collect evidence, and submit

About the CAPM Exam

The following are the exam details:

- Total duration of the exam is 3 hours.
- Total number of questions: 150. Out of these, 15 questions are considered pre-test questions used for future tests. Only 135 questions are scored.
- All questions are "multiple choice questions" with only one correct answer.
- You get 1 point for every right answer. There is no penalty for wrong answers.
- PMI grades students on each of the five process groups and assigns a grading of "Below Target," "Target," "Above Target" and "Needs Improvement" in each of the five process groups.
- The result (pass or fail) is determined by a combination of these grades. How many grades or number of points one has to score to pass the PMP certification exam is not made public by PMI.



For more details, please refer to the "CAPM Examination Content Outline" on PMI website.

CAPM Exam Content Outline

Topic Name	Percentage of Questions
Introduction to Project Management	6
Project Environment	6
Role of the Project Manager	7
Project Integration Management	9
Project Scope Management	9
Project Schedule Management	9
Project Cost Management	8
Project Quality Management	7
Project Resource Management	8
Project Communication Management	10
Project Risk Management	8
Project Procurement Management	4
Project Stakeholder Management	9

CAPM Exam Syllabus

There are five process groups, ten knowledge areas, and forty-nine processes in the new *PMBOK® Guide* – Sixth Edition.

The process groups are:

- Initiating
- Planning
- Executing
- Monitoring and Controlling
- Closing

The knowledge areas are:

- Project Integration Management
- Project Scope Management
- Project Schedule Management
- Project Cost Management
- Project Quality Management
- Project Resource Management
- Project Communications Management
- Project Risk Management
- Project Procurement Management
- Project Stakeholder Management

There are 49 project management processes. For instance, "Develop Schedule," one of the processes, is a part of the "Planning" process group and "Project Schedule Management" knowledge area.

What's New in PMBOK® Guide – Sixth Edition?

Three new processes have been added to the PMBOK® Guide – Sixth Edition:

- Manage Project Knowledge
- Control Resources
- Implement Risk Responses

One process has been removed:

- Close Procurements



About This Tutorial

There are a total of 14 lessons in the CAPM certification course.





Key Takeaways

- ▷ PMI is an organization; CAPM is a credential
- ▷ PMI conducts and supervises the CAPM examinations
- ▷ Your CAPM credential is valid for 5 years after which you must retake the exam
- ▷ The exam duration of CAPM is 3 hours.
- ▷ There are 150 questions on the exam. 15 questions are considered pre-test questions used for future tests. Only 135 questions are scored.
- ▷ The Exam is based on the Project Management Body of Knowledge (PMBOK® Guide) Sixth Edition



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CAPM® Certification Training

Lesson 02: Introduction to Project Management

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Objectives

- ▷ Define project and project management
- ▷ Describe how project management benefits project delivery
- ▷ Explain the five project management process groups and the processes within each group
- ▷ Distinguish between Portfolio, Program, Projects and operational management
- ▷ Differentiate between project life cycle and product life cycle
- ▷ Recognize the importance of tailoring for different projects

What Is a Project?

Project Management Institute Definition

- Project Management Institute (PMI): A *project is a temporary endeavor undertaken to create a unique product, service, or result.*
- Projects are:
 - Performed by people
 - Constrained by limited resources
 - Are done once and finished
 - Planned, executed, and controlled
 - Temporary in nature
- Projects and operations differ primarily in that operations are ongoing and repetitive, while projects are temporary and unique endeavors.
- Projects can contain repetitive elements, but the elements do not change the unique characteristics of the project.
- Projects end when they either meet their objectives or are terminated because they cannot meet their objectives.

What Is a Project: Examples

- Developing a new charger for cell phones
- Expanding the service offering at a consulting firm
- Merging two organizations
- Implementing a new accounting system and the corresponding process changes
- Renovating corporate office space
- Developing research around a particular political issue
- Performing a study on the environmental impact of a new bridge in a rural area
- Building a new parking garage
- Creating a new watch for children to be on time to class

Each of these is a temporary endeavor undertaken to create a unique product, service, or result.

Project Characteristics

Projects are performed once and done

- Definite beginning and end
- Projects can have varied durations ranging from very short (<1 month) to very long (>5 years)
- Projects are completed when:
 - The defined objectives are met
 - The goals/objectives cannot be met within budget, time, with the available resources, or chosen technology
 - Funding is exhausted
 - The need to perform the project has changed or been eliminated (competition, regulation, legal, compliance)
 - Legal or contractual issues result in project closure

Project Drivers

Why do we do projects? What drives the need for projects?

Projects drive change

- Transforming business from one state to another
- Strategic shifts
- Organizational growth
- Mergers and acquisition

Enable business value

- New market opportunities
- Response to competition
- Global marketplace
- Decreasing profit margins

Address increasingly complex business and technical challenges

- Technology changes
- Global markets
- Legal and regulatory issues
- Other environmental factors

Definition of Project Management

PMI® Definition:

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

- Accomplished through the appropriate application and integration of the project management processes and knowledge areas
- Enables organizations to execute projects effectively and efficiently

Common Definition:

Project management is the art of creating the illusion that any outcome is the result of a series of predetermined, deliberate acts when, in fact, it was dumb luck.

Definition of Project Management (Contd.)

Project Management is formalized approach to manage a unique product, service or result.

Management methodology defined by Project Management Institute

Follows <ul style="list-style-type: none">• 5 Process Groups• 10 Knowledge Areas• 49 Processes	Spans industries <ul style="list-style-type: none">• Standard documentation• Standard process and approaches	Process applies across industries <ul style="list-style-type: none">• Oil and Gas• Petrochemical• Construction• Information Technology• Software Development• Telecom	Tailored to meet specific project and organizational needs.
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Value of Project Management

- Project Management contributes to organizational success
- Project is completed:
 - Within the allotted time
 - Within the budgeted cost
 - At the proper performance or specification level
 - With acceptance by the customer, sponsor, or user
 - With minimally agreed upon scope changes
 - Without disturbing the main work flow of the organization
 - Without changing the corporate culture
- Unique efforts require innovative thinking and advanced planning
- While similar efforts may have taken place in the past, situational, environmental, legal, regulatory, and technical changes require a unique approach

The Role of a Project Manager

Project manager has the single most important position on a project and has the overall responsibility for its success. This position comes with tremendous responsibility, accountability, ownership, and authority.

A project manager:

- Has full responsibility and accountability for the project
- Applies lessons learned from recent projects
- Defines project roles and responsibilities
- Leads the project planning activities
- Performs project tracking and communicates project status
- Adopts project management best practices
- Manages project priorities
- Performs risk and issue management
- Drives decision making
- Promotes client involvement
- Encourages and supports escalations
- Enforces effective change control
- Mentors project members

The Role of a Project Manager (Contd.)

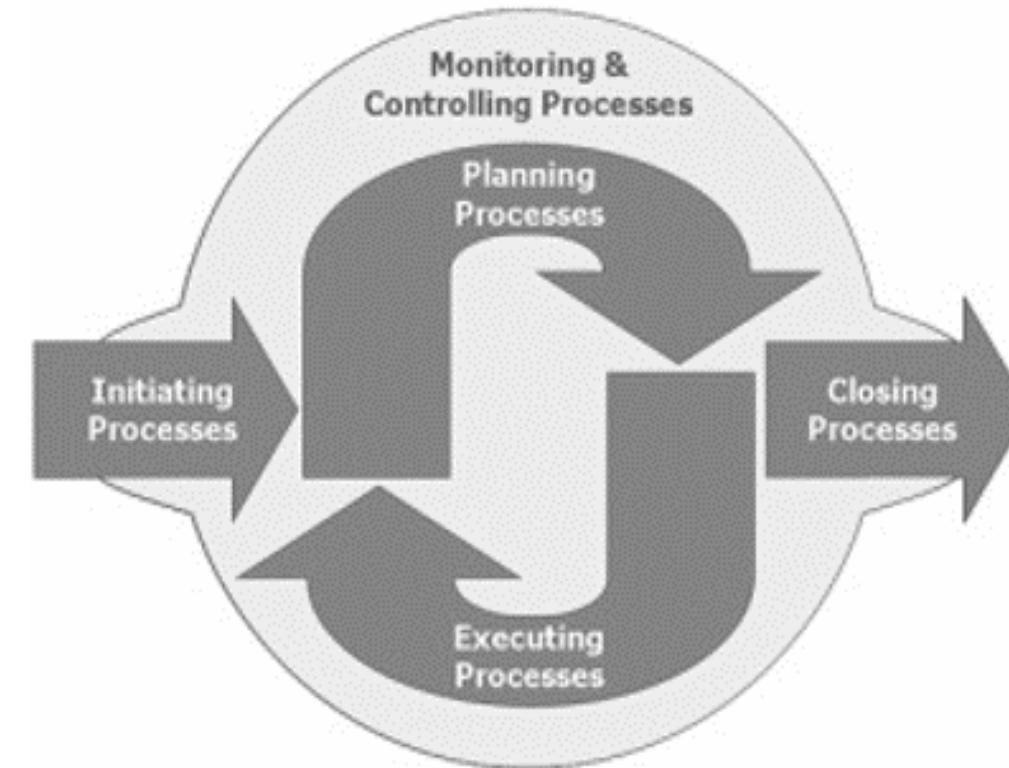


PMP v6 emphasizes Agile and Adaptive practices and minimizes the role of the PM as a controller. The PM is responsible for monitoring and managing, particularly around Risks, Stakeholders, and Communications.

Project Management Process

Project management processes demonstrate the project life cycle. There are 5 Process Groups within the *PMBOK® Guide*. Each contains processes that support the goals of the process groups to successfully plan, execute, and manage a well-run project.

- **I** Initiating
- **P** Planning
- **E** Executing
- **C** Monitoring & Controlling
- **C** Closing



Project Management Process

Process Groups

Initiating Process Group

- Establishes the vision of what the project will accomplish and defines and authorizes the project or a project phase.

Planning Process Group

- Establishes the total scope of the project.
- Defines and refines objectives, and plans the course of action required to attain the objectives and scope for which the project was undertaken.

Executing Process Group

- Integrates and coordinates people and other resources to carry out the project plan and deliver the agreed to scope of the project.

Monitoring and Controlling Process Group

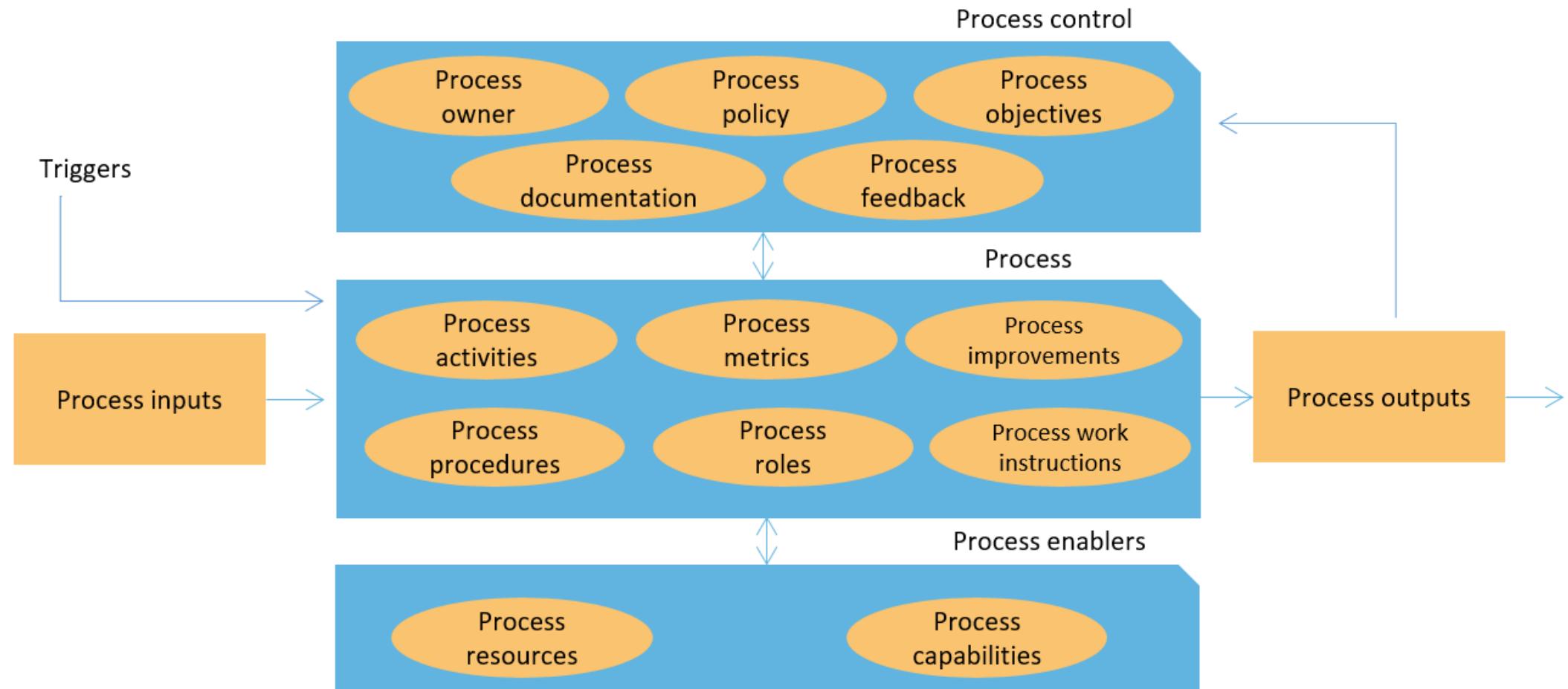
- Regularly monitoring and measuring progress in order to identify variances from the plan so appropriate corrective actions can be taken when necessary.

Closing Process Group

- Formalizes acceptance of the product, service or result, and brings the project or a project phase to an orderly end.

Definition of a Process

A process is a set of activities designed to accomplish a specific objective. It takes defined inputs and turns them into defined outputs. A process may include roles, responsibilities, tools, and management controls required to deliver the outputs.



Project Flow

The Project life cycle flow shows the order of events that occur during a project's duration.

During the project, data is collected and analyzed to assist in project decision making.

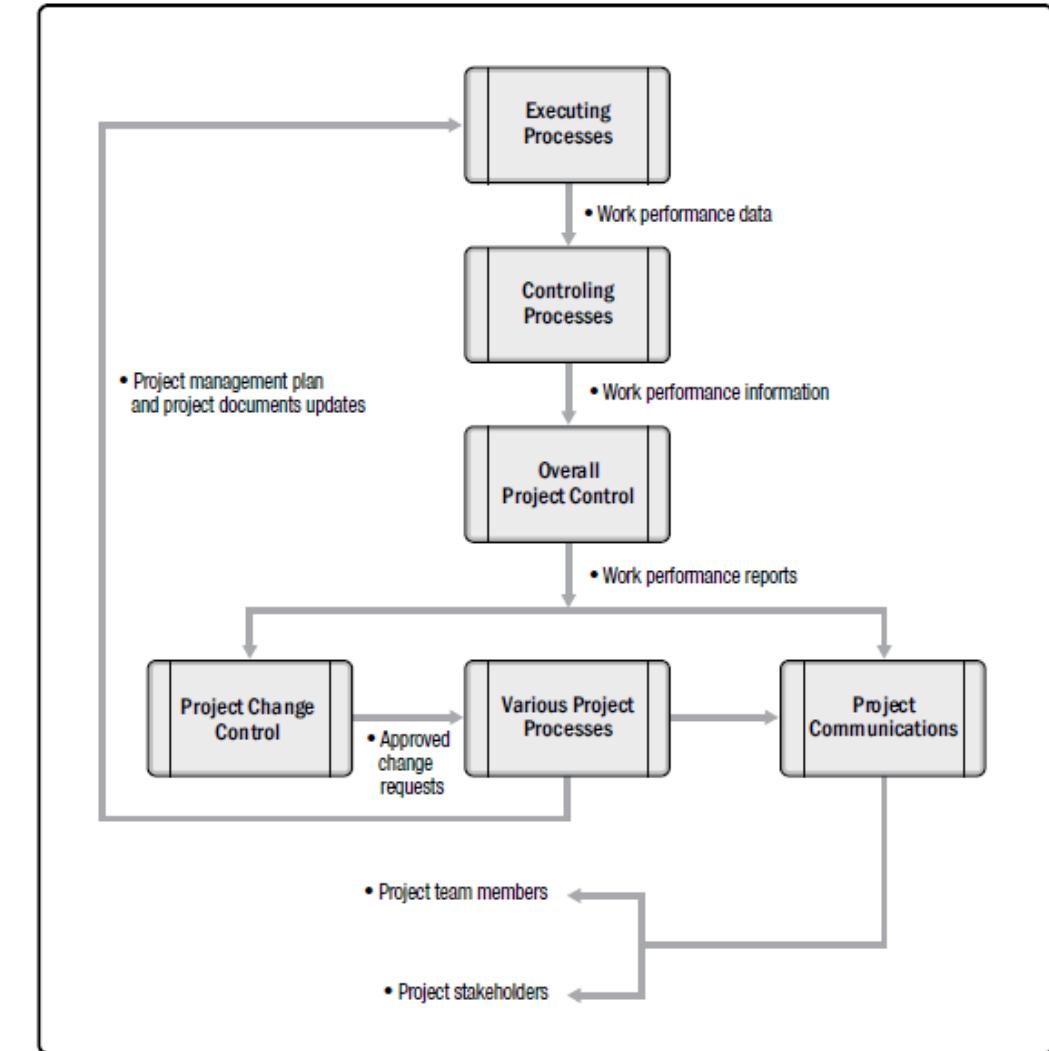


Figure 1-7. Project Data, Information, and Report Flow

Project Flow: Key Terms

The following are the key PMI® terms related to project data and information.

Work Performance Data

- The raw observations and measurements identified during project activities.

Work Performance Information

- Data collected from various controlling processes analyzed in context.

Work Performance Reports

- The physical or electronic representation of work performance information such as status reports, electronic dashboards, and recommendations.

Project Management Processes

Project Management Institute provides formalized project management process:

A *Guide to Project Management Body of Knowledge (PMBOK® Guide)* consists of 5 process and 10 knowledge areas.

- Planning is a priority as:
 - Plans permeate every activity
 - Plans can be executed when developed in advance
 - Planning ensures that process is well thought out
 - Planning makes sure that project participants know their roles and responsibilities
 - Eliminates confusion, rework, redundancy and conflict
 - Ensures that “greater good” drives project decisions
 - Plans are done at the level of detail sufficient to determine strategy, approach, and potential risks
 - Planning establishes how quality and success are measured – “When are we done”
 - Planning provides strategies for handling risks when realized

Project Process

Project Phases: A series of phases that a project passes through from its start to its completion.

Phase Gate: A review at the end of a phase in which a decision is made to continue to the next phase.

Process Group: A logical grouping of project management inputs, tools and techniques, and outputs.

Knowledge Area: An identified area of project management defined by its knowledge requirements and described in terms of its processes and practices.

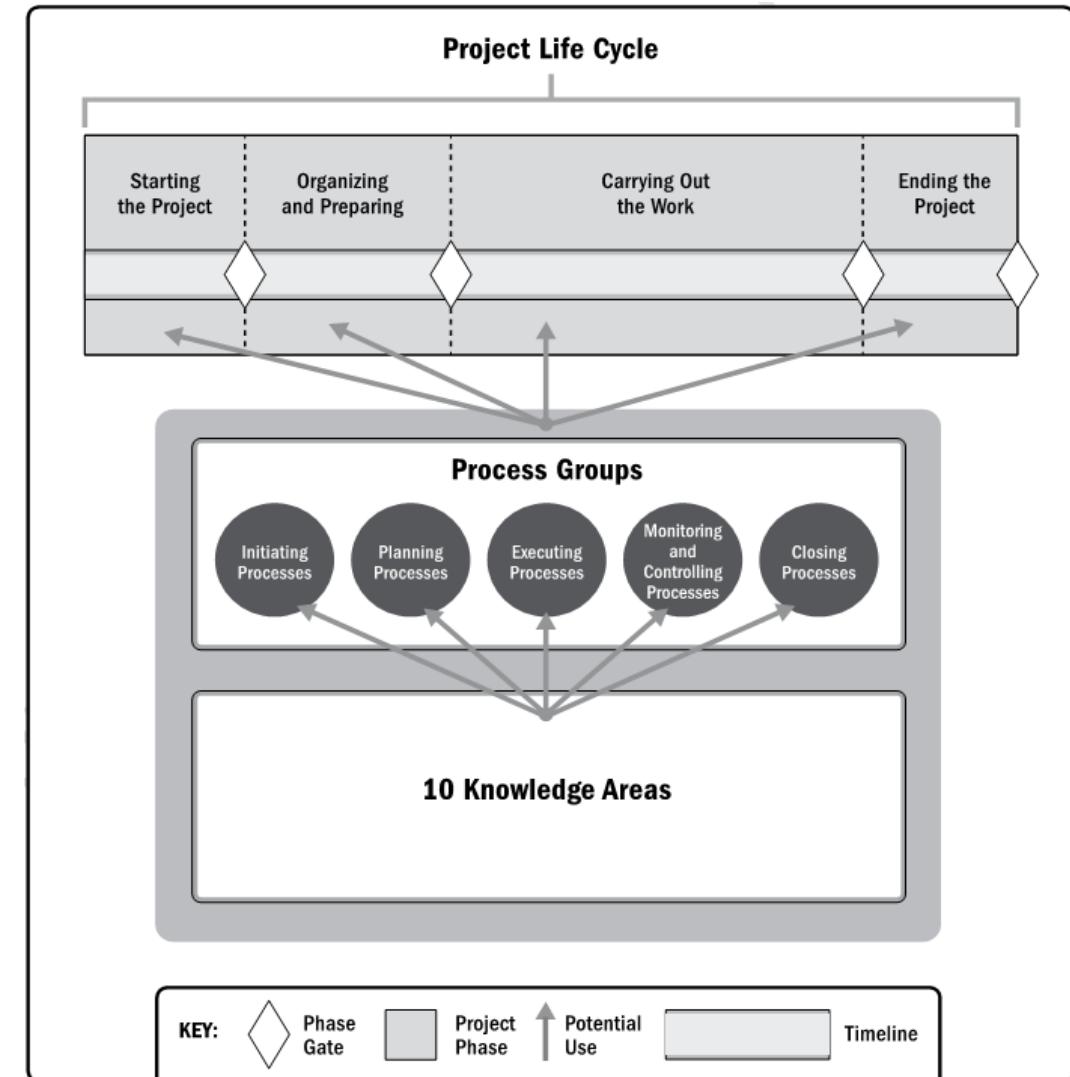


Figure 1-5. Interrelationship of PMBOK® Guide Key Components in Projects

Process Group Interactions

Process Groups have overlapping activities that occur throughout the project life cycle.

The output of one process acts as an input to another process or a deliverable of the project.

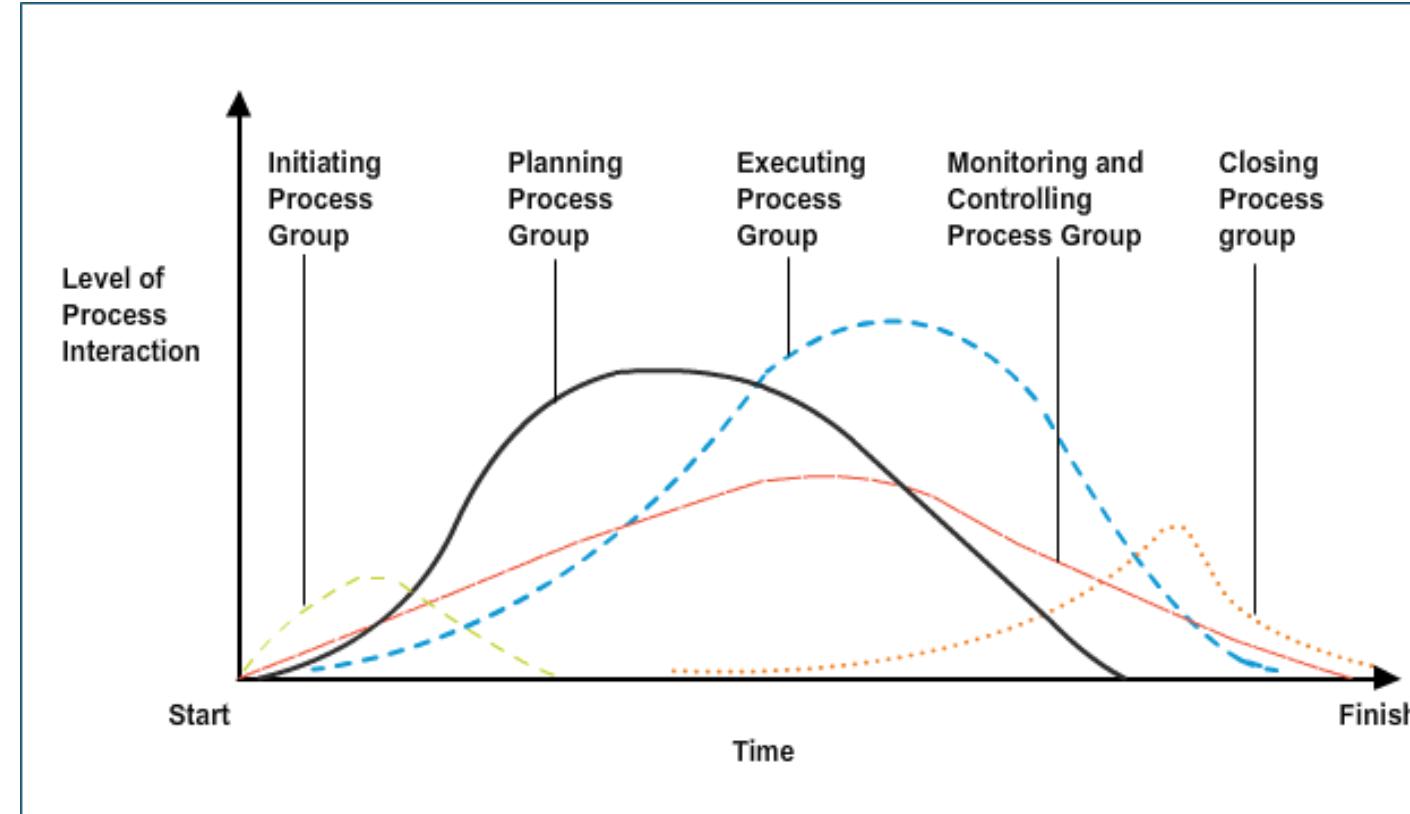


Figure 1-5. Example of Process Groups Interactions Within a Project or Phase

Process Group Interactions

Sequential Projects

Sequential project process runs through the life cycle multiple times. Each closing phase is a phase gate to the next iteration.

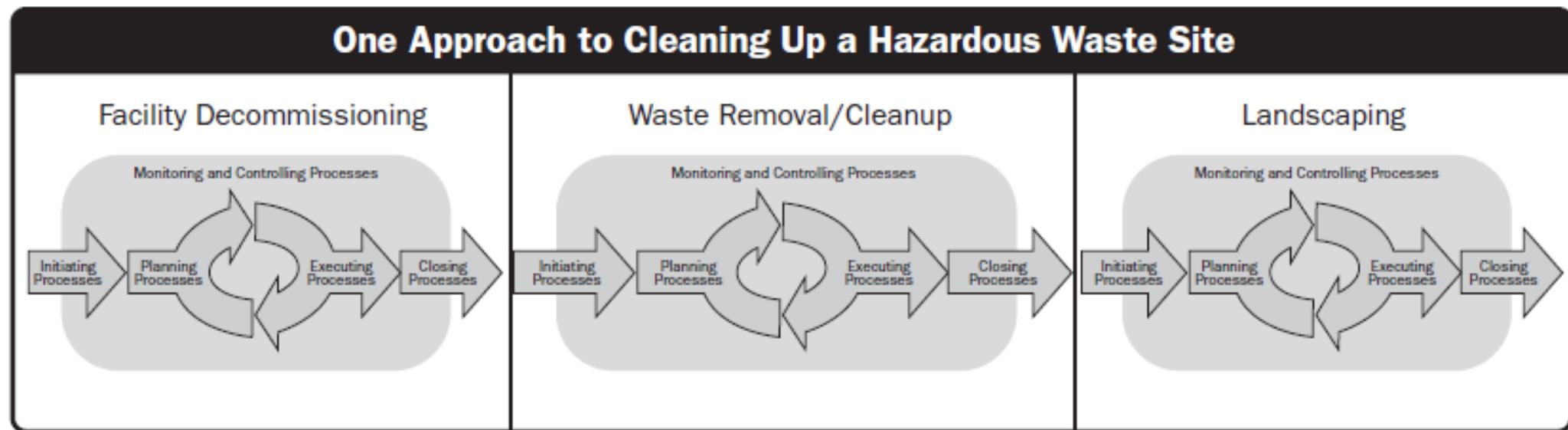


Figure 2-11. Example of a Three-Phase Project

Project Life Cycles

The phases of a life cycle represent discrete units of work to be completed on the project.

There are various classifications of project life cycles.

Sequential and Overlapping Phases

- In sequential phases, the subsequent phase starts only after the previous phase has been completed.
- In overlapping phases, two or more phases may run in parallel for some time.

Predictive Life Cycles (or Plan-Driven)

- Scope, cost, and time are determined in advance or as early as possible.
- The project is executed in a series of sequential or overlapping phases.
- These are suitable for large projects where most requirements are known at the beginning of the project.
- Each phase focuses on different activities and may require different skill sets.

Project Life Cycles (Contd.)

The phases of a life cycle represent discrete units of work to be completed on the project.

There are various classifications of project life cycles.

Iterative and Incremental Life Cycles

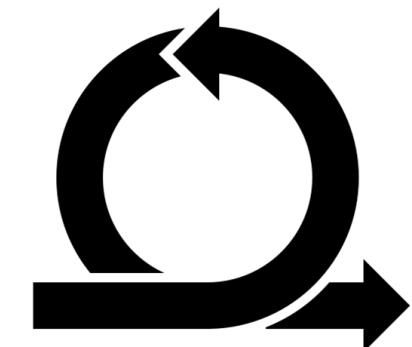
- The high-level objective may be defined up-front, but the details are defined in each iteration.
- Product is developed through a series of such cycles.
- In iterative and incremental life cycles, project phases intentionally repeat themselves.

Adaptive (or Agile) Life Cycles

- These are also incremental and iterative, but the iterations are very rapid (2 to 4 weeks).
- They are generally preferred when dealing with a rapidly changing environment.

Agile Mindset

- The *PMBOK® Guide* – Sixth Edition places a much higher emphasis on Agile project management techniques.
- Agile techniques apply best to projects involving high degrees of new design, problem solving and not-done-before work.
- These projects have high degrees of uncertainty and require more collaboration to solve problems and create solutions.
- Examples of roles involved in high uncertainty work include engineers, product designers, doctors, and lawyers. These projects have high rates of change, complexity and risk. This makes it difficult to define the bulk of requirements upfront and control changes through a change request process.
- Agile techniques emphasize exploring feasibility in short cycles, often called iterations or sprints, and quick adaption based on evaluation and feedback.



Project Framework

PMP Exam Tip

The PMP® Exam is not just on the framework, but on the application of the knowledge contained in the framework.

- Scenario questions describe a situation that can be answered knowing the next process step
- Framework questions are based on current and next steps
- Input/output questions ask for the details around a process

Detailed coverage of each individual process will follow in this course, segmented by the ten Knowledge Areas.

Project Management Process Map

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

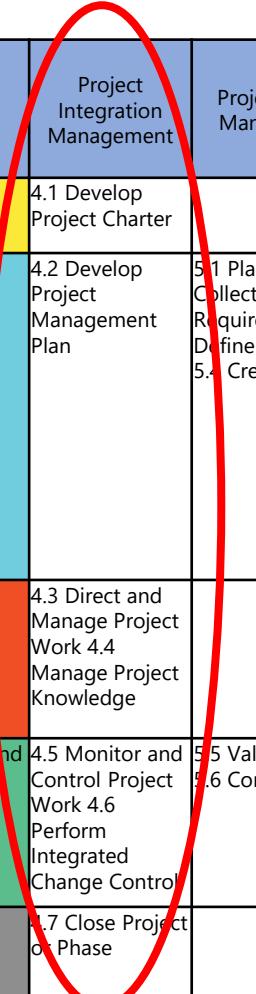


Study the table to identify processes under project management and the knowledge area they belong to.

PMI® Numbers: the “10,” the “5,” and the “49”

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	Closing	4.7 Close Project or Phase									

Only Integration Is in All 5 Process Groups



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2 Processes in Initiating Process Groups

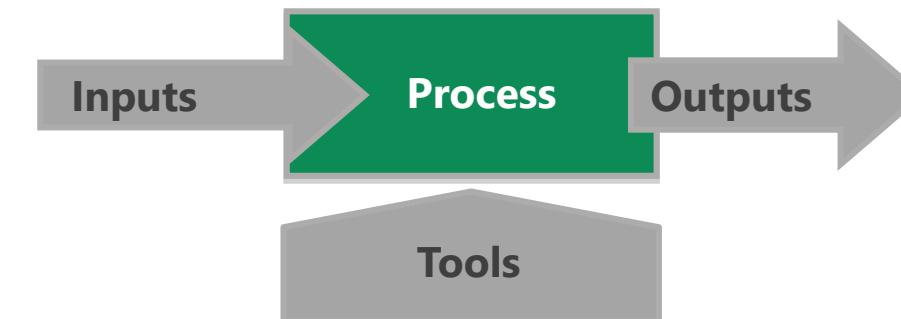
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	Closing	4.7 Close Project or Phase									

PMI's Process Framework

Inputs, Outputs, and Tools

- All project management work can be described by one of the 49 processes.
- A process is defined by inputs, tools and techniques, and outputs.
- Every exam question will tie back to a process, knowledge area, or process group or to Professional and Social Responsibility.

A process is characterized by three elements:



To better structure ITTOs, the *PMBOK® Guide* structures them into groupings such as Data Gathering, Interpersonal and Team Skills, Data Analysis, and so on.

Common Inputs

Inputs and Outputs have some similarities

Enterprise Environmental Factors

- Anything that affects your project—examples include the culture, the organization, the PM's power, risk tolerance, and the market.
- Used heavily in Initiating, Planning, and Monitoring & Controlling process groups (27 occurrences)

Organizational Process Assets

- Anything that helps projects and planning—examples include previous plans, documents, analytical data, policies, and systems.
- Used heavily in all process groups (37 out of 49 occurrences)

Project Management Plan

- Primary project document that directs execution, control, and closure—Discussed in the next segment.
- Used in all Executing, Monitoring and Controlling, and Closing process groups (19 occurrences)

Work Performance

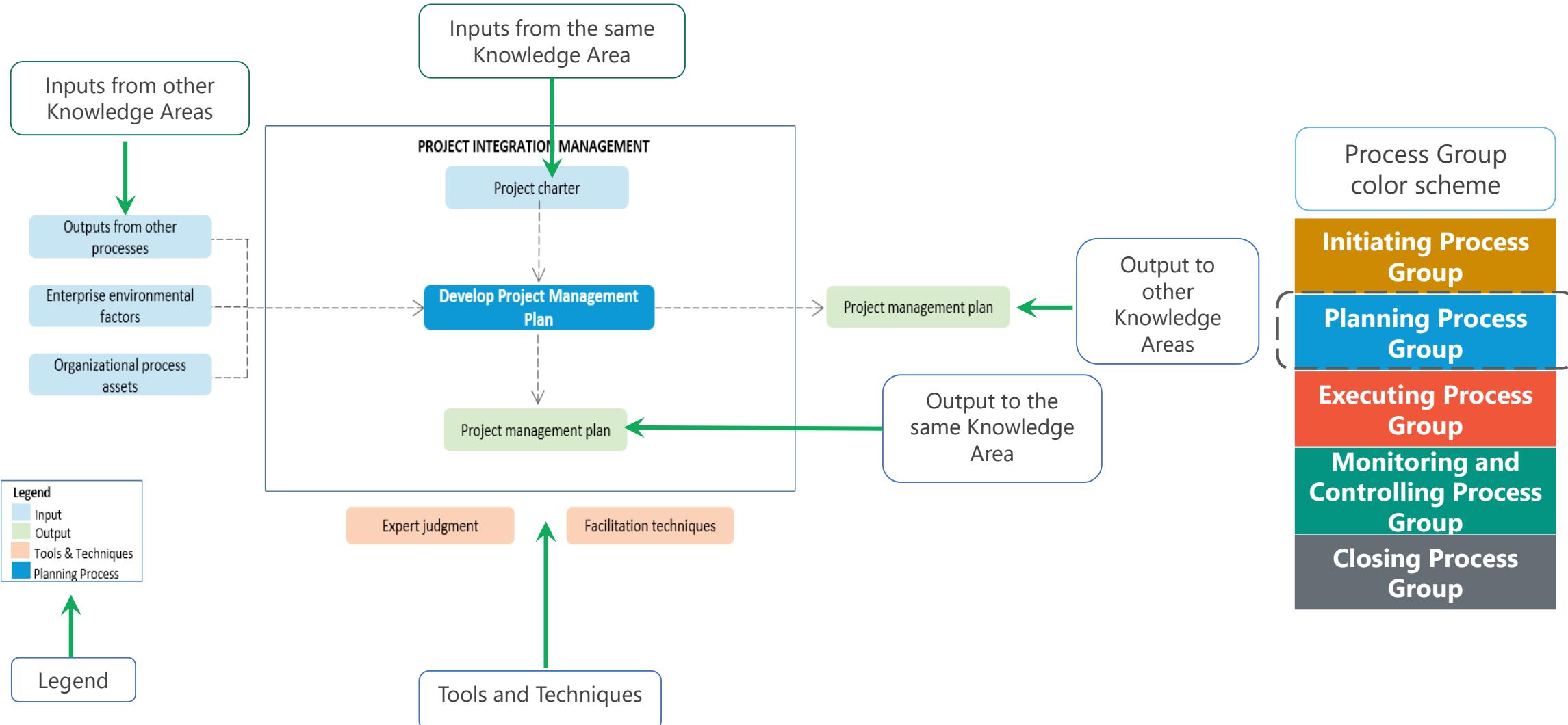
- The raw observations and measurements identified during activities performed to carry out the project work.
- Used in Monitoring and Controlling process group (7 occurrences)

Project Terms

Terms you should know...

- Process
 - Input
 - Output
 - Tools / Techniques
 - Knowledge Area
 - Expert Judgment
 - Change Requests
 - Organizational Process Assets
 - Work Performance Information
- Enterprise Environmental Factors
 - Project Management Plan
 - Process Group
 - Initiating
 - Planning
 - Executing
 - Monitoring & Controlling
 - Closing

Reading a Process Diagram



Initiating Process Group

Initiating Process Group defines a new project or phase by establishing its vision and outcomes. The project is officially authorized when the project charter is approved by the sponsor.

Inputs

- Project statement of work
- Agreements
- Business case
- Enterprise environmental factors
- Organizational process assets
- Procurement documents

Actions taken

- Perform project assessment with key stakeholders using available and historical data to see the feasibility of new products or services, considering assumptions and constraints.
- Identify key deliverables to achieve the project goals.
- Perform stakeholder analysis to align expectations and gain support for the project.
- Identify high-level risks using current and past data to propose implementation strategy.
- Participate in project charter development to ensure stakeholders' agreement.
- Obtain project charter approval to gain authority and commitment.
- Perform benefit analysis to align organizational strategy and business value
- Facilitate stakeholder communication about the elements of project charter



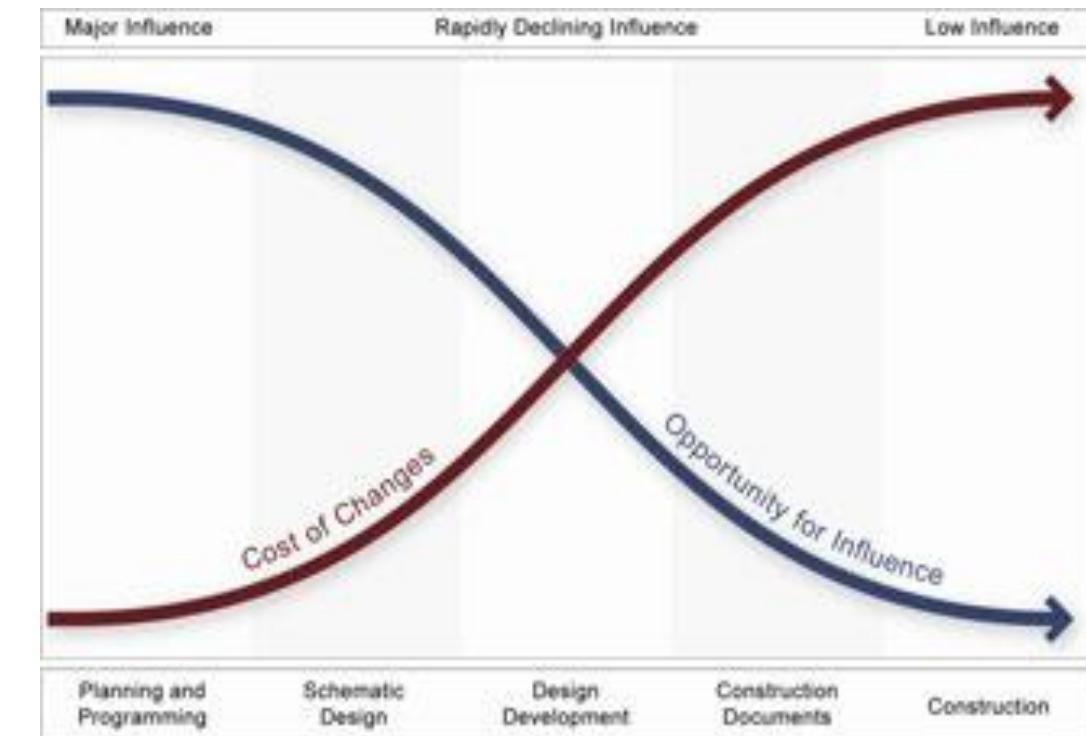
The inputs and activities of initiating process group are important from the exam perspective.

Project Initiation

The ability of the stakeholders to influence the final characteristics of the project product(s) and final cost of the project is highest at the start, and progressively lowers as the project continues.

A key contributor to this phenomenon is the fact that the cost of changes and error correction generally increases as the project continues.

Influence vs. Cost



Planning Process Group

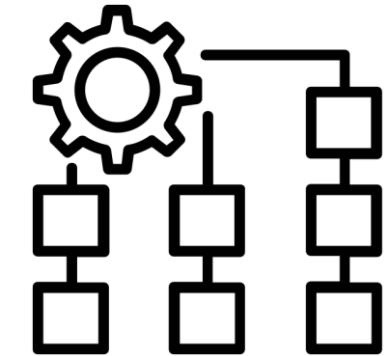
Planning Process Group establishes the total scope of effort, objectives, and course of action required to attain the objectives.

Inputs	Actions taken
<ul style="list-style-type: none">• Project charter• Requirements given by the customer• Stakeholder register• Stakeholder management strategy• Organizational process assets• Enterprise environmental factors• Teaming agreements• Resource calendars	<ul style="list-style-type: none">• Refine requirements and convert them into a scope statement and work breakdown structure• Get stakeholder approval and buy-in• Develop the baseline scope, cost, and schedule• Select project team and determine its roles and responsibilities• Determine project's quality standards and plan• Prepare a framework for risk management, identification, analysis, and response planning• Determine what needs to be purchased• Determine how to execute and control the project• Document the project management plan• Handle updates on the plan arising out of change requests

Project Planning

Project planning serves six primary functions:

- Translating needs into manageable tasks
- Defining required resources
- Organizing and coordinating the Project Team work
- Identifying and evaluating potential risks
- Establishing processes, practices, and procedures for project execution
- Defining the measure(s) of project success



Repeating the initiation processes at the start of each project phase helps keep the project focused on the need for which it was undertaken. This provides a decision gate at each project phase to help ensure the project is halted if the need no longer exists or if the project is not likely to satisfy the need.

Executing Process Group

Executing Process Group completes the work defined in the project management plan to satisfy the project specifications.

Inputs	Actions taken
<ul style="list-style-type: none">• Project management plan• Quality metrics• Change log• Enterprise environmental factors• Organizational process assets• Seller proposals• Approved change requests• Quality control measurements• Make-or-buy decisions• Source selection criteria• Work performance report• Work performance information	<ul style="list-style-type: none">• Manage stakeholder engagements• Finalize procurement arrangements and contracts• Organize team building activities and training for the team members• Implement quality assurance activities• Implement approved changes, corrective actions, preventive actions, and defect repair• Implement the approved actions and maximize the opportunity• Produce project reports• Maintain stakeholder relationships

Monitoring and Controlling Process Group

Monitoring and Controlling Process Group tracks, reviews, and regulates the progress and performance of the project; identifies and initiates the changes to the plan when required.

Inputs	Actions taken
<ul style="list-style-type: none">• Deliverables• Work performance data• Change requests• Organizational process assets• Project management plan and documents• Selected sellers	<ul style="list-style-type: none">• Measure project performance against the baseline• Determine variances and take appropriate action• Recommend changes, corrective, and preventive action• Facilitate conflict resolution• Ensure that risk management activities are per the risk management plan and the risk responses implemented• Review the issue log• Issue resolution• Enable continuous improvement throughout the project• Monitor sellers

Closing Process Group

Closing Process Group finalizes the activities across all Project Management Process Groups to formally complete the project, phase, or contractual obligations.

Inputs

- Project plan and documents
- Accepted project deliverables
- Procurement documentation
- Organizational process assets
- Enterprise environmental factors

Actions taken

- Confirm that all project requirements are met
- Obtain formal signoff from customer
- Hand over project deliverables to operations team
- Make payment to all parties and update cost records
- Complete contract closure
- Update lessons learned database
- Archive project documents
- Measure customer satisfaction

Portfolios, Programs, Projects

Portfolios, Programs, and Projects operate together to deliver benefits to the business

Program management is the centralized, coordinated management of a program to achieve the program's strategic objectives and benefits. It involves aligning multiple projects to achieve the program goals and allows for optimized or integrated cost, schedule, and effort.

Projects in a program have a common deliverable or capability. Projects with a loose association are called a portfolio of projects.

A portfolio may consist of other portfolios, projects, and programs. The components may or may not be interdependent.

Program Management

The definition of *Program Management is as follows:

The application of knowledge, skills, tools, and techniques to a program to meet the program requirements and in order to obtain benefits and control not available by managing projects individually.

A program is defined as a group of related projects, subprograms, and program activities managed in a coordinated way to obtain benefits not available from managing them individually.

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017. Page 14

Features of Program Management

- For a group of projects to be classified as a program, there must be some value added in managing them together as a program.
- A project need not belong to a program; a program will always have projects.
- A program is designed to deliver some strategic benefits to the organization; the benefits could be tangible (for example, growing the operating margin) or intangible (for example, improving the morale of the team).
- A project manager focuses on fulfilling the requirements of a project, whereas a program manager focuses on delivery of benefits to the organization.

Portfolio



The definition of *Portfolio is as follows:

A collection of projects, programs, sub-portfolios, and operations managed as a group to achieve strategic objectives.^[5]

- Projects and programs of a portfolio may not be necessarily interdependent or directly related.
- A portfolio can be based on the business objectives.

"Japanese Projects" can be a portfolio where an IT company puts all its projects from Japan to give more focus and attention to its Japanese projects, and grow its Japanese business. Similar projects can be managed as a program within this portfolio; all banking projects will be managed as a "banking program."

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017. Page 15

Portfolio Management

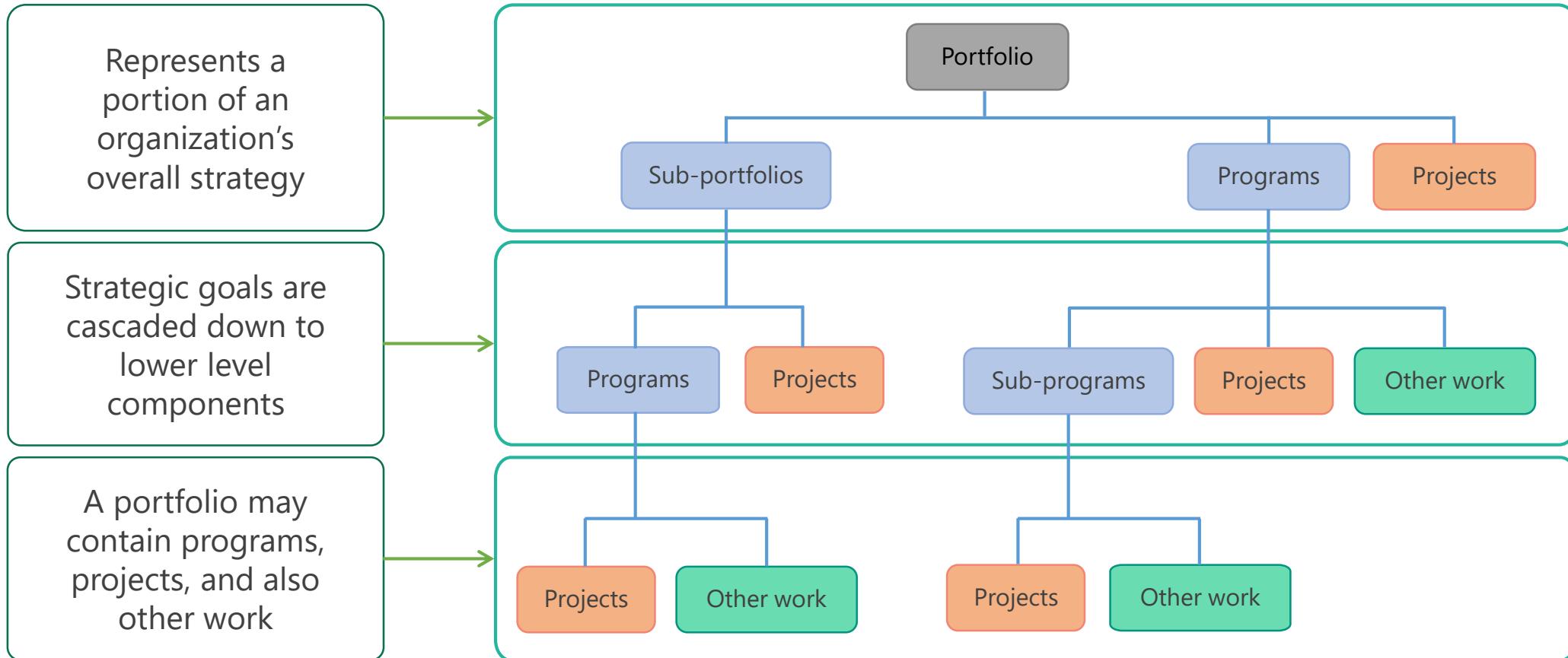
The definition of *Portfolio Management is as follows:

Portfolio management refers to the centralized management of one or more portfolios to achieve strategic objectives.^[6]

Portfolio management includes identifying, prioritizing, authorizing, managing, and controlling projects, programs, and other related work to achieve strategic business objectives.

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017. Page 15

Relationship between Portfolios, Programs, and Projects



Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute Inc., 2017, Fig. 1-3, Page 12.



Quiz



Quiz

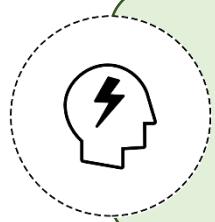


1

Which of the following is not a characteristic of a project?

- A ➤ Repeats every week
- B ➤ Temporary
- C ➤ Definite beginning and end
- D ➤ Interrelated activities

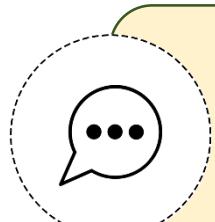
Quiz



1

Which of the following is not a characteristic of a project?

- A ➔ Repeats every week
- B ➔ Temporary
- C ➔ Definite beginning and end
- D ➔ Interrelated activities



The correct answer is: **A**

Characteristic of a project is based on the project definition. Except for choice a, everything else is part of the project definition itself.

Quiz



2

Identify the least important stakeholder from the given options.

- A ➤ The project manager who is responsible for building the project
- B ➤ A project team member who will work on the project
- C ➤ Customer who will use the end product or service
- D ➤ Competitor whose organization will be affected by the new product release

Quiz



2 Identify the least important stakeholder from the given options.

- A ➤ The project manager who is responsible for building the project
- B ➤ A project team member who will work on the project
- C ➤ Customer who will use the end product or service
- D ➤ Competitor whose organization will be affected by the new product release



The correct answer is: **D**

Stakeholders are persons or organizations that are actively involved in the project or who may be positively or negatively affected by the performance or completion of the project. Competitor is the least important stakeholder.

Quiz



3 What is not included in the definition of a process?

- A ➤ It responds to a trigger.
- B ➤ It requires an input.
- C ➤ It produces an output of value.
- D ➤ It is timely.

Quiz



3 What is not included in the definition of a process?

- A ➤ It responds to a trigger.
- B ➤ It requires an input.
- C ➤ It produces an output of value.
- D ➤ It is timely.



The correct answer is: **D**

Processes require inputs and produce outputs and respond to triggers, however, a process does not need to be timely and can take any length of time that is appropriate.

Quiz



4 What does ITTO stand for?

- A ➤ Information, Tools, Techniques, Outputs
- B ➤ Inputs, Timing, Tasks, Outputs
- C ➤ Inputs, Tools, Techniques, Outputs
- D ➤ Information, Tools, Tasks, Outcomes

Quiz



4 What does ITTO stand for?

- A ➔ Information, Tools, Techniques, Outputs
- B ➔ Inputs, Timing, Tasks, Outputs
- C ➔ Inputs, Tools, Techniques, Outputs
- D ➔ Information, Tools, Tasks, Outcomes



The correct answer is: **C**

ITTO stands for Inputs, Tools, Techniques and Outputs.

Quiz



5 A project manager is validating the scope. Which Process Group is the project manager working in?

- A ➔ Planning
- B ➔ Monitoring and Controlling
- C ➔ Initiating
- D ➔ Closing

Quiz



5 A project manager is validating the scope. Which Process Group is the project manager working in?

- A ➔ Planning
- B ➔ Monitoring and Controlling
- C ➔ Initiating
- D ➔ Closing



The correct answer is: **B**

Monitoring and Controlling (see PMBOK® Guide section 3.6). During project closure the project manager reviews the acceptance documentation from scope validation to ensure that all project requirements are completed.

Quiz



6

Which of the following is an output of the Initiating Process Group?

- A ➔ Project charter
- B ➔ Organizational process assets
- C ➔ Enterprise environmental factors
- D ➔ Procurement documents

Quiz



6

Which of the following is an output of the Initiating Process Group?

- A ➔ Project charter
- B ➔ Organizational process assets
- C ➔ Enterprise environmental factors
- D ➔ Procurement documents



The correct answer is: A

Project charter is the output of the Initiating Process Group. All other options are inputs to the Initiating Process Group.

Quiz



7

Who is in control of the project during the Planning Processes?

- A ➔ Project manager
- B ➔ Functional manager
- C ➔ Team members
- D ➔ Stakeholders

Quiz



7

Who is in control of the project during the Planning Processes?

- A ➔ Project manager
- B ➔ Functional manager
- C ➔ Team members
- D ➔ Stakeholders



The correct answer is: **A**

The project manager is in control of the project throughout the project life cycle.

Quiz



8 The high level project schedule constraints have been determined. Which Process Group is the project in?

- A ➤ Planning
- B ➤ Closing
- C ➤ Monitoring and Controlling
- D ➤ Initiating

Quiz



8 The high level project schedule constraints have been determined. Which Process Group is the project in?

- A ➔ Planning
- B ➔ Closing
- C ➔ Monitoring and Controlling
- D ➔ Initiating



The correct answer is: **D**

The high level constraints of schedule and budget are determined during the Initiating Process Group. The detailed planning is done during the Planning Process Group.

Quiz



9 Which of the following is not true about project life cycle?

- A ➤ Cost of changes increases as the project approaches completion
- B ➤ Stakeholder influences are greatest towards the end of the project
- C ➤ Risk and uncertainty are greatest at the start of the project
- D ➤ Cost and staffing levels are low at the start, peak as the work is carried out, and drop rapidly as the project draws to a close

Quiz



9

Which of the following is not true about project life cycle?

- A ➤ Cost of changes increases as the project approaches completion
- B ➤ Stakeholder influences are greatest towards the end of the project
- C ➤ Risk and uncertainty are greatest at the start of the project
- D ➤ Cost and staffing levels are low at the start, peak as the work is carried out, and drop rapidly as the project draws to a close



The correct answer is: **B**

Stakeholder influences are greatest towards the beginning of the project.

Quiz



10 Which of the following Process Groups should be included in all the projects?

- A ➤ Initiating, Planning, Executing, Monitoring and Controlling, Closing
- B ➤ Planning, Executing, Monitoring and Controlling
- C ➤ Monitoring and Controlling
- D ➤ Initiating, Planning, and Executing

Quiz



10 Which of the following Process Groups should be included in all the projects?

- A ➤ Initiating, Planning, Executing, Monitoring and Controlling, Closing
- B ➤ Planning, Executing, Monitoring and Controlling
- C ➤ Monitoring and Controlling
- D ➤ Initiating, Planning, and Executing



The correct answer is: **A**

In every project, all five Process Groups must be included but the level of attention given to each Process Group will be governed by the project manager depending on the project size and complexity.

Quiz



11 How many Process Groups, Knowledge Areas, and Processes are covered in the *PMBOK® Guide*?

- A ➤ 5, 10, 47
- B ➤ 5, 10, 49
- C ➤ The *PMBOK® Guide* is flexible and does not have a specific number of groups, knowledge areas, or processes.
- D ➤ 4, 9, 48

Quiz



11 How many Process Groups, Knowledge Areas, and Processes are covered in the *PMBOK® Guide*?

- A ➤ 5, 10, 47
- B ➤ 5, 10, 49
- C ➤ The *PMBOK® Guide* is flexible and does not have a specific number of groups, knowledge areas, or processes.
- D ➤ 4, 9, 48



The correct answer is: **B**

The *PMBOK® Guide* v6 now has 49 processes, which reflects addition of three new processes (Manage Project Knowledge, Control Resources, Implement Risk Responses) and removal of one process (Close Procurements).

Quiz



12

In which Process Group is the majority of a project's costs incurred?

- A ➔ Initiating
- B ➔ Planning
- C ➔ Execution
- D ➔ Closure

Quiz



12

In which Process Group is the majority of a project's costs incurred?

- A ➔ Initiating
- B ➔ Planning
- C ➔ Execution
- D ➔ Closure



The correct answer is: **C**

Execution is where the project teams deliver the work specified in the Initiation phase and planned in the Planning phase. Execution is when the project resources are onboarded and the majority of the project costs are incurred.



Key Takeaways

- ▷ Project management is the application of knowledge, skills, and tools and techniques applied to project activities to meet the project requirements.
- ▷ Project manager has to integrate various project aspects, like the people, stakeholders, risks, communication, and procurements with the project constraints (time, scope, cost, and quality).
- ▷ Projects differ from operations in that they are temporary and not repetitive in nature.
- ▷ Programs encapsulate multiple projects to achieve objectives not possible by managing projects individually.
- ▷ Portfolios are strategically aligned efforts combining programs, projects, and operational efforts in the pursuit of organizational objectives.



Key Takeaways

- ▷ Project lifecycle follows 5 process groups: Initiating, Planning, Executing, Monitoring and Controlling, and Closing.
- ▷ Project lifecycle can be iterative in nature going through the 5 process groups multiple times.
- ▷ PMI provides 10 Knowledge Areas, 5 Process Groups, and 49 processes.



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Lesson 03: Project Environment



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Objectives

- ▷ Identify the factors and assets that may impact the outcome of a project
- ▷ Describe different organization structures
- ▷ Recognize the roles of project management office
- ▷ Describe stakeholders and their value to project efforts
- ▷ Distinguish between Portfolio, Program, and Projects

Why Do Projects Fail?

Research has identified the following top reasons for project failures.

1. Requirements are ambiguous, misunderstood, or incorrect
2. Controlling cost and schedule
3. Scope creep
4. Sponsor not actively involved in the project strategy and direction
5. Project plan is non-existent, out of date, incomplete, or poorly constructed
6. Frequent changes of assigned PM
7. Project Teams (external and in-house resources) whose responsibilities and relationships are not clearly defined in writing
8. No clear definition of the benefits and the deliverables that will produce them
9. Poor or no change control
10. Inappropriate or insufficient skills

Enabling Project Success

- Projects succeed based on a number of factors and the PMI has developed the Project Management Body of Knowledge (*PMBOK® Guide*) to provide guidance on effective project management practices that enable project success.
- In addition to the project management processes, the organizational structure of the company will affect project success.
- To ensure that projects are supported, organization's can establish a Project Management Office (PMO). The PMO provides support to the project managers and coordinates the delivery of Portfolios, Programs and Projects.

Organization Structure

The different organization structures, based on the level of authority vested in the project manager, are as follows:

Functional Organization

An organizational structure in which staff is grouped by areas of specialization and the project manager has limited authority to assign work and apply resources (e.g., marketing, accounting, engineering, etc.)

Each employee reports to a functional manager

Projectized Organization

The organization's resources mostly work on projects
The project manager has primary control over the resources

Matrix Organization

An organizational structure in which the project manager shares responsibility with the functional managers for assigning priorities and for directing the work of persons assigned to the project

The resources report into the functions, but may also work on projects. There may be weak matrix, strong matrix, and balanced matrix organizations depending on the level of authority granted to project managers.

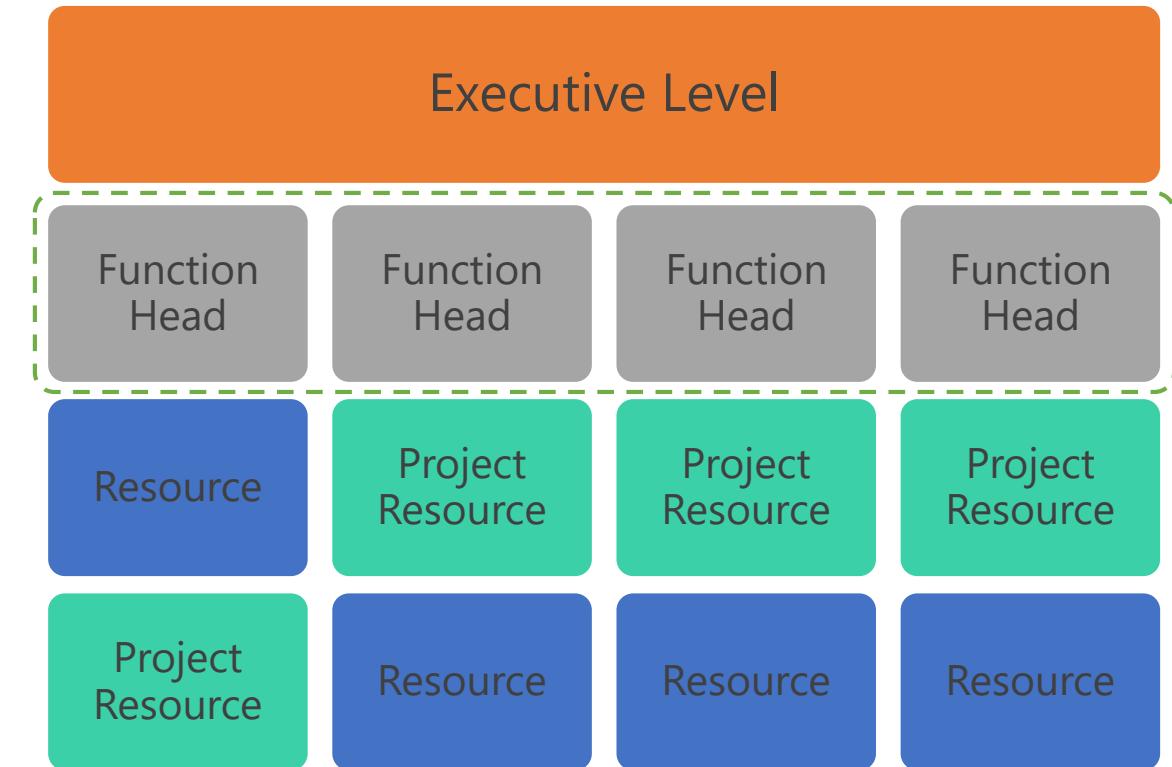


The term 'tight matrix' refers to a 'co-located' team, that is, a team that has been placed in the same location in order to enhance performance.

Functional Organization

Characteristics of a functional organization are as follows:

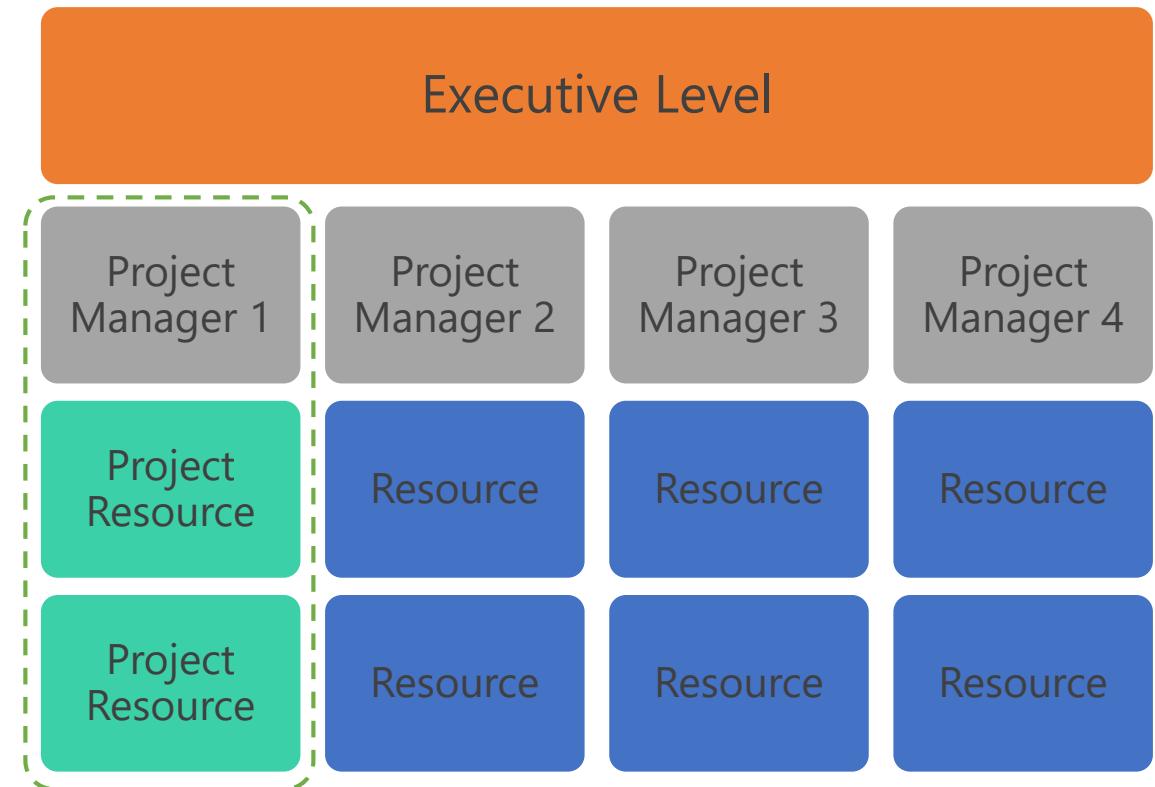
- Resources are grouped by functions or departments.
- Functions have definite roles and are headed by a manager.
- All the resources report directly to their functional management.
- Project manager's role is not explicitly defined. Resources from within the function play the role of project manager.
- Functional organizations provide an opportunity for specialization.
- Project resources are "negotiated" and "borrowed" from functional areas for the duration of the project needs.



Projectized Organization

Characteristics of a projectized organization are as follows:

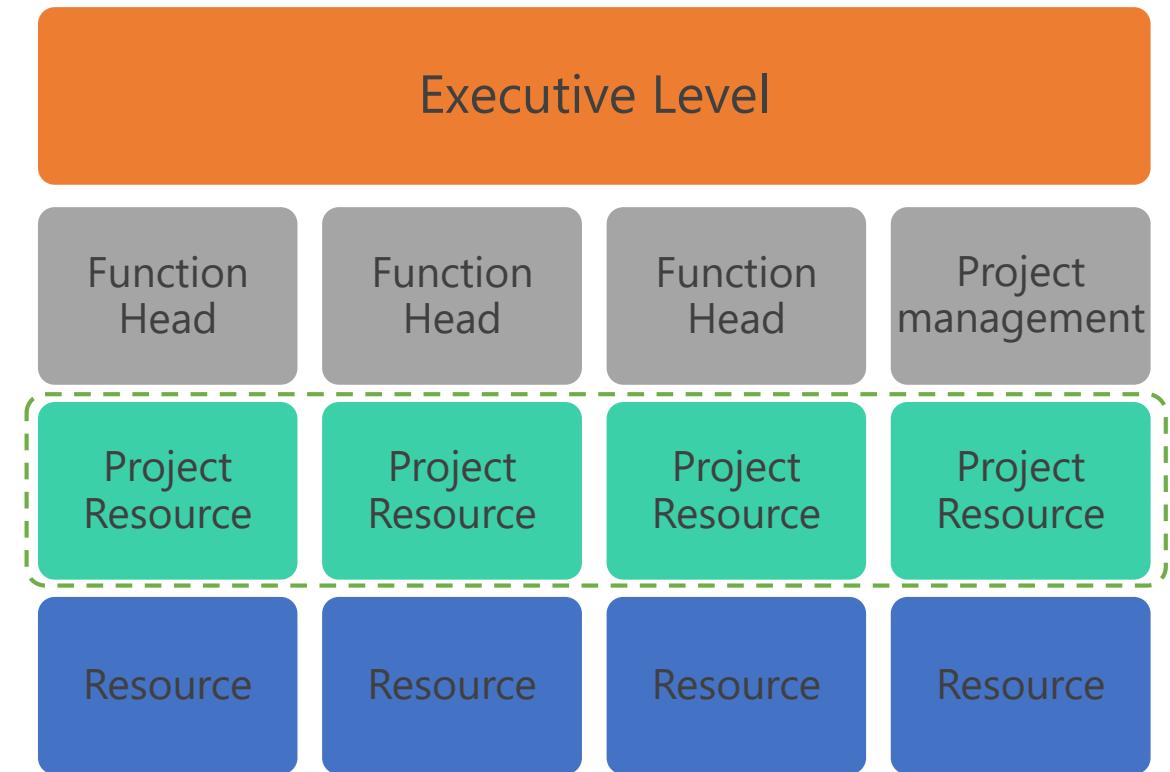
- Resources are aligned to projects.
- Project managers have primary authority over the project resources.
- Project execution becomes easier because of the dedicated project resources.
- Roles of the resources cease once the project is completed and resources return to functional pool.
- Scope for functional specialization is limited.



Matrix Organization

Characteristics of a matrix organization are as follows:

- Resources report to functional managers and are aligned to project managers.
- The authority of the project manager is the weakest in a weak matrix and is strongest in a strong matrix.
- It provides for optimal utilization of resources and functional specialization.
- Dual reporting structure increases the communication cost and management challenges.



Advantages and Disadvantages of Organizational Structures

Types of Organization	Advantages	Disadvantages
Functional	<ul style="list-style-type: none">Clearly defined career paths; greater specialization and skill developmentMore flexible work forceLess confusion because of the reporting structure (one manager)	<ul style="list-style-type: none">Departmental work gets higher priority than project workNo career path in project management
Projectized	<ul style="list-style-type: none">Better communication within projectsMore loyalty toward project goals	<ul style="list-style-type: none">Less efficient use of resourcesNo defined roles when the project is completedLimited and diffuse skill development
Matrix	<ul style="list-style-type: none">Better coordinationMaximum utilization of resources	<ul style="list-style-type: none">Higher potential for conflictGreater communication complexity and overhead

Project Life Cycle vs. Product Life Cycle

Project life cycle lasts from the initiation of a project until the closure, while product life cycle encompasses the operational and maintenance phases.

- A typical product life cycle starts with the conception of the product and goes on until its withdrawal from the market or when it becomes obsolete.
- Product life cycle is long; it can require or spawn many projects over its life.
- A project life cycle depends upon the control needs of the performing organization or the organization's preference, which is defined in the project execution methodology.

Project Life Cycle vs. Product Life Cycle (Contd.)



The Apple iPod is an example of a product. Over the course of its product life there were many projects that enhanced its functionalities and added features. These projects and their life cycles were determined by the control needs of Apple, which typically emphasize time to market priorities and high quality. The iPod as a product exhibited its own life cycle of "Conception – Introduction – Maturity – Decline" and now withdrawal as new products will replace it.



The ability to differentiate between product and project life cycle may be useful while answering the exam.

Project Life Cycle vs. Project Management Process

Given below are the differences between project life cycle and project management process:

Project Life Cycle

- Project life cycle addresses the question, "What to do to get the work done?"
- Project life cycle varies by industry.

Project Management Process

- Project management process addresses the question, "What to do to manage the project?"
- Project management processes are likely to be the same across industries.



In the software industry, project life cycle includes understanding requirement in the requirement analysis phase, implementing requirement in the design phase, writing code and implementing the functionality in the coding phase, debugging of code in the testing phase, installation of the software at customer location, and providing support in the operations and support phase.



In the develop schedule process, one needs to develop the project schedule, irrespective of the industry or domain one is working in.

Project Management Office

A Project Management Office (PMO) is an organizational structure that standardizes project-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques.

The roles of PMO are as follows:

Primary Roles

PMO usually has one or a combination of the following primary roles:

- It provides the policies, methodologies, and tools and templates for managing projects within the organization
- It provides support and training in the organization on how to manage projects
- It provides project managers for ongoing projects in the organization
- It ensures compliance (governance) with all policies, procedures, methodologies, and tools and templates within the organization

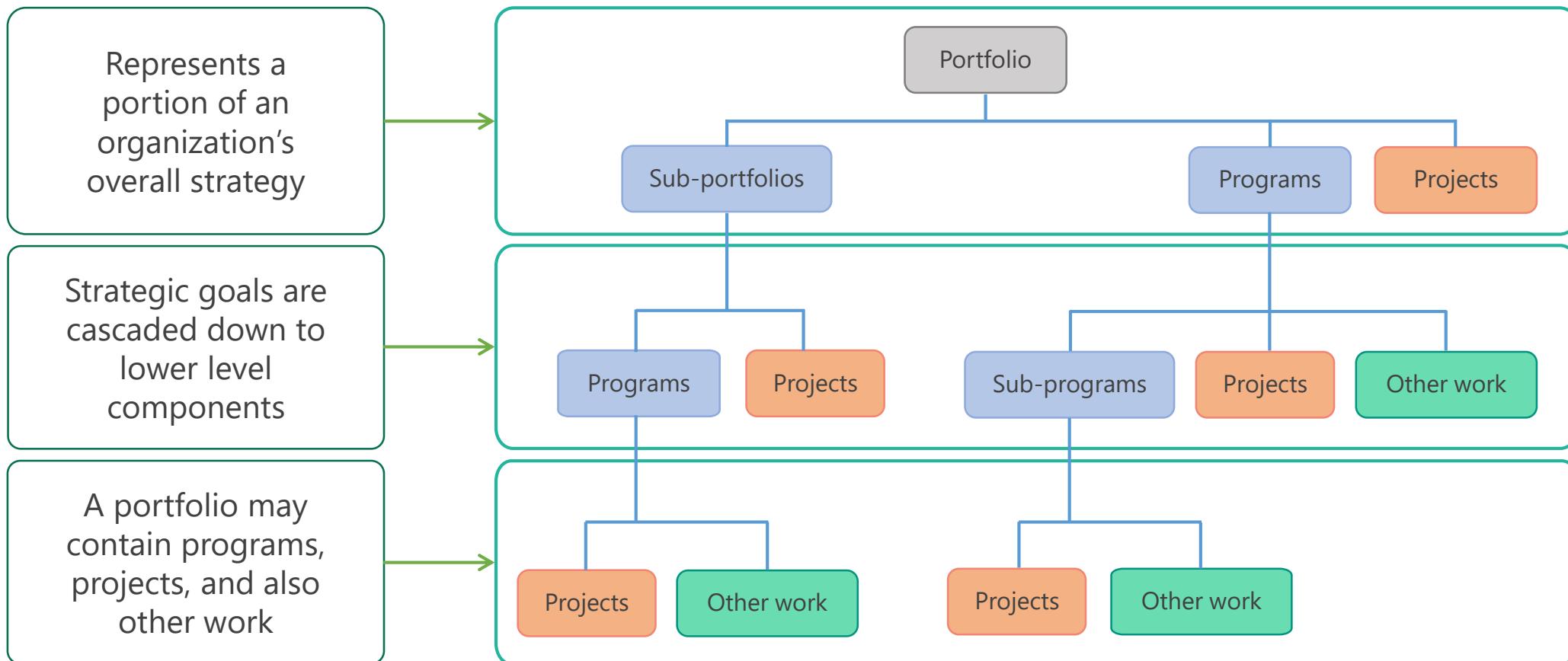
Other Roles

PMO may also help in the following areas:

- Managing interdependencies between projects
- Selecting, managing, and deploying shared or dedicated project resources
- Terminating projects
- Organizing “lessons learned” sessions
- Maintaining the project management knowledge base for an organization
- Supporting projects through knowledge repositories, training, and mentoring

Relationship between Portfolios, Programs, and Projects

The PMO manages the relationships between Portfolios, Programs and Projects. The relationships can be seen in the hierarchy below.



Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute Inc., 2017, Fig. 1-3, Page 12.



Quiz



Quiz



1.

A project manager is working on a project to construct a new bridge. The resources report to the functional manager and are mainly occupied with operational work. The project manager has no authority to properly assign resources. What type of organizational structure is the project manager in?

- A ➔ Functional
- B ➔ Projectized
- C ➔ Strong Matrix
- D ➔ Weak Matrix

Quiz



1.

A project manager is working on a project to construct a new bridge. The resources report to the functional manager and are mainly occupied with operational work. The project manager has no authority to properly assign resources. What type of organizational structure is the project manager in?

- A ➔ Functional
- B ➔ Projectized
- C ➔ Strong Matrix
- D ➔ Weak Matrix



The correct answer is: **A**

In a functional organization, team members are more concerned with their daily functional activities than with the project activities.

Quiz



2. Which of the following is not a characteristic of a project?

- A ➤ Repeats every week
- B ➤ Temporary
- C ➤ Definite beginning and end
- D ➤ Interrelated activities

Quiz



2. Which of the following is not a characteristic of a project?

- A ➤ Repeats every week
- B ➤ Temporary
- C ➤ Definite beginning and end
- D ➤ Interrelated activities



The correct answer is: **A**

Characteristic of a project is based on the project definition. Except for choice a, everything else is part of the project definition itself.

Quiz



3.

As a project manager, you have started a new project. Several stakeholders raise concerns about the quality of the new project management software provided by the PMO and the way project changes would be logged. As a project manager what should you do?

- A ➤ Provide training material on the new project management software.
- B ➤ Inform the project management office about the stakeholders' concerns.
- C ➤ Conduct an informal training session.
- D ➤ Assure the stakeholders that you will keep them engaged in the project and that the new software will in no way negatively impact them.

Quiz



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- B ➤ Inform the project management office about the stakeholders' concerns.
- C ➤ Conduct an informal training session.
- D ➤ Assure the stakeholders that you will keep them engaged in the project and that the new software will in no way negatively impact them.



The correct answer is: **B**

Although all the options look correct, informing the PMO is the best choice. The PMO controls the project management procedures and tools. PMI would like to believe that a mature organization would have a dedicated PMO and deferring to the PMO for this would be the right option.

Quiz



4. Who does the project team report to in a projectized organization?

- A ➤ No one
- B ➤ Project manager
- C ➤ Functional manager
- D ➤ CEO

Quiz



4. Who does the project team report to in a projectized organization?

- A ➤ No one
- B ➤ Project manager
- C ➤ Functional manager
- D ➤ CEO



The correct answer is: **B**

In a projectized organization, project team reports to the project manager.

Quiz



5. How is a project life cycle different from product life cycle?

- A ➤ A project life cycle has no methodology
- B ➤ A project life cycle depends on the control needs of the performing organization
- C ➤ A project life cycle can contain many product life cycles
- D ➤ A project life cycle only includes specific project management activities

Quiz



5. How is a project life cycle different from product life cycle?

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- B ➤ A project life cycle depends on the control needs of the performing organization
- C ➤ A project life cycle can contain many product life cycles
- D ➤ A project life cycle only includes specific project management activities



The correct answer is: **B**

A project life cycle depends on the control needs of the performing organization. Choice C is just the opposite, i.e., a product life cycle can include many projects through its life cycle, not the other way around.



Key Takeaways

- ▷ Projects fail for a variety of reasons. In order to increase project delivery success it is important to understand the different organizational structures that exist.
- ▷ Functional, projectized, and matrix are the three types of organization structures, based on the level of authority given to the project manager.
- ▷ PMO provides the policies, methodologies, and tools and templates for managing projects within the organization.
- ▷ The PMO also manages the work performed by Portfolios, Programs and Projects. Portfolios can contain Programs and Projects. Programs contain projects.
- ▷ Project life cycle is determined by the controlling needs of the performing organization while project management processes are common across most industries and organizations



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Lesson 04: Role of the Project Manager



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Objectives

- ▷ Define the role of a Project Manager
- ▷ Identify the major elements included in the PMI triangle
- ▷ Identify a project manager's sphere of influence
- ▷ Describe stakeholders and their value to project efforts
- ▷ Identify the professional and social obligations of Project Managers
- ▷ Explain how to ensure individual integrity
- ▷ Identify ways to contribute to project management knowledge base
- ▷ Explain how to enhance professional competence
- ▷ List the ways to promote stakeholder collaboration

The Role of a Project Manager

Project manager has the single most important position on a project and has the overall responsibility for its success. This position comes with tremendous responsibility, accountability, ownership, and authority.

A project manager:

- Has full responsibility and accountability for the project
- Applies lessons learned from recent projects
- Defines project roles and responsibilities
- Leads the project planning activities
- Performs project tracking and communicates project status
- Adopts project management best practices
- Manages project priorities
- Performs risk and issue management
- Drives decision making
- Promotes client involvement
- Encourages and supports escalations
- Enforces effective change control
- Mentors project members

The Role of a Project Manager (Contd.)



PMP v6 emphasizes Agile and Adaptive practices and minimizes the role of the PM as a controller. The PM is responsible for monitoring and managing, particularly around Risks, Stakeholders, and Communications.

Project Management Skills

PMI Talent Triangle (2015)

PM should have a balance of skills

Technical skills

- *PMBOK® Guide*

Strategic and Business Management

- Business acumen
- Basic management
- Vision
- Strategic alignment

Leadership

- Motivate and guide teams
- Soft Skills
 - Communications
 - Facilitation
 - Conflict Resolution
 - Emotional Intelligence
 - Critical Thinking

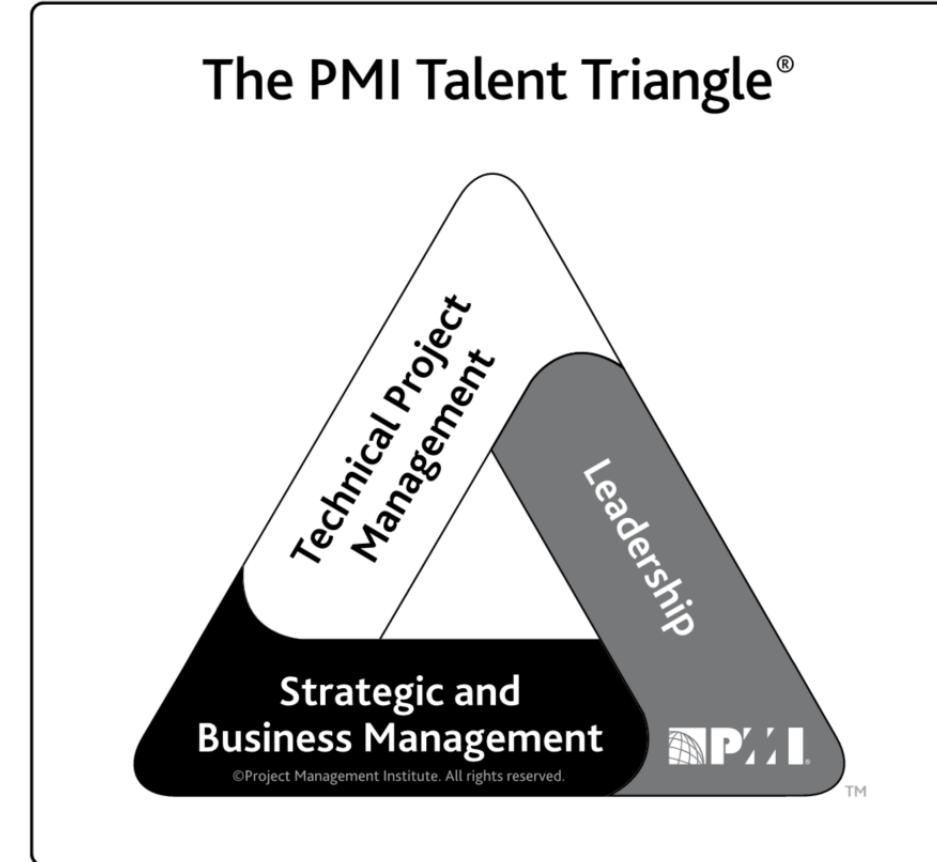


Figure 3-2. The PMI Talent Triangle®

Project Management Institute, *A Guide to the Project Management Body of Knowledge*, (*PMBOK® Guide*) – Sixth Edition, Project Management Institute, Inc., 2017. Page 57

Stakeholder

The definition of *Stakeholder is as follows:

An individual, group, or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project.^[7]

The project team, project manager, project sponsor, PMO office, customer, etc. are the stakeholders of the project.

A project sponsor is the one who gives a go ahead for a project and provides the necessary resources to execute the project.

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2013. Page 723

Stakeholder Management

A key responsibility of a project manager is to manage stakeholders. Project manager has to take up specific activities for stakeholder management.

Identifying internal and external stakeholders

Identifying stakeholders at the beginning is essential. A stakeholder, who is identified toward the end of the project, may come up with a new requirement at that stage, and incorporating it can be risky.

Determining stakeholder requirements

Stakeholder requirements need to be clearly identified. It is the job of the project manager to get them right by doing a proper stakeholder requirement analysis.

Determining stakeholder expectations

Unstated stakeholders' expectations need to be clarified to see if it needs to be a project requirement.

Communicating with stakeholders

The project manager, as part of stakeholder analysis, should focus on communicating with them regularly to keep stakeholders involved in the project.



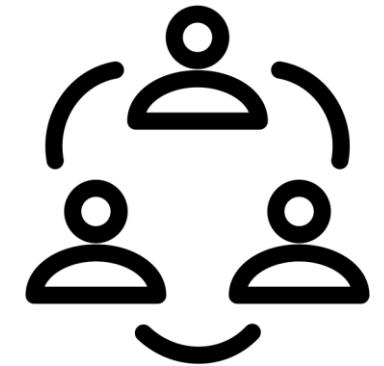
Understand the practices of stakeholder management to answer scenario based questions.

Promoting Stakeholder Collaboration

Project managers should encourage stakeholder collaboration so that stakeholders are aware of the true benefits of the project and help in whatever way they can to make it successful.

The project managers should perform the following activities to promote stakeholder collaboration:

- Resolve competing interests
- Take charge and deal with conflicting scenarios
- Respect cultural differences that occur when projects span geographies
- Always keep stakeholders informed about the true status of their projects



Code of Ethics

The PMI® has established a set of guidelines for Code of Ethics and Professional Conduct for certified PMP professionals to follow. It describes the expectations that the project managers should have of themselves and of their fellow practitioners in the global project management community.

Project managers hold a great deal of responsibility over:

- The projects they undertake
- The solutions provided
- The management of costs
- The impact on the performing organization
- Any impacted environments or groups
- Dollars spent
- Vendors/contractors hired



Understand the professional and social obligations of project managers.

The Values that Support the Code of Ethics

- PMI has identified four core values across the global project management community that are most important to project managers.
 - Responsibility
 - Respect
 - Fairness
 - Honesty
- Each section of the Code of Ethics and Professional Conduct includes both Aspirational Standards and Mandatory Standards.
- The aspirational standards describe the conduct that the Project Managers strive to uphold as practitioners.
- Although adherence to the aspirational standards is not easily measured, it is expected that Project Management Professionals adhere to them. These are not optional.
- The mandatory standards establish firm requirements, and in some cases, limit or prohibit practitioner behavior. Practitioners who do not conduct themselves in accordance with these standards will be subject to disciplinary procedures before PMI's Ethics Review Committee.

Responsibility: Aspirational Standards

Practitioners of Project Management are held to the highest standards and acknowledge their responsibility to take ownership for the decisions that they make or fail to make, the actions that they take or fail to take, and the resulting consequences.

Aspirational standards include:

- Making decisions and taking actions based on the best interests of the:
 - Society
 - Public Safety
 - Environment
- Accepting only those assignments that are consistent with their background, experience, skills, and qualifications
- Fulfilling the commitments undertaken – “Do what we say we will do”



Source: PMI Code of Ethics and Professional Conduct

Responsibility: Aspirational Standards (Contd.)

Aspirational standards include:

- Owning and correcting errors or omissions promptly
 - Errors are communicated immediately to the appropriate body
 - Accountability is accepted along with any resulting consequences
- Ensuring any and all proprietary and/or confidential information is protected
- Upholding ethical code and holding each other accountable to it



Source: PMI Code of Ethics and Professional Conduct

Responsibility: Mandatory Standards

Mandatory standards include:

- Be informed of all regulations and legal requirements
- Uphold the policies, rules, regulations and laws that govern their work, professional and volunteer activities
- Report unethical or illegal conduct to appropriate management, and if necessary, to those affected by the conduct



Source: PMI Code of Ethics and Professional Conduct

Responsibility: Ethics Complaints

Part of the responsibility of project managers includes reporting violations of the PMI Code of Ethics and Professional Conduct by other project managers.

Ethics complaints must adhere to the following PMI standards:

- Bring violations of this Code to the attention of the appropriate body for resolution
- File ethics complaints when they are substantiated by facts
- Pursue disciplinary action against an individual who retaliates against a person raising ethical concerns



Source: PMI Code of Ethics and Professional Conduct

Respect: Aspirational Standards

Project Managers show respect by having high regard for themselves, others, and the resources entrusted to them. Resources entrusted to project managers may include people, money, reputation, the safety of others, and natural or environmental resources.

Aspirational standards include:

- Being informed about the norms and customs of others and avoid engaging in behaviors they might be considered disrespectful
- Listening to others' points of view and seeking to understand them
- Approaching directly those persons with whom you have a conflict or disagreement
- Conducting themselves in a professional manner, even when it is not reciprocated

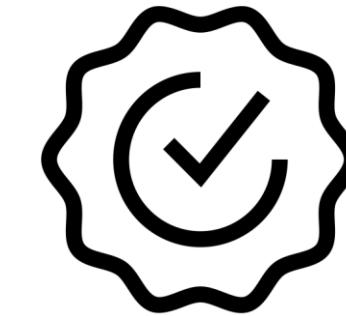


Source: PMI Code of Ethics and Professional Conduct

Respect: Mandatory Standards

Mandatory standards include:

- Negotiating in good faith
- Not exercising the power of their expertise or position to influence the decisions or actions of others in order to benefit personally at their expense
- Not acting in an abusive manner toward others
- Respecting the property rights of others



Source: PMI Code of Ethics and Professional Conduct

Fairness: Aspirational Standards

Project Managers must ensure Fairness as a core value while making decisions and must act impartially and objectively. Project manager's conduct must be free from competing self interest, prejudice, and favoritism.

Aspirational standards include:

- Demonstrating transparency in decision-making process
- Constantly re-examining personal impartiality and objectivity, taking corrective action as appropriate
- Providing equal access to information to those authorized to have that information
- Providing equal opportunities to qualified candidates



Source: PMI Code of Ethics and Professional Conduct

Fairness: Mandatory Standards

- Proactively and fully disclosing any real or potential conflict of interest to appropriate stakeholders
- When real or potential conflict of interest is realized, refraining from engaging in the decision making process or otherwise attempting to influence outcomes
- If there is real or potential conflict of interest, participating only when:
 - Full disclosure is made to the affected stakeholders
 - Approval on complete mitigation plan is received
 - Consent of stakeholders to proceed is obtained



Source: PMI Code of Ethics and Professional Conduct

Honesty: Aspirational Standards

Project managers must uphold Honesty as a core value to understand the truth and act in a truthful manner both in communications and conduct.

Aspirational standards include:

- Earnestly seeking to understand the truth
- Being truthful in communications and conduct
- Providing accurate information in a timely manner
- Making commitments and promises, implied or explicit, in good faith
- Striving to create an environment in which others feel safe to tell the truth



Source: PMI Code of Ethics and Professional Conduct

Honesty: Mandatory Standards

- Not engaging in, or condoning, behavior that is designed to deceive others, including, but not limited to:
 - Making misleading or false statements
 - Stating half-truths
 - Providing information out of context
 - Withholding information that, if known, would render your statements as misleading or incomplete
- Not engaging in dishonest behavior with the intention of personal gain or at the expense of another



Source: PMI Code of Ethics and Professional Conduct

Ensuring Individual Integrity

Project managers need to ensure their own individual integrity while managing a project.

This means:

- Always reporting the truth regardless of negative consequences
- When conflict occurs, dealing with it directly
- Treating everyone with respect
- Avoiding discrimination
- Following all rules and regulations governing the project
- Reporting any unethical or dishonest behavior
- Not factoring personal gains into a decision in any way
- Always doing the right thing and following the right process



Source: PMI Code of Ethics and Professional Conduct

Ensuring Individual Integrity (Contd.)

Project managers need to ensure their own individual integrity while managing a project.

This means:

- Never divulging company information to unauthorized parties
- Respecting intellectual property rights
- Following the Project Management Institute's (PMI) Code of Ethics and Professional Conduct. This can be found on the PMI website.



Understand the individual integrity required in project managers to answer questions that test professional and ethical responsibility.

Business Scenario: Problem Statement



- You are the project manager for a global infrastructure project. The project is being delivered in another country, and you travel frequently to assist with receiving the necessary approvals and permits for construction. Your Project Sponsor is confident in your team's ability to finish the project under budget and ahead of schedule. To encourage you and your team, an early completion incentive has been linked to the project.
- After using parametric estimates in the planning process and developing a well-documented basis of estimates, you are confident that you can deliver the project within its budget and on schedule. Although it's not clear if you can deliver the project sooner than scheduled.
- After an on-site meeting with local officials about the status of the project, one of the officials pulls you aside to have a conversation. He tells you that he can get an important government approval immediately which will ensure that the next phase of the project is completed ahead of schedule. However, he asks you to pay him \$250 in US currency as an "administration fee." What should you do as the project manager?

Business Scenario: Solution



You deny the request to pay \$250 to the official.

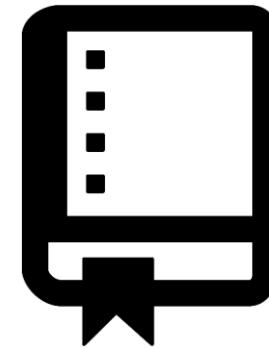
You want to keep your project on a positive path to ensure success. Further, your project team would like to earn an incentive for their hard work. However, paying the official money would be considered a bribe.

Therefore, the next step for you, as the project manager, is to meet with the sponsor and report the offer made by the official.

Contributing to the Project Management Knowledge Base

Project managers can contribute to the project management knowledge base in the following ways:

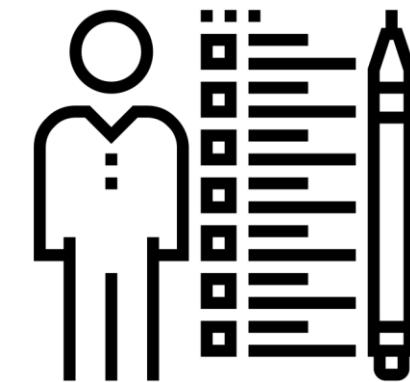
- Share the best practices learned during your project with other project managers in your organization
- Mentor junior team members on project management related topics
- Write a white paper or blog on project management or participate in project management discussion groups
- Actively participate in analyzing past project data, and compile project management related metrics to be used within the organization
- Participate in volunteer activities with PMI



Enhancing Professional Competence

Project managers should do the following to enhance their professional competence:

- Analyze their strengths and weaknesses
- Look for a senior project manager to mentor them on areas where they are not very competent
- Actively look for ways to apply their project management knowledge on projects
- Read project management books for new ideas or techniques
- Listen to or participate in webinars and online learning efforts
- Join a local chapter of PMI and participate with other project managers
- Discuss the challenges faced on their projects, with other project managers

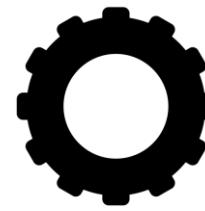
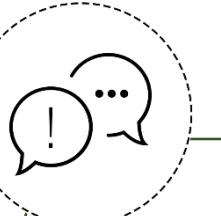


Business Scenario: Problem Statement



- You wrapped up a project 3 months ago that produced spare parts for one of your customers. You successfully gained final acceptance and signoff by the customer on the deliverable.
- Managing the project went well because your parts consistently met the quality metrics, fitness for use tests, and passed all control charts. There was no indication of issues with quality and grade that would prompt a need for change.
- A fellow project manager in the company is preparing for a similar project with a different customer, and they want to meet with you to glean insight on what to expect.
- During your meeting, you discover an error in the results communicated in the deliverable that may potentially turn into a safety issue in the future which could affect thousands of customers. Although the risks involved with these newly discovered safety issues are very small, they could have a serious impact. How should you handle this?

Business Scenario: Solution



You should first get in touch with your old Project Sponsor and management to communicate your findings both verbally and in writing (formally). Then you and/or the sponsor should communicate your findings to the customer.

According to PMI's Code of Ethics and Professional Conduct, you must "uphold the policies, rules, regulations, and laws that govern your work, professional and volunteer activities."

Business Scenario: Problem Statement

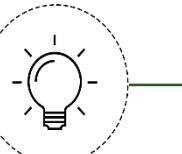


- The ACME Technology Company prides itself on providing excellent customer service and delivering high-quality technology implementations. This brand strategy has served the company well because they maintain a strong customer loyalty record. The area that hurts them, at times, is the fact that some of their system implementations take longer than forecast.
- Jim is a project manager at the company, and he is leading a desktop upgrade for one of their repeat customers. The project is nearing its completion date, and it is time to check the correctness of the computer build out. During the evaluation, it is brought to Jim's attention that the desktop system's speed is not fast enough for the company's core financial software to function as designed. A team member suggests they increase the system's speed by 10% with additional RAM as a courtesy to the customer since they have excess parts from another project, and it will not cost the company any additional dollars. In addition, there were issues on the last project worked for this customer, and this would be a great way to make up for the past problems. What should Jim do?

Business Scenario: Solution



- The additional speed would make a huge difference and allow ACME to meet their defined quality metrics and fitness for use requirements. The fact that the software will not be able to perform on the system to meet established requirements would be a failure point for the project.
- Jim should document both the issues and the recommendations to present to the project sponsor. Identifying the performance concerns is required as he has now been made aware of the issue.



Study the business scenarios to get familiar with questions that test professional and ethical responsibility.



Key Takeaways

- ▷ The Project Management Institute's Code of Ethics and Professional Conduct should always be followed by the project managers during a project.
- ▷ Project managers can contribute to the project management knowledge base by actively analyzing past project data and compiling project management related metrics to be used within the organization.
- ▷ The project managers should analyze their strengths and weaknesses, and look for a senior professional to mentor them on areas where they need to improve.
- ▷ The project managers should always keep stakeholders informed about the true status of their projects to promote stakeholder collaboration.
- ▷ If a project manager becomes aware of any unethical practices and has factual evidence, the conduct should be reported to the appropriate governance body.



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CAPM® Certification Training

Lesson 05: Project Integration Management

This course is based on the Project Management Institute, *A Guide to the Project Management of Body of Knowledge (PMBOK® Guide)* – Sixth Edition.
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Objectives

- ▷ Define Project Integration Management
- ▷ Identify the key role of the project manager, project team, and project sponsor
- ▷ Explain various project selection methods
- ▷ Describe the Project Integration Management processes
- ▷ Identify key terminologies used in Project Integration Management

Project Integration Management

The Project Integration Management includes:

Processes and Activities to identify, define, combine, unify, and coordinate the various processes and project management activities

Project Integration Management is high-level work that requires the project manager to manage interdependencies among the other Knowledge Areas. It deals with:

- Resource allocation
- Balancing complex demands
- Examining alternatives
- Tailoring processes to work within organization and project needs
- Managing the interdependencies among Project Management Knowledge Areas



Integration management ensures continuity across multiple knowledge areas.

Project Integration Management

Projects are iterative in nature with links among processes requiring integration to:

- Ensure deliverables and due dates are achieved
- Provide a plan for managing the project
- Ensure proper knowledge is used/available to the effort when needed
- Manage performance of effort
- Constrain change to project
- Integrate decision-making across knowledge and process groups
- Identify and collect work performance
- Monitor and control work performance
- Implement risk strategies across efforts when indicated by events or performance
- Manage communications and engagements
- Effectively manage phase transitions

Role of Project Manager, Team, and Sponsor

Given below are the key roles of the project manager, project team, and the project sponsor:



Project Manager

The key role of a project manager is to integrate various activities of the project.



Project Team

The key role of a project team is to concentrate on completing the project activities.



Project Sponsor

The key role of a project sponsor is to protect the project team from unnecessary changes and loss of resources.

Project Selection Methods

An organization can undertake a project as a contract or driven by business needs. There should be a formal process for selecting projects to ensure that the limited corporate resources are optimized.

The two broad project selection methods are as follows:

Benefit measurement methods

These methods ascertain the costs and benefits of undertaking the project.

Examples:

- Murder board
- Peer review
- Scoring models
- Economic models
- Benefit compared to cost

Constrained optimization methods

These methods rely on mathematical modeling techniques to determine the selection of the best projects to achieve certain business objectives.

Examples:

- Linear programming
- Goal Programming
- Integer Programming



Understand the characteristics of various project selection methods to answer scenario based questions.

Project Selection Methods (Contd.)



What type of project selection technique is peer review?



Peer review is a benefit measurement method.

Present Value (PV)

Present Value (PV) is the current value of a future cash flow. The amount of money received today is worth more than the same amount in the future. A discount factor has to be applied to reflect future cash flows in present values.



A sum of \$250 being paid right now will be more valuable than \$250 being paid 3 years from now.

PV analysis is important to ensure that an organization maximizes its profit, particularly when value will be delivered a long time in the future.



Farther the timing of the cash flow (future value), lower is the present value.

Net Present Value (NPV)

Net Present Value (NPV) is the difference between value of the total benefits (income or revenue) and the costs over a period of time. Present values of different items combined gives the NPV.



Project X will take 2 years to complete and has an NPV of \$35,000. Project Y will take 5 years to complete and has an NPV of \$95,000. Which project would you select?



Project Y, because it has a higher NPV
Note: The project with the higher NPV is better



Problems where a project has to be selected over other projects on the basis of its net present value can be expected in the exam.

Internal Rate of Return (IRR)

Internal Rate of Return (IRR) is the rate of discounting (used to reduce future cash flows to their present value) at which the present value of costs match the present value of benefits. In other words, it is the rate of return internal to the project.



Project A has an IRR of 25% and project B has an IRR of 15%. which project would you choose?



Project A, because it has a higher IRR



The project with the higher IRR is better.

Payback Period

Payback Period is the number of time periods it takes to recover the investment from the project before profits start accumulating.



Project A has a payback period of 5 months and project B has a payback period of 12 months. Which project would you select?



Project A, because it has a lesser payback period



The project with the lesser payback period is better.

Benefit Cost Ratio (BCR)

Benefit Cost Ratio (BCR) compares the present value of benefits to the present value of costs. A benefit cost ratio of more than 1 means that the benefits are greater than the costs.



Which project would you select if the BCR of Project A is 2.5 and BCR of Project B is 1.5?



Project A, as it has higher BCR



Accept a project with a BCR greater than 1. The project with the higher BCR is better.

Return on Investment (ROI)

Return on Investment (RoI) is the rate of return on the project normalized by the initial investment. It indicates the profitability of the project.



If a project involves an initial investment of \$100,000 and generates an average return of \$20,000 per year, ROI is $20,000/100,000$ or 20%.



Higher the ROI, the more profitable the project is.

Opportunity Cost

Opportunity cost is the cost related to the next best choice available after choosing from among several mutually exclusive choices. It is therefore the opportunity given up by selecting one project over another.



What is the opportunity cost of selecting Project B if Project A has an NPV of \$55,000 and Project B has an NPV of \$85,000?



Opportunity cost is \$55,000. This is the NPV of Project A.



Problems where a project has to be selected over other projects on the basis of net present value and opportunity cost can be expected in the exam.

Project Integration Management Knowledge Areas

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

Table 1-4. Project Management Process Group and Knowledge Area Mapping

Develop Project Charter

Develop Project Charter is a 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 the project activities.^[1] It belongs to the Initiating Process Group.

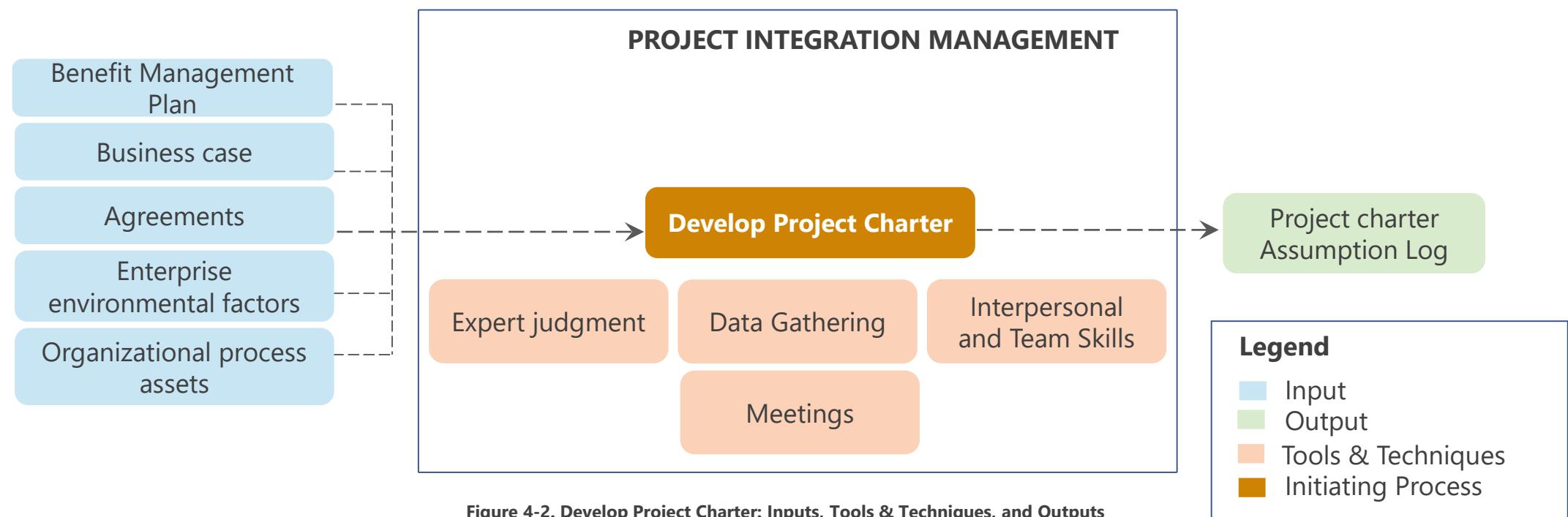


Figure 4-2. Develop Project Charter: Inputs, Tools & Techniques, and Outputs

Develop Project Charter

This process is the first opportunity for Project Manager to understand the vision and goals of the project as agreed to by the sponsor and stakeholders.

- Describes project purpose, vision, and initial scope
- Formally authorizes project and project manager
- Contains
 - Business problem to be solved
 - Measurable project objectives/requirements
 - Project boundaries and key deliverables
 - Risks
 - Critical success factors
 - Stakeholder list and roles/responsibilities
 - Constraints and assumptions
 - Project exit criteria
- Approved by project sponsor

Initial Scope Statement

Defining the initial scope statement is the first step in the Project Management Process

- What problem or opportunity is to be addressed?
- What are the project goals and objectives?
- What are the project work activities to be performed
- What will success look like?
- How will success be measured?
- What risks or obstacles may affect the outcome?
- What roles and responsibilities will be assigned in the effort?
- What constraints, assumptions, and unanswered questions are impacting the vision?
- What is the cost/benefit and/or Return on Investment (ROI) analysis?
- How is Internal Rate of Return (IRR) estimated?
- What are the project resource requirements and constraints - time, budget, HR, physical assets, etc.?

Develop Project Management Plan

Develop Project Management Plan is the process of defining, preparing, integrating, and coordinating all subsidiary plans and integrating them into a comprehensive project management plan.[2]

- Project management plan is a detailed document that describes how the project would be executed, monitored and controlled, and closed.
- Project management plan contains all the subsidiary plans and their baseline values. Performance measurement baseline of project's time is the total of project baseline time and the agreed time variance.
- Subsidiary plans can be separate documents, particularly on very large projects.



If the initial agreed time for a project is 180 days, it is the project baseline time value. If the agreed variance is 10%, the project should be executed in maximum $180 + 180 * 10\% = 180 + 18 = 198$ days.

Contents of Develop Project Management Plan

Regardless of how the plan is organized, it should contain a section referencing or covering:

- Project Charter
- Project management approach or strategy
- Scope Management Plan
- Requirements Management Plan
- Schedule Management Plan
- Cost Management Plan
- Quality Management Plan
- Resource Management Plan
- Communications Management Plan
- Risk Management Plan
- Procurement Management Plan
- Stakeholder Engagement Plan
- Change Management Plan
- Configuration Management Plan
- Scope Baseline
- Schedule Baseline
- Cost Baseline
- Performance Measurement Baseline
- Project Life cycle Description
- Development Approach

Develop Project Management Plan: Process Flow

The various inputs, outputs, and tools and techniques of developing the project plan are given below.

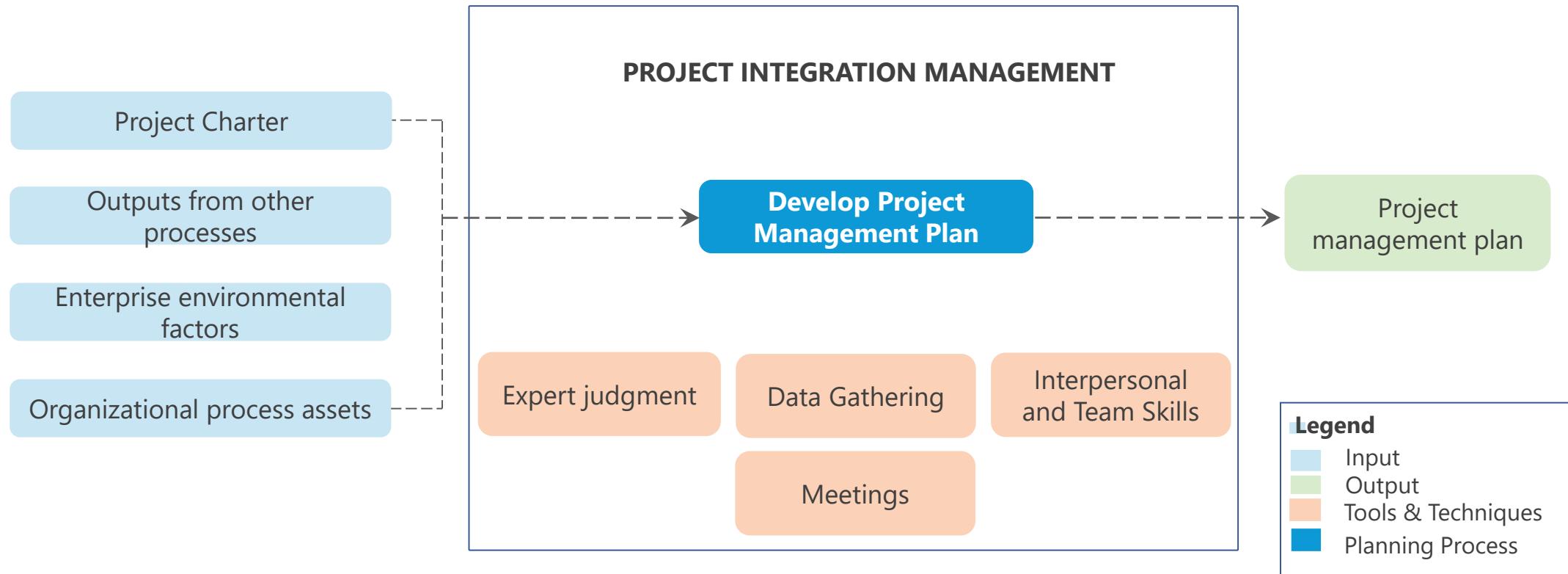


Figure 4-4. Develop Project Management Plan: Inputs, Tools & Techniques, and Outputs

Key Terms



The following key terms are essential to understand project management processes:

***Work Authorization System**

A subsystem of the overall project management system, that is, a collection of formal documented procedures that defines how project work will be authorized ^[3]

***Corrective Action**

An intentional activity that realigns the performance of the project work with the project management plan

***Preventive Action**

An intentional activity that ensures the future performance of the project work is aligned with the project management plan ^[3]

*Definitions taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 703, 714.

Key Terms (Contd.)

The following key terms are essential to understand project management processes:

***Change Control System**

A set of procedures that describes how modifications to the project deliverables and documentation are managed and controlled

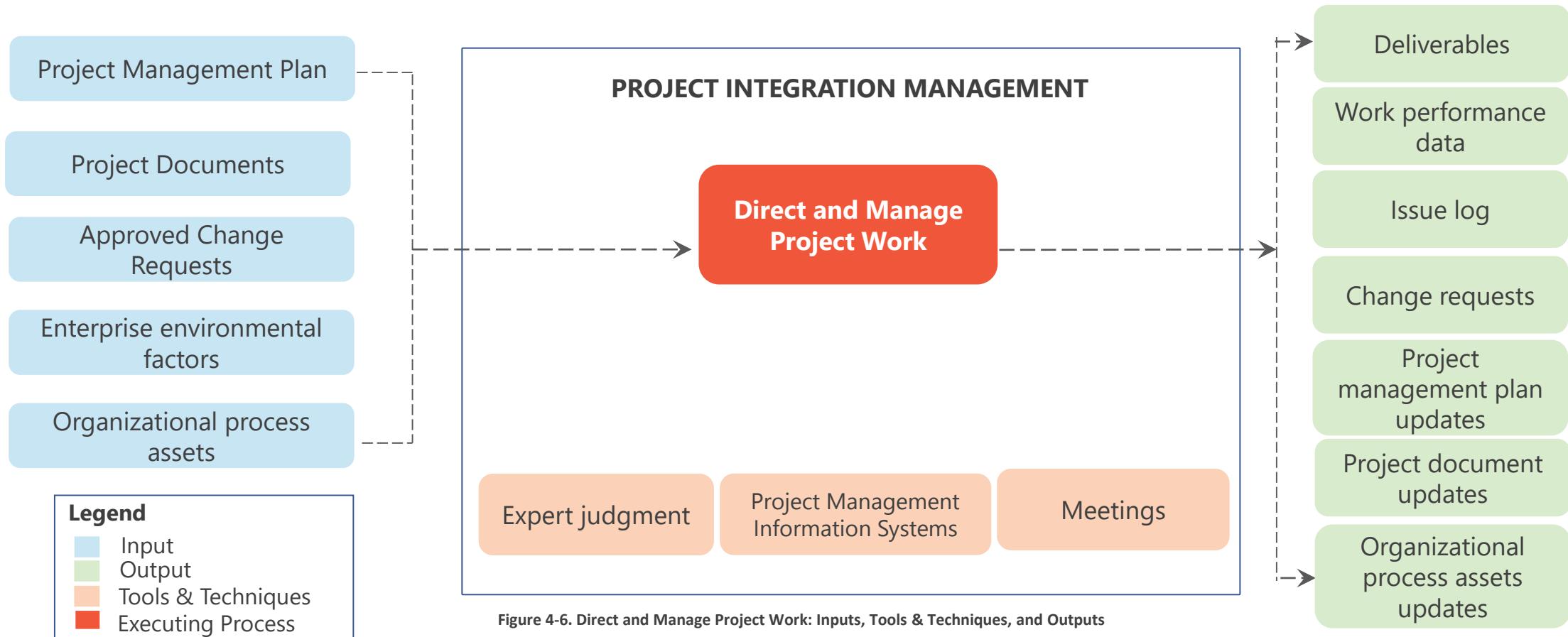
***Configuration Management System**

A set of procedures used to apply technical and administrative direction and surveillance to identify and document the functional and physical characteristics of a product, service or result, or component

*Definitions taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 700,701.

Direct and Manage Project Work

Direct and Manage Project Work is the process of leading and performing the work defined in the project management plan to achieve the project objectives. It belongs to the Executing Process Group.



Direct and Manage Project Work (Contd.)

During Direct and Manage, the Project Manager focuses on:

- Project Team development and coordination
 - Ensure appropriate training, reference material, availability of experts
 - Coordinate efforts within team
 - Resolve conflicts and issues with internal/external groups or contractors
 - 5 minute meetings
- Interfacing with all stakeholders
 - Following Communication plan
 - Following Stakeholder Engagement plan
 - Reporting metrics
 - Reporting progress
 - Additional reporting requirements as defined in the Communication plan

Direct and Manage Project Work (Contd.)

During Direct and Manage, the Project Manager focuses on:

- Project Plan Monitoring (actual vs. planned)
 - Gathering actual completion dates
 - Determining task completion status
- Overall quality management
 - Quality in all deliverables
 - Compliance with process
- Risk management
 - Identifying risks
 - Implementing mitigation strategies
 - Communicating risks
- Scope and product change management
 - Implement the process
 - Look for unauthorized changes
 - Ensure scheduled changes are incorporated and completed

Direct and Manage Project Work (Contd.)

During Direct and Manage, the Project Manager focuses on:

- Facilitating project meetings and performance reviews (communications management)
 - Follow Communication plan
 - Execute Stakeholder Engagement Management Plan
 - Document inputs from meetings and communications with stakeholders and team members
- Documenting progress and work performance
- Updating project records, reports (communications management), and deliverables management

Execution

During Execution, Project Leadership is a critical success factor.

The PM must lead the Project Team and stakeholders with respect to the project.

- Essential prerequisite for project success is the PM's ability to lead the Project Team in what can be an unstructured environment.
- Provide leadership throughout each phase of the project to motivate team members, ensure consistent interpretation of the requirements, keep the project on schedule and within budget, and make sure all milestones (e.g., deliverables submissions) are met.

Leadership roles and skills:

- Planning
- Organizing
- Coordinating
- Motivating (team building)
- Controlling
- Directing

Manage Project Knowledge

Manage Project Knowledge is the process of using existing knowledge to create new knowledge to achieve project objectives and to contribute to the organizational knowledge base for future efforts.

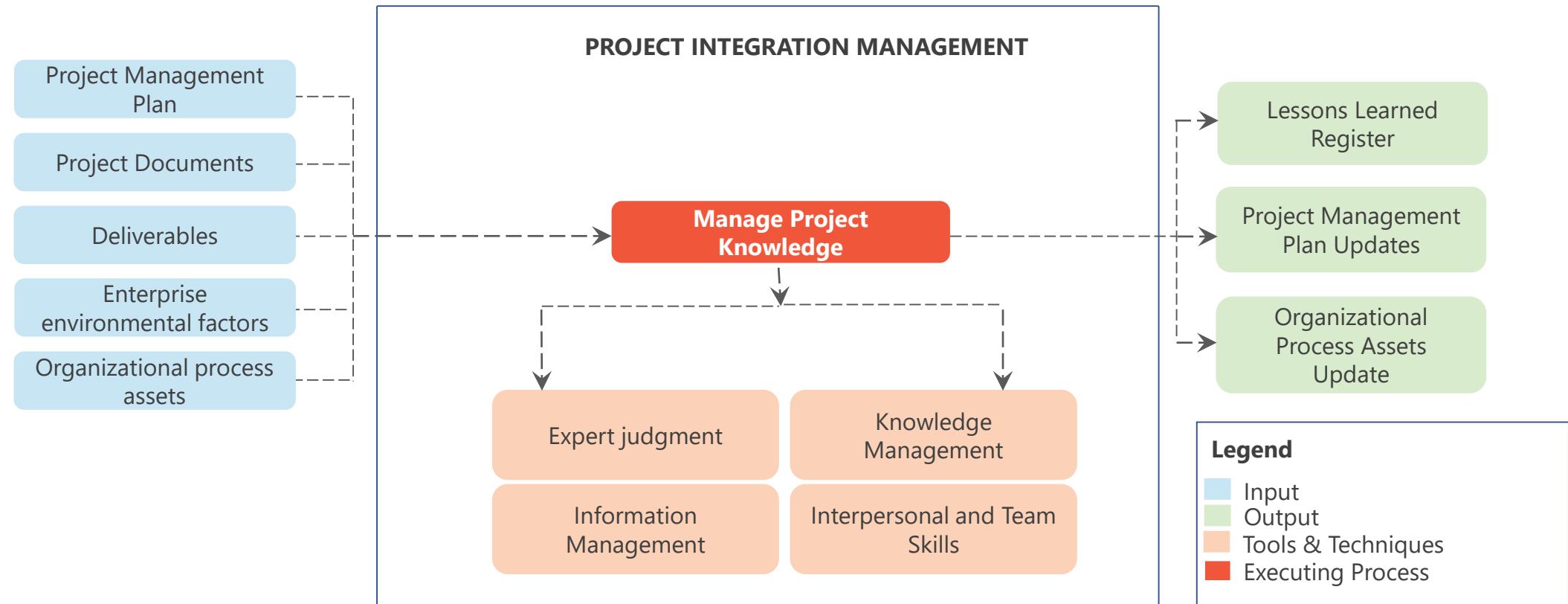


Figure 4-8. Manage Project Knowledge: Inputs, Tools & Techniques, and Outputs

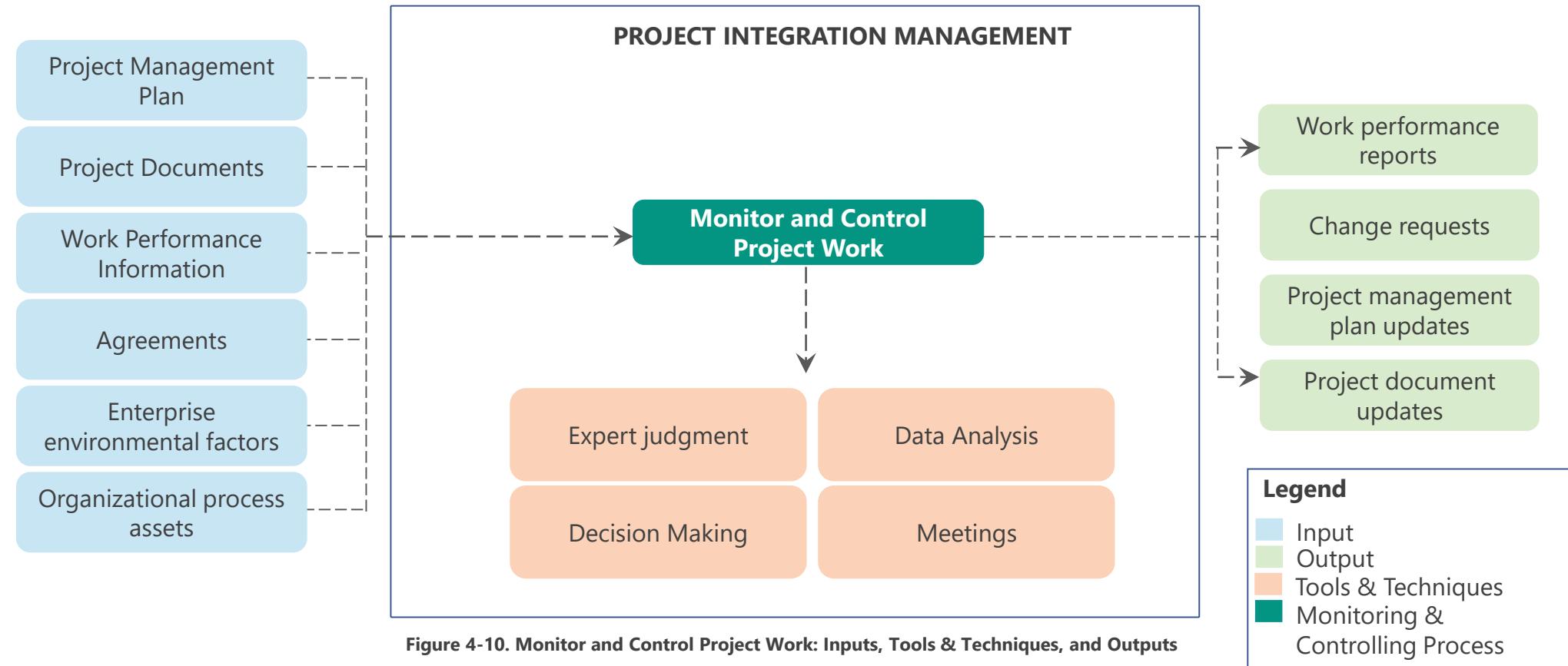
Manage Project Knowledge

Project knowledge is broken into explicit and tacit knowledge and is intended to increase organizational success factors as well as achieve project objectives.

- Explicit knowledge is information that can be easily documented and communicated
- Tacit knowledge is personal and difficult to communicate (expertise, experience, insights, etc.)
- Both types of knowledge are required for Project Knowledge
- Ensure that tacit and explicit knowledge are used before, during, and after project development
- Knowledge Management is more than lessons learned, change requests, and risks

Monitor and Control Project Work

Monitor and Control Project Work is the process of tracking, reviewing, and regulating the progress to meet the performance objective(s) defined in the project management plan. It belongs to the Monitoring and Controlling Process Group.



Monitor and Control Project Work (Contd.)

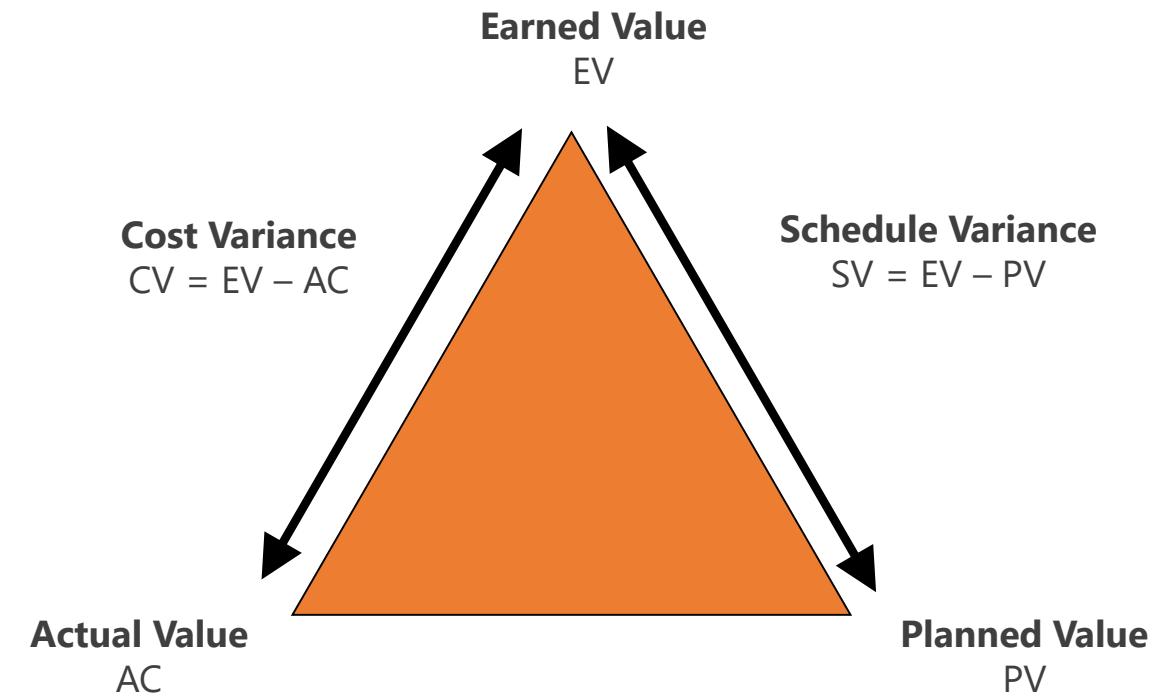
During Monitor and Control Project Work, the Project Manager focuses on:

- Evaluating work performance
- Developing Variance analysis
 - Monitor metrics and evaluate and report on variance
 - Evaluate for impact and correct if necessary
 - Evaluate trending work performance and project status and look for indicators in project variables
- Earned value management
 - Overlap with Control and Monitoring process
 - Collect information to develop analysis model
 - Communicate results of model throughout the team
 - Make decisions to improve performance, burn-rate, or both
 - Evaluate staffing decisions for performance

Monitor and Control Project Work: Challenges

Project Managers must manage both cost and schedule

- "Poor cost variance combined with good schedule variance does not mean everything is alright." – Humphreys 2002
- Spend more and make up time (SV decrease)
- Spend less and lose time (CV decrease)



Monitor and Control : Lesson Learned

The monitor and control project work is an opportunity to adjust and adapt the work to ensure project success. It is also an opportunity to learn new approaches and techniques that other projects can benefit from. This process:

- Generates real-time Lessons Learned for current and future efforts
- Defines additional approaches for future efforts
- May result in schedule modifications
 - Corrective / Preventative Actions
 - Fast-track schedule
 - Schedule Optimization
 - Implementation of mitigation plans

Perform Integrated Change Control

Perform Integrated Change Control is the process of reviewing all change requests; approving and managing changes to the project deliverables, project documents, and the project management plan; and communicating the decisions. It belongs to the Monitoring and Controlling Process Group.

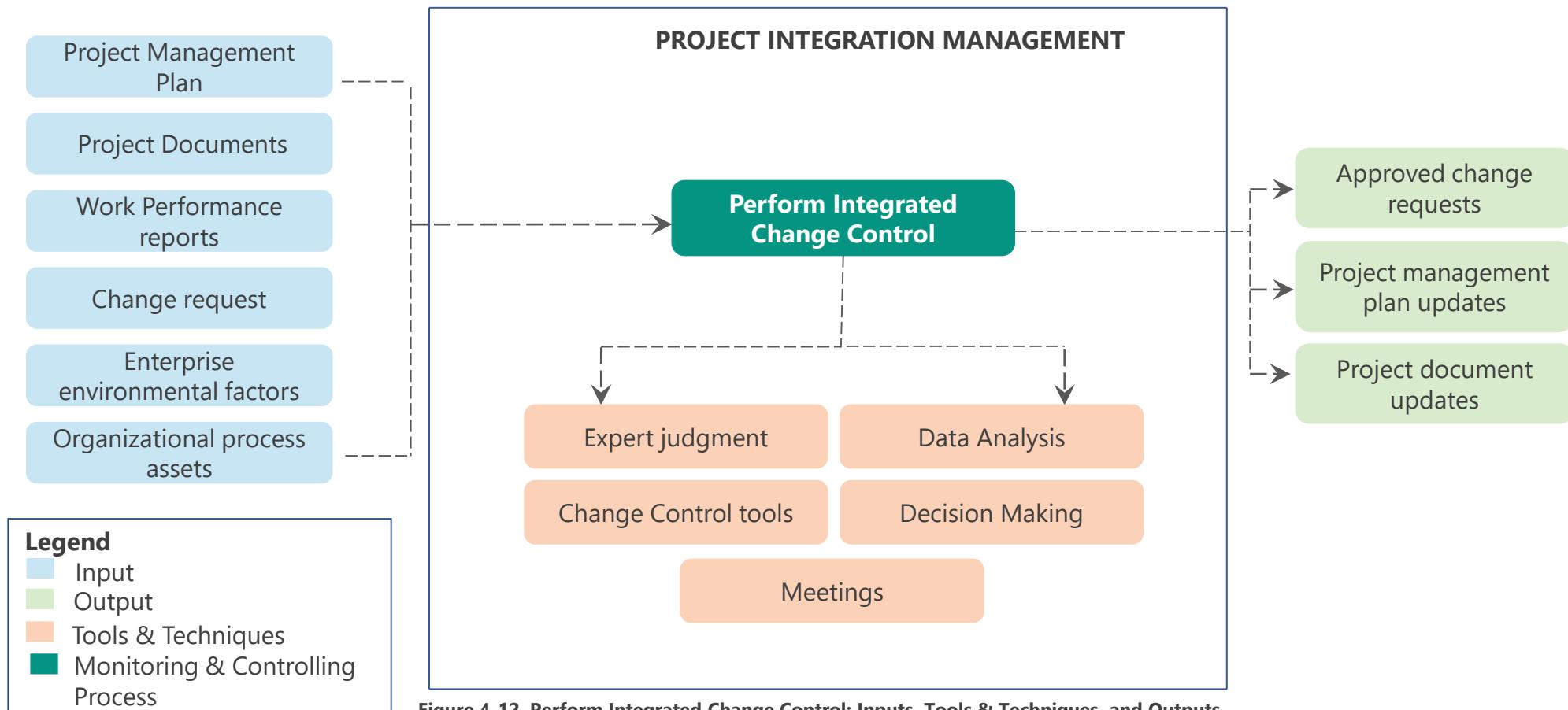


Figure 4-12. Perform Integrated Change Control: Inputs, Tools & Techniques, and Outputs

Change Management Process

The process of change management is as follows:



Ability of a project manager to manage change will be tested in the exam.

Integrated Change Control

Projects seldom run according to plan.

- The only constant is change
- Identify that a change needs to occur or has occurred
- Influence the factors that circumvent change control
- Review and approve changes
- Manage approved changes
 - Monitor when and how changes occur
 - Analyze risk impact
 - Socialize and seek change approval (Change Control Board (CCB), Sponsor, Stakeholders)
 - Schedule change
 - Release only approved changes
 - Update project documents (schedule, cost, risk, quality plan, change log)

Business Scenario: Problem Statement



You are the project manager of a new corporate initiative that is focused on revising and reclassifying the staffing positions in its Design Division. The project plan has been developed. Initially, there were some challenges as the teams adjusted to the new staffing positions. However, you have worked with the teams to provide insight on their roles and responsibilities and everything is now progressing smoothly. The past five project team review meetings have shown that you are on schedule and 5% under budget.

Now, you are preparing a project status report for your upcoming meeting with the Project Sponsor. You are positive and excited at your project status despite the rocky start. Unfortunately, the meeting with the Project Sponsor does not go as planned. You are informed by the Sponsor that the deadline for the project needs to be moved up by 30 days and the budget will remain the same. The Sponsor has asked you to submit a plan of action on how you would accomplish this new deadline. What should you do?

Business Scenario: Solution

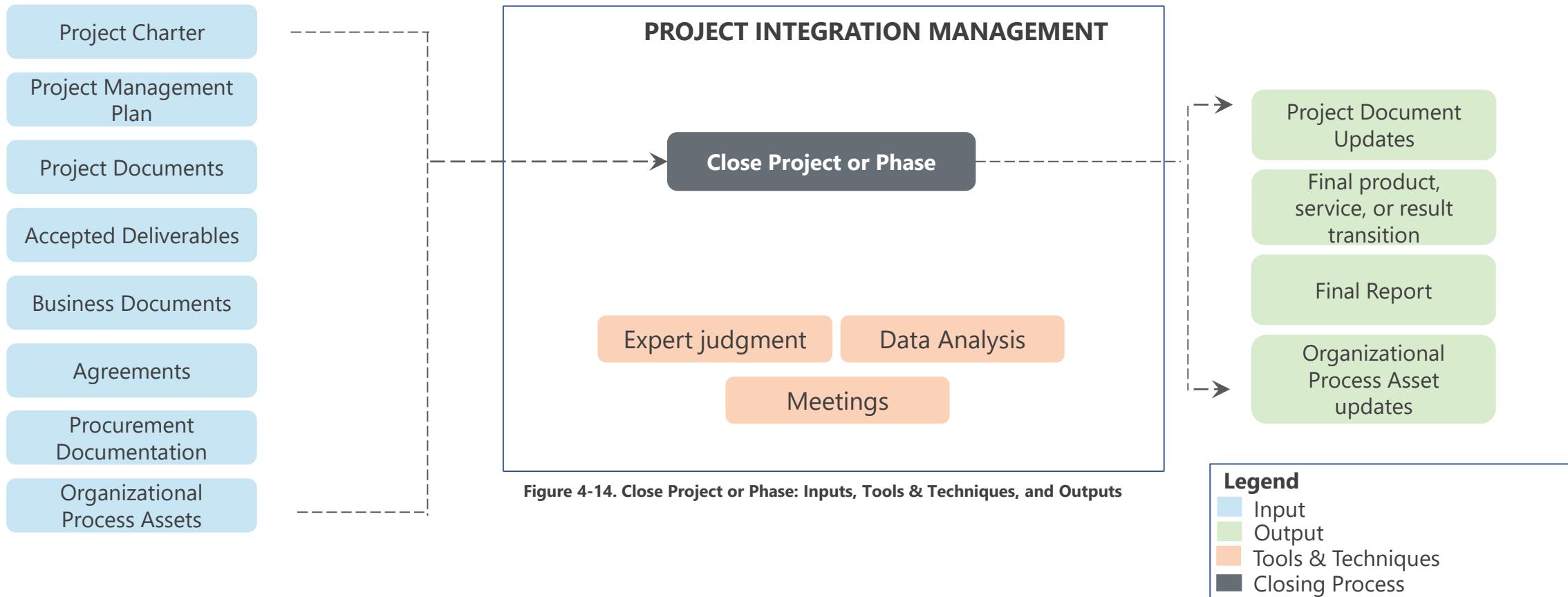


You need to schedule a team meeting to discuss your strategy and plan for implementing the change. After reviewing your change management plan, your team should first look at the remaining work to be completed to assess what it would take to complete the activities. This relates to the triple constraint of scope, budget, and schedule and other measurable constraints such as quality metrics, risk reassessment, and resources. Then, the team will be able to brainstorm and analyze how to adjust the calendar accordingly, see if there are opportunities to reduce scope, work overtime, and still meet the budgetary constraint.

After approaching the problem using the triple constraint and change management process, you will be able to create a new viable plan of action so that you will both meet the new deadline and not compromise on the integrity of the deliverable. Using the triple constraint and change control process is a great framework for assessing change and making decisions around change.

Close Project or Phase

Close Project or Phase is the process of finalizing all activities for the project, phase, or contract. It belongs to the Closing Process Group.



Business Scenario: Problem Statement



The ABC Fencing Line of Business (LOB) has been progressing for the past two years and it is now ending. The new LOB is finally ready for its 'Go live' date and will become a new service option for the company. In the last week of work on the project schedule, only 10 of the 50 project team members involved in the life of the project are needed to complete the remaining tasks that will take it live.

You have already been assigned your next project, which starts in 4 weeks, and you are starting to transition into your new responsibilities. What should you be concerned about as you try to close your project?

Business Scenario: Solution



With both yourself and many of the team members leaving the project, you need to ensure that everyone contributes to the Lessons Learned process before they leave.

Some team members could be apprehensive about contributing because they do not see the value or benefit in this process and feel you could have done it on your own. In that case, you need to explain that lessons learned and historical information are valuable because they give insight and a potential starting point for new projects.

You should inform the team that this is also part of the updates to Organization Process Assets, which is necessary to close the project formally.



Quiz



Quiz



1. With respect to change, which of the following is the most important for a project manager to focus on?

- A ➤ Undertake the change
- B ➤ Track and record the change
- C ➤ Prevent uncontrolled change
- D ➤ Inform project sponsor of the change

Quiz



1. With respect to change, which of the following is the most important for a project manager to focus on?

- A ➤ Undertake the change
- B ➤ Track and record the change
- C ➤ Prevent uncontrolled change
- D ➤ Inform project sponsor of the change



The correct answer is: **C**

It is the responsibility of the project manager to proactively manage the project. This includes preventing unnecessary changes. The changes are actually undertaken by the project team.

Quiz



2. In the middle of a project, you are informed that the resources promised at the beginning of the project are no longer available. As a project manager, what would you do?

- A ➤ Raise a concern that you can no longer execute this project
- B ➤ Evaluate the impact of not having the promised resources
- C ➤ Move forward without the promised resources
- D ➤ Identify other resources that can be provided to you in lieu of the earlier promised resources

Quiz



2. In the middle of a project, you are informed that the resources promised at the beginning of the project are no longer available. As a project manager, what would you do?

- A ➤ Raise a concern that you can no longer execute this project
- B ➤ Evaluate the impact of not having the promised resources
- C ➤ Move forward without the promised resources
- D ➤ Identify other resources that can be provided to you in lieu of the earlier promised resources



The correct answer is: **B**

Although all the responses here seem feasible, the first thing to do is to evaluate the impact of not having the promised resources.

Quiz



3.

A customer is known for requesting numerous changes to projects. You have been assigned as the project manager for this customer's new project. What would you do in the beginning of the project to manage this customer?

- A ➤ Check who the customer's manager is and inform him/her about the customer's past record
- B ➤ Involve the customer as early in the project as possible
- C ➤ Be firm and say no to the customer a few times
- D ➤ Send the customer a copy of your company change control procedure

Quiz



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- B ➤ Involve the customer as early in the project as possible
- C ➤ Be firm and say no to the customer a few times
- D ➤ Send the customer a copy of your company change control procedure



The correct answer is: **B**

In real life, you might consider doing all the options listed, but the best way to handle such a scenario is to involve the customer as early in the project as possible.

Quiz



4. Who performs project integration?

- A ➔ Project Sponsor
- B ➔ Project Manager
- C ➔ Project Team
- D ➔ Customer

Quiz



4. Who performs project integration?

- A ➔ Project Sponsor
- B ➔ Project Manager
- C ➔ Project Team
- D ➔ Customer



The correct answer is: **B**

The project manager's primary role is to integrate the various activities and processes in the project to help fulfill the project's requirements.

Quiz



5. As a project manager, what would you do if you received a change request that does not impact the project schedule?

- A ➤ Go ahead and do the change
- B ➤ Evaluate the impact on the other project constraints
- C ➤ Get in touch with the change control board
- D ➤ Ask your boss's permission

Quiz



5. As a project manager, what would you do if you received a change request that does not impact the project schedule?

- A ➤ Go ahead and do the change
- B ➤ Evaluate the impact on the other project constraints
- C ➤ Get in touch with the change control board
- D ➤ Ask your boss's permission



The correct answer is: **B**

Whenever there is a change request, you should look at the impact on all of the project constraints, not just the schedule.

Quiz



6.

You have been assigned as the project manager of a project that is halfway through execution. You meet the customer and inform him that project is within the baselines, but the customer informs you that he is not happy with the performance of the project. What should you do first?

- A ➤ Meet with the project team to understand the customer's concerns
- B ➤ Meet with the project sponsor and discuss the customer's concerns
- C ➤ Inform the customer that the project team has met the stated expectations
- D ➤ Show the customer the performance of similar other projects

Quiz



6.

You have been assigned as the project manager of a project that is halfway through execution. You meet the customer and inform him that project is within the baselines, but the customer informs you that he is not happy with the performance of the project. What should you do first?

- A ➤ Meet with the project team to understand the customer's concerns
- B ➤ Meet with the project sponsor and discuss the customer's concerns
- C ➤ Inform the customer that the project team has met the stated expectations
- D ➤ Show the customer the performance of similar other projects



The correct answer is: **A**

As the customer is directly informing you that he is not happy, the best option is to meet the project team and discuss the customer's concerns before doing anything else.

Quiz



7.

You are managing a software development project, and one of the developers tells you that he added a new feature that he heard the sponsor talking about in a hallway conversation. The developer did the work after hours and it does add a lot of value to the solution. How should you manage this?

- A ➤ Thank the developer for his hard work and communicate this as a 'win' in your next status report.
- B ➤ Document this as a Change Request and follow the Change Control process to ensure it is documented and approved.
- C ➤ As there were no costs incurred from the work and no schedule impact, you do not need to do anything.
- D ➤ Tell the developer to immediately back the change out as it was not approved and explain that any scope changes must be reviewed and approved before implementation.

Quiz



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- C ➤ As there were no costs incurred from the work and no schedule impact, you do not need to do anything.
- D ➤ Tell the developer to immediately back the change out as it was not approved and explain that any scope changes must be reviewed and approved before implementation.



The correct answer is: **B**

Although the developer did the work after hours and it appears to address the needs of the sponsor, it should be documented as a change. This feature will need to be tested and there is risk that it might affect other parts of the system. It's also possible that the sponsor's requirement was not fully understood if it was talked about in a hallway conversation.

Quiz



8. What makes Project Integration Management unique among the other ten knowledge areas?

- A ➤ It is the only knowledge area with processes in each of the project process groups (Initiating, Planning, Execution and Monitoring and Controlling).
- B ➤ Integration Management is the only knowledge area where no resources are assigned as it is a coordination function that is the responsibility of the project manager.
- C ➤ Integration Management is the only knowledge area that can be completed in the Planning phase.
- D ➤ When closing integration planning, it is not necessary to have sign-off as it only delivers subsidiary plans.

Quiz



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- C ➤ Integration Management is the only knowledge area that can be completed in the Planning phase.
- D ➤ When closing integration planning, it is not necessary to have sign-off as it only delivers subsidiary plans.



The correct answer is: A

Project integration management has processes within each project process group and ensures that the entire project is planned, executed and managed effectively.



Key Takeaways

- ▷ Project Integration Management involves unification, consolidation, articulation, and integrative actions that are crucial for successfully completing the project.
- ▷ Integrating the project activities is the key role of a project manager; the project team focuses on completing the project activities, and the project sponsor protects the team against unsolicited changes.
- ▷ Benefit measurement methods ascertain the costs and benefits of undertaking the project, while constrained optimization methods rely on mathematical modeling to select the best projects that achieve business objectives.
- ▷ Various Project Integration Management processes are Develop Project Charter, Develop Project Management Plan, Direct and Manage Project Work, Manage Project Work, Monitor and Control Project Work, Perform Integrated Change Control, and Close Project or Phase.



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CAPM® Certification Training

Lesson 06: Project Scope Management

This course is based on the Project Management Institute, *A Guide to the Project Management of Body of Knowledge (PMBOK® Guide)* – Sixth Edition.
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Objectives

- ▷ Define Project Scope Management
- ▷ Differentiate between project scope and product scope
- ▷ Identify the key terms used in Project Scope Management
- ▷ Explain work breakdown structure
- ▷ Describe the Project Scope Management processes

What Is Project Scope Management?

The definition of Project Scope Management is as follows:

Project Scope Management includes the processes required to ensure that a project includes all the work required, and only the work required, to complete the project successfully.

Managing the project scope is primarily concerned with defining and controlling what should be included in the project.

*Definitions taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 129

Project Scope Management Activities

The key activities of Project Scope Management are as follows:



Ensure Constant Monitoring

Ensure all the project work is being completed



Avoid Scope Creep

Define project boundaries and avoid unnecessary addition of scope



Prevent Gold Plating

Restrict the project work only to the defined activities and avoid doing more work than required for the project

Product Scope vs. Project Scope

Project Scope Management deals with managing both the product scope as well as the project scope.

The difference between project scope and product scope is as follows:

***Product Scope**

Product scope refers to the features and functions that characterize a product, service, or result.

Example: In the banking sector, services like savings accounts and mutual funds are called products.

***Project Scope**

Project scope refers to the work performed to deliver a product, service, or result with the specified features and functions. Project Scope is often inclusive of Product Scope.

Example: To deliver a product, requirement and design documents have to be produced. This is a part of project scope and not product scope.

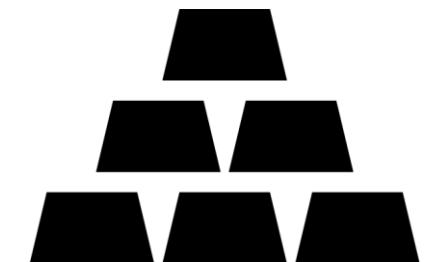
*Definitions taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 131

Definition of Work Breakdown Structure (WBS)

A deliverable-oriented, functional decomposition of the project scope of work into hierarchically grouped work elements

Work Breakdown Structure (WBS) reflects the scope baseline of the entire project.
Deliverables not incorporated in WBS will not be a part of the project.

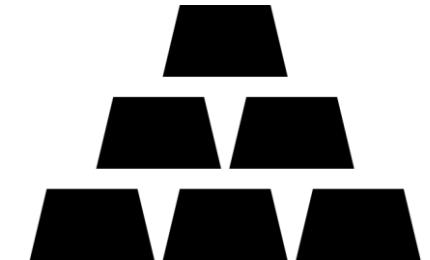
- WBS is prepared with the team's buy-in.
- During decomposition, each level should be complete; it should include all the work in the project before decomposing further.
- Decomposition should be done until the lowest work unit cannot be logically subdivided further (and/or it can be estimated with reasonable accuracy).
- WBS is a deliverable-oriented decomposition and should contain only deliverables and not activities.
- WBS is part of Project Scope Baseline along with Project Scope Statement and WBS Dictionary.



Concept-based questions on work breakdown structure can be expected in the exam.

Work Breakdown Structure (WBS)

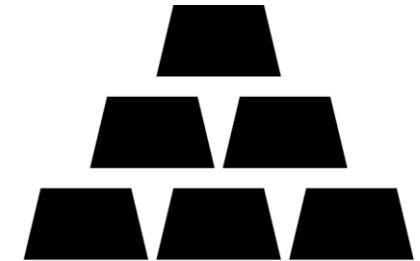
- A WBS defines the total project work.
- If a deliverable is not in the WBS, it is not in the project.
- Each descending level of a WBS represents an increasingly detailed definition of the project work to be performed.
- The WBS is the foundation for project task definition, resource and performance planning, cost estimating, budget control, progress tracking, and status reporting.



Definition of WBS (Contd.)

Work packages are considered decomposed at their lowest level when decomposing them offers no further value or when the work packages can be realistically estimated and they have a meaningful conclusion.

- For a completely decomposed project, each work package should:
 - Have a single purpose
 - Be decomposed until it does not make sense to decompose further
 - Be estimable with a high degree of accuracy
 - Contain clearly understood deliverable(s) or work product(s)



Key Terms



Work Breakdown Structure

A hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables

WBS Dictionary

A document that provides detailed deliverable, activity, and schedule information about each component in the Work Breakdown Structure

Project Scope Statement

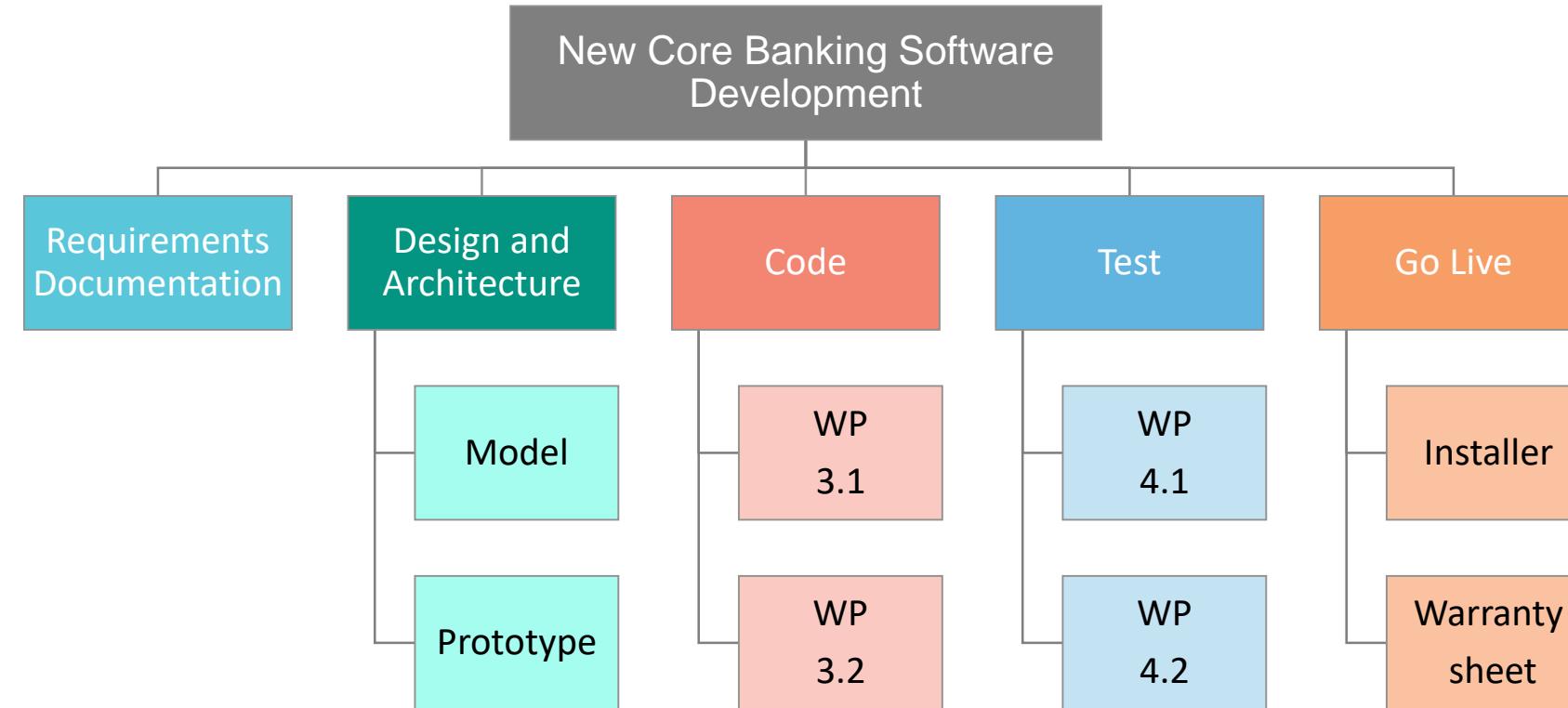
The project scope statement is the description of the project scope, major deliverables, assumptions, and constraints. It describes the project's deliverables in detail.

Control Account

A management control point where scope, budget, actual cost, and schedule are integrated and compared to earned value for performance measurement

WBS: Example

Given below is the WBS of a core banking software development project:



Project Scope Management Processes

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

Plan Scope Management

"Plan Scope Management is the process of creating a scope management plan that documents how the project scope will be defined, validated, and controlled." It belongs to the Planning Process Group.

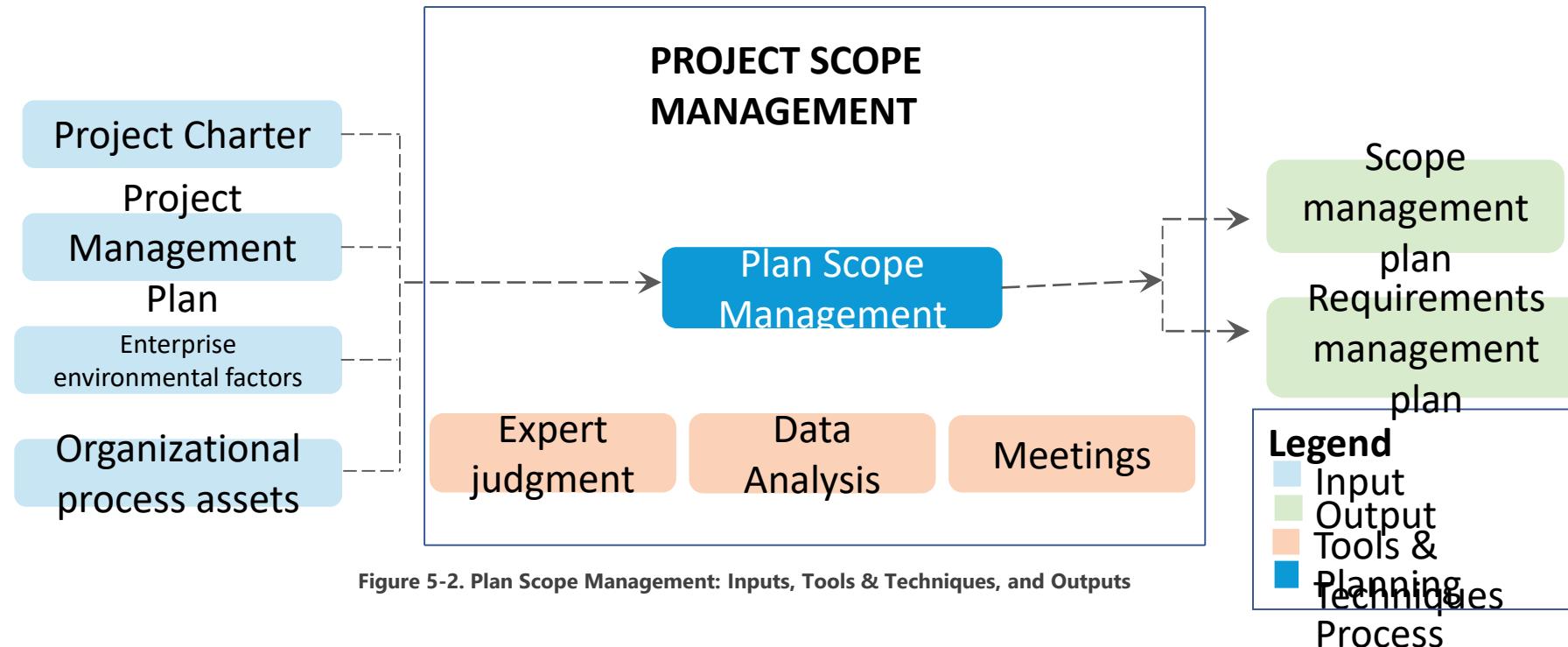


Figure 5-2. Plan Scope Management: Inputs, Tools & Techniques, and Outputs

Understand the inputs and tools and techniques of scope management to answer concept-based questions.

Collect Requirements

"Collect Requirements is the process of determining, documenting, and managing stakeholder's needs and requirements to meet objectives." It belongs to the Planning Process Group.

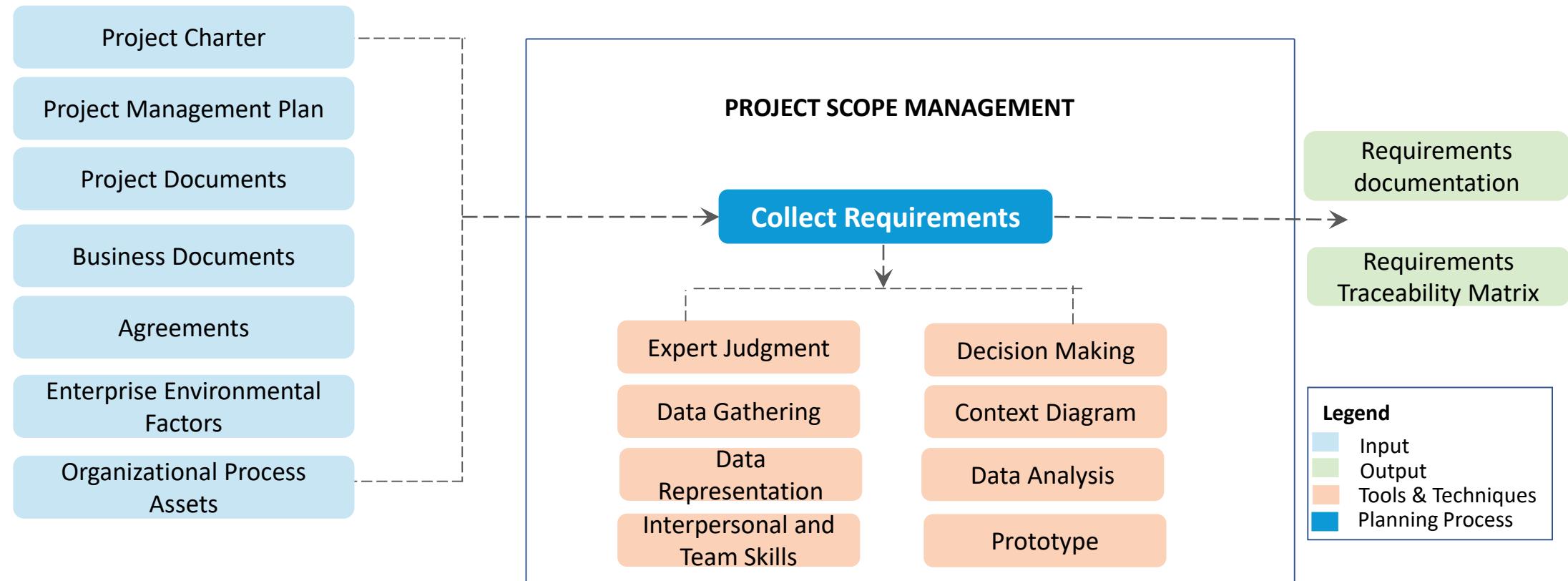


Figure 5-4. Collect Requirements: Inputs, Tools & Techniques, and Outputs⁹

Business Scenario: Problem Statement



- Gina is a project manager with Bluedot Software Development and Web Design Company.
- A large, global customer contracts the company to design software that would allow them to capture service requests from thousands of potential clients, track existing client projects, and facilitate communication between them and their clients.
- Gina has never led a project of this size, but has successfully completed a similar project on a smaller scale. Therefore, Gina feels confident about her abilities to lead the project and will utilize historical information from her previous project to plan for this initiative.
- During the planning process, Gina and her team conduct interviews and surveys and facilitate workshops to collect the necessary requirements needed to complete the project scope of work. They use these requirements to design and build the software system.
- Unfortunately, during the final user acceptance testing of the software, which is required for customer sign-off, Gina's project team discovers the software design will not support the performance requirements when the system is under the load of several hundred users. What happens now?

Business Scenario: Solution



- This is a major blow to Gina and her team. They had captured the customer requirements accurately but had not anticipated how to support the non-functional requirements for load and performance of the system.
- With this being a software design issue, the team has to rewrite the core architecture of the software, which requires all components of the systems to be retested before customer sign-off.
- Because of the team's inability to adequately define the requirements without cutting corners, the rework impacts Gina's project in several ways:
 - Increased cost
 - High risk of customer dissatisfaction
 - Missed schedule deadlines
 - Low morale of project team members
- The project needs to assess the impact and likely requires a Change Request for schedule and budget impacts.

Group Creativity Techniques

Requirements gathering has several techniques to ensure a solid understanding of the functionality of the project.

Group creativity techniques are used to channel a group's combined brainpower to solve a problem, identify requirements or risks, or make a decision.

Nominal Group Technique

It enhances brainstorming with a voting process used to rank the most useful ideas for further brainstorming or prioritization.

1

Brainstorming

It is used to generate and collect multiple ideas related to project and product requirements. It is not an evaluation technique but an ideation process.

Affinity Diagram

It allows large number of ideas to be classified into groups for review and analysis.

4

Idea or Mind Mapping

It consolidates ideas created through individual brainstorming sessions into a single map to reflect commonality and differences in understanding and to generate new ideas.

3

5

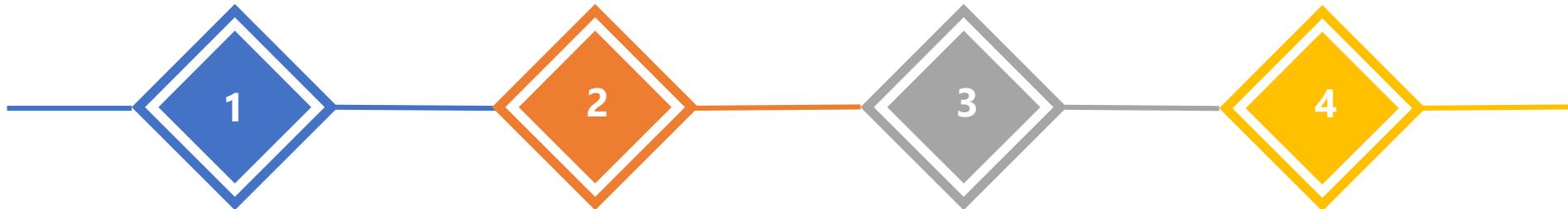
Multi-criteria Decision Analysis

It is a technique that uses a decision matrix to provide a systematic analytical approach for establishing criteria, such as risk levels, uncertainty, and valuation, to evaluate and rank ideas.

Group Decision-making Techniques

Group decision-making techniques are used to arrive at decisions when a number of people are involved in the decision-making process.

Some of the techniques used are as follows:



Unanimity

It is a decision that is reached whereby everyone agrees on a single course of action. This can be achieved using Delphi method.

Majority

It is a decision that is reached with support from more than 50% of the members of the group.

3

Plurality

It is a decision that is reached whereby the largest block in a group decides, even if a majority is not achieved.

4

Autocratic

Decisions are made by an individual on behalf of the group.

Requirement Traceability Matrix

A sample requirements traceability matrix is given below:

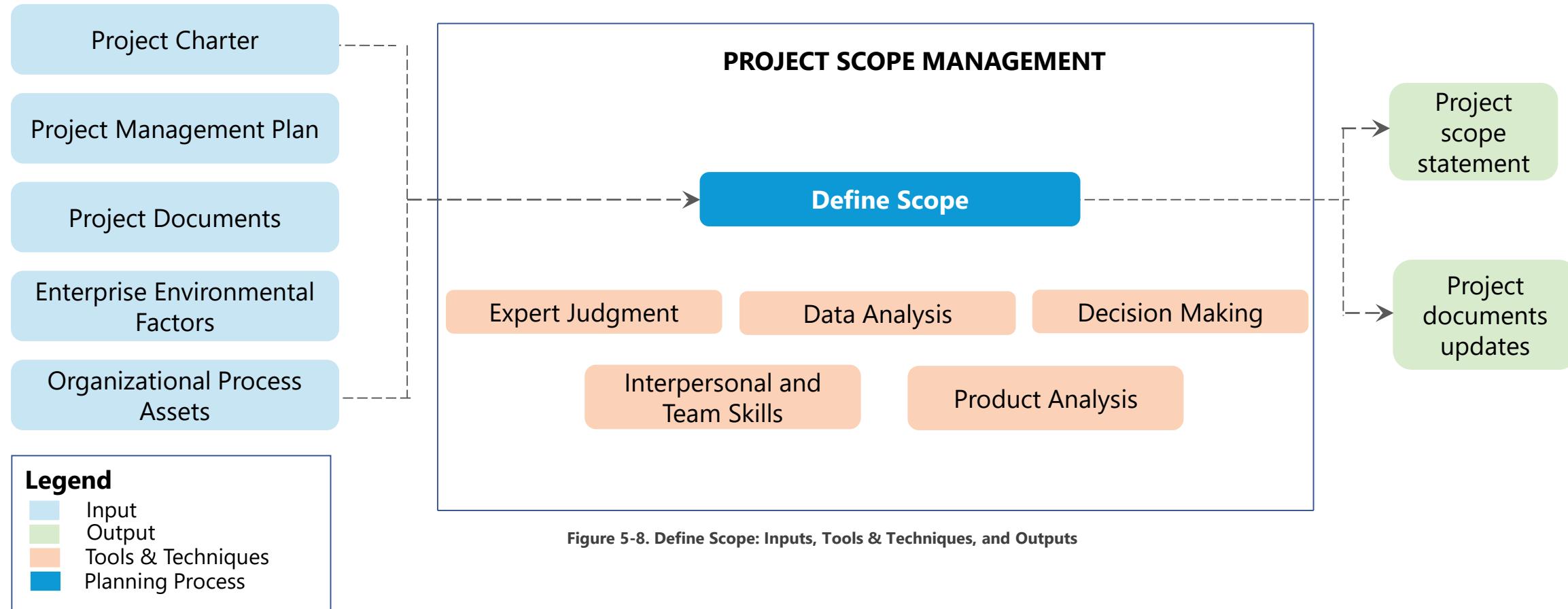
Requirement Number	Design	Coding	System Testing	Acceptance Testing
3.1.1.1 (Multi-user access)	SDD Section 3.1	RBACprocessing.cpp SchemaCreation.sql	Tests 111-120	Tests 51-55
...				
...				
...				
...				



Requirements Traceability is a technique used to verify that the work packages of a WBS are delivered and tested. Typically, this is supported through tooling like Microsoft Team Foundation Server or similar products.

Define Scope

"Define Scope is the process of developing a detailed description of the project and product." It belongs to the Planning Process Group.



Create WBS

"Create WBS is the process of subdividing project deliverables and project work into smaller, more manageable components." It belongs to the Planning Process Group.

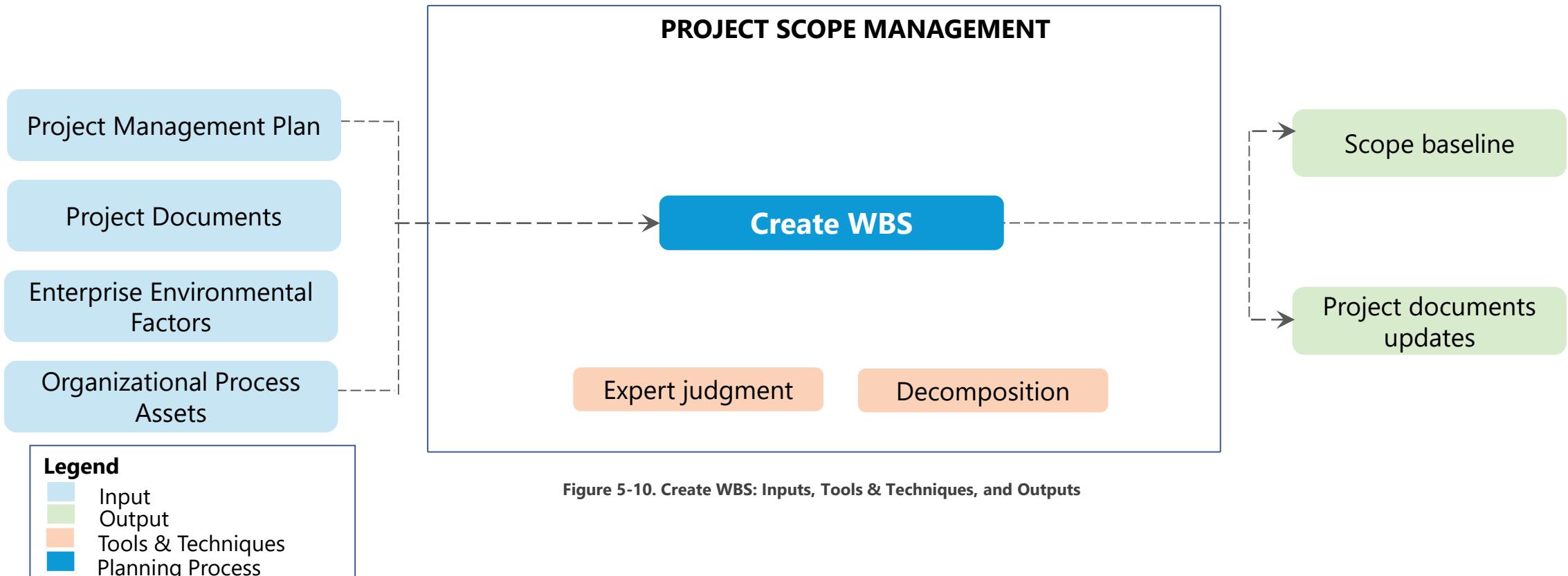
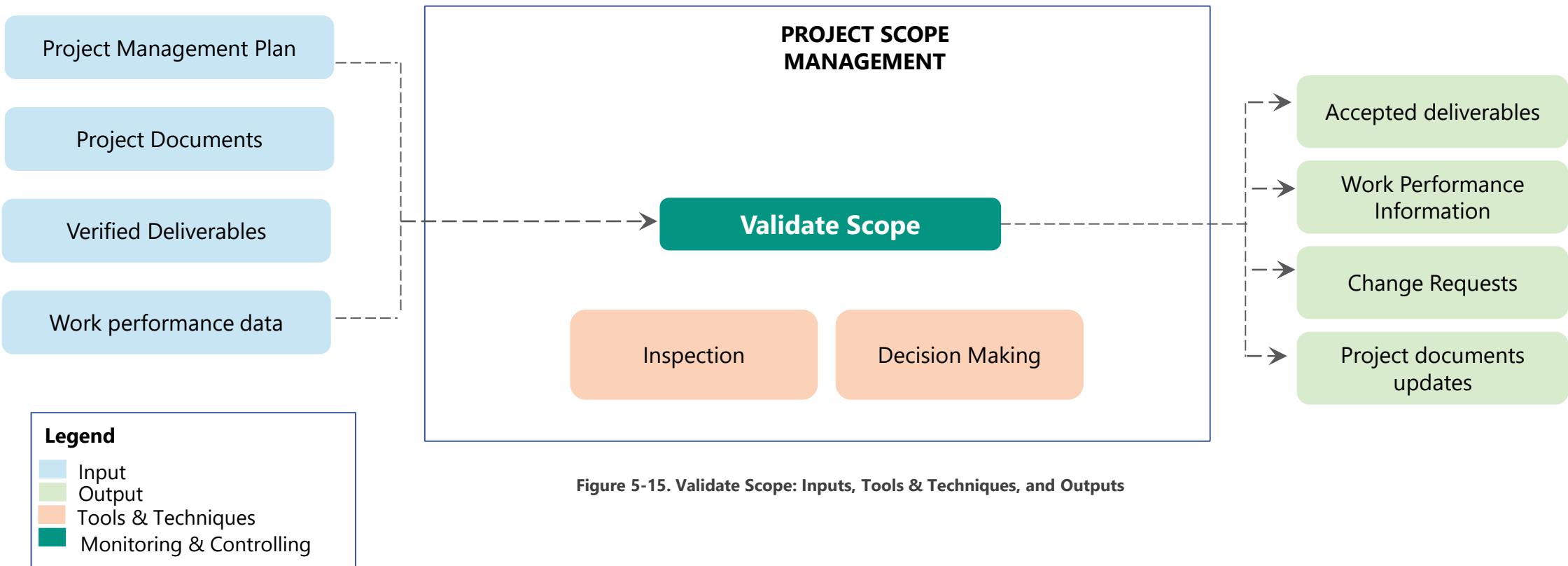


Figure 5-10. Create WBS: Inputs, Tools & Techniques, and Outputs

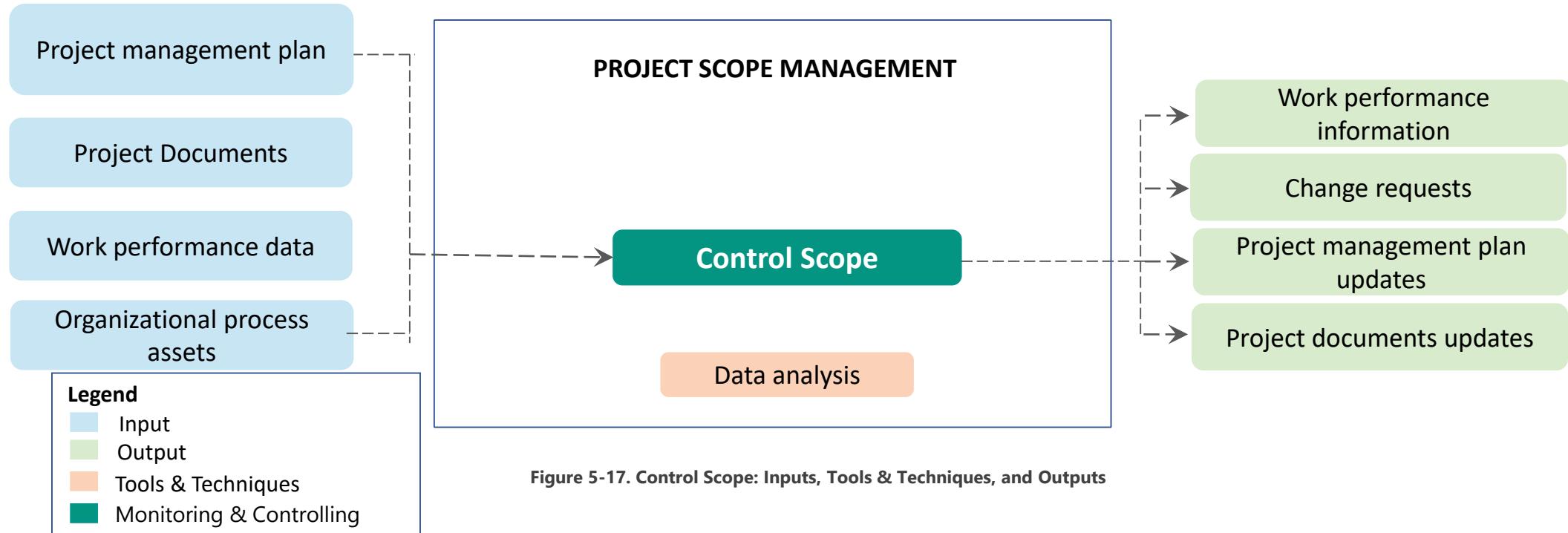
Validate Scope

"Validate Scope is the process of formalizing acceptance of the completed project deliverables." It belongs to the Monitoring and Controlling Process Group.



Control Scope

"Control Scope is the process of monitoring the status of the project and product scope and managing changes to the scope baseline." It belongs to the Monitoring and Controlling Process Group.



Understand the creation of WBS to answer concept-based questions.

Important Outputs

Given below are important outputs from Project Scope Management:

Work Performance Information

The performance data collected from controlling processes, analysed in comparison with project management plan components, project documents and other work performance information. Work performance data becomes work performance information after the tools and techniques of a process have been applied.

Accepted Deliverables

These are deliverables that have been verified and are ready for validation against the project scope at which point they are accepted.

Change Requests

When validating project scope, new requirements might be discovered, for example, adding an email notification when a password is changed. These requirements should be documented as change requests.

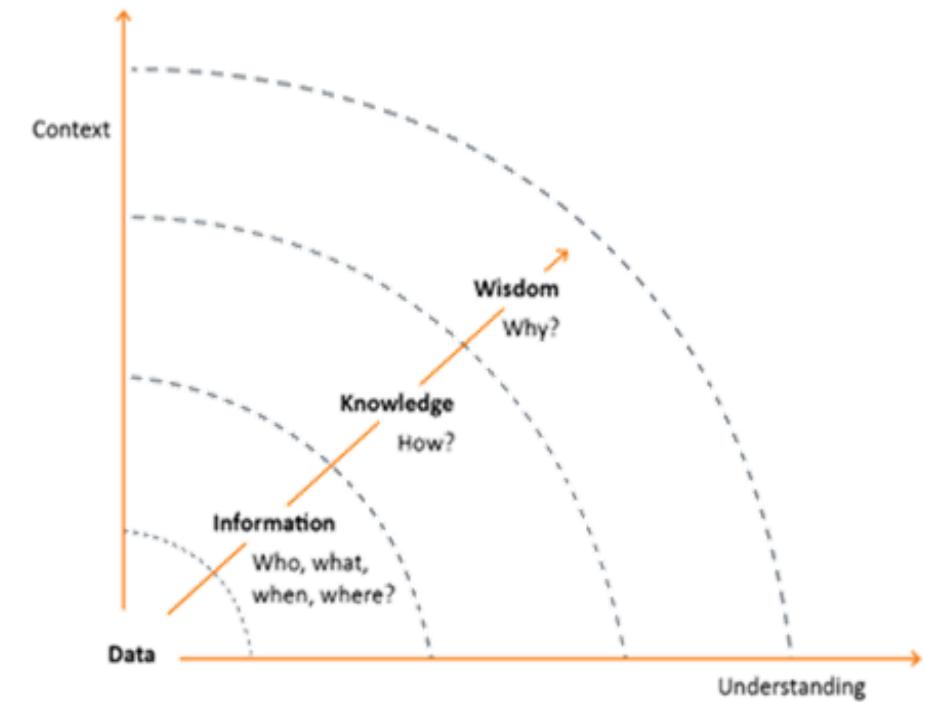
Data–Information–Knowledge–Wisdom

The PMI emphasizes managing project knowledge as an important technique throughout all processes. Existing knowledge and new knowledge are represented as Project Performance Data, which acts as an input to a process and, in turn, produces an output of Project Performance Information.

Data-Information-Knowledge-Wisdom (DIKW) is the heart of knowledge management. Effective sharing of knowledge requires the development and maintenance of data.

Some facts related to DIKW are:

- Data is a set of discrete facts
- Information requires applying meaning or relevance to the set of facts



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Business Scenario: Problem Statement



- Brian, the project manager in a strong-matrix organization, has been leading projects for his company for 10 years.
- The company has made a decision to streamline their operations and create policies and procedures to cultivate a culture that is more centered on driving customer excellence. This shift in mindset is slowly being adapted by company leaders and staff members.
- Brian's current project is 25% complete, ahead of schedule, and currently under budget.
- Every two weeks, Brian schedules meeting with key stakeholders to review the project reports and metrics.
- During the last stakeholder meeting, Brian was asked by one of the key stakeholders to add a new feature to the scope of work in the form of a formal change request.
- This stakeholder has just returned from an industry conference where he gained insight on some advanced technology that would increase the company's competitive position and result in a large increase in market share. How should Brian handle this change request?

Business Scenario: Solution



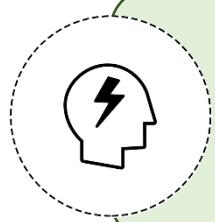
- As this was a formal request by a key stakeholder, Brian should follow the agreed upon Change Request process.
- This would include analyzing the costs and benefits of the proposed request and providing alternatives to minimize the impact to cost and schedule.
- Once this analysis is complete, Brian can present his findings to the Sponsor and Stakeholders for their decision.



Quiz



Quiz



1 In which Project Management Process Group is the project scope defined?

- A ➤ Planning
- B ➤ Initiating
- C ➤ Executing
- D ➤ Monitoring and Controlling

Quiz



1. In which Project Management Process Group is the project scope defined?

- A ➔ Planning
- B ➔ Initiating
- C ➔ Executing
- D ➔ Monitoring and Controlling



The correct answer is: **A**

There are only six processes in scope management. Four are in Planning Process Group and two are in Monitoring and Controlling Process Group. Project scope is defined in Planning Process Group.

Quiz



2. During a project meeting, one of the team members suggests a new feature that customers may like. The project manager says no to this feature, indicating the project should focus on only what is required to complete the project. This is an example of _____.

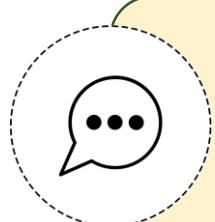
- A ➤ Scope Management
- B ➤ Change Management
- C ➤ Project Management
- D ➤ Quality Management

Quiz



2. During a project meeting, one of the team members suggests a new feature that customers may like. The project manager says no to this feature, indicating the project should focus on only what is required to complete the project. This is an example of _____.

- A ➔ Scope Management
- B ➔ Change Management
- C ➔ Project Management
- D ➔ Quality Management



The correct answer is: **A**

Scope management is about doing only the work needed for the project.

Quiz



3. What is the most important thing that a project manager should ensure during the Validate Scope process?

- A ➔ Accuracy
- B ➔ Timeliness
- C ➔ Acceptance
- D ➔ Completeness

Quiz



3. What is the most important thing that a project manager should ensure during the Validate Scope process?

- A ➔ Accuracy
- B ➔ Timeliness
- C ➔ Acceptance
- D ➔ Completeness



The correct answer is: **C**

Scope validation involves formal acceptance of the work deliverables.

Quiz



4. The WBS for your project has been prepared and distributed to the project team members. When execution begins, which document will provide the detailed descriptions of the WBS elements?

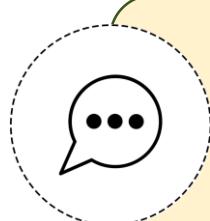
- A ➤ Scope Statement
- B ➤ Project Management Plan
- C ➤ WBS dictionary
- D ➤ Project Statement of Work

Quiz



4. The WBS for your project has been prepared and distributed to the project team members. When execution begins, which document will provide the detailed descriptions of the WBS elements?

- A ➤ Scope Statement
- B ➤ Project Management Plan
- C ➤ WBS dictionary
- D ➤ Project Statement of Work



The correct answer is: **C**

The WBS dictionary provides detailed descriptions about the deliverables listed in the WBS.

Quiz



5. Which of the following is not true regarding subdividing the work in the WBS?

- A ➤ Subdivide until it has a meaningful conclusion
- B ➤ Subdivide until it can be done by a single person
- C ➤ Subdivide until it cannot be logically subdivided further
- D ➤ Subdivide until it can be realistically estimated

Quiz



5. Which of the following is not true regarding subdividing the work in the WBS?

- A ➤ Subdivide until it has a meaningful conclusion
- B ➤ Subdivide until it can be done by a single person
- C ➤ Subdivide until it cannot be logically subdivided further
- D ➤ Subdivide until it can be realistically estimated



The correct answer is: **B**

WBS need not be decomposed until it can be done by a single person.

Quiz



6. Validate scope is the process of formalizing acceptance of the completed project deliverables. When should this process be done?

- A ➤ During quality control
- B ➤ During the planning processes
- C ➤ At the end of each phase of the project
- D ➤ At the end of the project

Quiz



6. Validate scope is the process of formalizing acceptance of the completed project deliverables. When should this process be done?

- A ➤ During quality control
- B ➤ During the planning processes
- C ➤ At the end of each phase of the project
- D ➤ At the end of the project



The correct answer is: **C**

Validate scope is a monitoring and controlling process which can be performed throughout the project. At the end of each phase of the project, you would perform validate scope to achieve the formal acceptance of the completed project deliverables.

Quiz



7. Which are the effective forms of Requirements Gathering documents?

- A ➤ Use Cases
- B ➤ User Stories
- C ➤ Product Backlog Items
- D ➤ All of the above

Quiz



7. Which are the effective forms of Requirements Gathering documents?

- A ➔ Use Cases
- B ➔ User Stories
- C ➔ Product Backlog Items
- D ➔ All of the above



The correct answer is: **D**

Use Cases, User Stories, and Product Backlog Items (PBIs) are all valid forms of requirements. User Stories and PBIs are agile forms of requirements documentation.

Quiz



8. Javed is a project manager for a custom-manufacturing company that has recently completed the testing of a new Bluetooth-enabled digital thermometer. The Quality Assurance team has signed off stating that the product meets requirements and specifications. At which state are the deliverables?

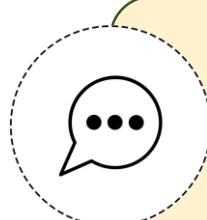
- A ➤ Verified
- B ➤ Accepted
- C ➤ Inspected
- D ➤ Validated

Quiz



8. Javed is a project manager for a custom-manufacturing company that has recently completed the testing of a new Bluetooth-enabled digital thermometer. The Quality Assurance team has signed off stating that the product meets requirements and specifications. At which state are the deliverables?

- A ➔ Verified
- B ➔ Accepted
- C ➔ Inspected
- D ➔ Validated



The correct answer is: **A**

The project deliverables are “verified” and ready for the Scope Validation process, where they will be inspected, validated, and accepted if the users feel they meet requirements and specifications.



Key Takeaways

- ▷ Project Scope Management includes the processes required to ensure that a project includes all and only the work essential to complete the project successfully.
- ▷ Product scope refers to the features and functions that characterize a product, service, or result, while project scope refers to the work that must be performed to deliver a product, service, or result with the specified features and functions.
- ▷ WBS breaks the project scope into smaller and more manageable pieces called work packages
- ▷ WBS dictionary contains the explanation of the terms used in WBS.
- ▷ The six Project Scope Management processes are Plan Scope, Collect Requirements, Define Scope, Create WBS, Validate Scope, and Control Scope.



CAPM® Certification Training Lesson 07: Project Schedule Management

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Objectives

- ▷ Define Project Schedule Management
- ▷ Explain project schedule, Gantt charts, and network diagrams
- ▷ Identify the key terms used in Project Schedule Management
- ▷ Describe the Project Schedule Management processes
- ▷ Explain various schedule network analysis techniques

Project Schedule Management

The definition of *Project Schedule Management is as follows:

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

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



Schedule management plan defines how schedule contingencies will be reported and assessed.

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 173

Project Schedule Management Activities

The key activities of Project Schedule Management are as follows:

Identifying Activities

A list of activities to be included in the project will be identified.

Estimating Time and Resources

Time and resources for each of the identified activities will be estimated.

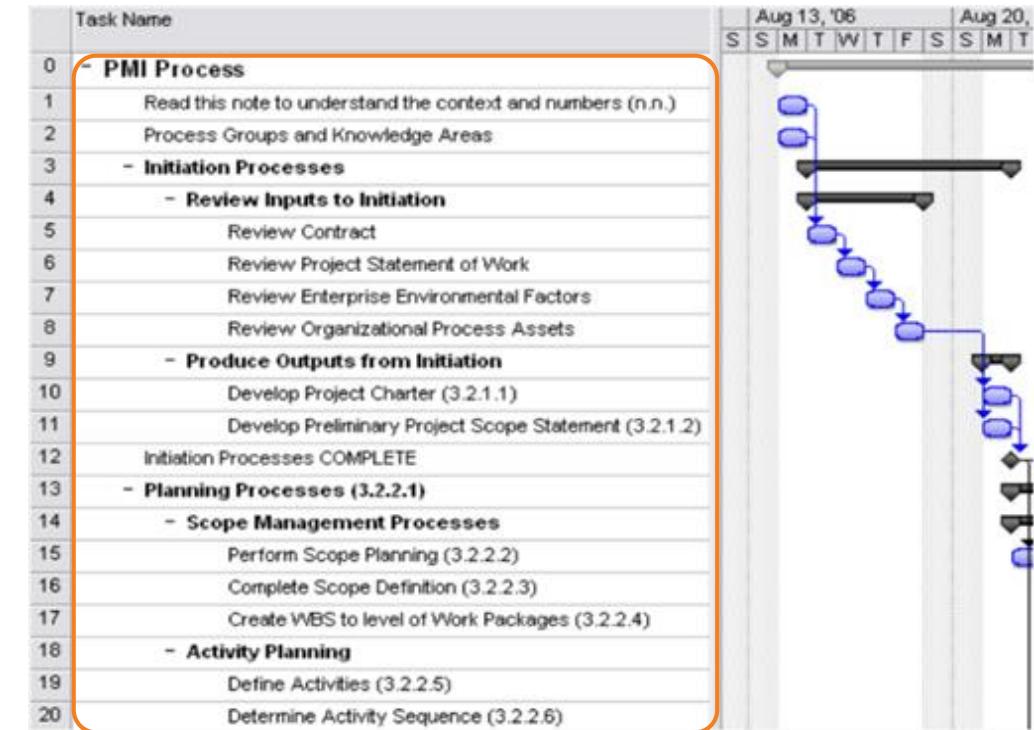
Sequencing Activities

All the activities will be sequenced as per the dependencies.

Project Schedule

Project schedule assigns a duration to the project activities, and the activities are sequenced in a logical order.

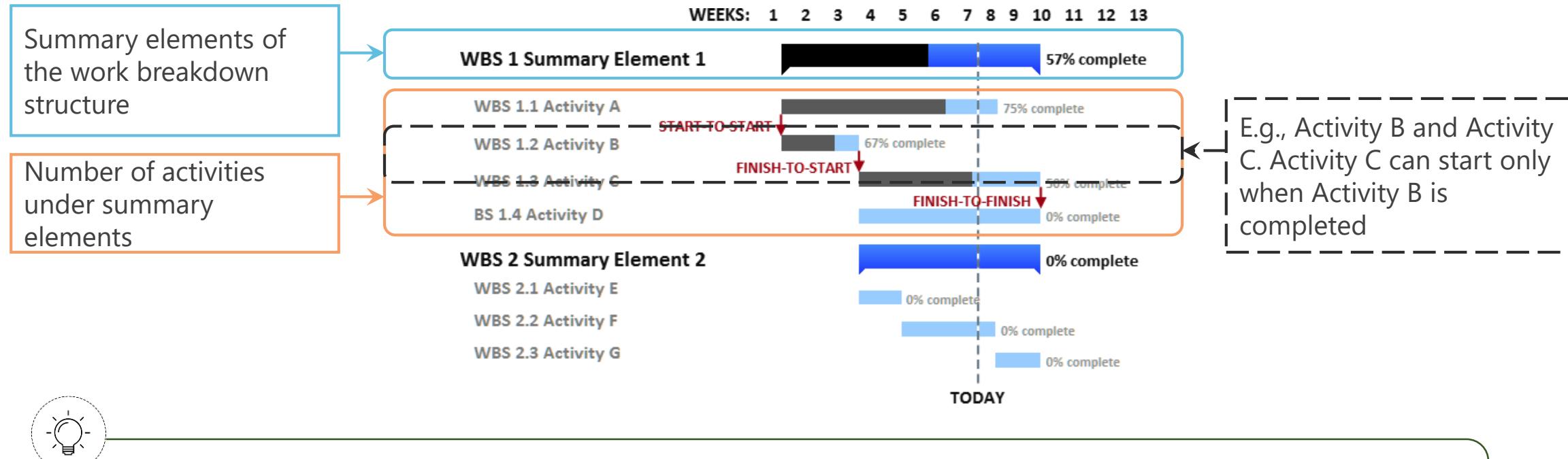
- Project schedule defines the start and end dates of the project and its activities.
- Each task is assigned a resource, duration, and, when appropriate, a predecessor task.
- Scheduling software is used to develop the project schedule. Microsoft Project is the most popular tool used for project schedule development.



A project management plan is not a project schedule. It is more comprehensive and contains various project related plans such as risk management plan, cost management plan, etc. It may also include a schedule.

Gantt Chart

Gantt chart is a type of bar chart that displays the start and end dates for project activities and the overall project schedule. They can also show logical task relationships and indicate the task completion percentage.



Create tasks and work with the Gantt chart. Each task has a duration, and the Gantt chart facilitates a graphical representation of the overall project schedule, with path to completion.

Gantt Chart: Relationships

Project activities are related to each other. The relationships among project activities can be classified as follows:

Finish to Start

An activity must finish before the next activity can start.



Finish to Finish

An activity must finish before the next activity can finish.



Start to Start

An activity must start before the next activity can start.



Start to Finish

An activity must start before the next activity can finish.



Charts are generally laid out with finish-start and then time/resource adjusted by changing the relationship of tasks (start-start, finish-finish, start-finish)

Gantt Chart Relationships: Examples

Finish to Start

An activity that cannot be started until its predecessor is completed. For example, the foundation for a building cannot be poured until it has been excavated.

Finish to Finish

An activity must finish before the next activity can finish. For example, an old system must be retired before a new system can go into production.

Start to Start

An activity must start before the next activity can start. For example, the project request must be submitted before work can start on the project charter.

Start to Finish

An activity must start before the next activity can finish. For example, billing for a service must be started until the service task can be finished.

Gantt Chart: Dependencies

Dependency suggests that the project activities are interdependent. Dependencies can be classified as follows:

Classification 1

Mandatory Dependencies

These dependencies are inherent in the nature of the work and cannot be passed by.
Example: The foundation of a civil structure must be laid before working on pillars and slabs.

Discretionary Dependencies

These dependencies are based on the preference of the team and can be changed if required.
Example: Painting activities can be started only after all the electrical and plumbing work is done.

Classification 2

External Dependencies

These dependencies involve an external entity that may impact the project.
Example: Approval by a government authority for the structural design of a building.

Internal Dependencies

These dependencies are within the control of project team.
Example: Commencement of the slab work depends on the availability of ready-mix concrete.

Network Diagram

Network diagram is used to plot the activity dependencies. Project activities are represented in the form of a network. Network diagrams can be drawn in one of the following two ways:

Precedence Diagramming Model (PDM) or Activity on Node (AON)

In precedence diagramming model:

- Boxes represent activities
- Arrows indicate dependencies
- Relationships can be of four types:
 - Finish to Start
 - Start to Start
 - Finish to Finish
 - Start to Finish

Arrow Diagramming Model (ADM) or Activity on Arrow (AOA)

In arrow diagramming model:

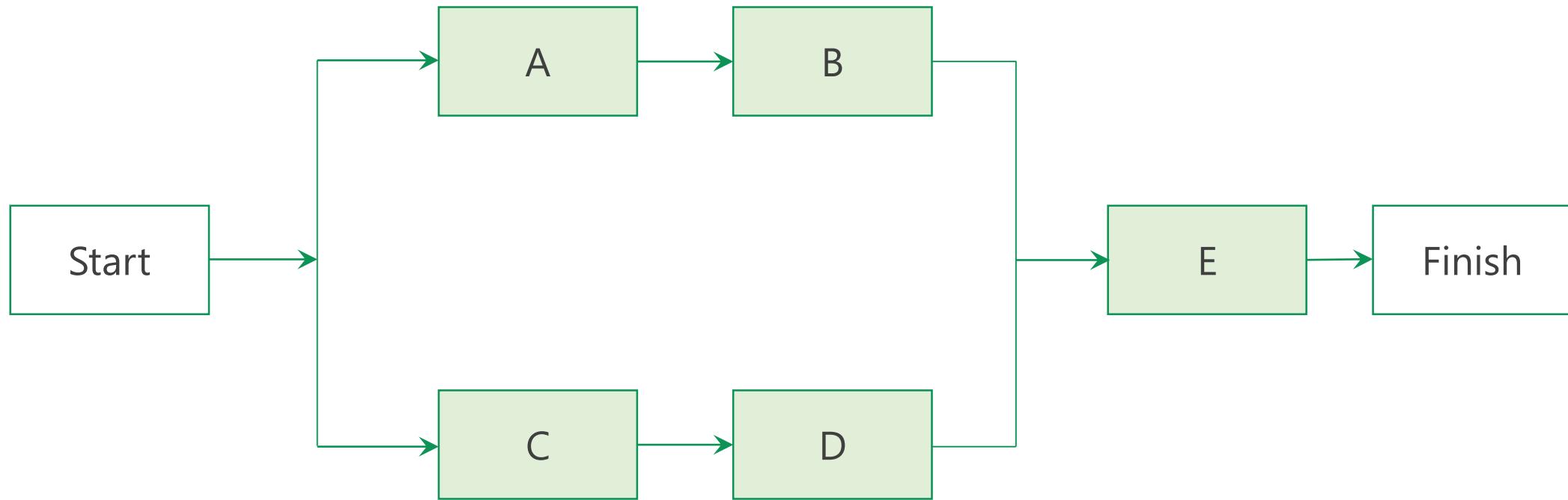
- Arrows are used to represent activities
- Direction of the arrows indicates the relationships and sequences
- Only Finish to Start relationships can be shown
- Dummy activities may be required to show a dependency



There may be questions in the PMP exam based on the Network diagram. So create and work with diagram network diagrams to ensure that you understand the value. This will make answering questions based on Network diagram easier.

Network Diagram: Example

Given below is an Activity on Node diagram:



Hammock activities are used to show a comprehensive summary activity, which can be used for control and reporting purposes.

Key Terms

Given below are the key terms used in Project Schedule Management:

Leads and Lags

A successor activity is said to have a lead when it can start before the predecessor.

Example: Activity B can start 2 days before the completion of activity A.

A successor activity is said to have a lag when it needs to be delayed with respect to the predecessor.

Example: Activity B can start 2 days AFTER activity A is completed.

*Rolling Wave Planning

Rolling wave planning is an iterative planning technique in which the work to be accomplished in the near term is planned in detail while the work in the future is planned at a higher level. It is a form of **progressive elaboration**.

Analogous Estimating

This estimating is based on data from previous projects (or activities). For example, if the last 5 similar projects took 6 months, this one will also take 6 months.

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 698

Key Terms

Given below are the key terms used in Project Schedule Management:

Parametric Estimating

This uses a mathematical model to calculate projected times for an activity based on historical records from the previous projects and other information.

*Effort

Effort is the total amount of work required to complete the activity.

*Duration

Duration is the calendar (elapsed) time required to complete an activity.

Example: An activity requires 10 people to work for 5 days; total effort is 50 person days, and duration is 5 days.

*Decomposition

Decomposition is the technique of breaking a task into smaller pieces.

Note: Decomposition should continue until there is no further value from decomposing the task further or until it can be estimated accurately.

Project Schedule Management Processes

Knowledge Areas		Project Integration Management	Project Scope Management	Project Schedule Management	Project Cost Management	Project Quality Management	Project Resource Management	Project Communications Management	Project Risk Management	Project Procurement Management	Project Stakeholder Management
Project Management Process Groups	Initiating	4.1 Develop Project Charter									13.1 Identify Stakeholders
	Planning	4.2 Develop Project Management Plan	5.1 Plan Scope Management	6.1 Plan Schedule Management	7.1 Plan Cost Management	8.1 Plan Quality Management	9.1 Plan Resource Management	10.1 Plan Communications Management	11.1 Plan Risk Management	12.1 Plan Procurement Management	13.2 Plan Stakeholder Engagement
	Executing	4.3 Direct and Manage Project Work				8.2 Manage Quality	9.3 Acquire Resources	10.2 Manage Communications	11.6 Implement Risk Response	12.2 Conduct Procurements	13.3 Manage Stakeholder Engagement
	Monitoring and Controlling	4.5 Monitor and Control Project Work	5.5 Validate Scope	6.6 Control Schedule	7.4 Control Costs	8.3 Control Quality	9.6 Control Resource	10.3 Monitor Communications	11.7 Monitor Risks	12.3 Control Procurements	13.4 Monitor Stakeholder Engagements
	Closing	4.7 Close Project or Phase									

Plan Schedule Management

"Plan Schedule Management is the process of establishing the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule." It belongs to the Planning Process Group.

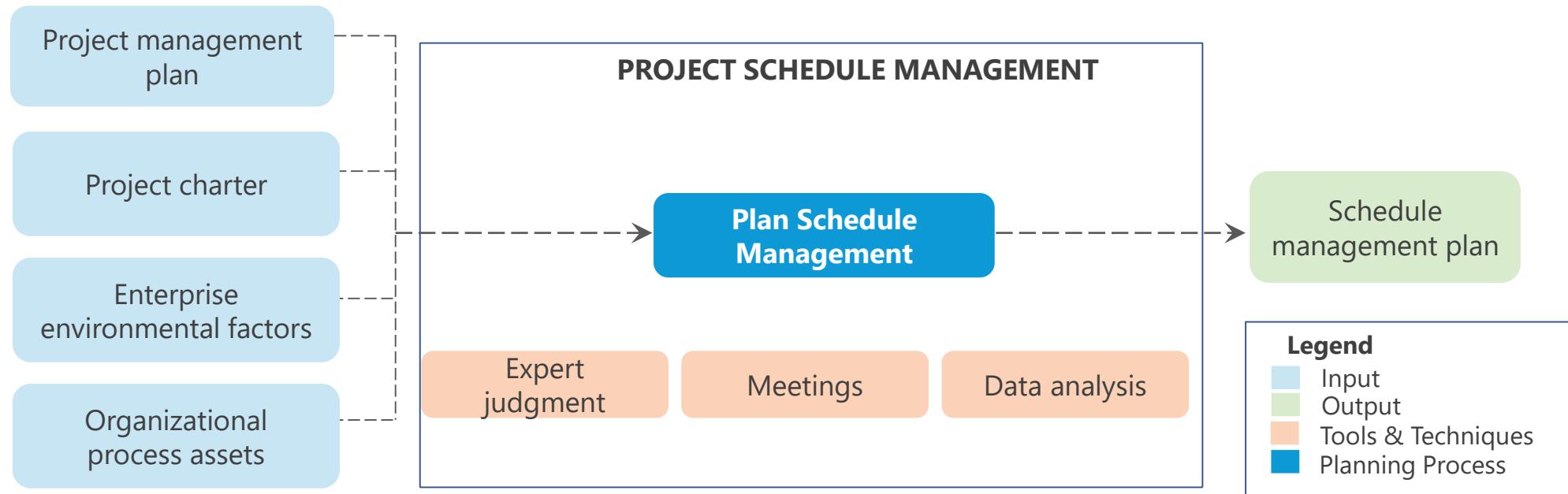


Figure 6-3. Plan Schedule Management: Inputs, Tools & Techniques, and Outputs

Define Activities

"Define Activities is the process of identifying and documenting the specific actions to be performed to produce the project deliverables." It belongs to the Planning Process Group.

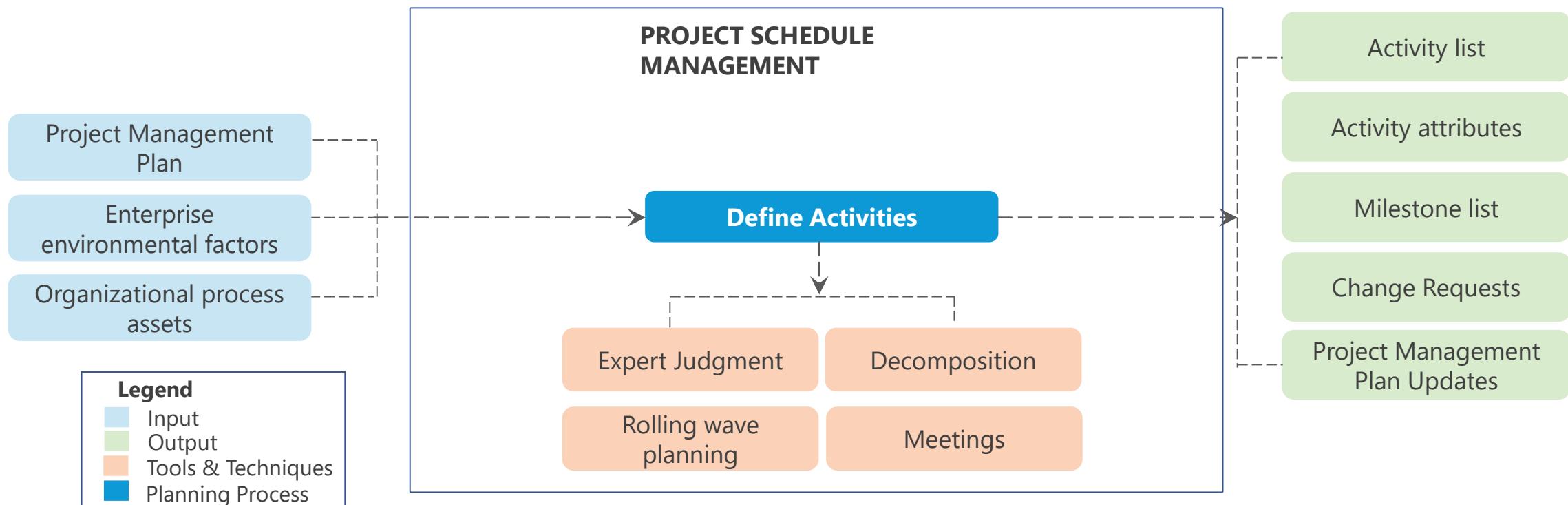


Figure 6-5. Define Activities: Inputs, Tools & Techniques, and Outputs

Sequence Activities

"Sequence Activities is the process of identifying and documenting relationships among the project activities." It belongs to the Planning Process Group.

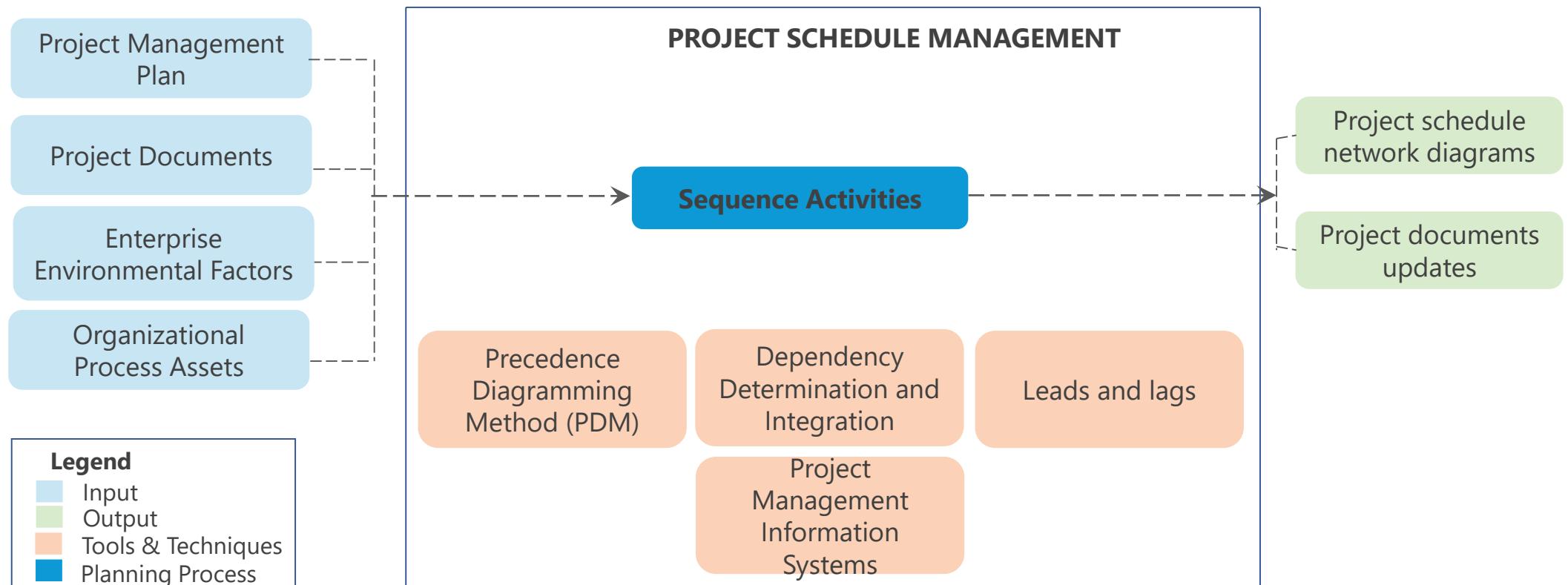


Figure 6-7. Sequence Activities: Inputs, Tools & Techniques, and Outputs

Estimate Activity Durations

"Estimate Activity Durations is the process of estimating the number of work periods needed to complete individual activities with estimated resources. The key benefit of this process is that it provides the amount of time each activity will take to complete, which is a major input into the Develop Schedule process." It belongs to the Planning Process Group.

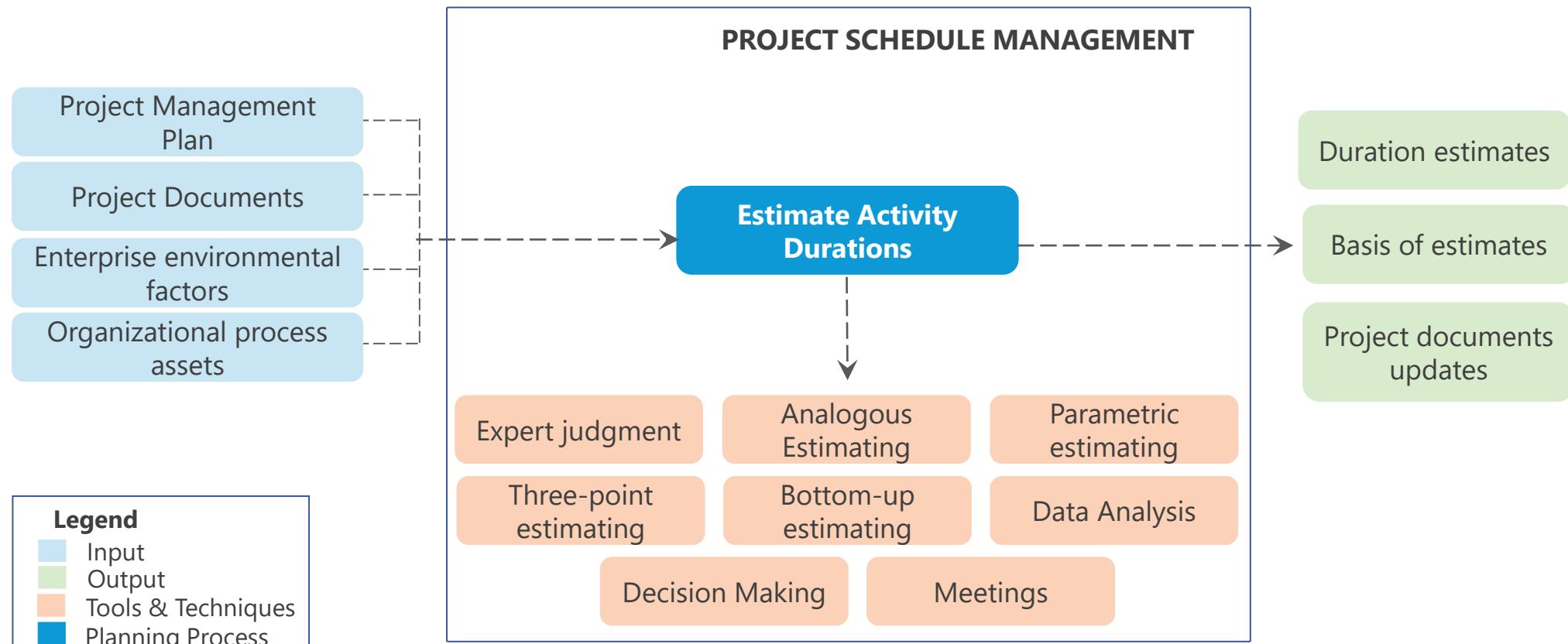


Figure 6-12. Estimate Activity Durations: Inputs, Tools & Techniques, and Outputs

Business Scenario: Problem Statement



Jan, the EVP of the manufacturing division, has commissioned Jack to lead a project initiative in her area of responsibility because of his attention to detail. Jack is working with his team to estimate activity durations so they can map out the schedule for the project. After a successful decomposition process of the scope statement of work, Jack is confident in his team's ability to capture the true work effort that needs to be estimated and scheduled.

In reviewing the activities to be estimated, Jack realizes that a large number of the activities could benefit from some historical data and the use of mathematical parameters. This minimizes his estimating risk for 60% of the activities. For the remaining activities, the team is able to research past practices and industry standards to come up with a range of estimates based on optimistic, pessimistic, and realistic durations. What approach are Jack and his team likely to take to determine their estimates?

Business Scenario: Solution



Jack and his team have decided to use parametric estimation technique for a large number of activities and have decided to use three-point estimate for the remaining activities. This is also known as PERT.

Develop Schedule

"Develop Schedule is the process of analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model." It belongs to the Planning Process Group.

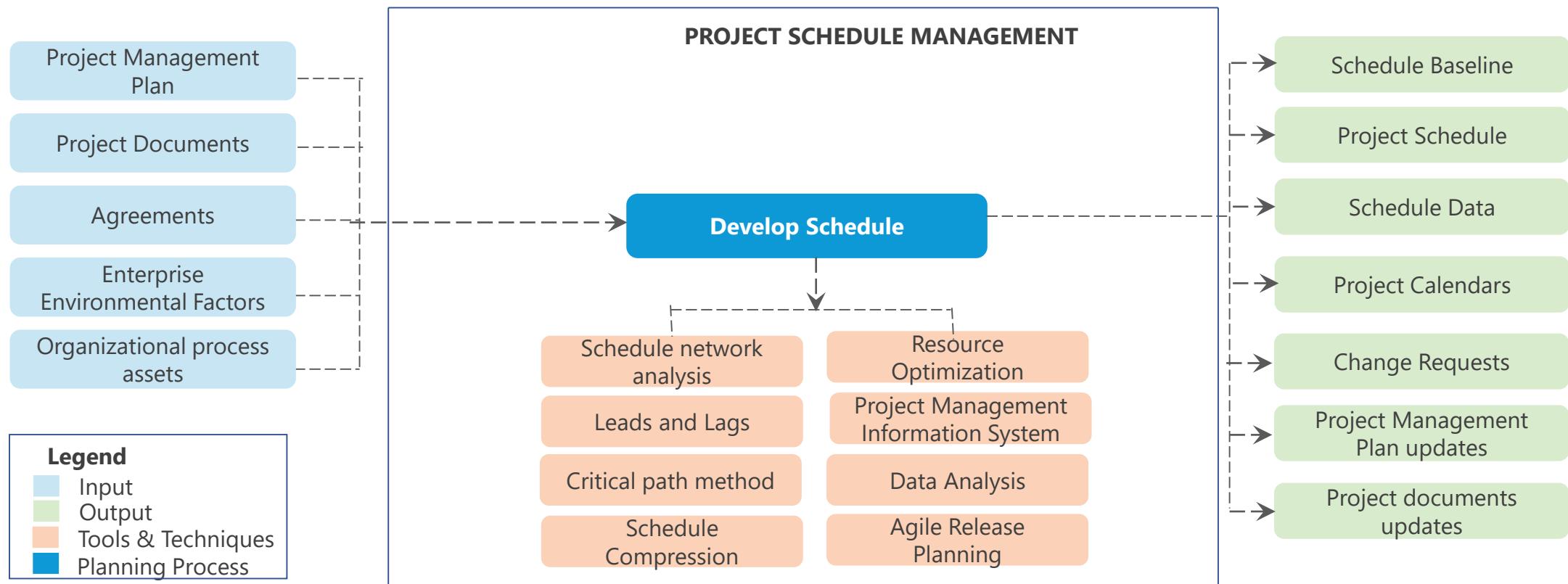


Figure 6-14. Develop Schedule: Inputs, Tools & Techniques, and Outputs

Schedule Network Analysis

Along with the time estimate, it is necessary to know if the required resources are available at a given time.

Schedule network analysis technique generates project schedule. Various schedule network techniques are as follows:

Critical Path Method

It determines a critical path on a project schedule.

Critical Chain Method

Critical chain method is determined based on the resources required to execute project tasks. It reflects delays that occur due to task switching, Parkinson's Law (work grows to fill the available time), and lack of prioritization.

What-If Scenario Analysis

It varies a certain parameter and observes the impact on the schedule.

Resource Optimization Techniques

They arrive at the optimal utilization of the resources used on a project.

Program Evaluation and Review Technique (PERT)

Program Evaluation and Review Technique (PERT) uses three-point estimates for an activity.

- Pessimistic (P) estimate refers to the duration an activity would take in the worst case scenario.
- Most likely (M) estimate refers to the duration an activity would take in a realistic scenario.
- Optimistic (O) estimate represents the duration an activity would take in the best case scenario.

Given below are the key formulae used in PERT:

To calculate the expected duration of the estimate, based on the three estimates

$$(\mu) = (P+4M+O)/6$$

To calculate the standard deviation of an activity

$$(\sigma) = (P-O)/6$$

To calculate the variance of the activity

$$\sigma^2$$



Concept-based questions on PERT can be expected in the exam.

PERT: Example

The values of expected deviation and standard deviation can be applied to derive useful information about the likely range for values.

Given: O = 20; P = 70; M = 30

$$\text{Now, } \mu = (70 + 30 * 4 + 20)/6 = 35$$

$$\text{And } \sigma = (70 - 20)/6 = 8 \text{ (approx.)}$$

Using the normal curve:

Likelihood of actual time lying between:

1 σ , i.e., 27 and 43 is 68.2%

2 σ , i.e., 19 and 51 is 95.4%

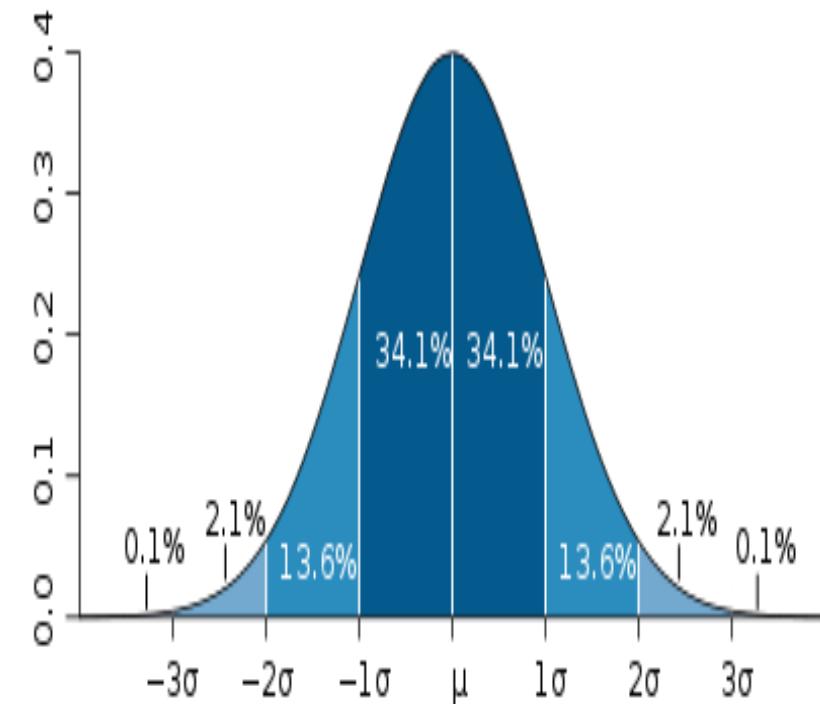
3 σ , i.e., 11 and 59 is 99.7%

Six Sigma:

Six Sigma is reaching a level of confidence where 3.4 times out of a million would fall outside the stated range.



PERT allows you to plan based on the intended level of confidence in the outcome and determine buffers accordingly.



Critical Path Method

Critical path is the longest duration path through a network diagram, which determines the shortest time to complete the project. Float, also called slack, is calculated in a network diagram.

The three types of float are as follows:

*Total Float (Slack)

The amount of time that a schedule activity can be delayed or extended from its early start date without delaying the project finish date or violating a schedule constraint^[7]

*Free Float (Slack)

The amount of time that a schedule activity can be delayed without delaying the early start date of any successor or violating a schedule constraint^[7]

Independent Float (Slack)

The amount of time an activity can be delayed if all the immediate predecessors finish at their latest finish dates and all the immediate successors are to be started on the earliest start dates.



The slack of activities on the critical path is zero (0) as the activities on critical path cannot be delayed.

*Definitions taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 210

Calculation of Float

Steps to calculate float are as follows:

Identify the critical path
of the network

Follow the forward pass
to find early start and
early finish for each
activity

Calculate late finish and late
start using backward pass
method

$$\text{Total Float} = \text{Late Start} - \text{Early Start} \text{ or } \text{Late Finish} - \text{Early Finish}$$

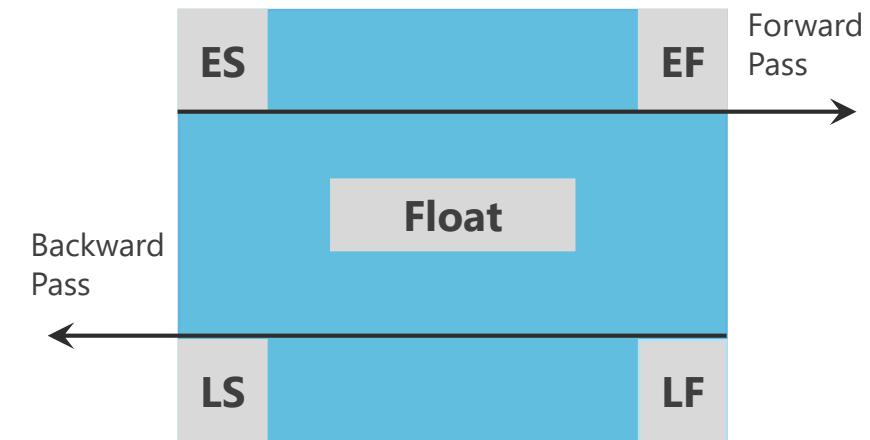


Before the start of exam, please make a note of the total float formula.

Calculation of Float (Contd.)

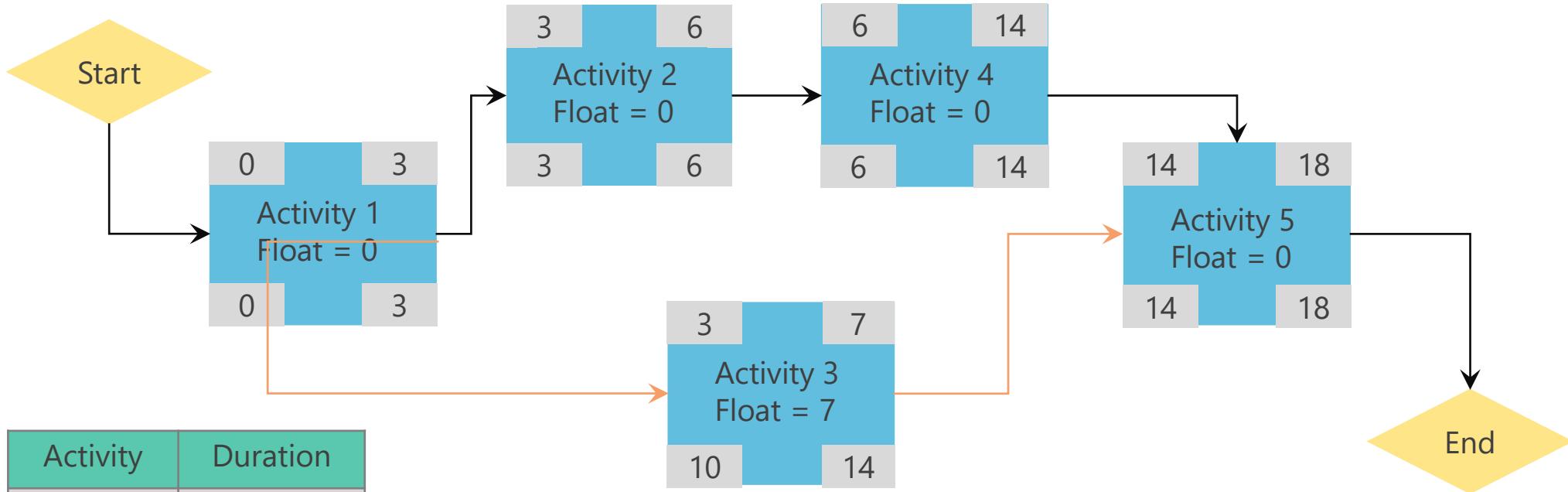
In forward pass, travel through the network starting with time zero and calculate the time required for each activity until the last activity of the project. The starting time of each activity is known as early start (ES) and the end time is known as early finish (EF).

In backward pass, travel through the network from project end date and calculate the time required for each activity. The end date is called the late finish (LF) and start date is called the late start (LS).



Critical Path: Example

Given below is the calculation of a critical path:



Activity	Duration
Activity 1	3
Activity 2	3
Activity 3	4
Activity 4	8
Activity 5	4

Paths	Duration
Start, 1, 2, 4, 5, End	18
Start, 1, 3, 5, End	11

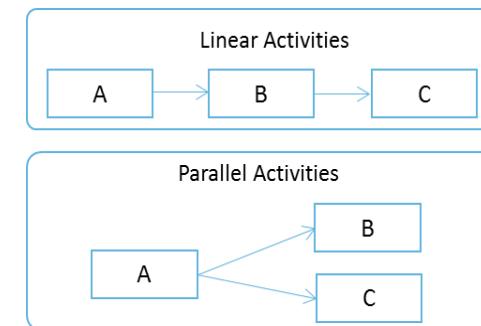
Start, 1, 2, 4, 5, End is the longer (critical) path

Schedule Compression

Schedule compression is done to see if the desired completion date can be met and what will have to change to meet that date. The two techniques of schedule compression are as follows:

Fast Tracking

Linear activities are checked if they can happen in parallel, thereby reducing the project cycle time



Crashing

This involves increasing resources on critical path activities while making cost and schedule tradeoffs. You must determine how to obtain the greatest amount of schedule compression for the least incremental cost while maintaining project scope.



Concept-based questions on schedule compression can be expected in the exam.

Schedule Compression: Example



The table summarizes the project activity details. Which activity would you crash to reduce the project time by 1 day?

Activity	Original Duration (in Days)	Crash Duration (in Days)	Time Savings	Original Cost in Dollars	Crash Cost	Extra Cost	Crash Cost per Day
A	10	8	2	10,000	12,000	2,000	1,000
B	14	10	4	14,000	24,000	10,000	2,500
C	5	4	1	15,000	17,000	2,000	2,000
D	9	7	2	12,000	18,000	6,000	3,000



Activity A, as it has the minimum crash cost per day.

Impact of Schedule Compression

Impact of schedule compression on projects are as follows:

Schedule Compression Technique	General Impact to the Project
Fast track	<ul style="list-style-type: none">• Adds risks• Increases management time for the project manager
Crash	<ul style="list-style-type: none">• Adds costs• Increases management time for the project manager
Reduce scope	<ul style="list-style-type: none">• Saves time and cost• Increases customer dissatisfaction
Cut quality	<ul style="list-style-type: none">• Saves cost and resources• Increases risks
Resource reallocation	<ul style="list-style-type: none">• Does not add cost or increase risks

Other Scheduling Techniques

The techniques used in project scheduling:

What-If Scenario Analysis

In this method, the following questions are asked to produce a realistic schedule:
What if a particular scenario changed on the project? Would that produce a shorter schedule?

Monte Carlo Analysis

In this method, a computer modeling program is used to simulate the outcomes of a project by making use of input values selected at random from probability distributions.

Resource Optimization Technique

In this technique, a resource-limited schedule is produced. Resource optimization results in more stable number of resources used in the project by resource leveling their effort.

Critical Chain Method

Critical chain method is determined based on the resources required to execute project tasks. It reflects delays that occur due to task switching, Parkinson's Law (work grows to fill the available time), and lack of prioritization.

Control Schedule

"Control Schedule is the process of monitoring the status of project activities to update project progress and manage changes to the schedule baseline to achieve the plan." It is part of the Monitoring and Controlling Process Group.

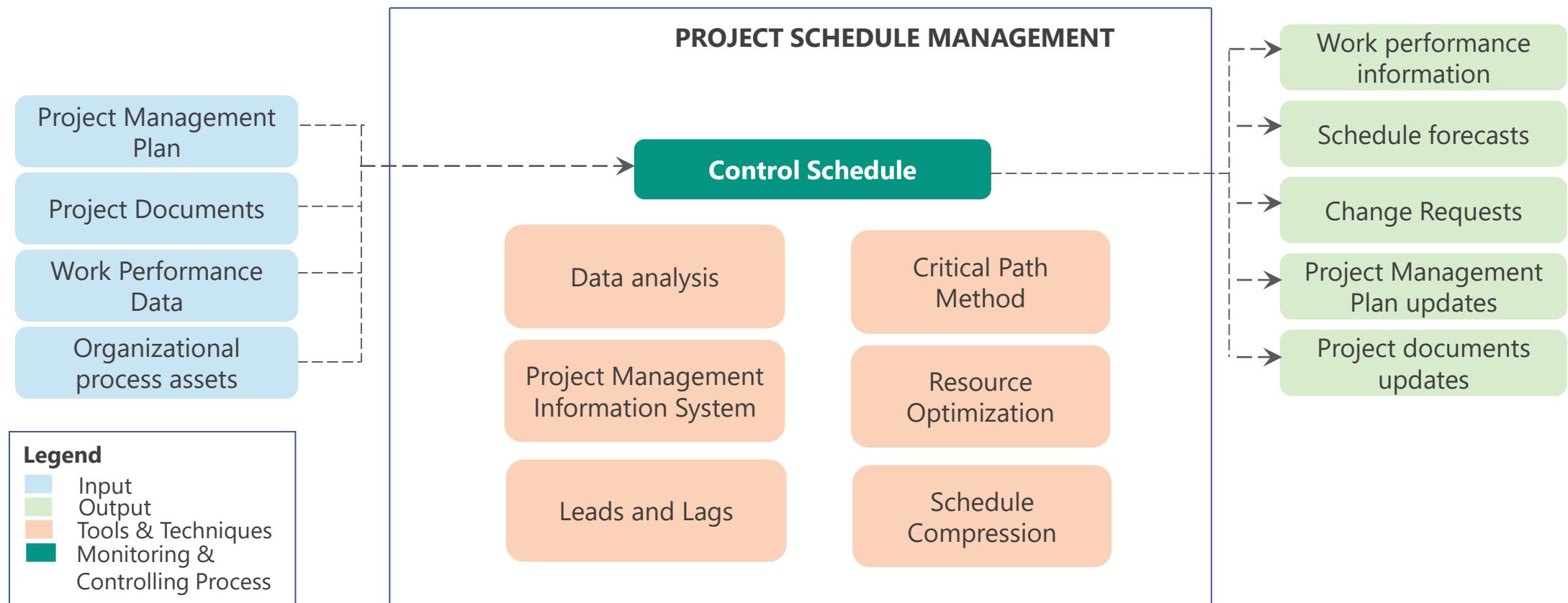


Figure 6-22. Control Schedule: Inputs, Tools & Techniques, and Outputs

Business Scenario: Problem Statement



In one of Janice's project team meetings, her team is reporting the status of their assigned activities defined on the project schedule. About halfway through the meeting, a problem with the schedule is discovered as several activities are behind schedule.

After all the activities for this phase of the project are reported, the overall schedule is determined to be progressing at about 75% of what had been planned. Janice has to figure out how she can get the schedule back on track. How can Janice go about solving this schedule problem?

Business Scenario: Solution



To aid in the decision making process, Janice needs to schedule a follow-up meeting with her team to evaluate the impact of this delay to the triple constraint. The delivery of the scope, budget, and schedule, along with quality expectations, resource availability, and risks, has to be evaluated so that she can present a strategy for correcting the project's schedule delay to the Project Sponsor.

Due to the team's assessment, Janice can make the decision to add additional resources to the scheduled activities on the critical path. Before crashing the critical path, the team can identify a series of sequenced activities that can be re-arranged and completed in parallel to free up more resources that can be re-allocated to the critical path activities. By utilizing these schedule compression techniques, Janice was able to increase the project's productivity rate to 95%.



Quiz



Quiz



1

Your customer wants your project to be completed 10 days earlier than planned. You believe that you can meet the target by overlapping the project activities. What is the approach that you plan to use?

- A ➤ Concurrent Engineering
- B ➤ Crashing
- C ➤ Resource Leveling
- D ➤ Fast Tracking

Quiz



1

Your customer wants your project to be completed 10 days earlier than planned. You believe that you can meet the target by overlapping the project activities. What is the approach that you plan to use?

- A ➤ Concurrent Engineering
- B ➤ Crashing
- C ➤ Resource Leveling
- D ➤ Fast Tracking



The correct answer is: **D**

Overlapping of activities implies taking activities that would otherwise be executed sequentially and executing them by introducing parallelism. This is referred to as fast tracking.

Quiz



2

You are managing a project to build a multi-storey complex in your city. You are waiting for the clearance to start construction of the building. A dependency that originates outside of the project is called _____.

- A ➤ External Dependency
- B ➤ Mandatory Dependency
- C ➤ Discretionary dependency
- D ➤ Internal Dependency

Quiz



2

You are managing a project to build a multi-storey complex in your city. You are waiting for the clearance to start construction of the building. A dependency that originates outside of the project is called _____.

- A ➔ External Dependency
- B ➔ Mandatory Dependency
- C ➔ Discretionary dependency
- D ➔ Internal Dependency



The correct answer is: **A**

This is an example of an external dependency that involves relationships between the project and non-project activities that are outside the control of a project manager.

Quiz



3

Which of the following is the best action to take to complete a project one week ahead of schedule?

- A ➤ Inform customer that critical path does not allow early completion
- B ➤ Motivate the team to work hard and check the status next month
- C ➤ Meet the team and look for options for crashing or fast tracking the critical path
- D ➤ Consult project sponsor

Quiz



3

Which of the following is the best action to take to complete a project one week ahead of schedule?

- A ➤ Inform customer that critical path does not allow early completion
- B ➤ Motivate the team to work hard and check the status next month
- C ➤ Meet the team and look for options for crashing or fast tracking the critical path
- D ➤ Consult project sponsor



The correct answer is: C

You should first seek to understand what the best course of action is. Also, when it comes to schedule compression, crashing and fast tracking are the two main options. The project sponsor would approve the actions after your team develops them.

Quiz



4

A project team is working on the network diagram of a project and wants to determine the float of a project activity. Which of the following is the correct formula?

- A ▶ Late Finish-Early finish (LF-EF)
- B ▶ Late Finish-Early finish (LF-EF) or Late Start-Early Start (LS-ES)
- C ▶ Late Start-Early Start (LS-ES)
- D ▶ Late Finish-Late Start (LF-LS)

Quiz



4

A project team is working on the network diagram of a project and wants to determine the float of a project activity. Which of the following is the correct formula?

- A ➤ Late Finish-Early finish (LF-EF)
- B ➤ Late Finish-Early finish (LF-EF) or Late Start-Early Start (LS-ES)
- C ➤ Late Start-Early Start (LS-ES)
- D ➤ Late Finish-Late Start (LF-LS)



The correct answer is: **B**

Float is calculated by subtracting either the Early Finish (EF) from the Late Finish (LF) or the Early Start (ES) from the Late Start (LS). Float for an activity = LS-ES or LF-EF.

Quiz



5

The project manager, along with his team, has defined the dependencies among the activities and estimated their durations and the resources required to work on them. He is now in the process of creating the project schedule. All of the following tools and techniques will assist him in creating the project schedule, except _____.

- A ➤ Resource leveling
- B ➤ Schedule compression
- C ➤ Critical chain method
- D ➤ Reserve analysis

Quiz



5

The project manager, along with his team, has defined the dependencies among the activities and estimated their durations and the resources required to work on them. He is now in the process of creating the project schedule. All of the following tools and techniques will assist him in creating the project schedule, except _____.

- A ➤ Resource leveling
- B ➤ Schedule compression
- C ➤ Critical chain method
- D ➤ Reserve analysis



The correct answer is: **D**

All of the above stated options, except D, are tools and techniques for the "develop schedule process." Reserve analysis is a tool and technique for "estimate activity durations."

Quiz



6

A summary activity that represents a group of related activities is called _____.

- A ➔ Hanger
- B ➔ Hammock
- C ➔ Float
- D ➔ Milestone

Quiz



6

A summary activity that represents a group of related activities is called _____.

- A ➔ Hanger
- B ➔ Hammock
- C ➔ Float
- D ➔ Milestone



The correct answer is: **B**

Hammock is a summary activity that represents a group of related activities.

Quiz



7

A sequence of tasks within a project schedule that has zero slack is called _____.

- A ➔ Critical Chain
- B ➔ Critical Path
- C ➔ Zero Slack Track
- D ➔ Network Dependency Diagram

Quiz



7

A sequence of tasks within a project schedule that has zero slack is called _____.

- A ➔ Critical Chain
- B ➔ Critical Path
- C ➔ Zero Slack Track
- D ➔ Network Dependency Diagram



The correct answer is: **B**

The Critical Path in a project has zero slack, and any delays on tasks on the critical path will delay the end date of the project.

Quiz



8

Keri is developing a project schedule. She includes a task to order a computer server with complex configurations, which takes 7 days to ship after the order is placed. How should she represent this in her Gannt chart?

- A ➤ She only needs one task for ordering and receiving the part of 7 days.
- B ➤ She should create a task for ordering the part. The task should reflect the time to create the complex order and a milestone to receive the part, with a Start to Finish dependency and a 3 day lag.
- C ➤ She should create a task for ordering the part and another task of seven days to receive it.
- D ➤ This task is too detailed for inclusion in a project schedule based on the principle of decomposition.

Quiz



8 Keri is developing a project schedule. She includes a task to order a computer server with complex configurations, which takes 7 days to ship after the order is placed. How should she represent this in her Gannt chart?

- A ➤ She only needs one task for ordering and receiving the part of 7 days.
- B ➤ She should create a task for ordering the part. The task should reflect the time to create the complex order and a milestone to receive the part, with a Start to Finish dependency and a 3 day lag.
- C ➤ She should create a task for ordering the part and another task of seven days to receive it.
- D ➤ This task is too detailed for inclusion in a project schedule based on the principle of decomposition.



The correct answer is: **B**

The best answer is to create one task and a milestone. The actual effort is creating the server order, which should be created as a task and assigned to a resource. Receiving the server is a milestone, and it should reflect the 7 day shipping duration from the point the task order is complete.



Key Takeaways

- ▷ Project Schedule Management includes the processes required to manage the timely completion of the project.
- ▷ A project schedule defines the start and end dates of the project and the project activities. These activities are assigned a duration and sequenced in a logical order.
- ▷ Gantt charts and network diagrams are used to identify project activities and determine the relationships and dependencies between them.
- ▷ Gantt chart displays the start and end dates of project activities, the overall project schedule, and the logical task relationships, while network diagram is used to plot the activity dependencies.
- ▷ Plan Schedule Management, Define Activities, Sequence Activities, Estimate Activity Durations, Develop Schedule, and Control Schedule are the six processes under Project Schedule Management.
- ▷ Schedule network analysis technique generates project schedule based on the estimates of time and resource requirements.
- ▷



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CAPM® Certification Training

Lesson 08: Project Cost Management

This course is based on the Project Management Institute, *A Guide to the Project Management of Body of Knowledge (PMBOK® Guide)* – Sixth Edition.
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Objectives

- ▷ Define Project Cost Management
- ▷ Differentiate between cost estimation and cost budgeting
- ▷ Explain control accounts
- ▷ Describe the Project Cost Management processes
- ▷ Apply earned value management technique to track project performance
- ▷ Identify key terminologies used in Project Cost Management

Project Cost Management

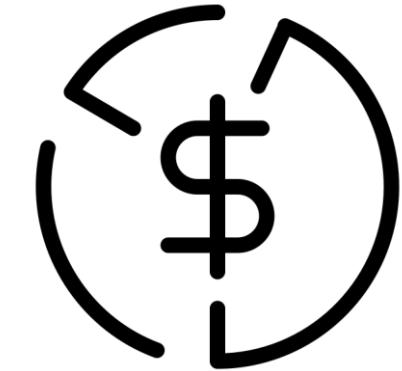
The definition of *Project Cost Management is as follows:

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

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 231

Cost Management Plan

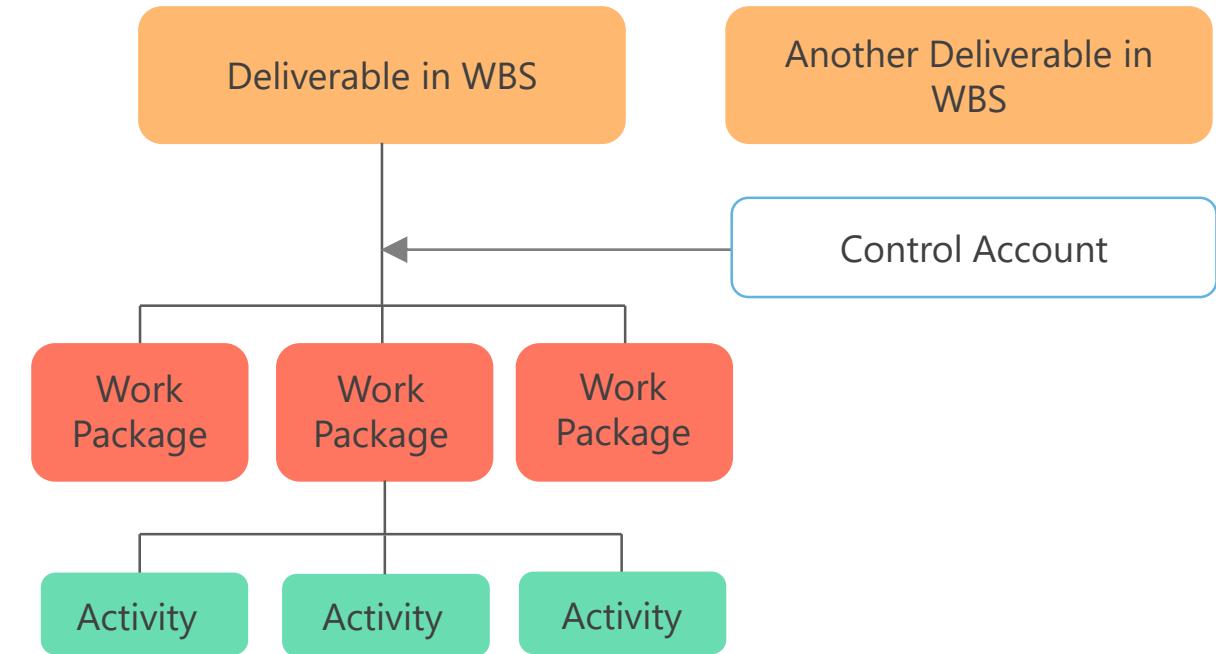
- The Cost Management Plan is concerned with the costs of the resources needed to complete project activities.
- It provides details on how to plan, manage, and control the project cost in relation to the cost baseline and manage the cost variances.
- The project cost management plan is a subsidiary of the project management plan.
- The techniques involved in estimating the cost of each project activity is similar to the ones used in estimating project time.
- Expert judgment, analogous estimating, bottom-up estimating, and reserve analysis are some of the techniques used in cost management.



Control Account

In larger projects, costs are managed at a higher level rather than at an individual activity level. Under control account technique, related activities are grouped and their costs are managed as one unit.

The scope of a project is decomposed through a Work Breakdown Structure (WBS). The lowest level deliverable in the WBS is called a work package.



Project Cost Management Processes

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

Plan Cost Management

"Plan Cost Management is the process of defining how the project costs will be estimated, budgeted, managed, monitored, and controlled." It is part of the Planning Process Group.

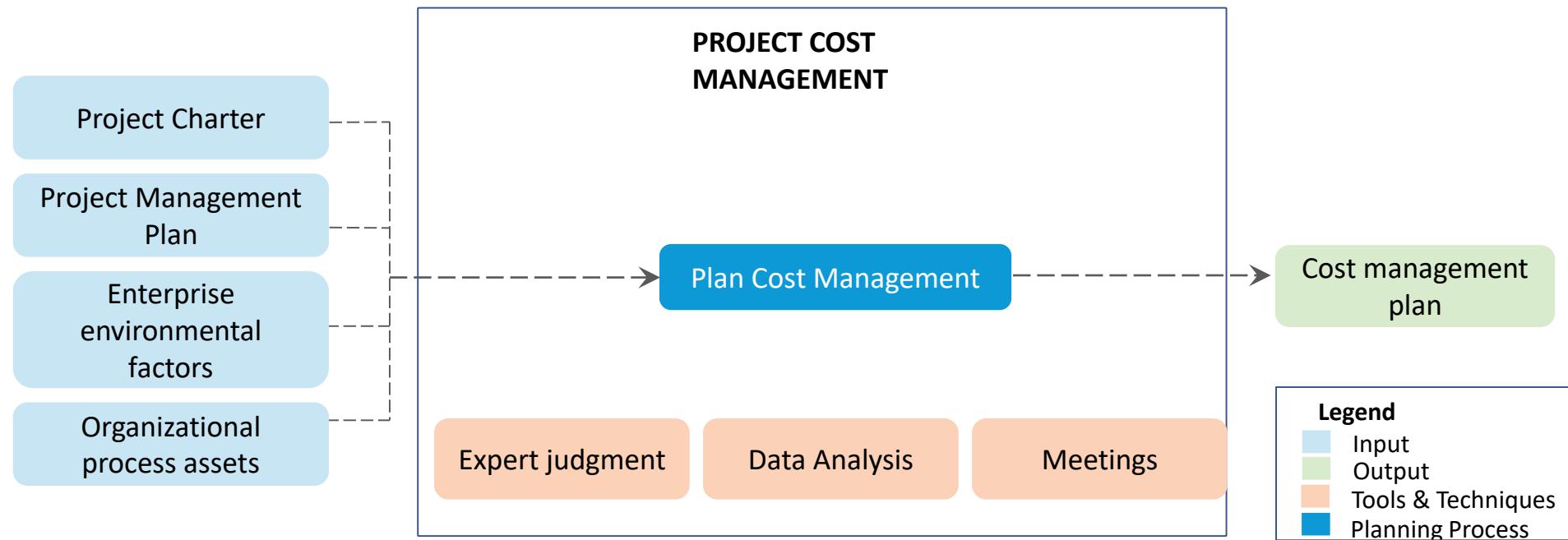


Figure 7-2. Plan Cost Management: Inputs, Tools & Techniques, and Outputs

Estimate Costs

"Estimate Costs is the process of developing an approximation of the cost of resources needed to complete project work." It belongs to the Planning Process Group.

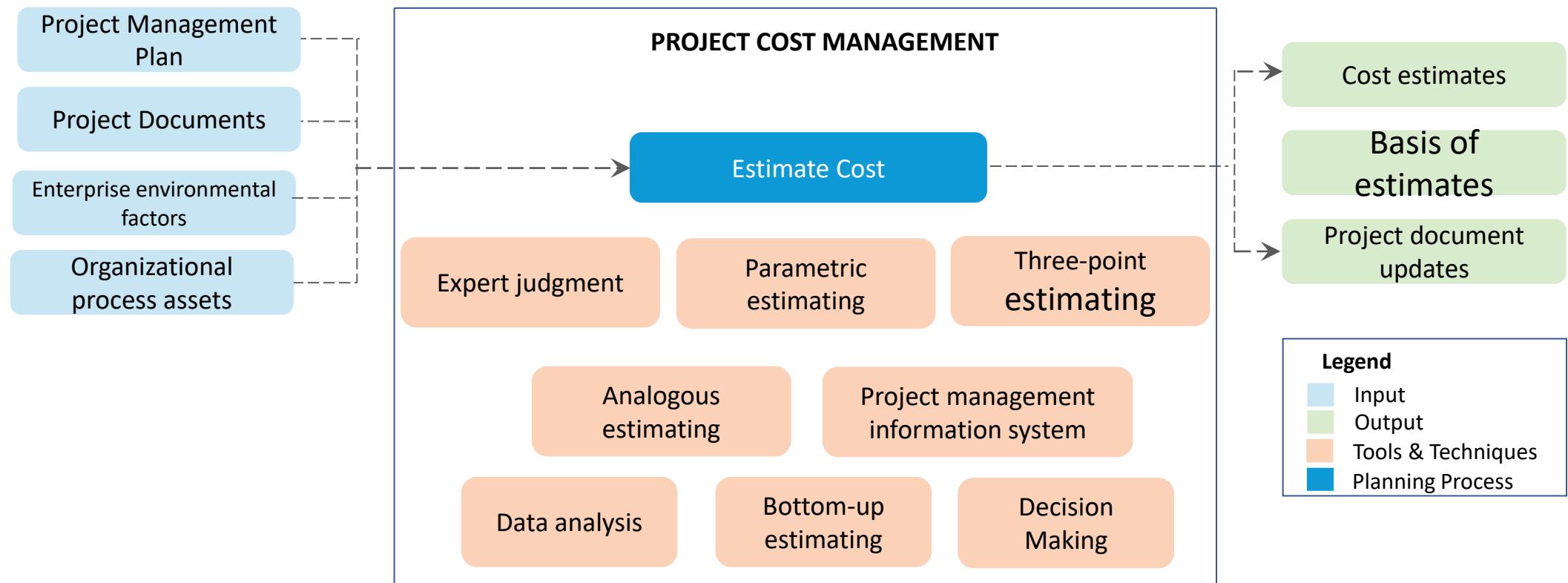
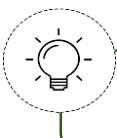
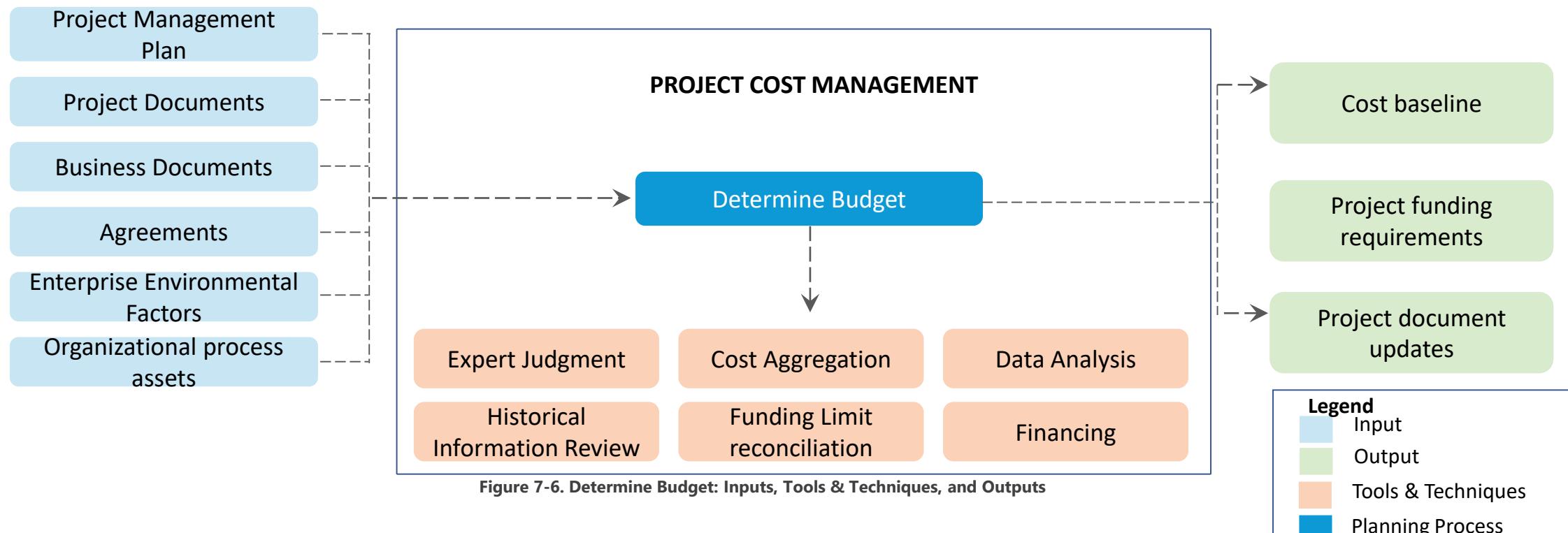


Figure 7-4. Estimate Costs: Inputs, Tools & Techniques, and Outputs

Determine Budget

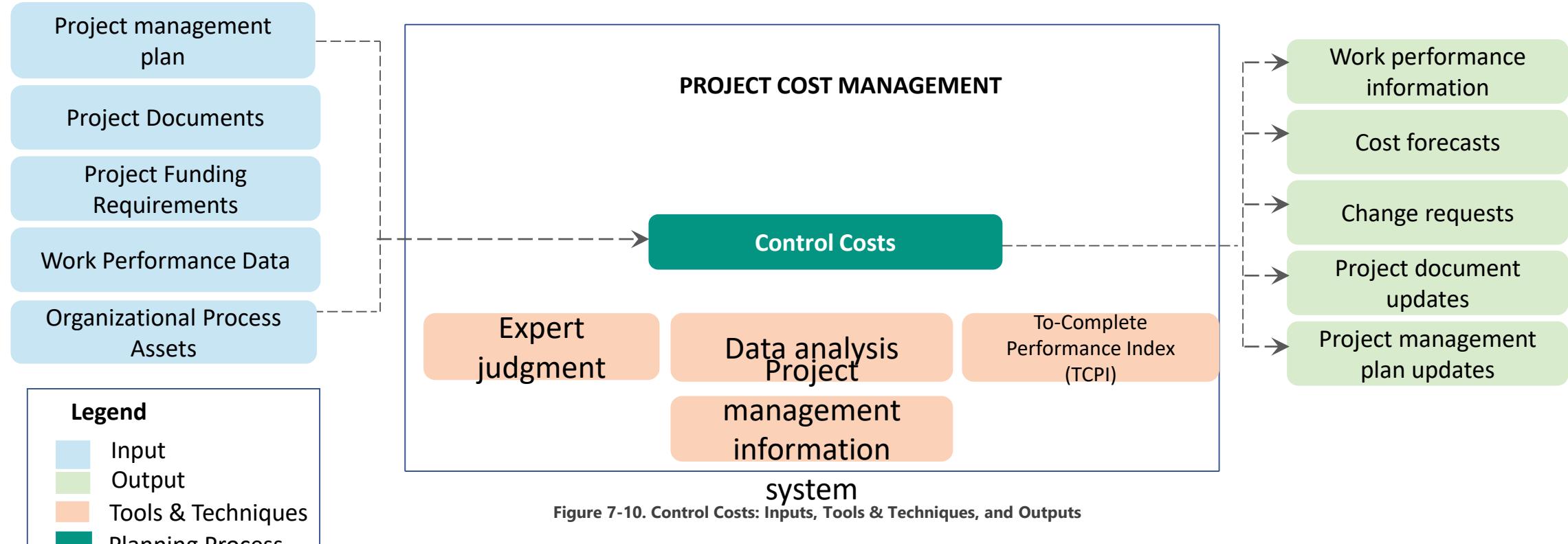
"Determine Budget is the process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline." It is part of the Planning Process Group. The cost baseline includes all authorized budgets but excludes management reserves.



An understanding of how to determine a project budget is important for the PMP exam.

Control Costs

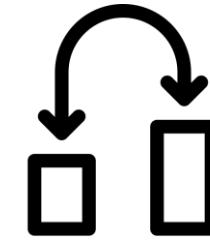
"Control Costs is the process of monitoring the status of the project to update the project costs and managing changes to the cost baseline." It belongs to the Monitoring and Controlling Process Group.



Business scenario based questions on project cost control can be expected in the exam.

Difference Between Planned Value and Earned Value

- Earned value is the total of budget allocated to each of the activities that have been completed at that point of time.
- We can compare the earned value (budget allocated for a specific period of time) to the planned value (the total of all work planned) to determine if the project is on track.



- If the planned value of a project is \$340, then the total of all the work packages planned for the project is \$340.

Earned Value Management

Earned Value Management (EVM) is a method to measure project performance against the project baselines. It results from an earned value analysis and indicates potential deviation of the project from the cost and/or schedule baselines.

The various terms used in earned value are as follows:

Acronym	Term	Explanation
PV	Planned Value	Authorized budget assigned to scheduled work
EV	Earned Value	Work performed in terms of budget authorized for that work
AC	Actual Cost	Actual cost incurred in work performed
BAC	Budget at Completion	Budgeted amount for the total work
EAC	Estimate at Completion	Expected total cost for the project
ETC	Estimate to Complete	Expected cost to finish all the remaining project work
VAC	Variance at Completion	Projected budget surplus or deficit at the end of the project



Questions based on earned value management can be expected in the exam.

Earned Value Formulae

The following table gives the formulae used in EVM and their interpretations:

Term	Formula	Interpretation
Cost Variance (CV)	$EV - AC$	Negative is over budget; positive is under budget
Schedule Variance (SV)	$EV - PV$	Negative is behind schedule; positive is ahead of schedule
Cost Performance Index (CPI)	EV / AC	Worth of work got out of every \$1 spent
Schedule Performance Index (SPI)	EV / PV	Percentage progress made against the planned rate
Estimate at Completion (EAC)	BAC / CPI $AC + (BAC - EV)$ $AC + [(BAC - EV) / (CPI * SPI)]$ $AC + ETC$	Work performed at current CPI Rest of the project at budgeted rate Factoring in both CPI and SPI Reevaluated based on forecast value for ETC
Estimate to complete (ETC)	$EAC - AC$	Amount that the project would cost from the current date to the end of the project
Variance at Completion	$BAC - EAC$	Amount the project would exceed or fall short of the planned budget by the end of the project (over budget or under budget)
To-Complete Performance Index (TCPI)	$(BAC - EV) / (BAC - AC)$ $(BAC - EV) / (EAC - AC)$	For managing to budget For managing to a specified value (EAC)

Business Scenario: Problem Statement



- Cynthia is a subject matter expert and Director of the Store Renovation Department. Because of her expertise and experience in managing store remodels for the corporation, she and her team are the 'go to' people for many project managers.
- Donnell is the Project Manager for one of the stores in the southeast region. Because of the age of the store, it has been classified as a Tier 1 Remodel, meaning it requires more work and a higher budget allocation.
- Donnell has a budget of \$850K to complete the entire schedule that has been defined for the project.
- At the 30% mark of work completed on the project, Donnell's team has spent \$310K.
- What does this tell Donnell about the status of his project? What should he do?

Business Scenario: Solution



- Donnell's project is 30% complete, and has a total budget of \$850K. The earned value at this point is \$255K; however, the actual costs of the project is \$310K. The Cost Performance Index (CPI), EV/AC, is at .82. This means that the project is spending only 82 cents of every dollar productively.
- Donnell is concerned especially as the project has not yet made it to the halfway mark. His previous Tier 1 remodels had a better CPI at this point in the project.
- The project has faced some unexpected events (unknown unknowns), which the team had neither planned for nor anticipated based on past performance. The money allocated in the management reserve is able to cover most of the expenses, but not all.
- After evaluating the root cause of these risk factors, Donnell is able to link the problems to the age of the store and the fact that none of the previous stores completed in the remodel initiative were as old.
- Donnell is asked to reassess the risk and collaborate with their structural engineer to re-evaluate the remaining activities so he can determine a revised budget and an estimate of what is needed to complete remaining activities based on new information.

Earned Value Management: Example 1



A software development project has four phases. Each phase takes a month to complete and is estimated to cost \$10,000 per phase. The phases are planned to be completed one after the other. Given the project status at the end of three months, calculate the CV, SV, CPI, and SPI.

Project Phases	Month 1	Month 2	Month 3	Month 4	Status at the End of Month 3
Requirement Definition	S-----F				Complete, spent \$10,000
Architecture & Design		S-----PF	---F		Complete, spent \$12,000
Development & Unit Testing			S----PF		50% done, spent \$9,000
System Testing & Go Live					Not yet started

Legend

S – Start time

F – Finish time

PF – Partly finished

Earned Value Management: Example 1

Calculation of project cost related attributes are as follows:

Term	Calculation	Value	Interpretation of the Answer
Planned Value (PV)	$\$10,000 + \$10,000 + \$10,000$	\$30,000	By third month, \$30,000 worth of work should have been completed.
Earned Value (EV)	$\$10,000 + \$10,000 + \$5,000$	\$25,000	The accomplished work is worth \$25,000.
Actual Cost (AC)	$\$10,000 + \$12,000 + \$9,000$	\$31,000	The amount actually spent is \$31,000.
Cost Variance (CV)	$\$25,000 - \$31,000$	-\$6,000	The project is over budget by \$6,000.
Schedule Variance (SV)	$\$25,000 - \$30,000$	-\$5,000	The project is behind schedule.
Cost Performance Index (CPI)	$\$25,000 / \$31,000$	0.80	\$0.80 worth is got out of every dollar spent.
Schedule Performance Index (SPI)	$\$25,000 / \$30,000$	0.83	The project is progressing at 83% of the originally planned rate.

Earned Value Management: Example 2



John is managing a three month project to enhance a financial system. He is working on his EVM analysis to report to management on status of project. Calculate the following based on the information given below:

Q1. John is comparing his actuals to the Earned Value of his project. He has finished the first month of his project schedule, and the earned value for his project is \$65,000. The actuals from the financial system are \$57,850. What is the CPI for his project?



CPI is calculated as EV/AC. $CPI = \$65,000/\$57,850 = 1.12$

Earned Value Management: Example 2



John is managing a three month project to enhance a financial system. He is working on his EVM analysis to report to management on status of project. Calculate the following based on the information given below:

Q2. Based on the CPI and a Budget at Completion (BAC) of \$200,000, what is the Estimate at Completion (EAC)?



EAC is calculated as BAC/CPI. $EAC = \$200,000/1.12 = \$178,571$

Earned Value Management: Example 2



John is managing a three month project to enhance a financial system. He is working on his EVM analysis to report to management on status of project. Calculate the following based on the information given below:

Q3. John's management is interested in understanding how much more money is required for the project to be completed. What is the Estimate To Complete (ETC)?



ETC is calculated as EAC - AC. $ETC = \$178,571 - \$57,850 = \$120,721$

Earned Value Management: Example 2



John is managing a three month project to enhance a financial system. He is working on his EVM analysis to report to management on status of project. Calculate the following based on the information given below:

Q4. John also needs to understand how his project is tracking against its schedule. After the first month of work effort, his Planned Value (PV) was \$60,000. What is the SPI for his project?



SPI is calculated as EV/PV. From our previous calculations, EV was \$65,000.

$$\text{SPI} = \$65,000/\$60,000 = \mathbf{1.08}$$

Earned Value Management: Example 2



John is managing a three month project to enhance a financial system. He is working on his EVM analysis to report to management on status of project. Calculate the following based on the information given below:

Q5. John wants to see if the positive SPI of the project will offset the CPI. He decides to rerun his EAC calculations. How can he incorporate both CPI and SPI?



EAC can also be calculated as $AC + [(BAC - EV)/(CPI * SPI)]$. Based on our previous answers we can determine: $\$57,850 + (\$200,000 - \$65,000)/(1.12 * 1.08) = \$169,438.69$

Key Terms



Given below are the key terms related to the cost concept:

Law of diminishing returns

The more you put into something, the less you get out of it

For example: doubling the number of resources working on a project will not necessarily halve the time

Working Capital

The amount of money the company has to invest on the project and the day-to-day company operations

Funding limit reconciliation

The process of comparing the planned expenditure in a given period with the available funding for that period

Key Terms

Given below are the key terms related to the cost concept:

Depreciation

Large assets purchased by the company lose value over time. The two forms of depreciation are straight line depreciation and accelerated depreciation.

Straight line depreciation

The same amount of depreciation is provided for every year for the asset.

For example, a car with a price tag of \$10,000 and a useful life of 10 years is depreciated by \$1,000 every year.

Accelerated depreciation

The asset depreciates faster than the straight line depreciation.

For example, a car with a price tag of \$10,000 depreciates \$3,000 the first year, \$1,500 the second year, \$1,000 the third year, and so on.



Quiz



Quiz



1. If Earned Value (EV) is \$550, Actual Cost (AC) is \$650, and Planned Value (PV) is \$600, what is the Cost Variance (CV)?

- A ➔ -100
- B ➔ +50
- C ➔ -50
- D ➔ +100

Quiz



1. If Earned Value (EV) is \$550, Actual Cost (AC) is \$650, and Planned Value (PV) is \$600, what is the Cost Variance (CV)?

- A ➔ -100
- B ➔ +50
- C ➔ -50
- D ➔ +100



The correct answer is: **A**

Apply the formula $CV = EV - AC$ to get the answer. Note that although PV is provided, it is not used in solving this problem.

Quiz



2. You, as a project manager, are in the process of midway review at the end of the first year of a \$50K project. The earned value analysis shows that the PV is \$25K, the EV is \$20K, and the AC is \$15K. What can be determined from these figures?

- A ➤ The project is behind schedule and over budget
- B ➤ The project is ahead of schedule and under budget
- C ➤ The project is ahead of schedule and over budget
- D ➤ The project is behind schedule and under budget

Quiz



2. You, as a project manager, are in the process of midway review at the end of the first year of a \$50K project. The earned value analysis shows that the PV is \$25K, the EV is \$20K, and the AC is \$15K. What can be determined from these figures?

- A ➤ The project is behind schedule and over budget
- B ➤ The project is ahead of schedule and under budget
- C ➤ The project is ahead of schedule and over budget
- D ➤ The project is behind schedule and under budget



The correct answer is: **D**

$SV = (EV - PV) = \$20K - \$25K = -\$5K$. $CV = (EV - AC) = \$20K - \$15K = \$5K$. Looking at the data, it is evident that the project is behind schedule and is also under budget.

Quiz



3. What does a Cost Performance Index (CPI) of 0.73 mean?

- A ➤ The project would cost 73% more than originally planned
- B ➤ The project would cost 27% more than originally planned
- C ➤ The project would cost 73% less than originally planned
- D ➤ The project is only getting \$0.73 for every \$1 spent

Quiz



3. What does a Cost Performance Index (CPI) of 0.73 mean?

- A ➔ The project would cost 73% more than originally planned
- B ➔ The project would cost 27% more than originally planned
- C ➔ The project would cost 73% less than originally planned
- D ➔ The project is only getting \$0.73 for every \$1 spent



The correct answer is: **D**

CPI = EV/AC, therefore if the CPI is 0.73, it means that the EV is less than the AC.

Quiz



4. What does a Schedule Performance Index (SPI) of 0.67 mean?

- A ➤ You are ahead of schedule by 33%
- B ➤ You are behind schedule by 67%
- C ➤ You are progressing at only 67% of the rate originally planned
- D ➤ You are progressing at only 33% of the rate originally planned

Quiz



4. What does a Schedule Performance Index (SPI) of 0.67 mean?

- A ➤ You are ahead of schedule by 33%
- B ➤ You are behind schedule by 67%
- C ➤ You are progressing at only 67% of the rate originally planned
- D ➤ You are progressing at only 33% of the rate originally planned

The correct answer is: **C**

Since the SPI (SPI = EV/PV) measures all project work, the critical path must also be analyzed to determine whether the project will finish ahead or behind schedule.



Quiz



5. As a project manager, when you present your initial cost estimate to the project sponsor for approval, you are asked to cut the cost of the project by 10%. What would you do?

- A ➤ Replace the originally planned resources with lesser skilled resources at lower rates
- B ➤ Cut specific project activities and obtain the sponsor's approval
- C ➤ Strongly say no to the sponsor and walk away from the project
- D ➤ Ask all the team members to reduce the cost of their activities by 10%

Quiz



5. As a project manager, when you present your initial cost estimate to the project sponsor for approval, you are asked to cut the cost of the project by 10%. What would you do?

- A ➤ Replace the originally planned resources with lesser skilled resources at lower rates
- B ➤ Cut specific project activities and obtain the sponsor's approval
- C ➤ Strongly say no to the sponsor and walk away from the project
- D ➤ Ask all the team members to reduce the cost of their activities by 10%



The correct answer is: **B**

A project manager is responsible for managing cost overruns. If you have estimated cost in a certain way and it's required to be reduced, you should determine the impact of any cost reduction actions. Replacing the originally planned resources with lesser skilled resources is also an option, but the risks associated with this action should be carefully investigated.

Quiz



6. Which of the following is not a tool or technique used in the process of determining budget?

- A ➤ Cost aggregation
- B ➤ Reserve analysis
- C ➤ Funding limit reconciliation
- D ➤ Resource calendars

Quiz



6. Which of the following is not a tool or technique used in the process of determining budget?

- A ➤ Cost aggregation
- B ➤ Reserve analysis
- C ➤ Funding limit reconciliation
- D ➤ Resource calendars



The correct answer is: **D**

All the above tools and techniques, except resource calendars, are used to determine budget process. Resource calendars are an input to this process.

Quiz



7. What is not a valid technique to estimate costs?

- A ➤ Three point estimating
- B ➤ Earned value management
- C ➤ Parametric estimating
- D ➤ Analogous estimating

Quiz



7. What is not a valid technique to estimate costs?

- A ➔ Three point estimating
- B ➔ Earned value management
- C ➔ Parametric estimating
- D ➔ Analogous estimating



The correct answer is: **B**

Earned Value Management is a technique used to Control Costs.

Quiz



8. Peter is a project manager of a large commercial construction project. The cost of concrete has risen substantially as the forecasted economic growth of the region has increased demand. Peter is concerned his project will be over-budget. What should he do?

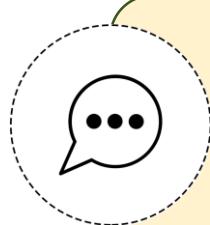
- A ➤ Submit a change request for more budget to cover any potential shortfall
- B ➤ Review the contingency reserve
- C ➤ As this is a result of an external variable, it should not be included in the project budget
- D ➤ Substitute concrete for a cheaper material like wood or plastic

Quiz



8. Peter is a project manager of a large commercial construction project. The cost of concrete has risen substantially as the forecasted economic growth of the region has increased demand. Peter is concerned his project will be over-budget. What should he do?

- A ➤ Submit a change request for more budget to cover any potential shortfall
- B ➤ Review the contingency reserve
- C ➤ As this is a result of an external variable, it should not be included in the project budget
- D ➤ Substitute concrete for a cheaper material like wood or plastic



The correct answer is: **B**

As the increase in concrete costs are a result of forecasted economic growth, this was likely identified as a risk, and an associated contingency was determined. Peter can use these funds now that the risk has materialized.



Key Takeaways

- ▷ Project cost management includes the processes involved in estimating, budgeting, and controlling costs so that the project can be completed within the approved budget.
- ▷ Cost management plan contains details on how to plan, manage, and control the project cost in relation to the cost baseline and manage the cost variances.
- ▷ Cost estimate is an educated guess of how much an activity or a project will cost. Budget considers the cost estimate and accordingly sets aside funds for the completion of the project.
- ▷ Under control account technique, related activities are clubbed and their costs are managed as one unit.
- ▷ The four Project Cost Management processes are Plan Cost Management, Estimate Costs, Determine Budget, and Control Costs.
- ▷ Earned Value Management technique indicates potential deviation of the project from the cost and/or schedule baselines.



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Lesson 09: Project Quality Management

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Objectives

- ▷ Define quality and quality management
- ▷ Differentiate between quality planning, quality assurance, and quality control
- ▷ Explain cost of quality and its categories
- ▷ Describe the Project Quality Management processes
- ▷ Explain the seven basic tools of quality
- ▷ Explain Six Sigma

Quality

In a project, meeting the quality expectation is the responsibility of not only the project manager but everyone involved.

The definition of *Quality is as follows:

Quality is the degree to which a set of inherent characteristics fulfills requirements (ISO 9000).

A project is said to meet quality expectations when all the project requirements agreed in the beginning of the project are met and the resulting product is usable.

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 274

Quality-related Terms

The following terms are related to the concept of quality:

Customer Satisfaction

Conformance to requirements and fitness for use

Grade

Classification based on technical characteristics

Precision

Granularity of measurement; how fine the outcome can be measured

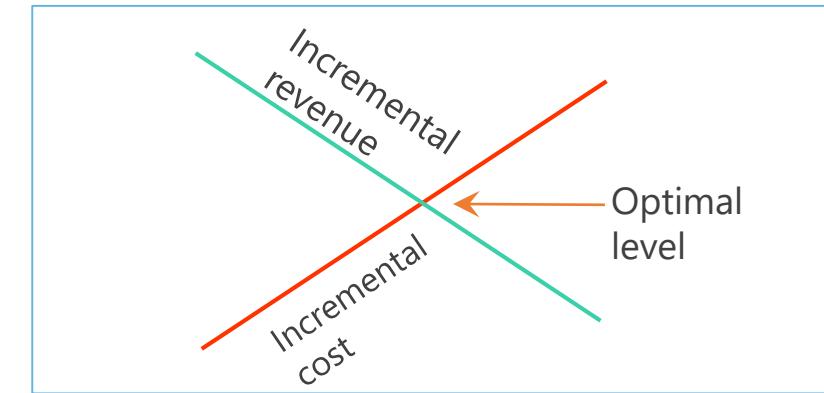
Accuracy

Correctness; being close to the desired value

Optimal Level of Quality

Achieving quality involves cost. Increased efforts and costs can increase the quality of output, but a ceiling on investment on quality has to be fixed.

- The investment on quality is determined by identifying the optimal level of quality of a project.
- Optimal level of quality is achieved when the incremental cost of achieving the quality is equal to the incremental revenue from such improvements.



The sales of a toy manufacturer is at an all-time low because of poor quality. To improve the quality, investments are made on identifying demand, sharing samples, and collecting feedback. Following this, parents are enticed to buy the product. However, the additional investment may increase the cost of the toy, making it prohibitive for the parents to buy. Optimal level of quality is reached at a point where the toy manufacturer gets the maximum number of buyers for the toys manufactured.

Quality Management

Quality management includes creating and following policies and procedures that meet the project's defined quality needs. This is to ensure that the specified approach to quality is implemented on the project. The three key activities of quality management are as follows:

Quality Planning

Quality-related activities of the project are planned

Quality Assurance

Quality assurance is carried out to ensure that a process is followed as per the quality management plan

Quality Control

Periodic checks are conducted to ensure quality improvements

Quality Planning vs. Quality Assurance vs. Quality Control

Basis of Comparison	Scope	Activities	Focus Area
Quality Planning	Determines a plan for quality, defining the standards, templates, policies, and procedures	Involves preparation of the quality management plan	Focuses on information on the level of quality and the methods of achieving it
Quality Assurance	Determines if the project is complying with the organizational (as well as project) policies and procedures	Involves conducting regular process audits to identify deviations from the quality plan and undertake corrective and preventive actions	Focuses on processes and not products
Quality Control	Measures specific project results (product) against standards	Involves inspecting and verifying the project's product, defect repair, and measuring whether the quality indicators are improving	Focuses on product and data

Quality Planning vs. Quality Assurance vs. Quality Control



A project was planned to be completed within plus or minus 10 percent of the budget. Three months ago, the project was over budget by 20 percent. The most recent measurement done one day ago shows budget overrun by 15 percent.

Since there is an improvement of 5 percent, it is quite likely that over the next 3 months the cost would reduce and the project could get completed within the planned limit. If the cost increases further, corrective and preventive actions have to be taken to bring the project within the agreed limits. This is quality control.

Quality Management Concepts

The concepts used in quality management are as follows:



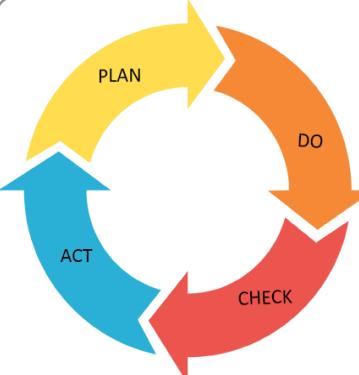
Total Quality Management (TQM)

An integrated management philosophy around quality and continuous improvement



Kaizen (change for better)

A philosophy that looks for small and continuous improvements in a process



Deming Cycle (Plan – Do – Check – Act)

A framework for process control and improvement



Kanban

A pull-based inventory management system based on the principle of just-in-time (JIT)

Cost of Quality

"Cost of quality includes all costs incurred over the life of the product by investment in preventing nonconformance to requirements, appraising the product or service for conformance to requirements, and failing to meet requirements (rework)." Cost of quality can be categorized as follows:

Cost of Conformance

It is the money spent during the project to avoid failures. This can be divided as follows:

- Prevention Costs: Costs to prevent errors and produce quality products
Example: training, documentation, equipment, time to do it right
- Appraisal Costs: Costs to assess the quality
Example: testing, destructive testing loss, and inspections

Cost of Nonconformance

It is the money spent during and after the project because of failures. This can be divided as follows:

- Internal Failure Costs: Costs that occur before the product is released
Example: rework, scrap
- External Failure Costs: Costs incurred after the product is released to the customer
Example: liabilities, warranty, and lost business

Figure 8-5. Cost of Quality



Concept-based questions on cost of quality can be expected in the exam.

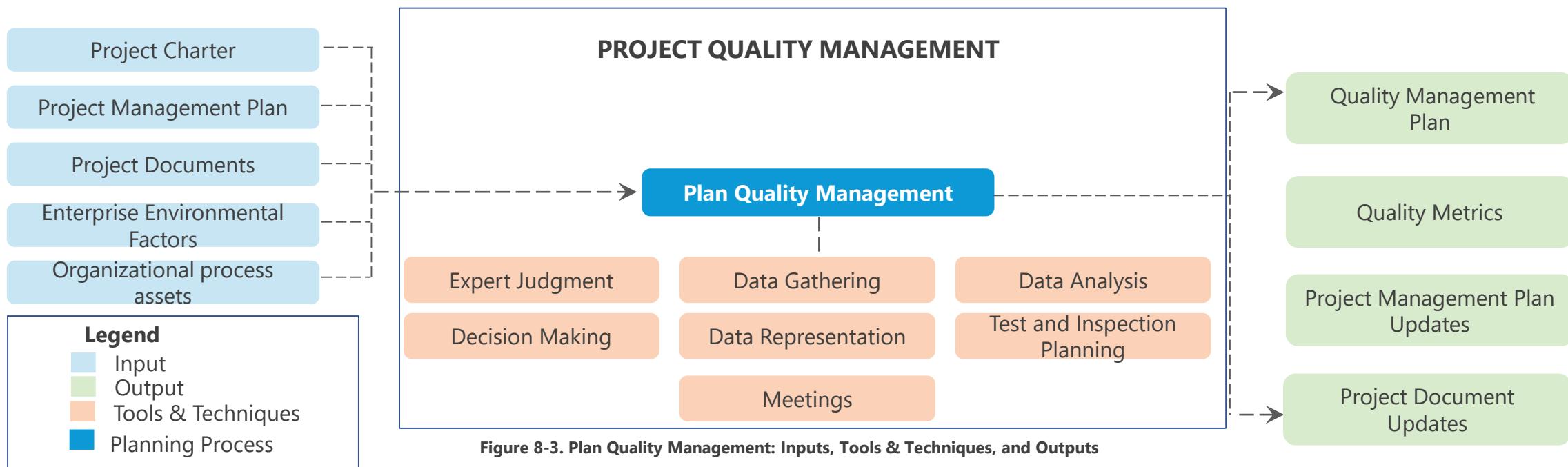
Project Quality Management Processes

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

Table 1-4. Project Management Process Group and Knowledge Area Mapping

Plan Quality Management

"Plan Quality Management is the process of identifying quality requirements and/or standards for the project and its deliverables, and documenting how the project will demonstrate compliance with relevant quality requirements." It is part of the Planning Process Group.



An understanding of planning quality management may be useful while answering the exam.

Manage Quality

"Manage Quality is the process of translating the quality management plan into executable quality activities that incorporate the organization's quality policies into the project." It is part of the Executing Process Group.

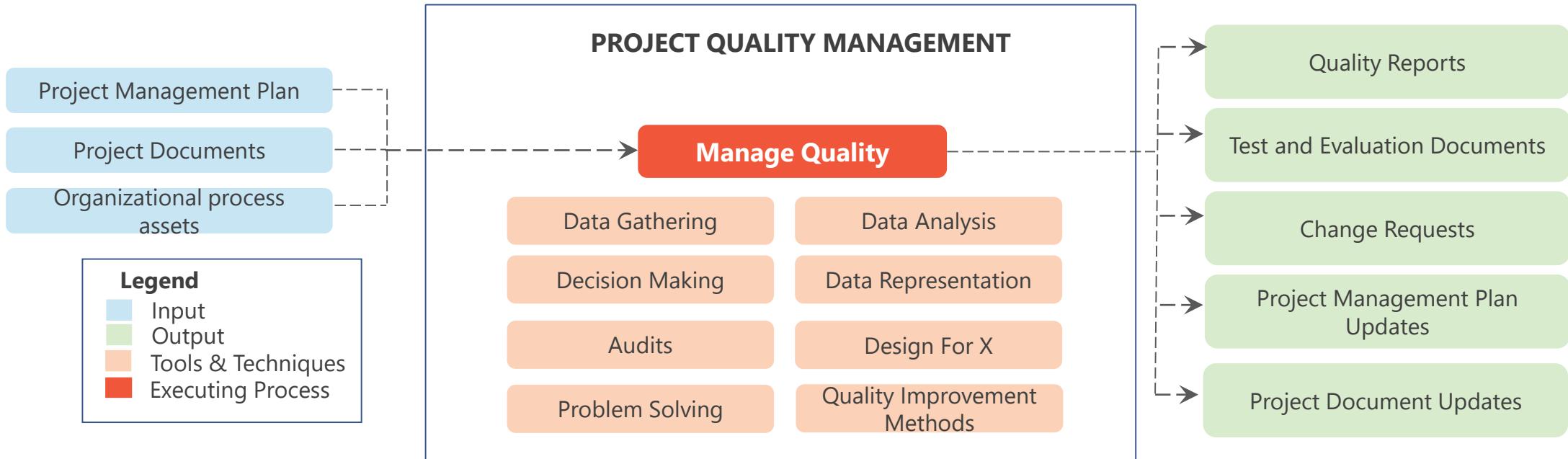


Figure 8-7. Manage Quality: Inputs, Tools & Techniques, and Outputs



Understanding characteristics of quality assurance tools and techniques may be useful while answering the exam.

Control Quality

"Control Quality is the process of monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes." It is part of the Monitoring and Controlling Process Group.

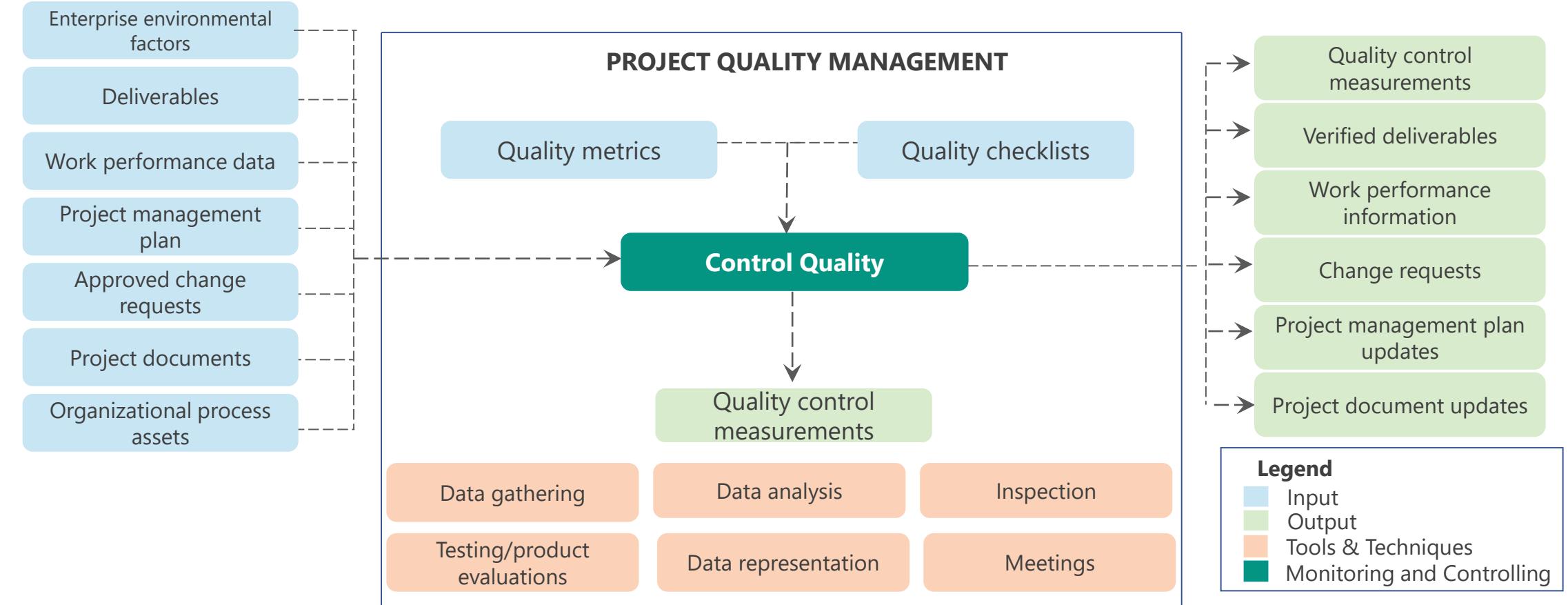


Figure 8-10. Control Quality: Inputs, Tools & Techniques, and Outputs

Business Scenario: Problem Statement



You are a project manager with Ace Engineering Inc. Four months ago, you wrapped up a project that produced an ignition switch for an automotive company's ignition switch redesign. Managing the project went well because your parts consistently met your quality metrics and fitness for use tests and passed all control charts. There was no indication of issues with quality and grade that would prompt a need for change.

During a post-production quality audit, one of your company's test engineers discovers that a key chain with many keys could pull the key out of the ignition, causing a car to stall as it is driving. This could potentially cause serious injury as air bags would not deploy in an accident. Several hundred thousand cars have been sold with the ignition switch manufactured by the automotive company. What should you do?

Business Scenario: Solution



Although you are no longer working on the project, you and your company are still responsible for the outcome of the project to the stakeholders. Therefore, first meet with the sponsor of the project so that the customer can be informed.

In an attempt to minimize nonconformance costs and its impact, a recall of all parts needs to be executed. The team needs to be reassembled to evaluate the failed test and find out the root cause of the failure and its effect by using the fishbone diagram. This will help the team determine how to move forward in terms of corrective action.

Seven Basic Quality Tools

Control Charts

Check Sheets

Cause and Effect Diagram

Seven Basic
Quality Tools

Scatter Diagram

Flowcharting

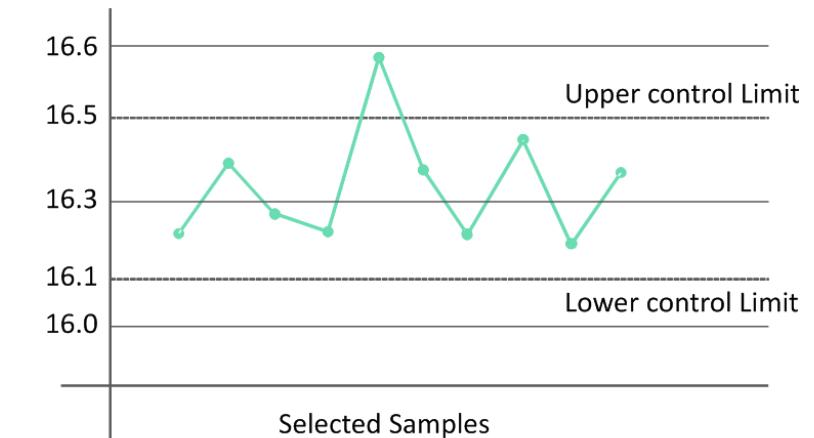
Pareto Diagram

Histogram

Control Charts

Control charts help to determine if a process is within acceptable limit.

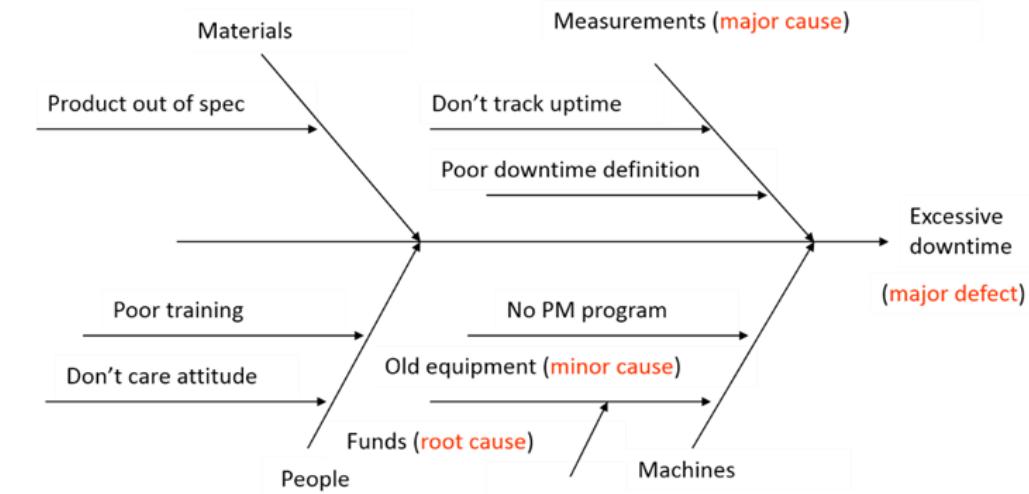
- They are useful to monitor project performance in terms of cost or schedule variance.
- Upper and lower control limits have to be set and the actual schedule variation over time has to be plotted.
- If the values are within the control limits, the project is on track.
- If the schedule variance goes out of these limits, project is out of control and investigations and corrective actions need to be done.



Cause and Effect Diagram

Cause and effect diagram is also called the fishbone or Ishikawa diagram.

- It is used in both quality planning and control.
- It is used to organize thoughts or ideas and to identify the root cause of a problem.
- To draw a fishbone diagram, first identify the reasons at a broad level and then try to find specific reasons under each category.

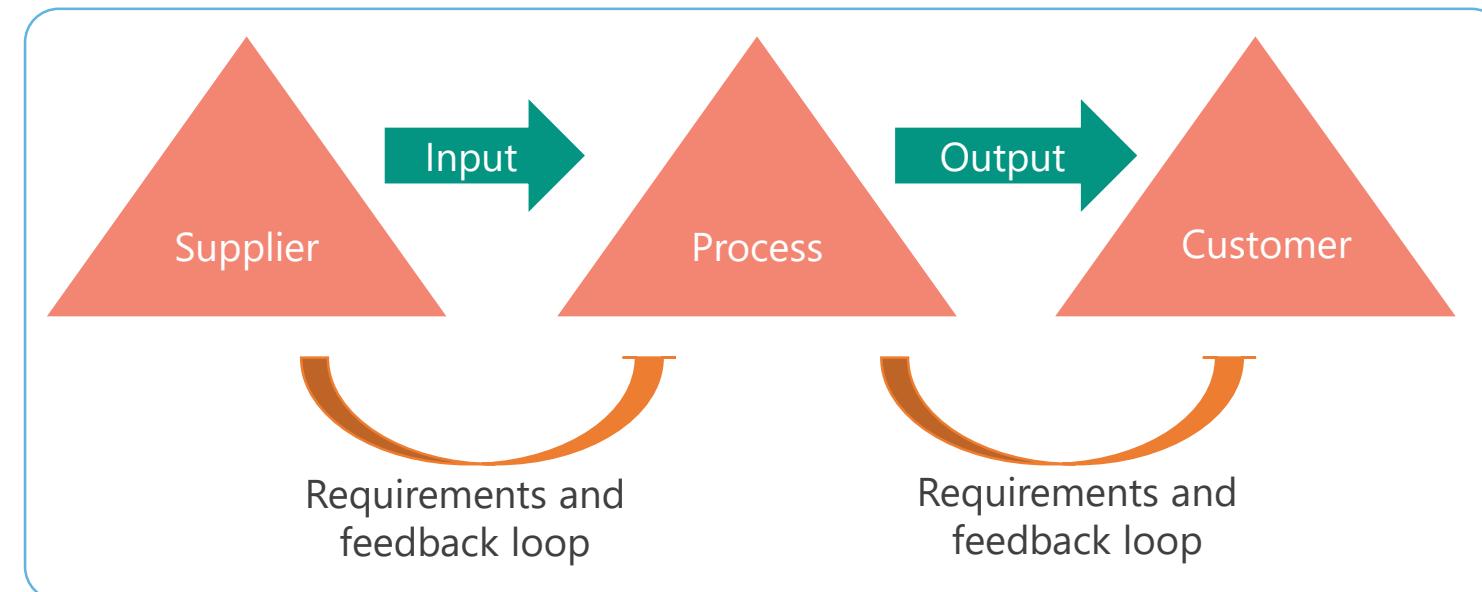


Practice cause and effect diagram for various business scenarios. This will be useful while answering questions based on cause and effect diagram.

Flowcharting

Flowcharts are graphical representations that show how a process or system flows from beginning to end and how the elements interrelate.

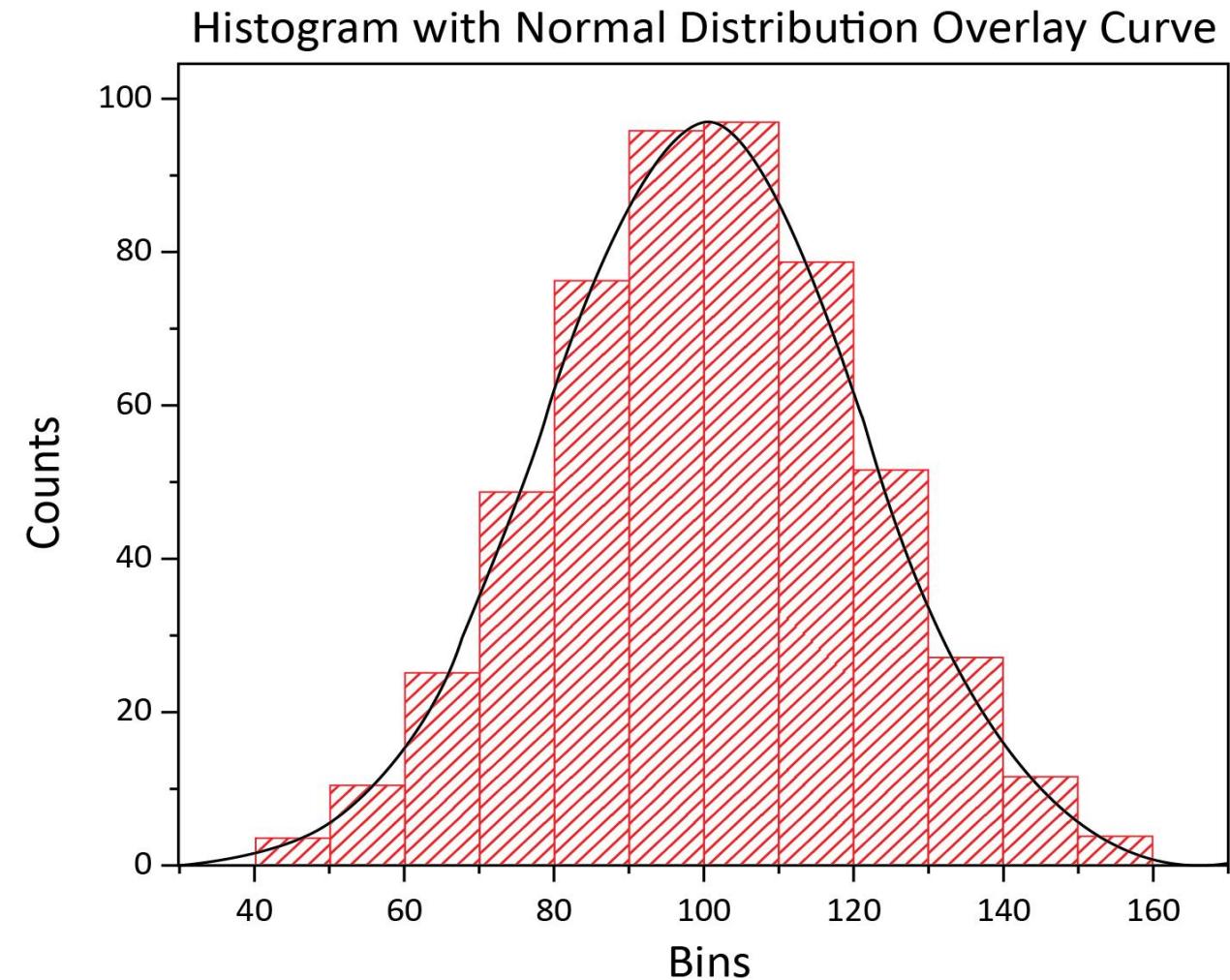
- They represent the process and help analyze where the problems occur.
- They are used to identify redundancies and bottlenecks.



Histogram

Histogram is a vertical bar chart showing the frequency of occurrence of a particular variable.

The height of each column represents the relative frequency of the variable.

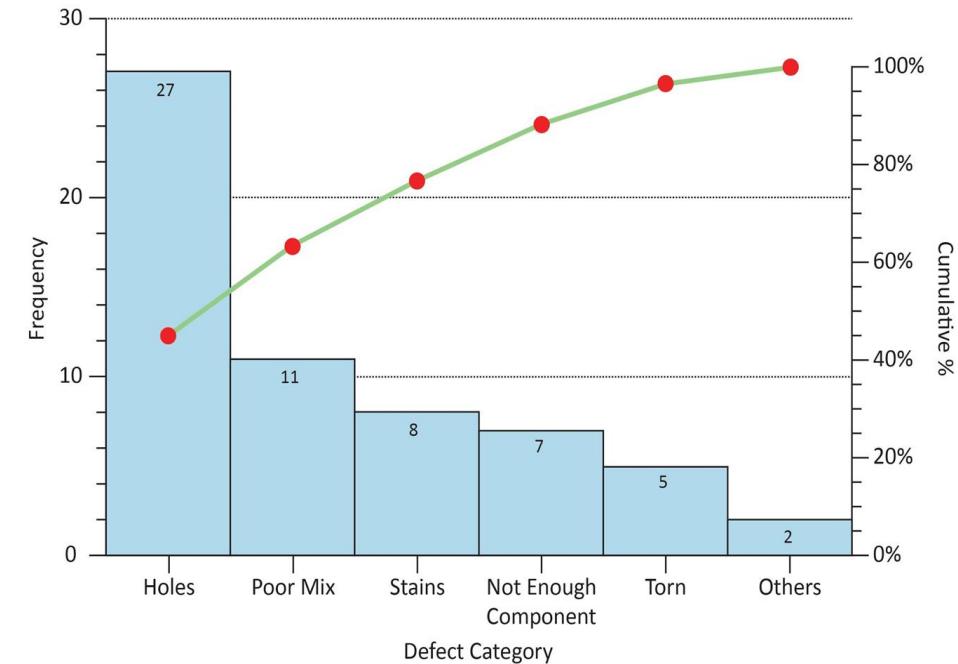


Pareto Diagram

Pareto diagrams are vertical bar charts that identify a few critical issues from the uncritical many.

- It is based on the 80/20 rule. Eighty percent of the problems are caused by 20 percent reasons.
- It helps focus attention on the most critical issues.
- It prioritizes potential causes of the problem.

Pareto Diagram of Defects



Check Sheets

Check sheets, also known as tally sheets, are checklists used for collecting data.

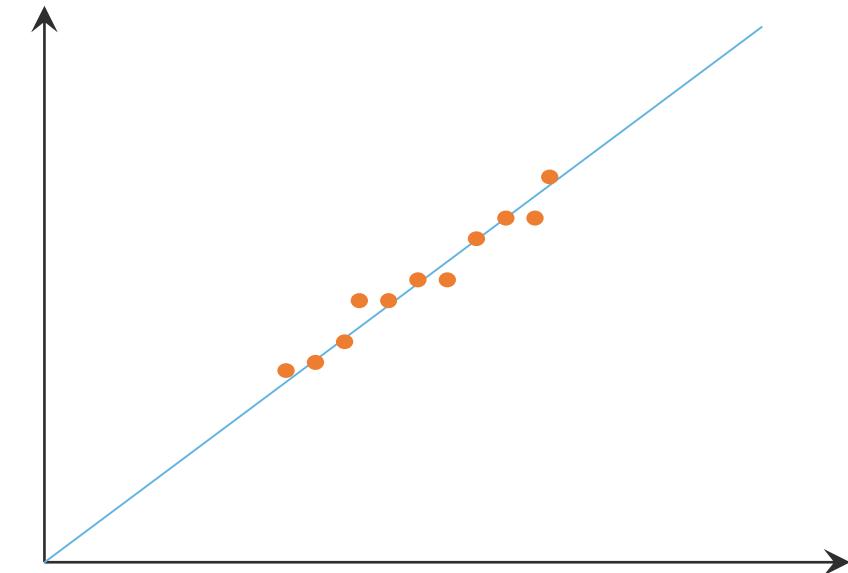
- It ensures that the relevant data or steps of a process are captured and executed.
- It is also useful during inspections.

Defect Description	Frequency of Issues (Tally)				
	Process 1	Process 2	Process 3	Process 4	Total
Defect 1					13
Defect 2					11
Defect 3					9
Defect 4					12
Total	11	9	11	14	45

Scatter Diagram

Scatter diagram tracks two variables to see if they are correlated or have no relationship.

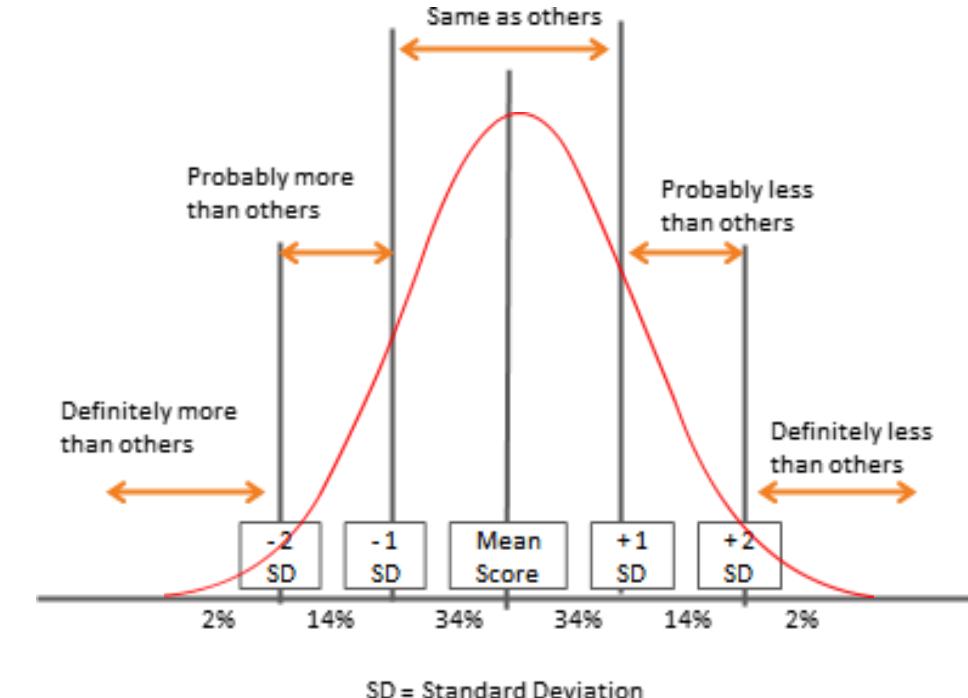
If the two variables are related, scatter diagrams are used to observe the changes in one variable due to a change in the other.



Six Sigma

The concept of Six Sigma is used to produce near-perfect products and services consistently.

- If large volume of data is plotted, the graph takes the form of a bell curve, and such distribution is called normal distribution.
- The line corresponding to the top of the bell curve is the median of the data sample.
- Standard deviation or Sigma is used to measure how far the data is from the mean.
- One standard deviation from the mean covers 68% data.
- At Six Sigma, the distribution covers 99.99966% of the data.



Six Sigma: Example



A tire manufacturing company produces 100,000 units per day. Random samples of these units are verified to ensure they are defect-free.

Thickness of the tires is a parameter to measure defects. A tire with thickness more or less than 10 mm is considered to be defective. If the thicknesses of all the 100,000 tires are plotted on a graph, normal distribution or bell curve is obtained.

One standard deviation from the mean covers 68% of the data, i.e., 68,000 tires lie within one standard deviation of the mean. If the company operates at Six Sigma level, there would be only three defects out of a million tires manufactured as 99.999966% of the data would be covered.



Quiz



Quiz



1. Which of the following tools and techniques is most likely used in quality assurance?

- A ➔ Fishbone diagram
- B ➔ Flowchart
- C ➔ Inspection
- D ➔ Process analysis

Quiz



1. Which of the following tools and techniques is most likely used in quality assurance?

- A ➤ Fishbone diagram
- B ➤ Flowchart
- C ➤ Inspection
- D ➤ Process analysis



The correct answer is: **D**

Inspection is a quality control tool. Flowchart and Fishbone diagrams are part of the seven basic quality tools used for planning and control. Process analysis is used in quality assurance, which focuses on the process rather than the product.

Quiz



2. Management wants to ensure that a project is following defined quality standards. Which of the following should be used?

- A ➤ Risk management plan
- B ➤ Work Breakdown Structure (WBS)
- C ➤ Statement of work
- D ➤ Quality audit

Quiz



2.

Management wants to ensure that a project is following defined quality standards. Which of the following should be used?

- A ➤ Risk management plan
- B ➤ Work Breakdown Structure (WBS)
- C ➤ Statement of work
- D ➤ Quality audit



The correct answer is: **D**

A quality audit periodically reviews quality management activities and assures that the project deliverables meet the expected quality standards.

Quiz



3.

As a project manager, which would you give the highest priority: quality, cost, or schedule?

- A ➤ It would depend on the prevailing circumstances of the project.
- B ➤ Quality is most important; cost and schedule come later.
- C ➤ Cost is most important; everything else comes later.
- D ➤ Completing the project on schedule is most important.

Quiz



3. **As a project manager, which would you give the highest priority: quality, cost, or schedule?**

- A ➤ It would depend on the prevailing circumstances of the project.
- B ➤ Quality is most important; cost and schedule come later.
- C ➤ Cost is most important; everything else comes later.
- D ➤ Completing the project on schedule is most important.



The correct answer is: **A**

Since quality, cost, and schedule are part of the project constraints, they are equally important. However, depending on the specific circumstances of the project, one may take precedence over the others.

Quiz



4.

A project manager is encountering numerous problems on his project. He wants to identify the root causes of the problems so that he can focus on them. Which of the following tools should he use?

- A ➔ Fishbone diagram
- B ➔ Control chart
- C ➔ Pareto diagram
- D ➔ Histogram

Quiz



4

A project manager is encountering numerous problems on his project. He wants to identify the root causes of the problems so that he can focus on them. Which of the following tools should he use?

- A ➔ Fishbone diagram
- B ➔ Control chart
- C ➔ Pareto diagram
- D ➔ Histogram



The correct answer is: A

Fishbone diagram specifically helps in understanding the root cause of problems.

Quiz



5. As a project manager, you are ensuring that quality standards are followed for your project. In which process are the quality standards identified?

- A ➤ Develop Project Charter
- B ➤ Collect Requirements
- C ➤ Plan Quality Management
- D ➤ Perform Quality Assurance

Quiz



5. As a project manager, you are ensuring that quality standards are followed for your project. In which process are the quality standards identified?

- A ➔ Develop Project Charter
- B ➔ Collect Requirements
- C ➔ Plan Quality Management
- D ➔ Perform Quality Assurance



The correct answer is: **C**

Plan Quality Management defines what quality standards should be chosen for the project and how to satisfy them.

Quiz



6. Which of the following is an example of cost of conformance?

- A ➤ Quality training
- B ➤ Cost of rework
- C ➤ Warranty cost
- D ➤ Scrap

Quiz



6. Which of the following is an example of cost of conformance?

- A ➔ Quality training
- B ➔ Cost of rework
- C ➔ Warranty cost
- D ➔ Scrap



The correct answer is: **A**

Quality training helps increase productivity and reduce the probability of errors occurring, i.e., helps in prevention. Hence, it can be classified as the cost of conformance.

Quiz



7.

If the mean of a normal distribution is 100, what percentage of data falls within one standard deviation of the mean?

- A ➤ 83 to 117
- B ➤ 66 to 134
- C ➤ 75 to 125
- D ➤ 80 to 120

Quiz



7.

- If the mean of a normal distribution is 100, what percentage of data falls within one standard deviation of the mean?

- A ➔ 83 to 117
- B ➔ 66 to 134
- C ➔ 75 to 125
- D ➔ 80 to 120



The correct answer is: **B**

One standard deviation of the mean covers 68% data, or 34% on either side of the mean.

Quiz



8. Approved Change Requests are an input to which Quality process?

- A ➤ Manage Quality
- B ➤ Plan Quality Management
- C ➤ Control Quality
- D ➤ Change Request

Quiz



8. Approved Change Requests are an input to which Quality process?

- A ➔ Manage Quality
- B ➔ Plan Quality Management
- C ➔ Control Quality
- D ➔ Change Request



The correct answer is: C

Approved change requests are an output of Perform Integrated Change Control and input to the Control Quality process.



Key Takeaways

- ▷ A project is said to meet quality expectations when all the project requirements agreed in the beginning of the project are met and the resulting product is usable.
- ▷ Quality management includes creating and following policies and procedures that meet the project's defined quality needs.
- ▷ Quality Planning defines the standards, templates, policies, and procedures; Quality Assurance determines if the project is complying with the policies and procedures; and Quality Control measures specific project results against standards.
- ▷ Plan Quality Management, Manage Quality, and Control Quality are the three Project Quality Management processes.
- ▷ Seven basic quality tools are used to plan and achieve the desired levels of quality.
- ▷ At Six Sigma level, there would be only three defects out of a million units manufactured.



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Lesson 10: Project Resource Management

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Objectives

- ▷ Define Project Resource Management
- ▷ Differentiate between functional manager and project manager
- ▷ Describe the Project Resource Management processes
- ▷ Identify the stages of team formation, powers of project manager, and conflict management techniques
- ▷ Explain organization theories and leadership styles

Project Resource Management

The definition of *Project Resource Management is as follows:

Project resource management includes the processes to identify, acquire, and manage the resources needed for the successful completion of the project.

- Project team is composed of people with assigned roles and responsibilities for completing the project.
- Physical resources are any tools, equipment, or property necessary for the project.
- Team resources include people (employees and contractors) working together to manage the project effort.

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 307

Functional Manager vs. Project Manager

The differences between functional and project managers are as follows:

Functional Manager

- Functional manager handles a business function; Example: HR, Engineering, etc.
- Functional managers are subject matter experts.
- Organization structure and the organization's products define the roles and responsibilities of a functional manager.
- Functional manager is the owner of resources and assigns specific individuals to the project team.

Project Manager

- Project managers are accountable and responsible for a project and its quality.
- Project managers are not technical experts.
- Organization's structure defines the degree of authority of a project manager.
- Project managers need to negotiate with the functional managers to procure project resources.
- Project managers are responsible for product quality and credit the team with project success.



If a company initiates a project of securing the ISO 9001:2008 certification, the project will require team members from different departments. The project manager has to request the functional managers to assign team members from their teams. Resources are released back to their functions once the project is completed.

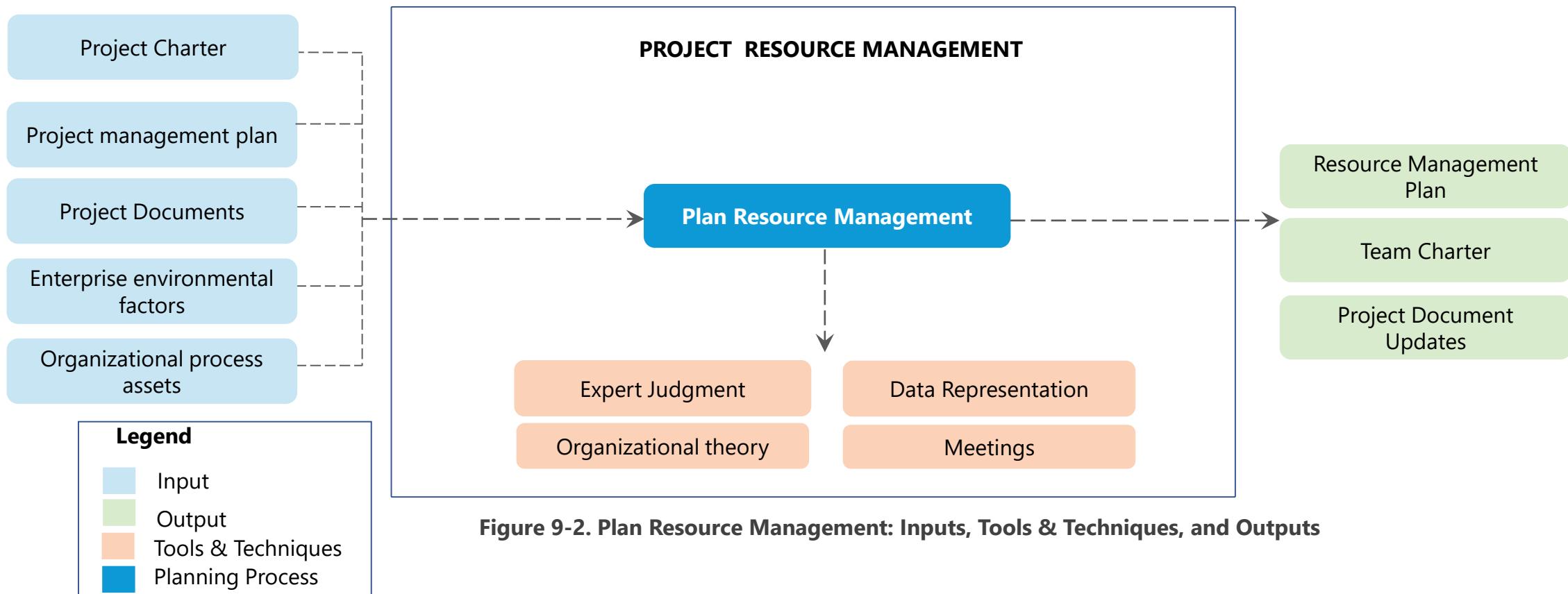
Project Resource Management Processes

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

Table 1-4. Project Management Process Group and Knowledge Area Mapping

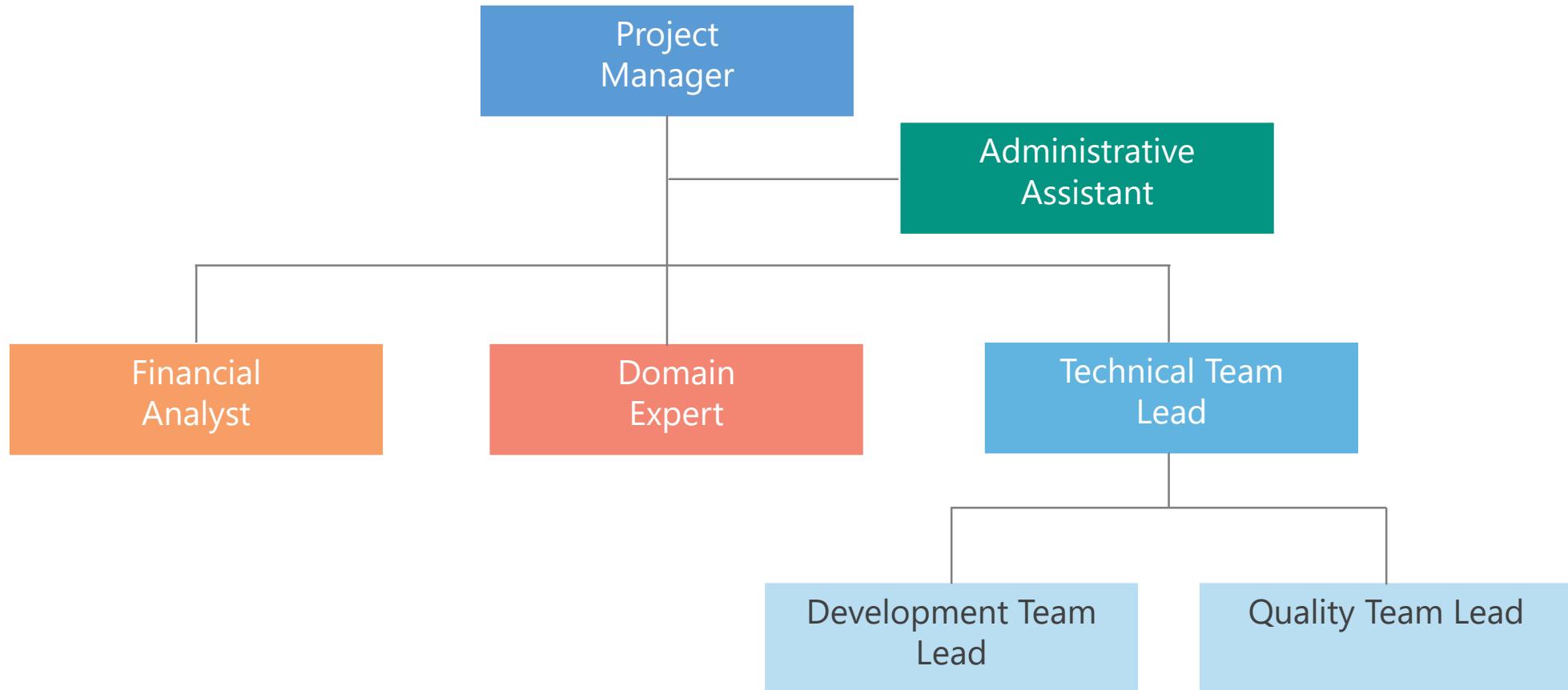
Plan Resource Management

"Plan Resource Management is the process defining how to estimate, acquire, manage, and use team and physical resources." This process is part of the Planning Process Group.



Organization Charts and Role Descriptions

A Project manager has to ensure that an organizational chart is prepared for every project to identify the roles and reporting relationships.



Responsibility Assignment Matrix

Responsibility Assignment Matrix (RAM) is used to define project responsibilities among the project team.

RACI charts are a form of RAM. RACI stands for:

- Responsible
- Accountable
- Consulted
- Informed

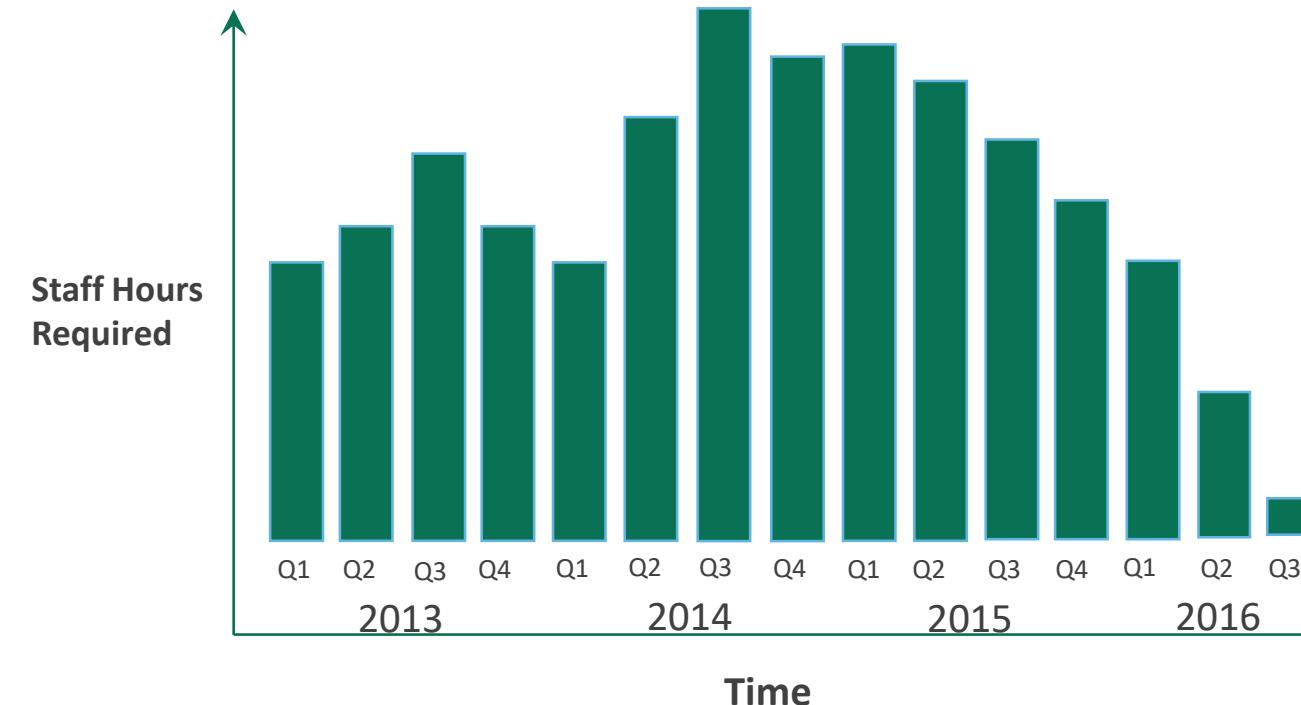
For every project deliverable, RACI charts identify who is responsible, accountable, consulted, and needs to be informed.

There can only be one Accountable (A) in each row of a RACI.

Activity	John	Kris	Sally	Ting
Project Plan	A	R	R	R
Configuration Management	C	A	R	R
Test Plan	C	R	A	R
Design	C	I	R	A
Team Budget	C	A	R	R
Customer Liaison	A	C	R	I
Team Building	R	R	A	C
Activity	A	R	R	R

Resource Histogram

Resource histograms are used to represent the resources required through the life of a project.



- For long term projects, staffing requirements can vary over different project phases.
- Based on these estimates, a project manager can develop the resource hiring strategy.

Estimate Activity Resources

"Estimate Activity Resources is the process of estimating team resources and the type and quantities of materials, equipment, and supplies necessary to perform project work." This process belongs to the Planning Process Group.

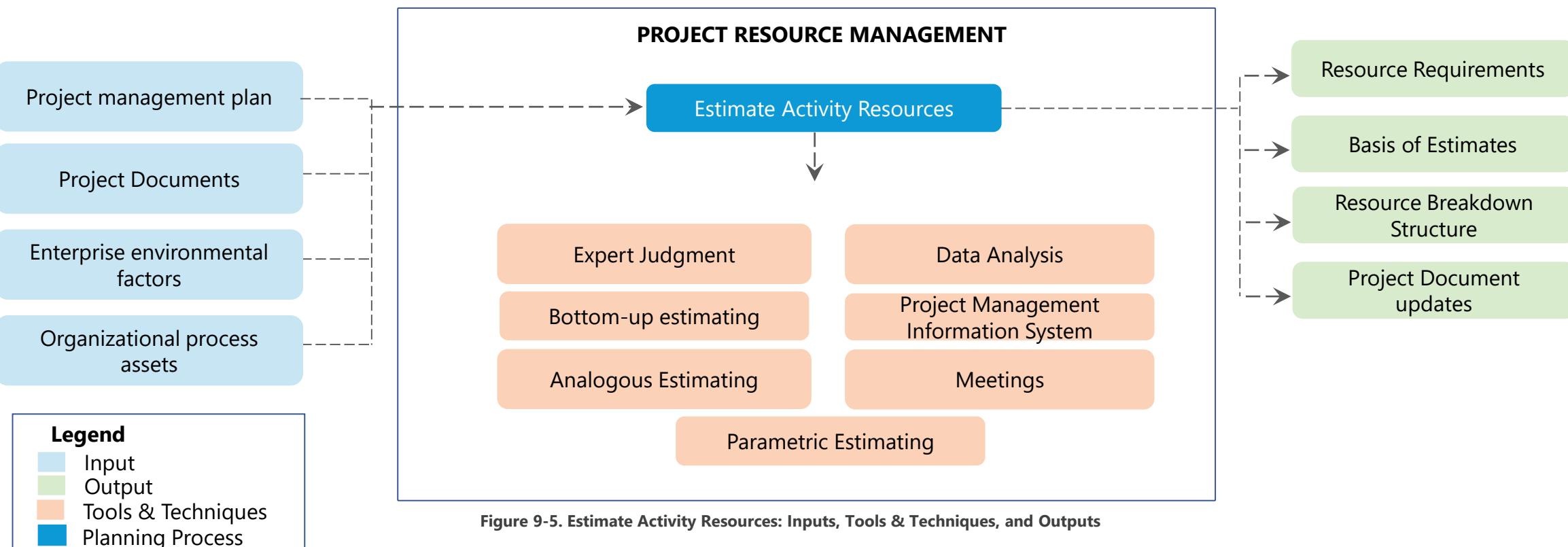
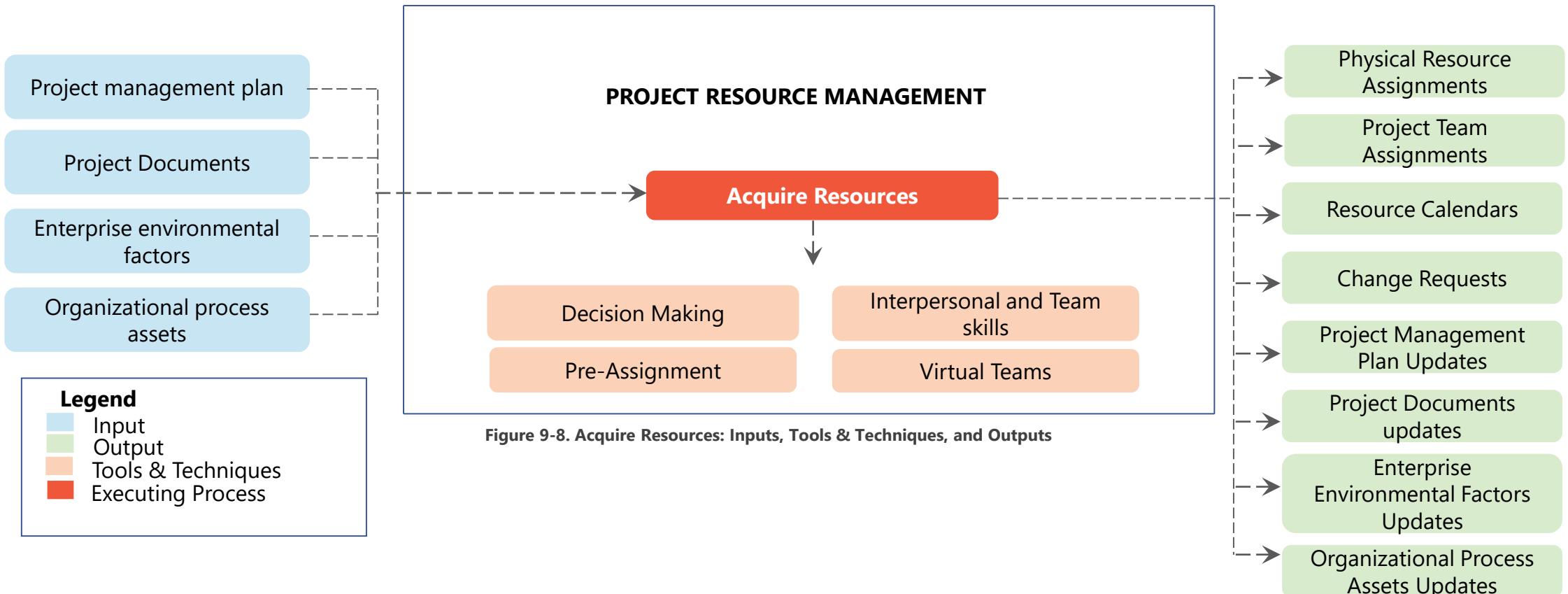


Figure 9-5. Estimate Activity Resources: Inputs, Tools & Techniques, and Outputs

Acquire Resources

"Acquire Resources is the process of obtaining team members, facilities, equipment, materials, supplies, and other resources necessary to complete the project work." This process belongs to the Executing Process Group.



Develop Team

"Develop Team is the process of improving competencies, team member interaction, and overall team environment to enhance project performance." This process belongs to the Executing Process Group.

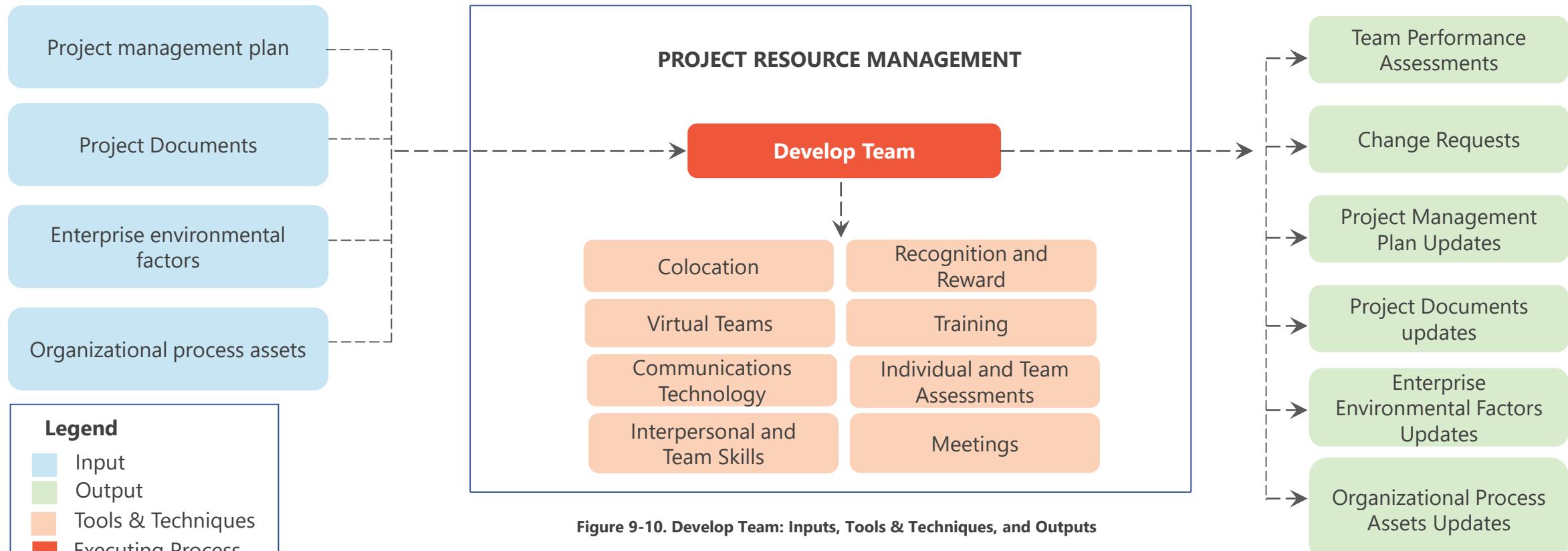


Figure 9-10. Develop Team: Inputs, Tools & Techniques, and Outputs



Questions that test a project manager's role in developing a project team can be expected in the exam.

Manage Team

"Manage Team is the process of tracking team member performance, providing feedback, resolving issues, and managing team changes to optimize project performance." This process belongs to the Executing Process Group.

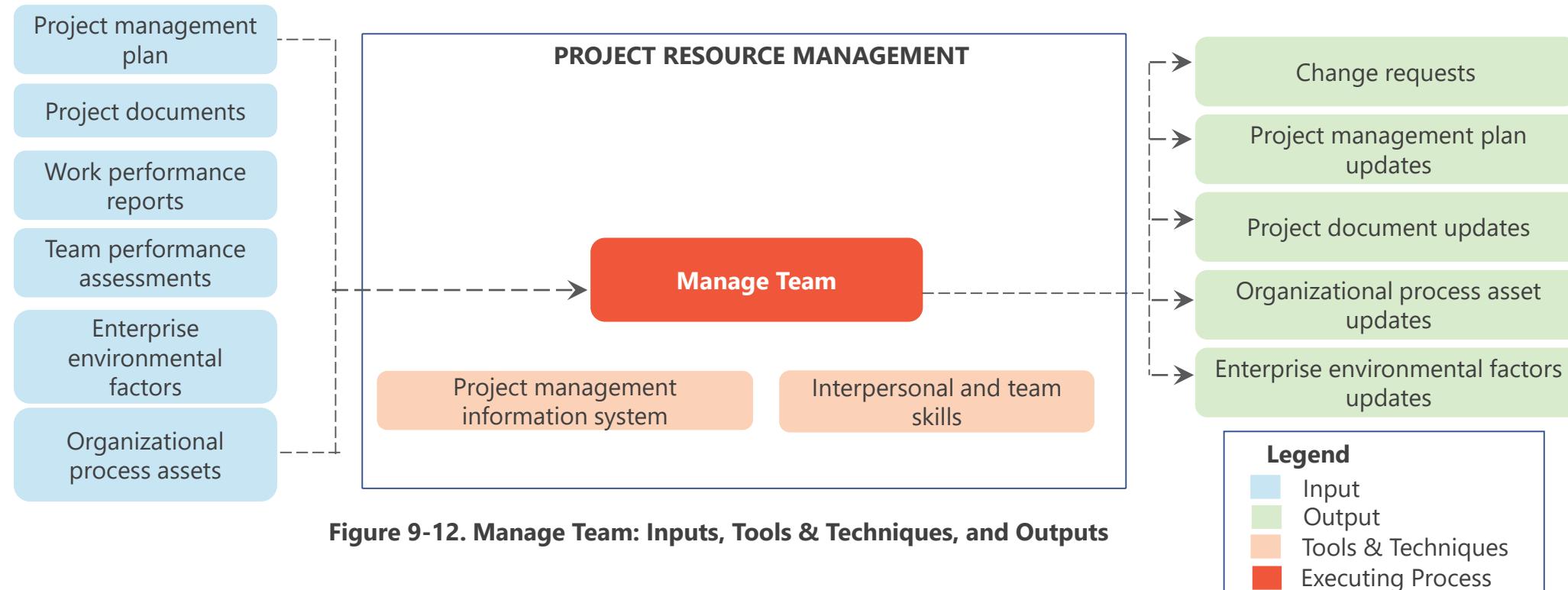


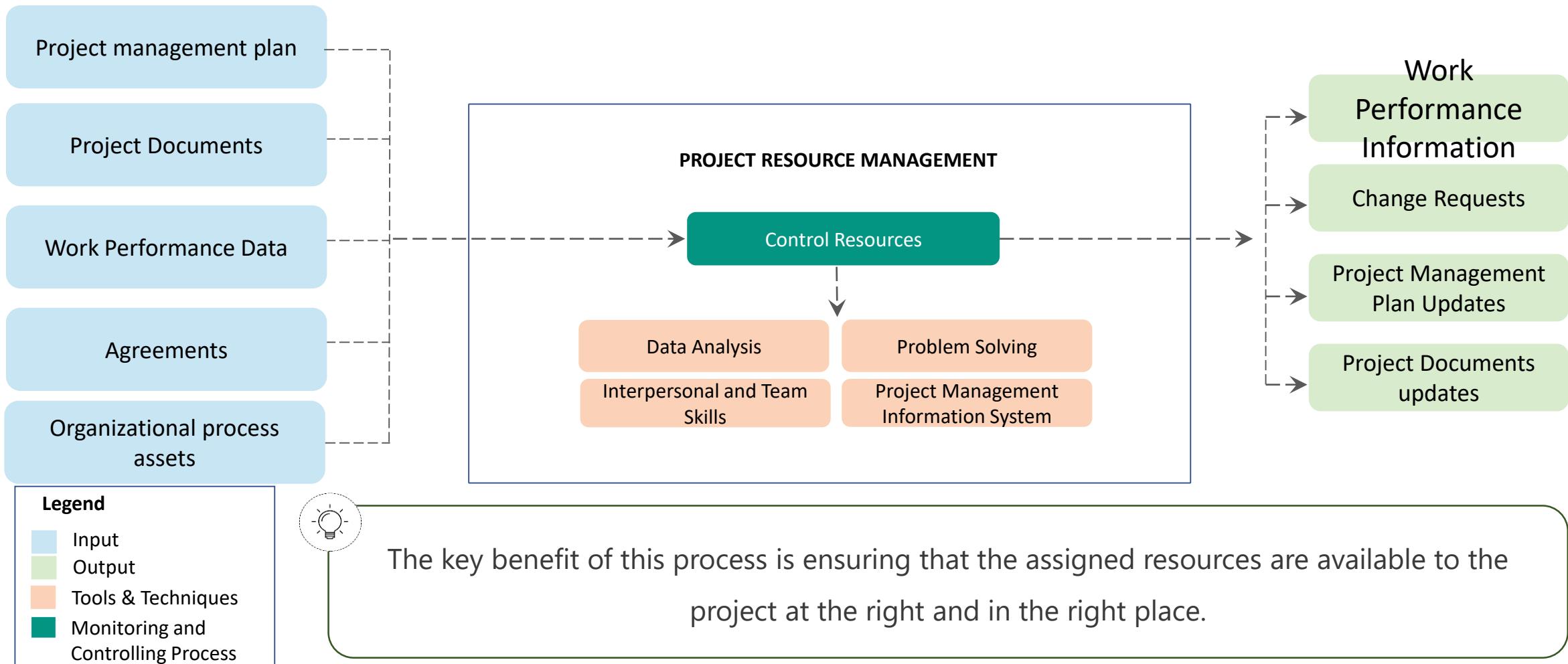
Figure 9-12. Manage Team: Inputs, Tools & Techniques, and Outputs



Questions that test a project manager's skill in managing a project team can be expected in the exam.

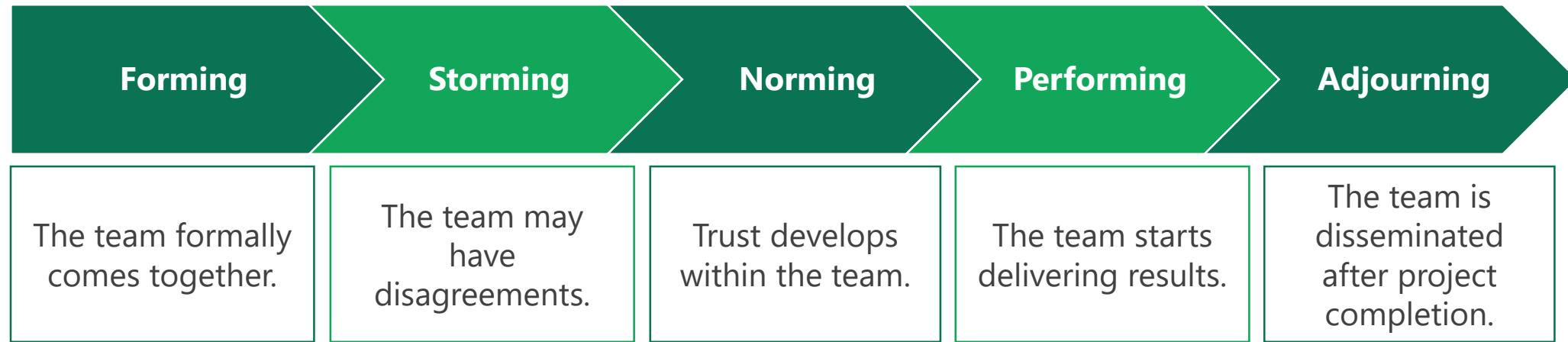
Control Resources

"Control resources is the process of ensuring that the physical resources assigned and allocated to the project are available as planned."



Team Dynamics

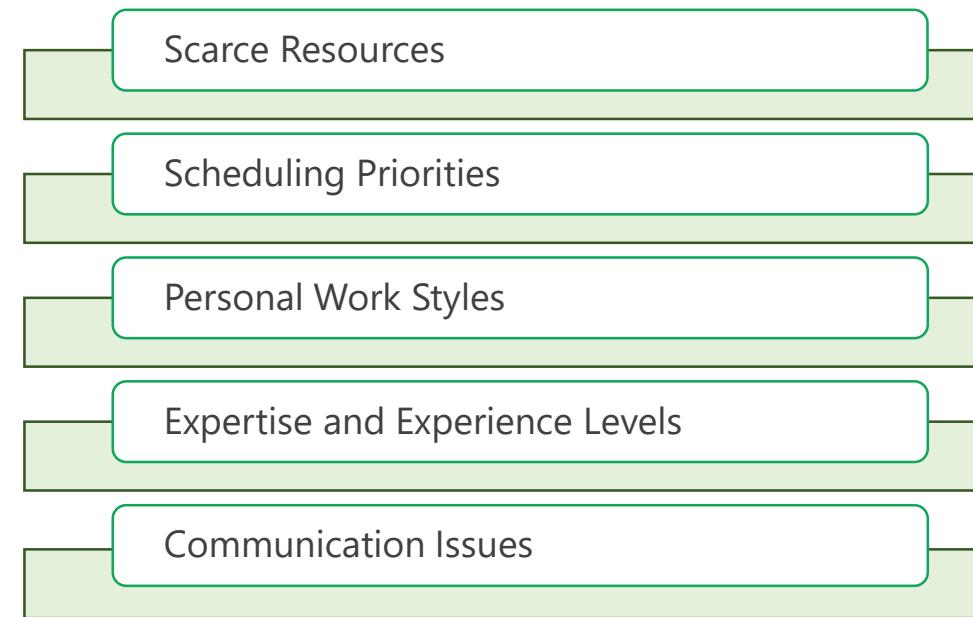
Dr. Bruce Tuckman's (1965) Stages of team formation are as follows:



Conflict Management

Conflict is an inevitable consequence of organizational interactions. If conflicts are managed well, they can create opportunities for improvement.

The sources of conflict are as follows:



The best way to resolve conflict is to discuss and clarify with the parties involved in it.



Business scenario based questions on conflict management can be expected in the exam.

Conflict Management (Contd.)

A project manager needs to be actively involved in the project processes to minimize and avoid conflicts.

The following are some measures that a project manager can take to avoid conflicts:

- Provide all details of the project and keep the team informed of the exact project status.
- Assign the work such that there are no overlapping tasks.
- Motivate the team and ensure everyone gets to work on interesting and challenging assignments.

Conflict Resolution Techniques

The five conflict resolution techniques are as follows:

Withdraw or Avoid

Resolution to the conflict is deferred to a later time.

Compromise or Reconcile

A certain degree of satisfaction is brought to all the parties involved.

Smooth or Accommodate

Areas of agreement are emphasized to reduce the conflict.

Force or Direct

Directions are given by a person in authority to resolve the conflict.

Collaborate or Problem Solve

All the parties are asked to jointly look for a resolution.



Business scenario based problems where a resolution technique has to be selected can be expected in the exam.

Business Scenario: Problem Statement



- Tanya is the project manager for a manufacturing project in a highly regulated industry.
- With the varying environment factors that govern the practices of the company, the room for error is very small. Tanya's project can have some major impact on several areas within the company.
- To strengthen the team's ability to deliver the project adequately without any infractions, the top players in those areas are selected to join Tanya's project team. This decision proves to be helpful.
- A conflict arises between a stakeholder and one of the team members regarding how a task can be completed without violating government regulations.
- Tanya has to meet with the team member and stakeholder to defuse the situation and resolve the conflict. What is the most effective approach?

Business Scenario: Solution



- Tanya should get all parties to focus on the end goal and persuade them to reach a consensus to meet their commitment.
- After redirecting their energy to the customer's needs and their points of agreement, Tanya should convince both sides to pull together and collaborate with one another to pick an approach that presents a win-win scenario.

Powers of the Project Manager

A project manager is vested with certain powers to facilitate project work from the team members.

Legitimate or Formal

- Formally assigns the tasks to the team members

Reward

- Can reward and recognize the team members based on their performance

Penalty

- Can penalize the team members for poor performance

Expert

- Can command authority by the virtue of their expertise in the domain

Referent

- Can be considered as a reference of higher authority to get the work done



Reward and expert are usually the best forms of authority to use. Penalty should be resorted to only as a last option.

Business Scenario: Problem Statement



- Robert is leading a major project initiative for his company. This project is very intense and critical to the business. It will require all hands on deck.
- Robert is task-driven and takes a no-nonsense approach. As a result, some project team members are afraid of him. They view Robert as someone who could damage their career, bonus potential, and work opportunities.
- Because of this mentality, Robert's next team meeting is unproductive, and there is debate around who is responsible for the activities. How should Robert handle this?

Business Scenario: Solution



- The fact that there are project team members who view Robert's power as an example of penalty power is a sign that the team is in need of some team building exercises.
- Team building will help the team get to know each another more and develop trust in each other.
- Then, Robert needs to evaluate his HR Management plan to see if he has a RACI chart for his project to help define who is responsible for what activities. This will aid in minimizing confusion within the project team.

Organizational Theories

A project manager needs to know what motivates the team members to design a reward and recognition plan.

The three popular motivation theories are as follows:

McGregor's Theory of X and Y

McGregor's theory indicates that there are two categories of managers, and this classification is based on what the managers think of their team members.

- **Theory X:** Managers who fall under this category believe that their team members need continuous monitoring. Further, they believe that though the team members are capable, they avoid work whenever possible.
- **Theory Y:** Managers under this category believe that their team members can work without supervision as they look forward to achieve something.

Organizational Theories (Contd.)

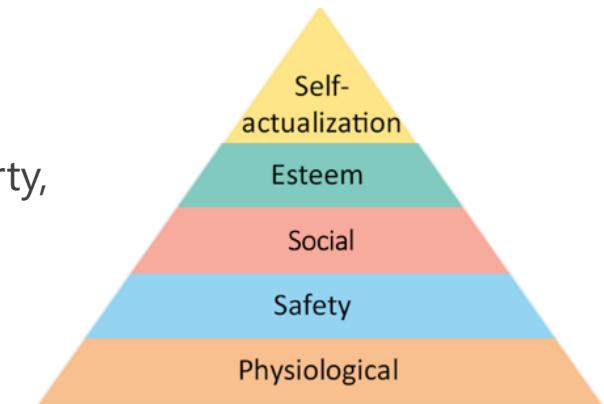
A project manager needs to know what motivates the team members to design a reward and recognition plan.

The three popular motivation theories are as follows:

Maslow's Hierarchy of Needs

According to Maslow's Hierarchy of Needs, people's needs change as they grow in their career. Maslow's hierarchy of needs are as follows:

- Physiological: breathing, food, water, sex, sleep, etc.
- Safety: safety of body, employment, resources, morality, family, health, property, etc.
- Social: friendship, family, intimacy, etc.
- Esteem: self-esteem, confidence, achievement, respect, etc.
- Self-actualization: morality, creativity, spontaneity, problem solving, lack of prejudice, acceptance of facts, etc.



Organizational Theories (Contd.)

A project manager needs to know what motivates the team members to design a reward and recognition plan.

The three popular motivation theories are as follows:

Herzberg's Theory

Herzberg's theory classifies factors as follows:

- Hygiene factors: Mandatory factors to motivate the team
 - Example: personal safety, fair compensation, working conditions, etc.
- Motivating agents: Additional factors that motivate people
 - Example: recognition, higher responsibility, etc.

Leadership Styles

A project manager needs to establish a leadership style that matches the needs of the team.

The three popular leadership styles are as follows:

Autocratic or Authoritarian Leadership



Leader gives clear direction and expects compliance.

Participative or Democratic Leadership



Leader offers guidance and encourages team participation.

Delegative or Laissez faire Leadership



Leader offers no guidance and lets the team be on their own.

McKinsey's 7-S Framework

McKinsey's 7-S framework recommends organizations to be aligned to seven elements to accomplish projects successfully.

The seven elements are categorized as follows:

Hard Elements

Hard elements will already be a part of the organizations working on projects.

The three hard elements are:

1. Strategy
2. Structure
3. Systems

Soft Elements

Soft elements are generally the leadership traits that a project manager needs to demonstrate.

The four soft elements are:

1. Shared values
2. Skills
3. Style
4. Staff



Quiz



Quiz



1. Which conflict resolution technique is best for a long lasting solution?

- A ➤ Smoothing
- B ➤ Forcing
- C ➤ Problem solving
- D ➤ Withdrawal

Quiz



1. Which conflict resolution technique is best for a long lasting solution?

- A ➤ Smoothing
- B ➤ Forcing
- C ➤ Problem solving
- D ➤ Withdrawal



The correct answer is: **C**

Problem solving is the best way to resolve conflict because it has the greatest probability to reach a permanent solution. All other methods may, at the best, lead to a temporary solution.

Quiz



2. As a project manager, you are deciding the inputs that you need to use on your project. Which process uses an issue log as one of the inputs?

- A ➔ Plan Resource Management
- B ➔ Manage Project Team
- C ➔ Manage Communications
- D ➔ Manage Stakeholder Engagement

Quiz



2. As a project manager, you are deciding the inputs that you need to use on your project. Which process uses an issue log as one of the inputs?

- A ➔ Plan Resource Management
- B ➔ Manage Project Team
- C ➔ Manage Communications
- D ➔ Manage Stakeholder Engagement



The correct answer is: **B**

The Manage Project Team process uses an issue log to manage and close all team member related issues.

Quiz



3. Which type of power would a project manager have if others believe he or she is highly knowledgeable in the technical area?

- A ➤ Reward
- B ➤ Coercive
- C ➤ Referent
- D ➤ Expert

Quiz



3. Which type of power would a project manager have if others believe he or she is highly knowledgeable in the technical area?

- A ➔ Reward
- B ➔ Coercive
- C ➔ Referent
- D ➔ Expert

The correct answer is: **D**

Expert is the power that comes with expert knowledge in a specific knowledge area.



Quiz



4. You have been assigned as the project manager of an existing project involving 50 company employees and 10 sub-contractors. You want to know who is assigned to do what. Where should you look for this information?

- A ➤ Responsibility assignment matrix
- B ➤ Project organization chart
- C ➤ Pareto chart
- D ➤ Resource histogram

Quiz



4. You have been assigned as the project manager of an existing project involving 50 company employees and 10 sub-contractors. You want to know who is assigned to do what. Where should you look for this information?

- A ➔ Responsibility assignment matrix
- B ➔ Project organization chart
- C ➔ Pareto chart
- D ➔ Resource histogram



The correct answer is: **A**

Responsibility assignment matrix lists the resources against the work assigned to them.

Quiz



5. While assessing the performance of your team members, you find that some of them are not strong enough to handle the tasks assigned. What will you do in this situation?

- A ➤ Communicate the improvement needs and establish a performance review and monitoring schedule.
- B ➤ Assign double the work and tell them to report the progress at the beginning and end of the day.
- C ➤ Return the team members to the functional department and warn the functional head.
- D ➤ Wait for them to fail so that you can prove your point and in the meantime start hiring additional resources.

Quiz



5. While assessing the performance of your team members, you find that some of them are not strong enough to handle the tasks assigned. What will you do in this situation?

- A ➤ Communicate the improvement needs and establish a performance review and monitoring schedule.
- B ➤ Assign double the work and tell them to report the progress at the beginning and end of the day.
- C ➤ Return the team members to the functional department and warn the functional head.
- D ➤ Wait for them to fail so that you can prove your point and in the meantime start hiring additional resources.



The correct answer is: **A**

It is the most appropriate answer in terms of the performance management life cycle. You need to first communicate the needs (plan), and then ensure that these are being met (review and monitoring).

Quiz



6. Your software project is in the critical system testing stage when two of the senior members of the team come to you with a conflict on usage of the simulation software during testing. One senior member claims that the other person keeps the software engaged nearly all of the working hours of the project preventing the former from completing test cases. While both need to use the software, you are able to get them to agree to adjust their working schedules so that they no longer overlap. You are using which of the following techniques for conflict resolution?

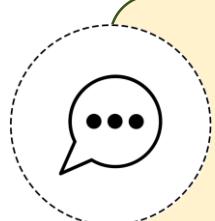
- A ➤ Forcing
- B ➤ Smoothing
- C ➤ Compromising
- D ➤ Collaborating

Quiz



6. Your software project is in the critical system testing stage when two of the senior members of the team come to you with a conflict on usage of the simulation software during testing. One senior member claims that the other person keeps the software engaged nearly all of the working hours of the project preventing the former from completing test cases. While both need to use the software, you are able to get them to agree to adjust their working schedules so that they no longer overlap. You are using which of the following techniques for conflict resolution?

- A ➤ Forcing
- B ➤ Smoothing
- C ➤ Compromising
- D ➤ Collaborating



The correct answer is: **C**

Both team members have to adjust their working schedules to accommodate the limited availability of the simulation software. This would be a compromise for both of them.

Quiz



7. You are managing a project in Canada during winter. It gets dark by 5PM, and you find most of the staff leaving early to get to their cars. You are concerned that this will impact productivity. When you inquire, they tell you that the car park is not monitored, and they don't feel safe going to their cars after dark. What Maslow hierarchy are they representing?

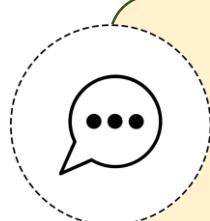
- A ➤ Physiological
- B ➤ Safety
- C ➤ Social
- D ➤ Esteem

Quiz



7. You are managing a project in Canada during winter. It gets dark by 5PM, and you find most of the staff leaving early to get to their cars. You are concerned that this will impact productivity. When you inquire, they tell you that the car park is not monitored, and they don't feel safe going to their cars after dark. What Maslow hierarchy are they representing?

- A ➔ Physiological
- B ➔ Safety
- C ➔ Social
- D ➔ Esteem



The correct answer is: **B**

The team members are concerned for their safety, which is one of the fundamental needs of the Maslow hierarchy. As the project manager, you should consider having security provide escorts for team members to their cars after dark.

Quiz



8. What would NOT be considered a hygiene factor according to Herzberg?

- A ➔ Personal safety
- B ➔ Fair compensation
- C ➔ Working conditions
- D ➔ Recognition

Quiz



8. What would NOT be considered a hygiene factor according to Herzberg?

- A ► Personal safety
- B ► Fair compensation
- C ► Fair compensation
- D ► Recognition



The correct answer is: **D**

Recognition would be considered a motivating factor according to Herzberg.



Key Takeaways

- ▷ Project resource management includes the processes that organize, manage, and lead the project team.
- ▷ A functional manager is in charge of a business function and owns the resources; a project manager is responsible for an organization's projects.
- ▷ Plan Resource Management, Estimate Activity Resources, Acquire Resources, Develop Team, Manage Team, and Control Resource are the six Project Resource Management processes.
- ▷ Forming, storming, norming, performing, and adjourning are the five stages of team formation.
- ▷ Reward and expert are usually the best forms of authority that a project manager can use. Penalty should be resorted to as a last option.
- ▷ Organization theories help a project manager to identify what motivates the team members and accordingly design a reward plan.
- ▷ A project manager should adopt a leadership style based on the team.



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Lesson 11: Project Communications Management

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Objectives

- ▷ Define communication and Project Communications Management
- ▷ Identify the different communication methods, technology, and channels
- ▷ Explain the elements of a basic communication model
- ▷ Describe the Project Communications Management processes

Communication

The definition of communication is as follows:

Communication is a two-way process of transferring information from one entity to another.



A project manager spends around 90 percent of time ensuring proper project communication.

Communication Methods

Communication can be either written or verbal.

Further, it can be formal or informal.

- In formal communication, certain rules should be followed.
- Informal communication takes a casual approach.
- Combination of the two forms results in the following four communication methods:
 - Formal written
 - Formal verbal
 - Informal written
 - Informal verbal

Written

- Project management plan
- Project charter
- Long-distance communication

Verbal

- Presentations

Formal

- Emails
- Notes

- Conversations

Informal



Questions that require choosing a communication method for a given situation can be expected in the exam.

Communication Technology

Communication technology refers to the various media used for communication. Commonly used technologies for communication are as follows:



Telephone



Fax



Emails



Messaging Software



Meetings



Skype™



Facebook



Twitter



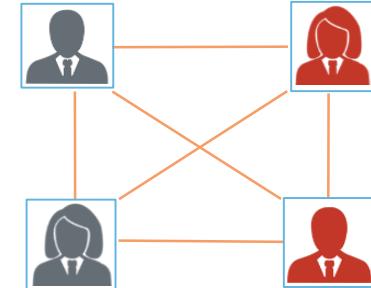
Blogger

Communication Channels



Given that communication takes place between four members of a team, there are six unique channels of communication.

If a team comprises ten stakeholders, how many channels of communication would exist?



Use the formula:

$$\text{Number of Communication Channels} = n * (n - 1)/2$$

In the formula, 'n' is equal to the number of stakeholders.

In this case, $n = 10$.

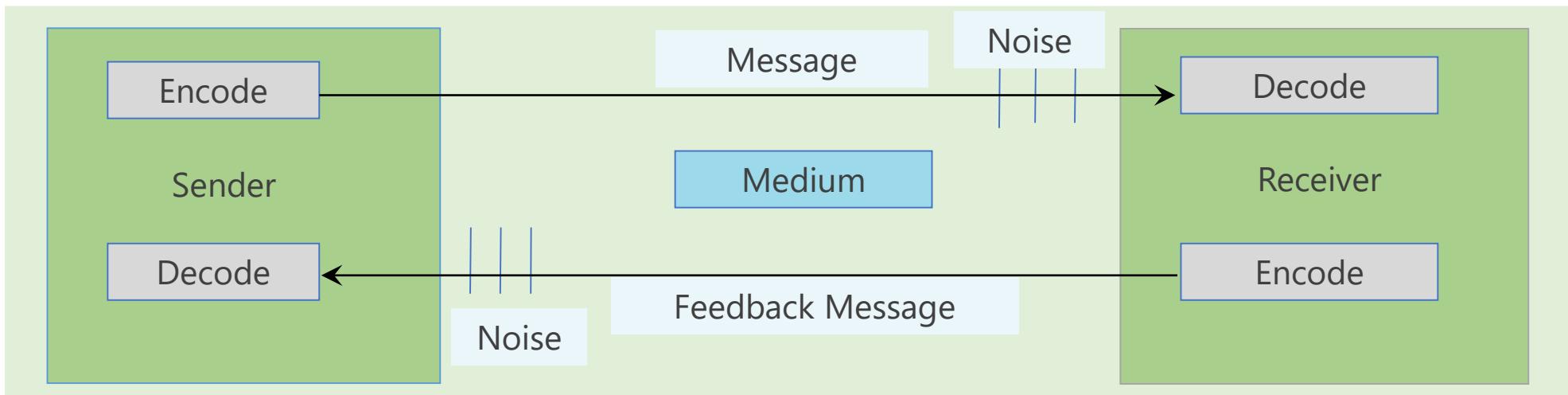
By substituting 'n' in the formula, the total number of communication channels that exist in a team of 10 stakeholders is 45.



When a large number of communication channels exist, it may get chaotic if communication is not structured.

Basic Communication Model

The process of communication involves several steps. Given below is a simple communication model:



A Japanese tourist calls a hotel in Dubai to book a room. The tourist speaking Japanese is the encoding of the message. Telephone serves as the medium. However, decoding is problematic as the receptionist does not understand Japanese. The same would be true if the receptionist speaks Arabic. However, communication can be streamlined if they communicate in a language comprehensible to both of them.

Basic Communication Model (Contd.)

Analyzing the communication model helps in identifying the communication problems.

- Encoding is the process of translating thoughts or ideas into a language that is understood by others.
- Decoding is the process of translating the message back into meaningful thoughts or ideas.
- Message is the output of encoding.
- Feedback message is the output of decoding.
- Medium is a communication method to convey the message.
- Noise is anything that interferes with the transmission and understanding of the message. Examples include distance and unfamiliar technology.

Project Communications Management

The definition of *Project Communications Management is as follows:

“Project Communications Management includes the processes necessary to ensure that the information needs of the project and its stakeholders are met through development of artifacts and implementation of activities designed to achieve effective information exchange.”

Project manager needs to ensure that the stakeholders get timely access to the required information.

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 359

Project Communications Management Processes

Knowledge Areas		Project Integration Management	Project Scope Management	Project Schedule Management	Project Cost Management	Project Quality Management	Project Resource Management	Project Communications Management	Project Risk Management	Project Procurement Management	Project Stakeholder Management
Project Management Process Groups	Initiating	4.1 Develop Project Charter									13.1 Identify Stakeholders
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	Executing	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge				8.2 Manage Quality	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	10.2 Manage Communications	11.6 Implement Risk Response	12.2 Conduct Procurements	13.3 Manage Stakeholder Engagement
	Monitoring and Controlling	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	5.5 Validate Scope 5.6 Control Scope	6.6 Control Schedule	7.4 Control Costs	8.3 Control Quality	9.6 Control Resource	10.3 Monitor Communications	11.7 Monitor Risks	12.3 Control Procurements	13.4 Monitor Stakeholder Engagements
	Closing	4.7 Close Project or Phase									

Table 1-4. Project Management Process Group and Knowledge Area Mapping

Plan Communications Management

"Plan Communications Management is the process of developing an appropriate approach and plan for project communications based on the information needs of each stakeholder or group, available organizational assets, and the needs of the project." This belongs to the Planning Process Group.

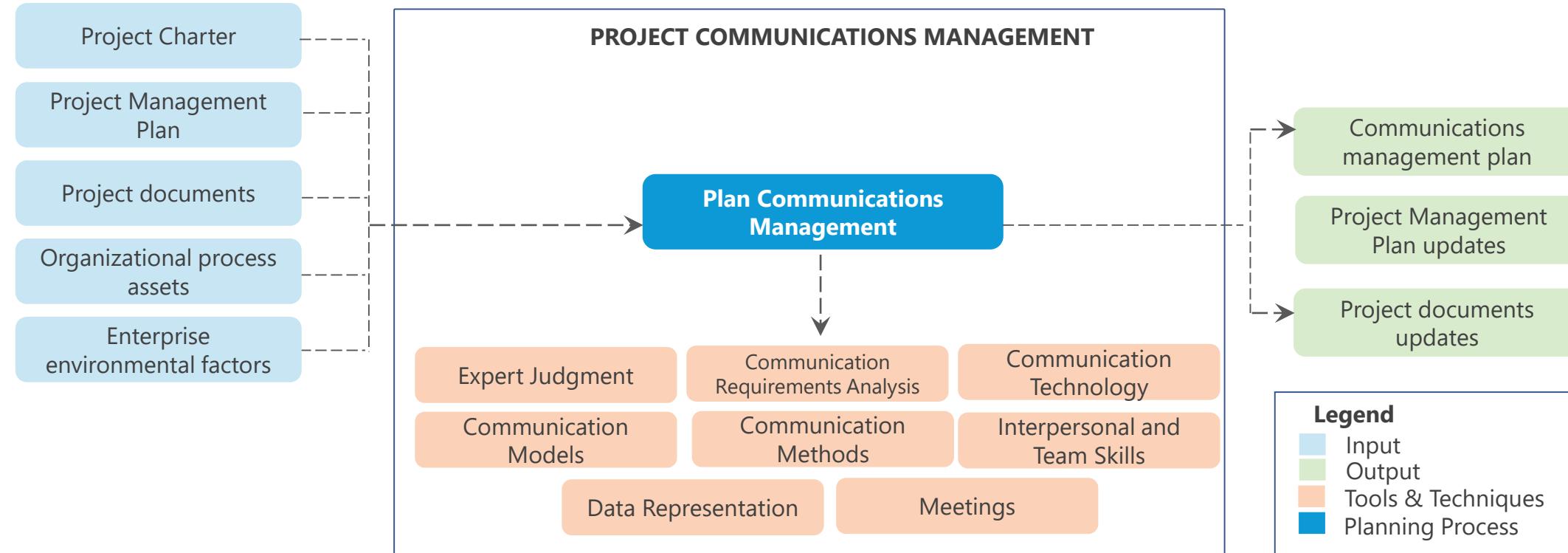


Figure 10-2. Plan Communications Management: Inputs, Tools & Techniques, and Outputs



Understand the communication management process to answer concept-based questions in exam.

Business Scenario: Problem Statement



- Communication is 90% of a Project Manager's job; communicating status is a critical part of ensuring project success.
- Your company is a key supplier for a major airline company; most projects are one to three years long.
- A large, 18-month design and manufacturing project is about halfway complete when the original project manager leaves for another position, and you are asked to step in as the new project manager.
- The project includes work performed by sub-contractors, and they have some key deliverables coming up. You need to understand the status of these deliverables.
- How should you prepare yourself for the project manager role, especially as it relates to communication requirements?

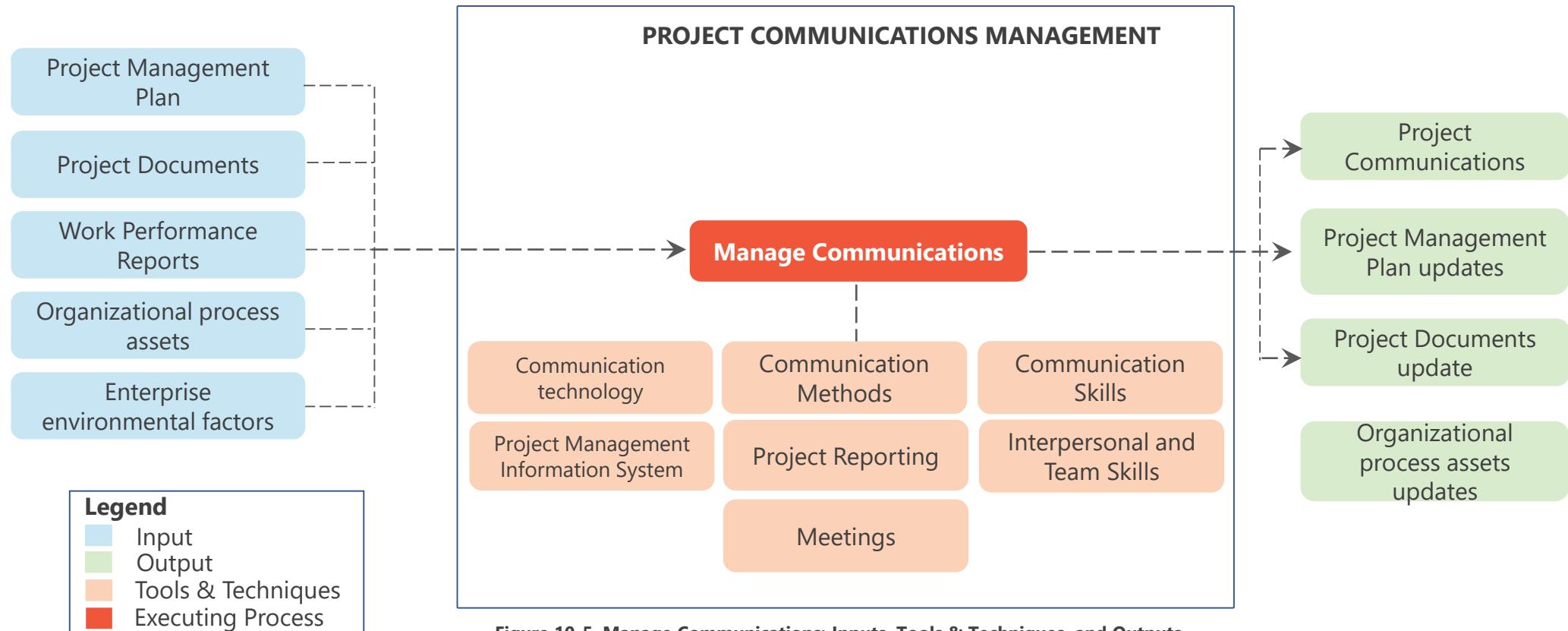
Business Scenario: Solution



- The project manager should start with the full project management plan. This document serves as a guide for the team and all stakeholders by setting expectations of what the team plans to do to execute the defined tasks to support the scope of work.
- PMP also includes the three baselines; the project manager can use them as a guide to measure the current status of the project.
- As it specifically relates to communication, the communication plan would provide details on what needs to be distributed, and why, how, when, and to whom it would be disseminated. It would also specify the roles and responsibilities for communication.

Manage Communications

"Manage Communications is the process of ensuring timely and appropriate collection, creation, distribution, storage, retrieval, management, monitoring, and the ultimate disposition of project information." It belongs to the Executing Process Group.



Monitor Communications

"Monitor Communications is the process of ensuring the information needs of the project and its stakeholders are met." It is part of the Monitoring and Controlling Process Group.

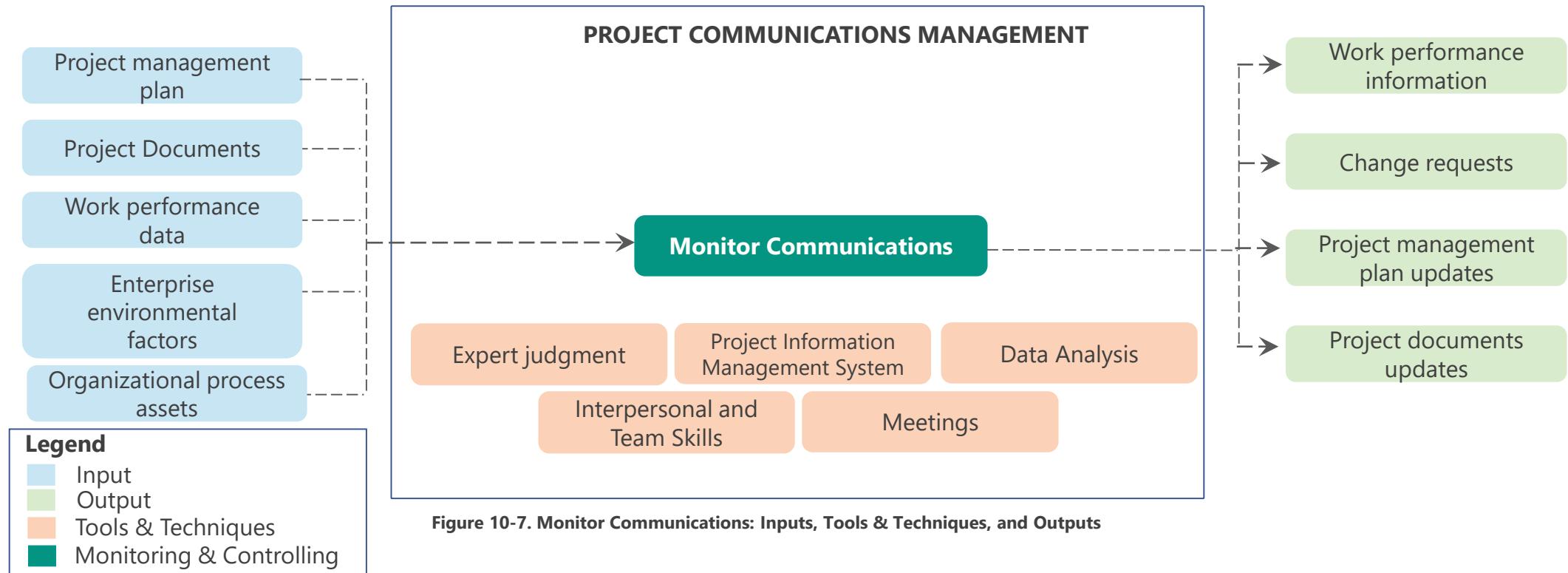


Figure 10-7. Monitor Communications: Inputs, Tools & Techniques, and Outputs

Business Scenario: Problem Statement



- Regina is managing a four-year international project and she is a year and a half into the project.
- Her project team includes team members from three different countries. Because of the distance between team members, many of them have never worked together on a project before. Therefore, Regina has to work hard to map out suitable communication methods in her plan to reach everyone.
- As the team nears the halfway mark on the project, Regina notices an influx in her issue log and a decrease in her team's productivity and engagement during project team meetings.
- What are some things Regina can do to motivate her team?

Business Scenario: Solution



- The issue log can be used to communicate issues on the project, like areas of confusion, disagreement, concern, etc. Therefore, Regina will be able to take the information and analyze the causes of the problems. She will be able to determine the root causes and the corrective actions needed to resolve the issue.
- In her investigation, she should link the areas of confusion to her lack of consideration of noise factors that prevented clear communication during web meetings and her lack of attention to cultural differences.
- Regina should also incorporate cultural awareness activities in her meetings going forward to increase respect for one another, minimize future communication barriers, and increase the team's cohesiveness.



Quiz



Quiz



1. As a project manager, you have a problem with a team member's performance. Which is the best way of communicating this problem to the team member?

- A ➤ Informal verbal
- B ➤ Formal verbal
- C ➤ Formal written
- D ➤ Informal written

Quiz



1. As a project manager, you have a problem with a team member's performance. Which is the best way of communicating this problem to the team member?

- A ➔ Informal verbal
- B ➔ Formal verbal
- C ➔ Formal written
- D ➔ Informal written



The correct answer is: **A**

Informal verbal communication is a good option. If this does not solve the problem, it should be followed up with formal written communication.

Quiz



2.

You are managing a project with project teams in different geographical locations. There are approximately 25 team members plus a team lead at 3 different locations. Additionally, there are 3 members from a supporting group that are working part-time on the project. How many communication channels are possible in your project?

- A ➤ 496
- B ➤ 992
- C ➤ 424
- D ➤ 32

Quiz



2.

You are managing a project with project teams in different geographical locations. There are approximately 25 team members plus a team lead at 3 different locations. Additionally, there are 3 members from a supporting group that are working part-time on the project. How many communication channels are possible in your project?

- A ➔ 496
- B ➔ 992
- C ➔ 424
- D ➔ 32



The correct answer is: **A**

This is directly based on the formula $n*(n-1)/2$. If n is the number of stakeholders in the project, the total possible communication channels = $n*(n-1)/2$. The project has 25 team members, 3 team leads, 3 support team members, and the project manager. That makes 32 people and 496 possible communication channels. Refer to *PMBOK® Guide – Sixth Edition* Project Communications Management, Communication Channels, Glossary.

Quiz



3.

You have a project team spread across 5 different countries. As a project manager, what is the best communication method that you should follow for communicating important project announcements?

- A ➤ Informal written
- B ➤ Informal verbal
- C ➤ Formal written
- D ➤ Formal verbal

Quiz



3.

You have a project team spread across 5 different countries. As a project manager, what is the best communication method that you should follow for communicating important project announcements?

- A ➤ Informal written
- B ➤ Informal verbal
- C ➤ Formal written
- D ➤ Formal verbal



The correct answer is: **C**

Communication is a big issue if team members are geographically distributed, and it is always a good practice to use formal written communication in such cases.

Quiz



4.

Project information may be distributed using a variety of methods, including hard copy document distribution, shared access to networked electronic databases, fax, electronic mail, voice mail, video conferencing, and electronic tools. These are known as _____.

- A ➤ Project controls
- B ➤ Project reporting system
- C ➤ Project distribution system
- D ➤ Information management system

Quiz



4.

Project information may be distributed using a variety of methods, including hard copy document distribution, shared access to networked electronic databases, fax, electronic mail, voice mail, video conferencing, and electronic tools. These are known as _____.

- A ➤ Project controls
- B ➤ Project reporting system
- C ➤ Project distribution system
- D ➤ Information management system



The correct answer is: **D**

All the methods mentioned are commonly known as information management system.

Quiz



5.

As part of a joint venture, a project manager working with another company needs to share some confidential information related to intellectual property rights. He wants to know the person responsible for authorizing the release of confidential information. Which project document should he refer?

- A ➤ Organizational Breakdown Structure
- B ➤ Project Charter
- C ➤ Communication Management Plan
- D ➤ Stakeholder Management Plan

Quiz



5.

As part of a joint venture, a project manager working with another company needs to share some confidential information related to intellectual property rights. He wants to know the person responsible for authorizing the release of confidential information. Which project document should he refer?

- A ➤ Organizational Breakdown Structure
- B ➤ Project Charter
- C ➤ Communication Management Plan
- D ➤ Stakeholder Management Plan



The correct answer is: **C**

A communication management plan will capture the details of the person responsible for authorizing the release of the confidential information on the project.

Quiz



6.

A project manager of an information technology project is discussing a complex algorithm with a new team member. After a long and thorough verbal discussion, the project manager asks the person if he has understood the algorithm and can put it in the document. The team member implies that he has understood. However, when the project manager goes through the document, he realizes that the member hasn't understood what was actually said, thus resulting in an inefficient use of time and effort. Who is responsible for this loss of time, and how could this be avoided?

- A ➤ Project manager; he should not have given the complex assignment to a new team member.
- B ➤ Team Member; he should have not implied that he had understood but should have cleared his doubts immediately.
- C ➤ Project Manager; he should have helped the team member in preparing and reviewing the document.
- D ➤ Project manager; it is his responsibility to ensure that his message is clear and concise and confirm that the team member truly understands the message.

Quiz



6.

A project manager of an information technology project is discussing a complex algorithm with a new team member. After a long and thorough verbal discussion, the project manager asks the person if he has understood the algorithm and can put it in the document. The team member implies that he has understood. However, when the project manager goes through the document, he realizes that the member hasn't understood what was actually said, thus resulting in an inefficient use of time and effort. Who is responsible for this loss of time, and how could this be avoided?

- A ➤ Project manager; he should not have given the complex assignment to a new team member.
- B ➤ Team Member; he should have not implied that he had understood but should have cleared his doubts immediately.
- C ➤ Project Manager; he should have helped the team member in preparing and reviewing the document.
- D ➤ Project manager; it is his responsibility to ensure that his message is clear and concise and confirm that the team member truly understands the message.



The correct answer is: **D**

In the communication model, it is the sender's responsibility to make the message clear, complete, and concise so that the recipient can receive it. The sender must also confirm that the recipient truly understands the message. Therefore, the responsibility lies with the project manager.

Quiz



7.

Xavier is a project manager of a large learning management system implementation. He recently held a meeting with the project's key stakeholders. One of the Senior Directors from Sales complained that there were never any status updates for the project. Xavier has spent considerable time on weekly project status reports to ensure they were accurate and well formatted. He has printed hard copies of the reports and placed them on stakeholders' desks. What should Xavier do?

- A ➤ Immediately send an email to all stakeholders explaining the status report process and include copies of all status reports.
- B ➤ Follow-up with the Senior Director and confirm whether a printed status reports best meets his communication needs. Update the Communication Plan if there are any changes.
- C ➤ Transition to an email distribution of the status reports.
- D ➤ At this point, Xavier does not need to do anything,. Not all stakeholders will be fully engaged in the project, and it is not his job to ensure that they read the status reports.

Quiz



7.

Xavier is a project manager of a large learning management system implementation. He recently held a meeting with the project's key stakeholders. One of the Senior Directors from Sales complained that there were never any status updates for the project. Xavier has spent considerable time on weekly project status reports to ensure they were accurate and well formatted. He has printed hard copies of the reports and placed them on stakeholders' desks. What should Xavier do?

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- B ➤ Follow-up with the Senior Director and confirm whether a printed status reports best meets his communication needs. Update the Communication Plan if there are any changes.
- C ➤ Transition to an email distribution of the status reports.
- D ➤ At this point, Xavier does not need to do anything,. Not all stakeholders will be fully engaged in the project, and it is not his job to ensure that they read the status reports



The correct answer is: **B**

Checking with the Director on his preferred communication channel is an important component of the Communication Management Plan. As a Sales Director, it is possible that the stakeholder might not be in the office consistently to benefit from hard copies of the reports. Any changes should be updated in the Communication Management Plan.

Quiz



8.

Sally spends part of each Friday afternoon informally connecting with all project team members to ensure that they are aware of the priorities and status of the project. What process is Sally performing?

- A ➤ Monitor Communications
- B ➤ Plan Communications Management
- C ➤ Team management
- D ➤ Quality Control

Quiz



8.

Sally spends part of each Friday afternoon informally connecting with all project team members to ensure that they are aware of the priorities and status of the project. What process is Sally performing?

- A ➔ Monitor Communications
- B ➔ Plan Communications Management
- C ➔ Team management
- D ➔ Quality Control



The correct answer is: **A**

Sally is monitoring the effect of her communications using interpersonal and team skills.



Key Takeaways

- ▷ Communication is a two-way process of transferring information from one entity to another.
- ▷ The four commonly used communication methods are formal written, formal verbal, informal written, and informal verbal.
- ▷ The total number of unique channels of communication can be calculated using the formula $n * (n - 1)/2$.
- ▷ By analyzing the basic communication model, problems in project communication can be identified.
- ▷ Project manager is responsible for timely availability of information to all the stakeholders.
- ▷ The three Project Communications Management processes are Plan Communications Management, Manage Communications, and Monitor Communications.



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Lesson 12: Project Risk Management



This course is based on the Project Management Institute, *A Guide to the Project Management of Body of Knowledge (PMBOK® Guide)* – Sixth Edition.
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Objectives

- ▷ Define risk
- ▷ Describe the key terms related to risk
- ▷ Learn how to calculate risk
- ▷ Identify different categories of risk
- ▷ Describe Project Risk Management processes

Risk



The definition of *Risk is as follows:

"Risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more of a project's objectives."



You are managing a gas pipeline expansion project in Canada. The project funds are allocated in US dollars even though most of the expenses are in Canadian dollars. Exchange fluctuations are a risk to the project budget. Shortly after the project starts, the Canadian dollar depreciates significantly, which contributes to a budget surplus. This is an example of a positive risk.

If a major storm delays construction of a commercial office tower, the project timelines may be delayed. This is an example of negative risk.

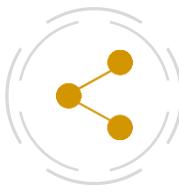
*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 397

Positive Risk Responses

Positive Risks have positive effects associated with them and are often called Opportunities. There are four response types for Positive Risks.



Enhance



Share



Exploit



Accept

The enhance strategy is used to increase the probability or impact of an opportunity.

Example: A construction project that involves building six apartment complexes in different parts of the country is underway. One of the teams is using a new construction design tool that has increased efficiency by 20%. The project manager enhances this result by having the other construction teams use the same tool.

Sharing involves transferring ownership of an opportunity to a third party so that it shares some of the benefit if the opportunity occurs.

Example: Your company is bidding for a large engineering project for a hydroelectric dam. As the team reviews the scope of the project, it sees an opportunity to increase its success if it partners with a company that has experience with advanced hydroelectric technology. The positive benefits of this risk are shared with the other company.

The exploit strategy can be used for high-priority opportunities, where the organization wants to ensure that the opportunity is realized.

Example: A large software development project has three teams working on different components within the architecture. If one of the teams completes work sooner than scheduled, the project manager can exploit this opportunity by allocating work from the other two teams to it.

Accepting an opportunity acknowledges its existence, but no proactive action is taken.

Example: A project constructing an overpass in a large city will have a pool of experienced construction workers to draw upon. As the project scope is constrained to the construction of this overpass and there is little opportunity to enhance, share, or exploit the positive effects of this risk, the project manager accepts the risk.

Negative Risk Responses

Negative Risks have negative effects associated with them and are often called Threats. There are four responses types for Negative Risks.



Avoid



Transfer



Mitigate



Accept

Risk avoidance is when the project teams act to eliminate the threat or protect the project from its impact.

Example: A project is building a new offshore drilling rig in the Gulf of Mexico. The risk of a hurricane during setup would impact schedule and budget. The project manager avoids this risk by setting up the rig outside of hurricane season.

Transfer involves shifting ownership of a threat to a third party to manage the risk and to bear the impact if the risk occurs.

Example: A large commercial office building is under construction. The work location has many flammable materials and there is a risk of fire that could damage/destroy the structure, causing significant budget/schedule impact. The project manager budgets for fire insurance during the construction phase until fire prevention equipment is installed.

In risk mitigation, action is taken to reduce the probability of occurrence or impact.

Example: A software development project is transitioning from the Java to .Net programming language. The risk that the developers will not be as familiar with .Net could lead to project schedule delays. The project manager mitigates this risk by providing training to the developers and hiring a .Net developer as a contractor.

Risk acceptance acknowledges the existence of a threat, but no proactive action is taken.

A project manager is concerned that his team does not have access to a printer at their work location. This will require the team to walk down the hall whenever they need a printout. The project manager decides to accept this risk as it has a low impact on his project.

Key Terms

- Negative risks are known as **threats** and positive risks are known as **opportunities**.
- A risk that can only have a negative consequence is called **pure risk**.
- A risk that can have a positive or negative consequence is called **business risk**.

Given below are other risk-related terms:

Risk averse

One who does not take risks.

Risk tolerance

The level of risk that can be tolerated.

Risk threshold

Amount of risk that is acceptable.



Remember, after a risk occurs, it is no longer “an uncertain event or condition”; it becomes an issue.

Issues should be resolved immediately or have a workaround identified.

Calculation of Risk

Risks can be managed only if they are measured quantitatively.

- Risk is measured by assigning a monetary value to it.
- Risk is calculated by multiplying probability and impact of risk.

Formula:

$$\text{Risk Exposure} = \text{Risk Probability} * \text{Risk Impact}$$

Where risk probability is the likelihood that a risk event could happen and risk impact is the effect on the project objectives if a risk event happens

Calculation of Risk: Example



Calculate the expected monetary value for the given work packages.

Work Package	Probability	Impact
X	25%	-\$10,000
Y	40%	-\$2,000
Z	10%	+\$20,000



Work Package	Probability	Impact	Expected Monetary Value (EMV)
X	25%	-\$10,000	-\$2,500
Y	40%	-\$2,000	-\$800
Z	10%	+\$20,000	+\$2,000
TOTAL EMV			-\$1,300

Risk Categorization

Risks can be classified in various ways. One classification of risk is as follows:

External Risks

- Arise out of external factors, for example, regulatory or governmental policies, subcontractors, suppliers, environment, etc.

Internal Risks

- Arise within the project, for example, funding, resources, prioritization, etc.

Technical Risks

- Arise out of the technology being used, for example, requirements, technology, quality, etc.

Project Management Risks

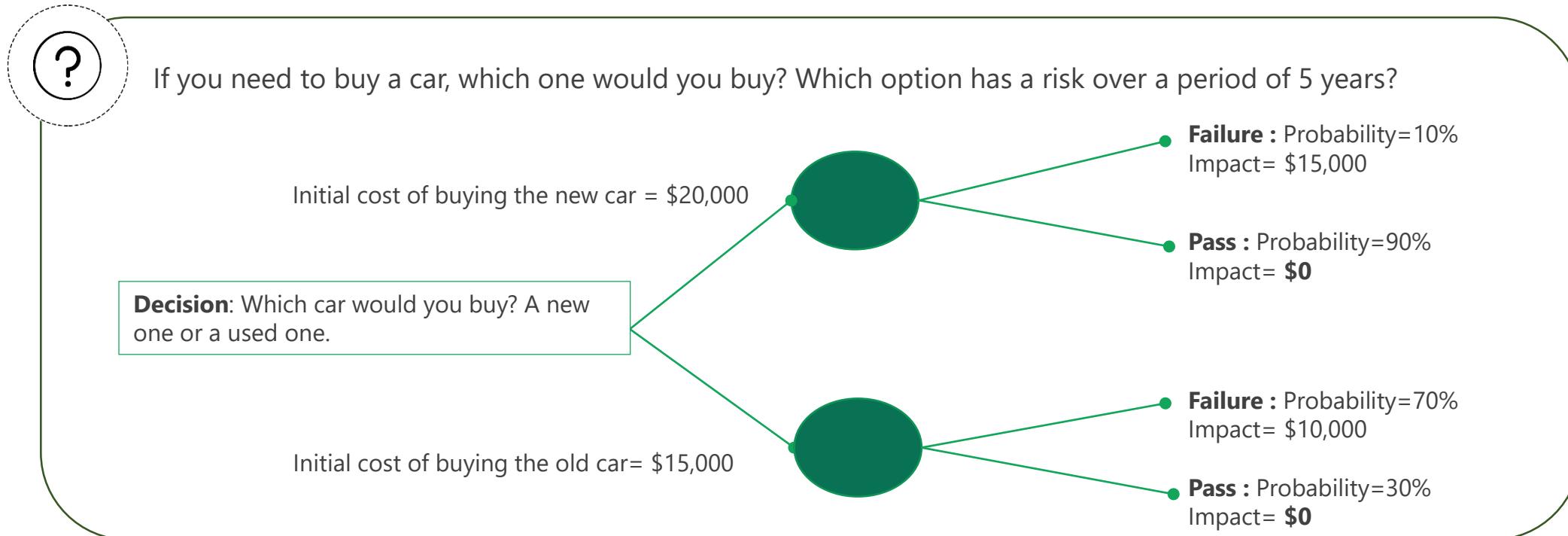
- Arise out of project management activities, for example, estimating, planning, schedule, communication, etc.



Risks can also be classified on the basis of their origin: scope risks, resource risks, schedule risks, cost risks, and quality risks.

Decision Tree

A decision tree is used to analyze risk and its impact on decisions in the face of uncertainties.



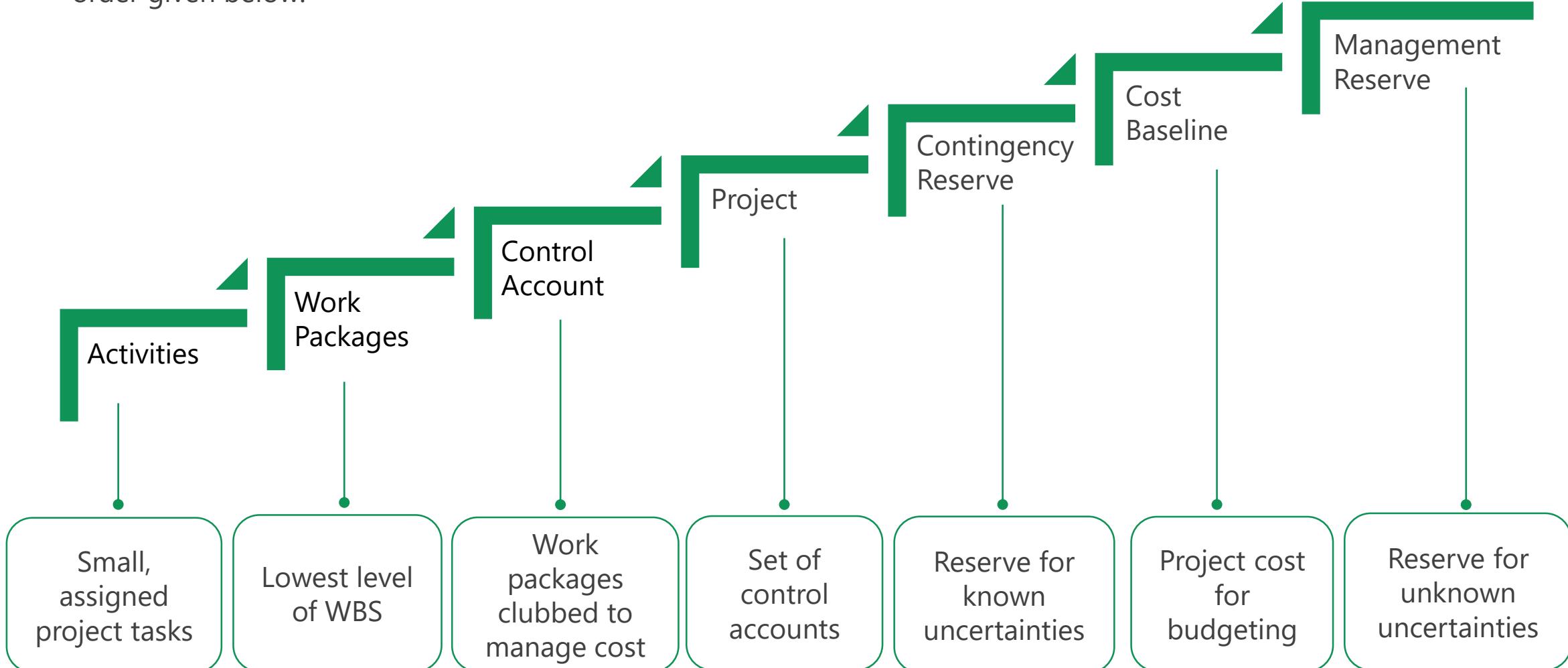
Risk Exposure = Probability * Impact

Risk associated with the new car is $\$20,000 + (\$15,000 * 10\%) + (\$000 * 90\%) = \$21,500$

Risk associated with the old car is $\$15,000 + (\$10,000 * 70\%) + (\$000 * 30\%) = \$22,000$

Risk Reserve

Project cost should include both the known and unknown risks. The various risk reserves are calculated in the order given below:



Project Risk Management

The definition of *Project Risk Management is as follows:

Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, response implementation, and monitoring risk on a project.^[2]

The key objective of risk management is to:

- Increase the probability and impact of positive events
- Decrease the probability and impact of negative events

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 395

Business Scenario: Problem Statement



- Cynthia is a subject matter expert and the Director of New Store Construction in Small Markets. As she has expertise and experience in managing complex store construction for the corporation, she has been appointed as the manager of a new, large, and complex construction project involving a gas station.
- None of the previous construction projects included a gas station and convenience store component. Since this is a new initiative and a way for the company to diversify its business, this project is critical to the business, very visible to senior management, and can be a career maker or breaker.
- The senior management team is anxious to see the project brought to life, but the company lacks a strong risk management process. The company would like Cynthia to prepare a risk response plan and submit it prior to the project's first milestone in 3 weeks. What should Cynthia do?

Business Scenario: Solution



- As the company lacks a risk management structure and has handled risk poorly in the past, Cynthia should first search internally for risk experts. Internal experts would be knowledgeable of risks that exist within the business as it deals with construction.
- She should then identify subject matter experts external to the organization who are knowledgeable about risk management as it relates to convenience stores with a gas station component.
- Another viable resource would be the historical documents around risk from previously completed projects, which will also point out other stakeholders and/or SMEs who can contribute to the risk response planning process.
- After the key players are in place, Cynthia can work with them to go through the identification and prioritization process of risk that leads up to the development of their plan.

Project Risk Management Processes

Highlighted here are the Project Risk Management processes:

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

Table 1-4. Project Management Process Group and Knowledge Area Mapping

Plan Risk Management

"Plan Risk Management is the process of defining how to conduct risk management activities for a project. The key benefit of this process is it ensures that the degree, type, and visibility of risk management are proportionate to both risks and the importance of the project to the organization and other stakeholders." It is part of the Planning Process Group.

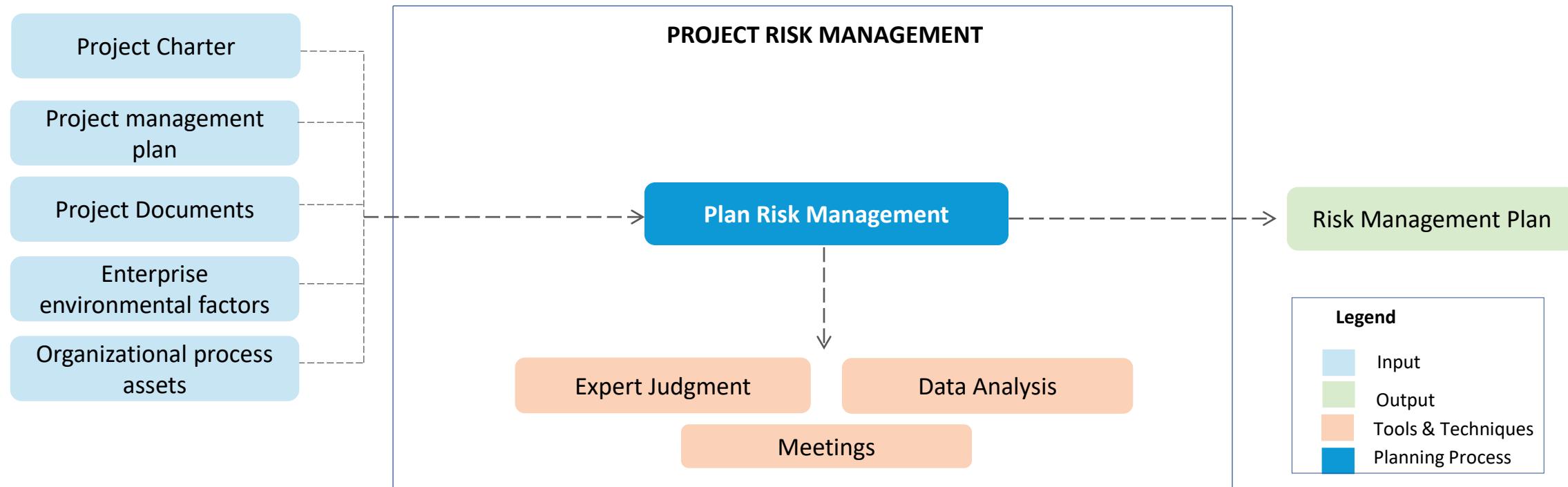


Figure 11-2. Plan Risk Management: Inputs, Tools & Techniques, and Outputs

Definition of Impact Scale

The table given below shows the impact on scope, cost, time, and quality.

Project Objective	Very Low 0.05	Low 0.1	Moderate 0.2	High 0.4	Very High 0.8
Scope	Barely noticeable change	Minor areas affected	Some important areas affected	Unacceptable change in scope	Entire scope rendered useless
Cost	Insignificant cost increase	<10% cost increase	10-20% cost increase	20-40% cost increase	>40% cost increase
Time	Insignificant change	<5% change to schedule	5-10% change to schedule	10-20% schedule change	>20% schedule change
Quality	Barely noticeable degradation	Few parameters affected	Needs sponsor approval	Major quality compromise	Need to scrap the project

Identify Risks

"Identify Risks is the process of identifying individual project risks as well as sources of overall project risk and documenting their characteristics." It belongs to the Planning Process Group.

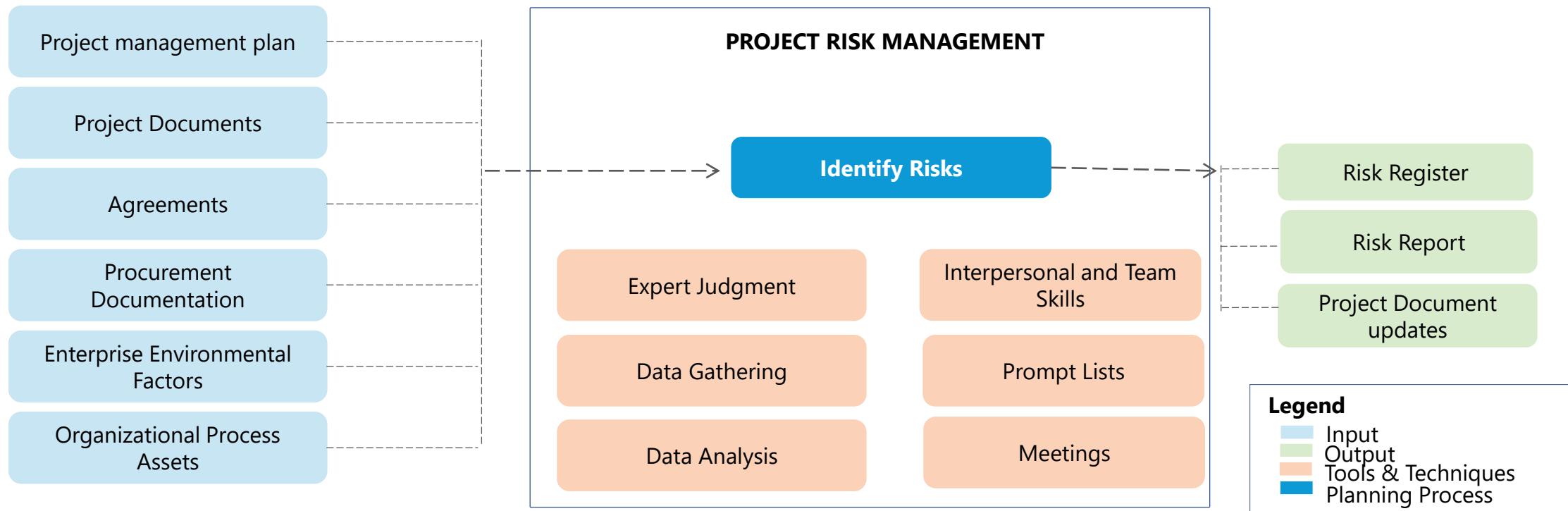


Figure 11-6. Identify Risks: Inputs, Tools & Techniques, and Outputs

Perform Qualitative Risk Analysis

"Perform Qualitative Risk Analysis is the process of prioritizing individual project risks for further analysis or action by assessing their probability of occurrence and impact as well as other characteristics." This process belongs to the Planning Process Group.

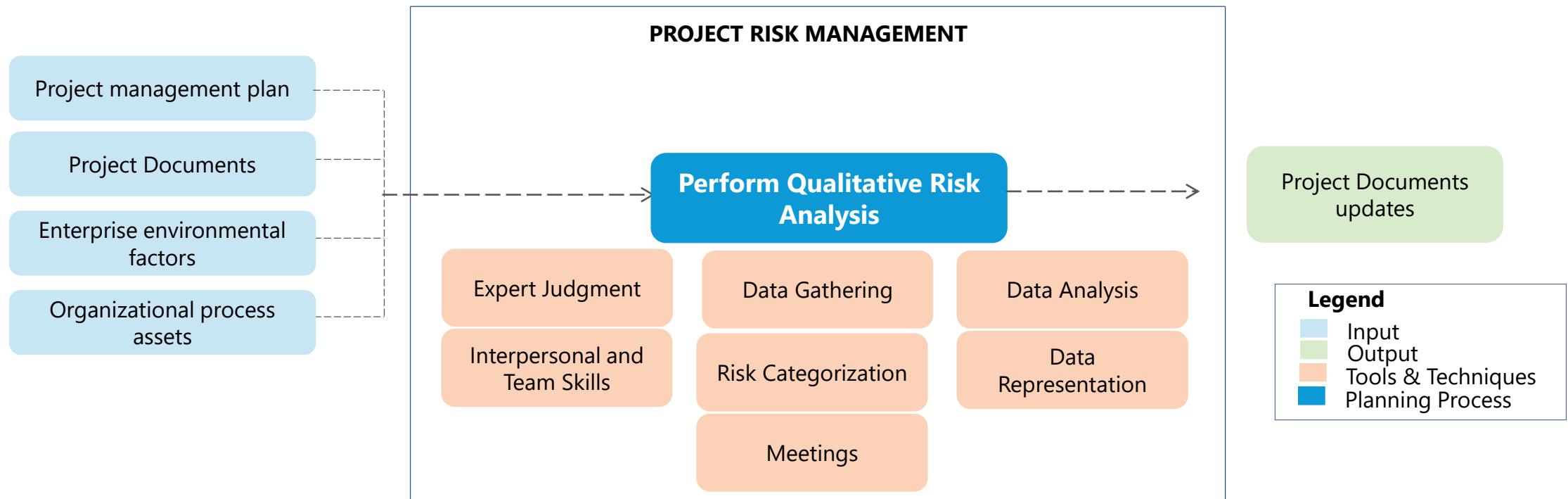
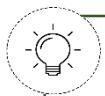


Figure 11-8. Perform Qualitative Risk Analysis: Inputs, Tools & Techniques, and Outputs



Concept based questions on qualitative risk analysis can be expected in the exam.

Probability and Impact Matrix: Example

A probability and impact matrix tabulates the probability and impact scales for the opportunities and threats on the project.

		Threats						Opportunities				
		Probability	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Impact	
Probability	High	0.9	0.05	0.09	0.18	0.36	0.72	0.72	0.36	0.18	0.09	0.05
	Medium	0.7	0.04	0.07	0.14	0.28	0.56	0.56	0.28	0.14	0.07	0.04
	Low	0.5	0.03	0.05	0.10	0.20	0.40	0.40	0.20	0.10	0.05	0.03
	Impact	0.3	0.02	0.03	0.06	0.12	0.24	0.24	0.12	0.06	0.03	0.02
	Impact	0.1	0.01	0.01	0.02	0.04	0.08	0.08	0.04	0.02	0.01	0.01
	Impact	Impact	0.05	0.10	0.20	0.40	0.80	0.80	0.40	0.20	0.10	0.05



Once the probability and impact matrix is filled, a risk threshold can be defined, and a risk becomes a candidate for active management.

Perform Quantitative Risk Analysis

"Perform Quantitative Risk Analysis is the process of numerically analyzing the combined effect of individual project risks and other sources of uncertainty on overall project objectives." This is part of the Planning Process Group.

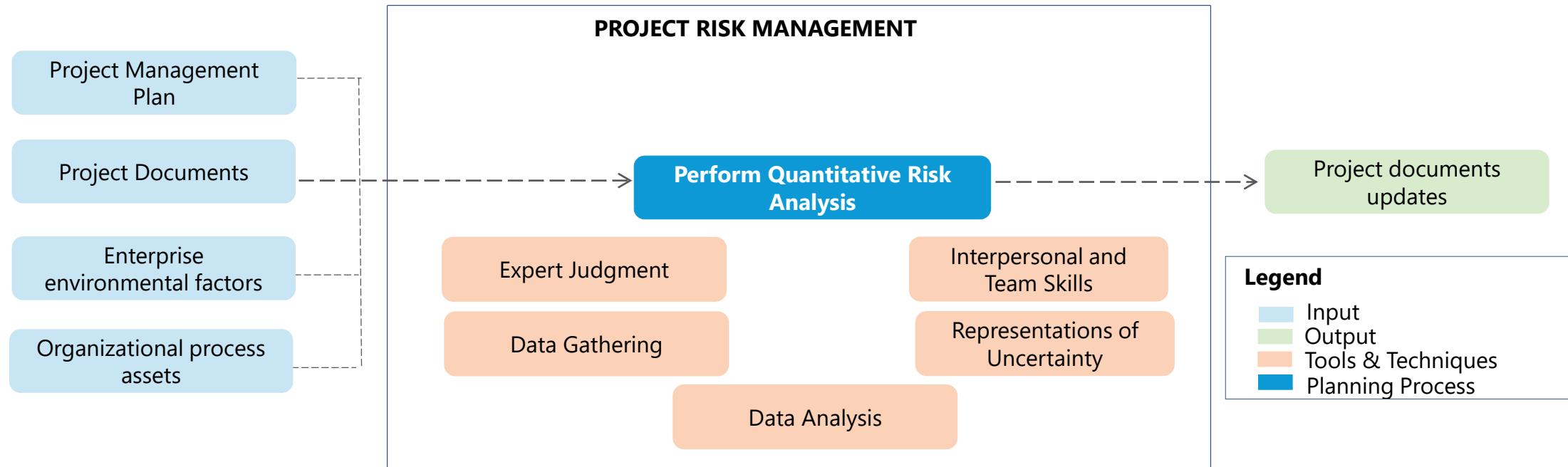


Figure 11-11. Perform Quantitative Risk Analysis: Inputs, Tools & Techniques, and Outputs



Concept based questions on quantitative risk analysis can be expected in the exam.

Plan Risk Responses

"Plan Risk Responses is the process of developing options, selecting strategies, and agreeing on actions to address overall project risk exposure, as well as to treat individual project risks."

It is part of the Planning Process Group.



Figure 11-16. Plan Risk Responses: Inputs, Tools & Techniques, and Outputs



Residual risks are those that remain after the risk responses were implemented.

Secondary risks arise out of implementing risk responses.

Implement Risk Response

"Implement Risk Response is the process of implementing agreed-upon risk response plans. The key benefit of this process is it ensures that agreed-upon risk responses are executed as planned in order to address overall project risk exposure, minimize individual project threats, and maximize overall project opportunities." It is part of the Executing Process Group.

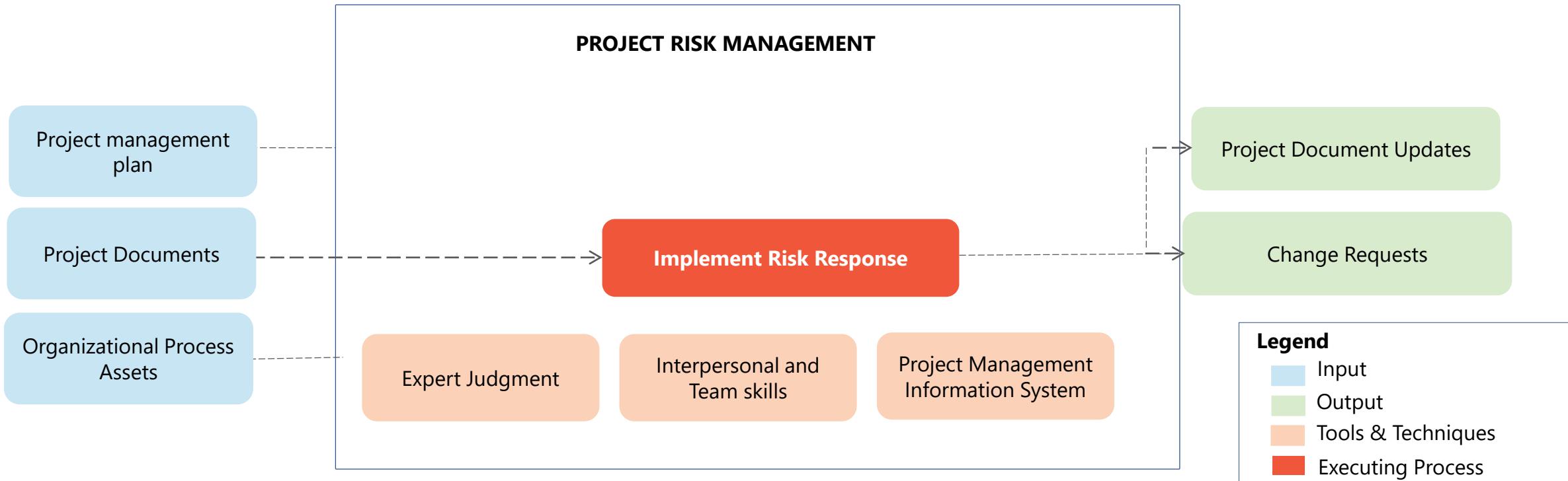
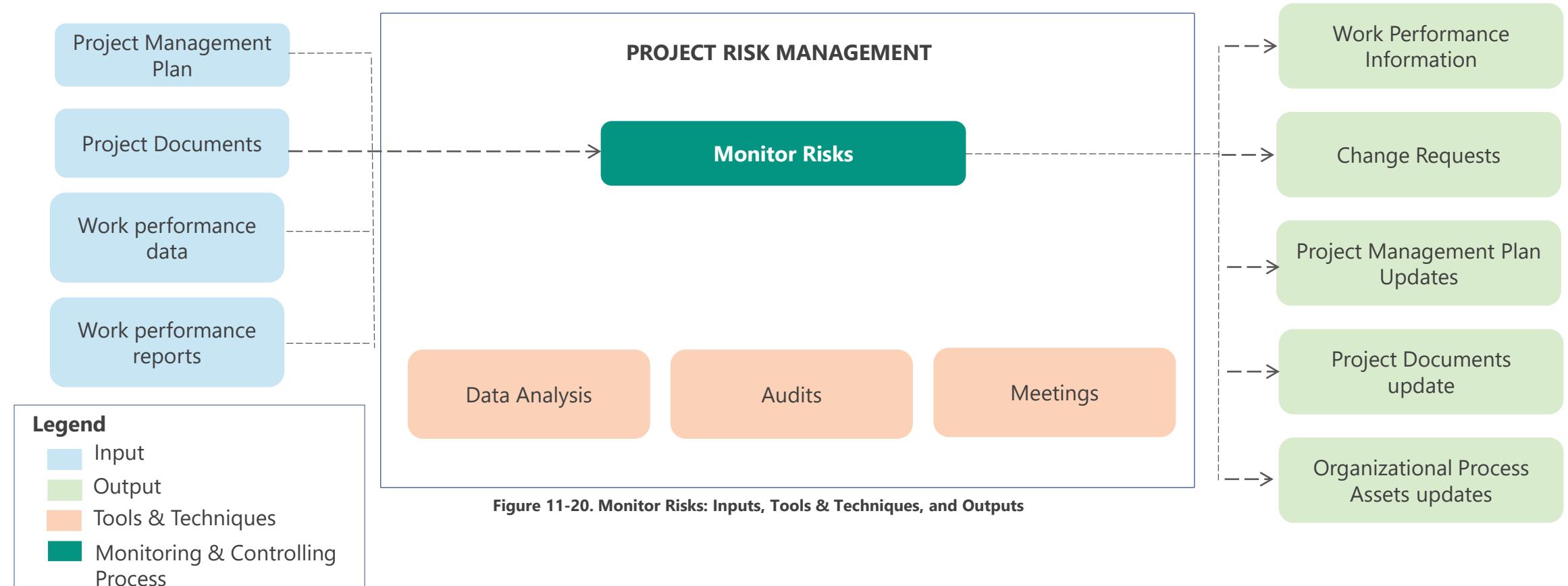


Figure 11-18. Implement Risk Responses: Inputs, Tools & Techniques, and Outputs

Monitor Risks

"Monitor Risks is the process of monitoring the implementation of agreed-upon risk response plans, tracking identified risks, identifying and analyzing new risks, and evaluating risk response effectiveness." It is part of the Monitoring and Controlling Process Group.

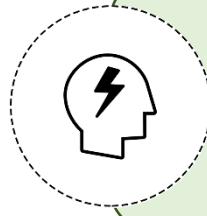




Quiz



Quiz



1. Purchasing insurance coverage for your project equipment is an example of _____ risk response.

- A ➤ Transfer
- B ➤ Mitigation
- C ➤ Acceptance
- D ➤ Avoidance

Quiz



- Purchasing insurance coverage for your project equipment is an example of _____ risk response.

- A ➔ Transfer
- B ➔ Mitigation
- C ➔ Acceptance
- D ➔ Avoidance

The correct answer is: **A**

This is an example of transfer as the financial risk is transferred to the insurance company.



Quiz



2. What action should a project manager first take when an unidentified risk event occurs?

- A ➤ Inform the customer of the possible consequences
- B ➤ Inform the senior management of the possible consequences
- C ➤ Redo the risk identification process to prepare for other 'known-unknowns'
- D ➤ Create a work-around

Quiz



2. What action should a project manager first take when an unidentified risk event occurs?

- A ➤ Inform the customer of the possible consequences
- B ➤ Inform the senior management of the possible consequences
- C ➤ Redo the risk identification process to prepare for other 'known-unknowns'
- D ➤ Create a work-around



The correct answer is: **D**

The right project management practice is to create a work-around as a response to the event.

Quiz



3. You are a project manager at a financial firm that has multinational dealings. You feel the financial meltdown in one of the client countries could affect your project adversely, so you want to hedge your risks. Although the probability of occurrence of the event is low, you are advised to play it safe. In terms of risk attitude, your organization could best be described as?

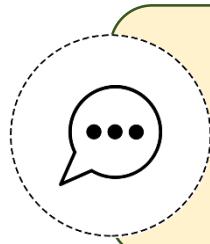
- A ➤ Risk Seeker
- B ➤ Risk Averse
- C ➤ Risk Neutral
- D ➤ Risk Mitigator

Quiz



3. You are a project manager at a financial firm that has multinational dealings. You feel the financial meltdown in one of the client countries could affect your project adversely, so you want to hedge your risks. Although the probability of occurrence of the event is low, you are advised to play it safe. In terms of risk attitude, your organization could best be described as?

- A ➤ Risk Seeker
- B ➤ Risk Averse
- C ➤ Risk Neutral
- D ➤ Risk Mitigator



The correct answer is: **B**

Someone who doesn't want to take risks is called risk averse, and the attitude of the organization seems to be the same.

Quiz



4. Decision tree analysis can be described as a _____.

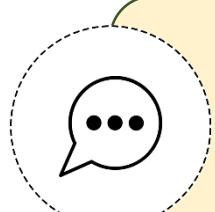
- A ➤ Quantitative risk analysis and modeling technique
- B ➤ Subset of the EMV technique
- C ➤ Subset of the Earned Value Management (EVM) technique
- D ➤ Risk response strategy

Quiz



4. Decision tree analysis can be described as a _____.

- A ➤ Quantitative risk analysis and modeling technique
- B ➤ Subset of the EMV technique
- C ➤ Subset of the Earned Value Management (EVM) technique
- D ➤ Risk response strategy



The correct answer is: **A**

Decision tree analysis is a quantitative risk analysis technique that involves a diagram describing different decisions under consideration and the impact on the project of choosing one over the other.

Quiz



5. How early can comprehensive risk analysis be done on a project?

- A ➤ During project initiation
- B ➤ After scope decomposition
- C ➤ During scope validation
- D ➤ After the project management plan has been baselined

Quiz



5. How early can comprehensive risk analysis be done on a project?

- A ➤ During project initiation
- B ➤ After scope decomposition
- C ➤ During scope validation
- D ➤ After the project management plan has been baselined



The correct answer is: **B**

A comprehensive risk analysis can be done only after the entire scope has been defined in the Work Breakdown Structure (WBS).

Quiz



6. A project manager is managing a pilot project of a short duration and has started the risk management planning process. He has identified new risks and prioritized them based on the probability and impact matrix. The project manager now proceeds to plan responses for the risks without analyzing the risks numerically. According to you, this decision of project manager is:

- A ➤ Incorrect, as it is important to numerically analyze each risk so that it can be responded properly
- B ➤ Correct, as quantitative risk analysis is a waste of time and not required if risks are already assessed qualitatively
- C ➤ Incorrect, as quantitative risk analysis is important to calculate EMV for each risk and then later move to risk response planning
- D ➤ Correct, as this is a short project and project manager might skip quantitative risk analysis if he feels it is not assisting in the risk management process

Quiz



6. A project manager is managing a pilot project of a short duration and has started the risk management planning process. He has identified new risks and prioritized them based on the probability and impact matrix. The project manager now proceeds to plan responses for the risks without analyzing the risks numerically. According to you, this decision of project manager is:

- A ➤ Incorrect, as it is important to numerically analyze each risk so that it can be responded properly
- B ➤ Correct, as quantitative risk analysis is a waste of time and not required if risks are already assessed qualitatively
- C ➤ Incorrect, as quantitative risk analysis is important to calculate EMV for each risk and then later move to risk response planning
- D ➤ Correct, as this is a short project and project manager might skip quantitative risk analysis if he feels it is not assisting in the risk management process

The correct answer is: **D**

The amount of rigor in the analysis is dependent upon the duration and complexity of the project. For a project with a short duration, it may not be necessary to perform numeric (quantitative) risk analysis.

Quiz



7. Which of the following is not a response type for positive risks?

- A ➤ Exploit
- B ➤ Enhance
- C ➤ Accept
- D ➤ Leverage

Quiz



7. Which of the following is not a response type for positive risks?

- A ➤ Exploit
- B ➤ Enhance
- C ➤ Accept
- D ➤ Leverage



The correct answer is: **D**

Leverage is not one of the positive risk responses identified by PMBOK. Exploit, Enhance, Accept, and Share are the four positive risk responses.

Quiz



8. John is managing a project. He conducted a risk assessment workshop with project stakeholders and identified several risks. He is concerned about the amount of time it will take for quantitative and qualitative risk analysis and to develop a risk response plan. What should John do?

- A ➤ As the risks were identified by project stakeholders, John needs to ensure that each risk follows the risk management processes.
- B ➤ John should use his expert judgement to decide which risks warrant more complete risk analysis and response.
- C ➤ John should create a Probability and Impact matrix that determines risk thresholds for quantitative and qualitative risk assessments. He should apply this to his Risk Register and use that to determine which risks need analysis and risk responses.
- D ➤ John should refer this decision to the project stakeholders who can determine which risks merit response.

Quiz



8. John is managing a project. He conducted a risk assessment workshop with project stakeholders and identified several risks. He is concerned about the amount of time it will take for quantitative and qualitative risk analysis and to develop a risk response plan. What should John do?

- A ➤ As the risks were identified by project stakeholders, John needs to ensure that each risk follows the risk management processes.
- B ➤ John should use his expert judgement to decide which risks warrant more complete risk analysis and response.
- C ➤ John should create a Probability and Impact matrix that determines risk thresholds for quantitative and qualitative risk assessments. He should apply this to his Risk Register and use that to determine which risks need analysis and risk responses.
- D ➤ John should refer this decision to the project stakeholders who can determine which risks merit response.



The correct answer is: **C**

The Probability and Impact matrix is an important tool for project managers to determine which risks warrant deeper analysis and response plans. The PMO at John's company might already have a matrix that he can leverage.



Key Takeaways

- ▷ Risk is an uncertain event or condition that has a positive or negative effect on a project's objectives.
- ▷ Risk is calculated by multiplying probability and impact of risk (Risk Weighting = Probability * Impact).
- ▷ Risk can be classified in various ways. Under one category, risks are classified as external, internal, technical, and project management. On the basis of origin, risks can be classified as scope, resource, schedule, cost, and quality risks.
- ▷ A decision tree is used to analyze risk and its impact on decisions in the face of uncertainties.
- ▷ The seven Project Risk Management processes are Plan Risk Management, Identify Risks, Perform Qualitative Risk Analysis, Perform Quantitative Risk Analysis, Plan Risk Responses, Implement Risk Responses, and Monitor Risks.



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Lesson 13: Project Procurement Management

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Objectives

- ▷ Define contract
- ▷ Differentiate between centralized and decentralized contracting
- ▷ Explain the different types of contract
- ▷ Identify the key terms used in Procurement Management
- ▷ Describe the Project Procurement Management processes

Contracts

The definition of a *Contract is as follows:

A contract represents a mutually binding agreement that obligates the seller to provide the specified products, services, or results and obligates the buyer to provide the monetary or other valuable consideration in return. A contract can also be called an agreement, understanding, undertaking, or a purchase order.

The two parties involved in a contract are the buyer and the seller. A seller provides the goods and services and the buyer buys these for a compensation.

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 489

Characteristics of Contract

The characteristics of a contract are as follows:

A contract must be formal and in written form.

A contract must have legal remedies.

Changes to contracts must also be subject to the same checks as the contract itself.

A contract is created and managed by contract managers, also called the procurement managers.

Centralized vs. Decentralized Contracting

In centralized contracting, a single contract manager handles multiple projects, whereas in decentralized contracting, a contract manager is assigned to a project full time and reports to the project manager.

The advantages and disadvantages of the two methods are as follows:

Method	Advantages	Disadvantages
Centralized Contracting	<ul style="list-style-type: none">Increased expertise in contractingStandardized company practices	<ul style="list-style-type: none">Difficult to get contracting help as the contractors may be involved in multiple projects
Decentralized Contracting	<ul style="list-style-type: none">More focus and control on the projectEasier access to contracting experience	<ul style="list-style-type: none">Duplication of expertiseLess standardization of contracting practices from one project to another



If British Petroleum is starting a project of setting up a new refinery plant in Nigeria, they can procure key machinery through centralized purchasing department and later have a full-time contract manager to procure smaller equipment, locally.

Types of Contract

Contracts can be of three types. They are as follows:

Cost Reimbursable (CR) or Cost Plus

The seller is paid based on the actuals. Cost plus, say, incentive or fixed fee will be paid in addition to the actuals.

Cost-based contracts can be classified as:

- Cost Plus Fee (CPF) or Cost Plus Fixed Fee (CPFF)
- Cost Plus Percentage of Costs (CPPC)
- Cost Plus Incentive Fee (CPIF)
- Cost Plus Award Fee (CPAF)

Time and Material (T and M) or Unit Price

Time and material (T and M) or unit price contracts are generally used for smaller projects, wherein customer pays per item, hour, or day.

Fixed Price (FP) or Lump Sum

Fixed price contracts (or lump sum contracts) are generally signed when the scope of work is very clear.

Fixed price contracts can be classified as:

- Fixed Price Incentive Fee (FPIF)
- Fixed Price – Economic Price Adjusted (FP – EPA)
- Firm Fixed Price (FFP)

Business Scenario: Problem Statement



- Scott is the Project Manager for a global project, which is very demanding and critical to his company. His Project Sponsor is confident in his team's ability to finish the project under budget and ahead of schedule.
- To manage the huge demand, Scott has to make a decision to procure additional resources.
- The additional resources would be responsible for activities requiring specific skills, which his project team lacks.
- The customer has an incentive clause in the project's agreement that yields a bonus for early completion. Scott has a vision for the work the additional resources will complete, but there is also an opportunity to expand their scope of work, especially if he runs into scheduling problems that will require him to crash the critical path.
- What contract should Scott establish to procure the additional resources?

Business Scenario: Solution



- Although Scott wants to complete his project early so that the team can receive the bonus for early completion, he has to pick a contract that is less risky and based on the scope of work.
- Out of the available contracts, the best choice for Scott is the Time and Material Contract, which gives him more flexibility.
- Fixed Fee contracts require a well-defined scope of work, and Time and Material is the only option that accommodates open-ended work arrangements.

Types of Contract: Advantages and Disadvantages

The advantages and disadvantages of different types of contracts are as follows:

Type of Contract	Advantages	Disadvantages
Cost Reimbursement	<ul style="list-style-type: none">Less costly than fixed price because seller does not have to account for the riskSimple to draft	<ul style="list-style-type: none">Requires auditing all the seller invoices and thus increases buyer effortsSeller has less incentive to control cost and thus these contracts are inefficient, i.e., riskier for the buyer or the project manager
Fixed Price	<ul style="list-style-type: none">More efficient as the seller has strong incentive to control costRequires less effort by buyer to manage contracts as cost risk is with the seller	<ul style="list-style-type: none">Seller may underquote initially and later try to make high margins on change requestsNot having a proper Statement of Work (SOW) can result in seller not providing some of the deliverables
Time and Material	<ul style="list-style-type: none">Easy to createGood for resource augmentation assignments, where cost risk is shared by buyer and seller	<ul style="list-style-type: none">Seller has no incentive to control costsRequires monitoring of daily outputCan't be used in big projects

Key Terms



The following are the key terms used in Procurement Management:

Request for Information

Request for Information (RFI) is used to get potential sellers' information to see their capability.

Request for Proposal

Request for Proposal (RFP) is used to get proposals from prospective sellers.

Request for Quotation

Request for Quotation (RFQ) is used to get quotation from prospective sellers for standard products or services.

Request for Bid

Request for Bid (RFB) is used by the buyer to get bids from the shortlisted sellers.

Purchase Order

Purchase Order (PO) is the simplest type of commercial contract. PO is generally issued for small purchases.

Key Terms (Contd.)

Statement of Work

Statement of Work (SOW) defines the scope of the deliverables according to the contract.

Quotation

A Quotation is the submission of response by the vendor to a request from the buyer.

Non-disclosure Agreement

Non-disclosure Agreement (NDA) is signed between two parties to maintain the confidentiality of the information of each other. They abide by the agreement and don't disclose the information with any of the competitors.

Letter of Intent

Letter of Intent (LOI) is issued by the buyer to indicate that he is interested to carry on work with the seller.

Terms and Conditions

A procurement agreement includes certain Terms and Conditions (T and C) and may incorporate other items that the buyer specifies regarding what the seller should perform or provide.

Key Terms (Contd.)

Force majeure

It is a clause in contracts that frees both business parties from obligation in case of unavoidable events or an event described by the legal term as act of God (flood, hurricane, earthquake, and so on).

Doctrine of waiver

Doctrine of waiver is a voluntary act by a person or a party that surrenders a legal right.

Privity of contracts

The doctrine of Privity implies that the contract cannot confer rights or obligations to any party other than those directly involved in the contract.

Dispute resolution

It is about taking action or finding a resolution in case of disputes..

Termination for convenience of buyer

This involves termination of the contract by the buyer under any circumstances.

Project Procurement Management

The definition of *Project Procurement Management is as follows:

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

Project Procurement Management helps in determining the type of contract to be issued and guides in managing the contracts with the sellers.

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 459

Project Procurement Management Processes

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

Table 1-4. Project Management Process Group and Knowledge Area Mapping

Plan Procurement Management

"Plan Procurement Management is the process of documenting project procurement decisions, specifying the procurement approach, and identifying potential sellers." It belongs to the Planning Process Group.

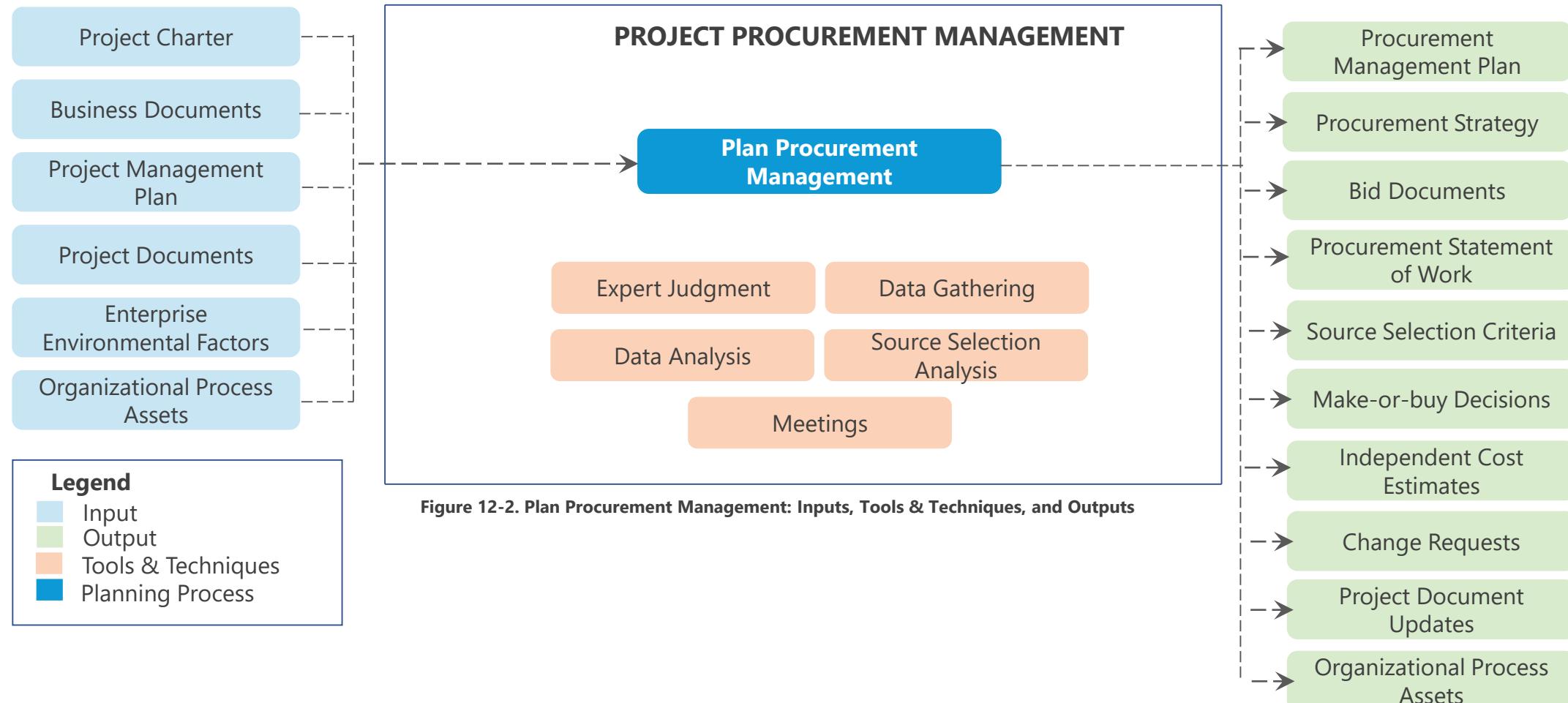
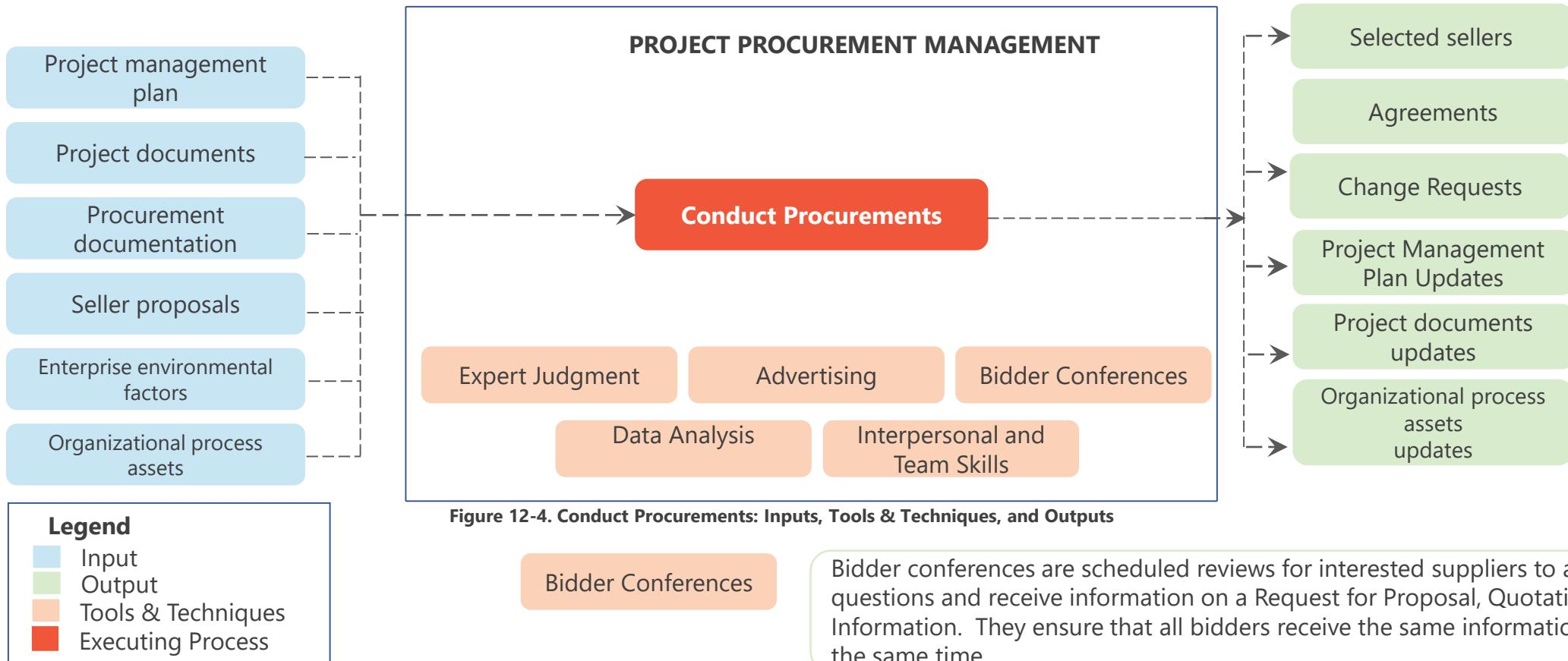


Figure 12-2. Plan Procurement Management: Inputs, Tools & Techniques, and Outputs

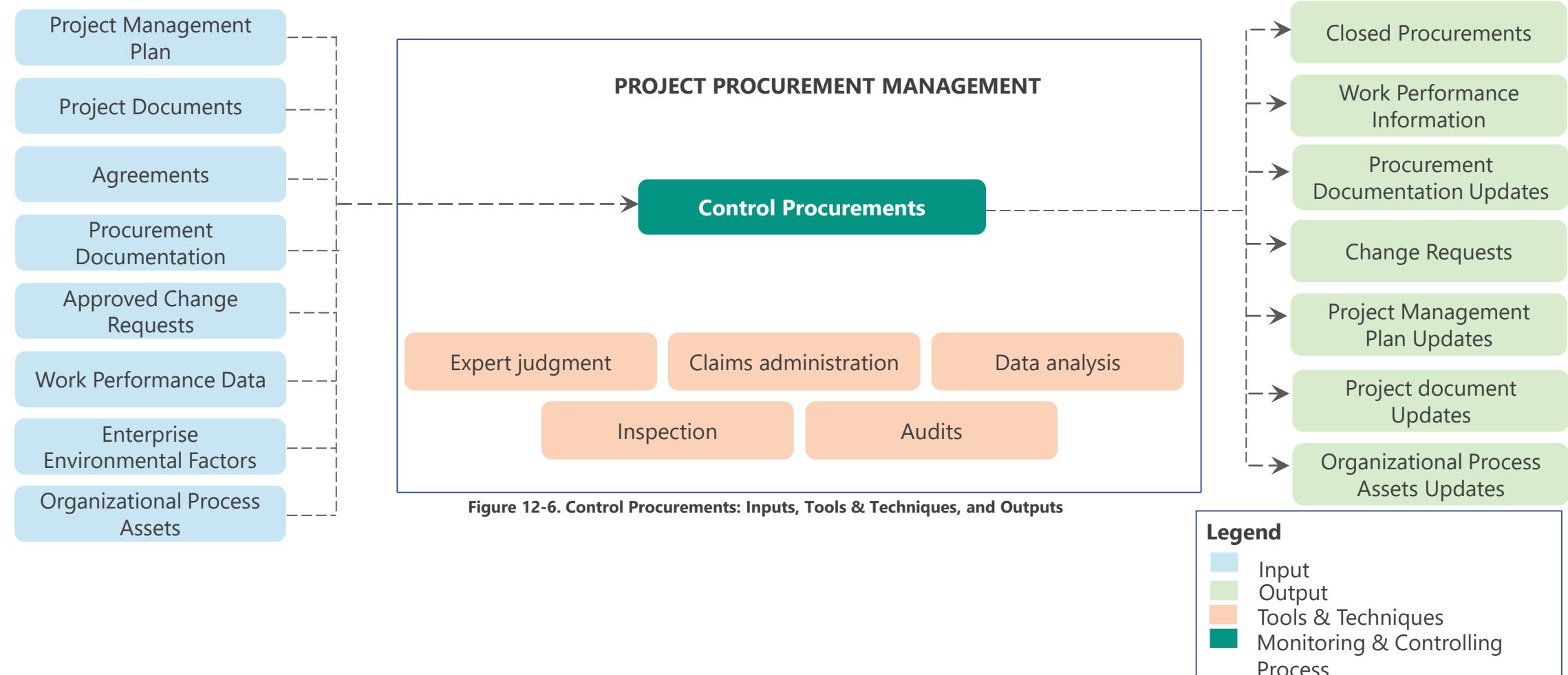
Conduct Procurements

"Conduct procurements is the process of obtaining seller responses, selecting a seller, and awarding a contract." It belongs to the executing process group.



Control Procurements

"Control Procurements is the process of managing procurement relationships, monitoring contract performance, and making changes and corrections to contracts as appropriate."^[3] It belongs to the Monitoring and Controlling Process Group.





Quiz



Quiz



1. What is the primary objective of negotiation?

- A ➤ Find a win-win proposition for both parties
- B ➤ Get the best deal
- C ➤ Define the exact responsibilities of each party
- D ➤ Clarify the contract scope

Quiz



1. What is the primary objective of negotiation?

- A ➤ Find a win-win proposition for both parties
- B ➤ Get the best deal
- C ➤ Define the exact responsibilities of each party
- D ➤ Clarify the contract scope



The correct answer is: **A**

Negotiation should result in a positive feeling for both parties so that their commitment toward the contract is assured.

Quiz



2.

You are in the process of selecting a seller from the shortlisted ones and awarding a contract. The process involves receiving bids or proposals and applying the defined selection criteria to select the seller who is qualified to perform the work. Which of the following is not an input to this process?

- A ➤ Procurement documentation
- B ➤ Make-or-buy decisions
- C ➤ Bidder conferences
- D ➤ Source selection criteria

Quiz



2.

You are in the process of selecting a seller from the shortlisted ones and awarding a contract. The process involves receiving bids or proposals and applying the defined selection criteria to select the seller who is qualified to perform the work. Which of the following is not an input to this process?

- A ➤ Procurement documentation
- B ➤ Make-or-buy decisions
- C ➤ Bidder conferences
- D ➤ Source selection criteria



The correct answer is: C

This is Conduct Procurements process. The inputs to this process are the project management plan, procurement documents, source selection criteria, seller proposals, project documents, make-or-buy decisions, and organizational process assets. Bidder conferences is the tool for this process.

Quiz



3.

You have been asked to assist the contract manager in drafting the contract for a large project with limited scope clarity. Which type of contract would you suggest so that your organization does not incur any financial losses?

- A ➤ Time and material
- B ➤ Fixed price
- C ➤ Cost plus fixed fee
- D ➤ Cost plus incentive fee

Quiz



3.

You have been asked to assist the contract manager in drafting the contract for a large project with limited scope clarity. Which type of contract would you suggest so that your organization does not incur any financial losses?

- A ➤ Time and material
- B ➤ Fixed price
- C ➤ Cost plus fixed fee
- D ➤ Cost plus incentive fee



The correct answer is: **C**

In a cost plus fixed fee project, the seller can exercise control over the cost rather than getting locked into a rate or a price. In a project with limited scope clarity, incentives are hard to define and agree.

Quiz



4.

A Cost Plus Incentive Fee (CPIF) contract has an estimated cost of \$150K with a predetermined fee of \$15K and a share ratio of buyer to seller equal to 70/30. The actual cost of the project is \$120K. How much savings did the seller make in total, and out of total savings, how much did he make due to the incentive?

- A ➤ \$30K, \$9K
- B ➤ \$55K, \$30K
- C ➤ \$32K, \$27K
- D ➤ \$15K, \$3K

Quiz



4.

A Cost Plus Incentive Fee (CPIF) contract has an estimated cost of \$150K with a predetermined fee of \$15K and a share ratio of buyer to seller equal to 70/30. The actual cost of the project is \$120K. How much savings did the seller make in total, and out of total savings, how much did he make due to the incentive?

- A ➤ \$30K, \$9K
- B ➤ \$55K, \$30K
- C ➤ \$32K, \$27K
- D ➤ \$15K, \$3K



The correct answer is: **A**

The estimated cost of project is \$150K, and the actual cost of project is \$120K. This implies a net saving of \$30K. The sharing ratio is 30% for the seller which is \$9K. The total value of the amount received by the seller is $\$120K + \$9K + \$15K = \$144K$ (actual cost + incentive + fixed fee).

Quiz



5.

As a project manager of a construction project, you are inviting requests for proposal from eligible vendors. On going through the list, you find the name of your friend and ex-colleague from university. He was a methodical, sharp student and excelled in his subjects. What should you do next?

- A ➤ Give him the contract as you are quite sure he would do a good job
- B ➤ Give him some inputs on how your organization awards the contract to improve his chances
- C ➤ Steer yourself away from the bidding process and inform your sponsor
- D ➤ Keep silent and continue with the procurement process

Quiz



5.

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- B ➤ Give him some inputs on how your organization awards the contract to improve his chances
- C ➤ Steer yourself away from the bidding process and inform your sponsor
- D ➤ Keep silent and continue with the procurement process



The correct answer is: **C**

This situation presents a potential conflict of interest. The best option for the project manager is to discuss it with his project sponsor and then disassociate himself from the process.

Quiz



6. Which of the following is not an advantage of a fixed price contract?

- A ➤ Less work for buyer to manage
- B ➤ Seller has a strong incentive to control costs
- C ➤ Buyer knows the total price at project start
- D ➤ Final cost may be more than that specified in a cost reimbursable contract because contractors have to inflate the price to cover their risk

Quiz



6. Which of the following is not an advantage of a fixed price contract?

- A ➤ Less work for buyer to manage
- B ➤ Seller has a strong incentive to control costs
- C ➤ Buyer knows the total price at project start
- D ➤ Final cost may be more than that specified in a cost reimbursable contract because contractors have to inflate the price to cover their risk

The correct answer is: **D**



Inflating the price to cover risks will only result in increasing the price for the buyers. This is definitely not an advantage.

Quiz



7.

As a project manager you arrange to have another company provide debris removal services for a construction project. The owner of a small debris removal company is ready to perform the service for half the costs of several companies that bid on the service. You agree to use his services, and he offers his handshake as a contract saying that's how he has been operating for more than 40 years. What should you do?

- A ➤ Given the significant savings and the fact that the owner of the company has been in business for 40 years, a handshake is enough to start doing business with the company.
- B ➤ Before you shake his hand, you clarify the specifics of the work that will be performed and upon agreement, you can complete the contract with a handshake.
- C ➤ You explain that you require a written contract that can be reviewed and signed by both parties and that provides clear descriptions of the services that will be rendered, the payment received for the services, and legal remedies in the event of disagreements.
- D ➤ Check with your legal team to determine if you can accept a handshake as a formal contract.

Quiz



7.

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- C ➤ You explain that you require a written contract that can be reviewed and signed by both parties and that provides clear descriptions of the services that will be rendered, the payment received for the services, and legal remedies in the event of disagreements.
- D ➤ Check with your legal team to determine if you can accept a handshake as a formal contract.



The correct answer is: C

As the project manager you need to ensure that all contracts are written and legally binding.

Quiz



8.

You are managing a large construction project and are concerned about the risk of completing the framing for a project which requires the purchase of a lot of supplies. You decide to outsource this to a company that specializes in framing. Which type of contract would be best for this service?

- A ➤ Fixed Price
- B ➤ Fixed Price plus early completion incentive
- C ➤ Time and Material
- D ➤ Time and Material with a cap

Quiz



8.

You are managing a large construction project and are concerned about the risk of completing the framing for a project which requires the purchase of a lot of supplies. You decide to outsource this to a company that specializes in framing. Which type of contract would be best for this service?

- A ➤ Fixed Price
- B ➤ Fixed Price plus early completion incentive
- C ➤ Time and Material
- D ➤ Time and Material with a cap



The correct answer is: **D**

As the framing work requires a lot of supplies, you do not want to pay for any additional mark-ups on the materials used. Time and Material with a cap or ceiling would be the best contract for this work.



Key Takeaways

- ▷ A contract is a mutually binding agreement that obligates the seller to provide the specified products, services, or results and obligates the buyer to provide the monetary or other valuable consideration in return.
- ▷ In centralized contracting, a single contract manager handles multiple projects, whereas in decentralized contracting, a contract manager is assigned to a project full time and reports to the project manager.
- ▷ The three types of contracts are Cost Reimbursable (CR) or Cost Plus, Time and Material (T and M) or Unit Price, and Fixed Price (FP) or Lump Sum.
- ▷ Project Procurement Management includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team.
- ▷ There are three Project Procurement Management processes. They are Plan Procurement Management, Conduct Procurements, and Control Procurements.



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Lesson 14: Project Stakeholder Management

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Objectives

- ▷ Define stakeholders
- ▷ Identify different stakeholders on a project
- ▷ Describe stakeholder classification models and stakeholder engagement assessment matrix
- ▷ List the skills needed to manage stakeholders
- ▷ Describe the Project Stakeholder Management processes

Stakeholders



The definition of a *Stakeholder is as follows:

An individual, group, or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project, program, or portfolio.

A stakeholder can have a positive or negative impact. Therefore, it is necessary to engage and involve the stakeholders in the project to ensure project success.

*Definition taken from the Glossary of the Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute, Inc., 2017, Page 723

Stakeholders: Example

Different examples of stakeholders are as follows:

- Project managers
- Project team members
- Senior management
- Sponsors
- Customers
- End users
- Vendors
- People affected by project's output
- Competitors
- Social groups
- Government and political leadership

Classification Models for Stakeholder Analysis

Stakeholders have power and influence over the project, and the best way to manage each stakeholder is to calibrate a proper classification.

The power, interest, influence, and impact that stakeholders have on projects can be mapped through power/interest, power/influence, or influence/impact grids, and Salience model.

A Salience model describes the classes of stakeholders based on their power, urgency, and legitimacy.

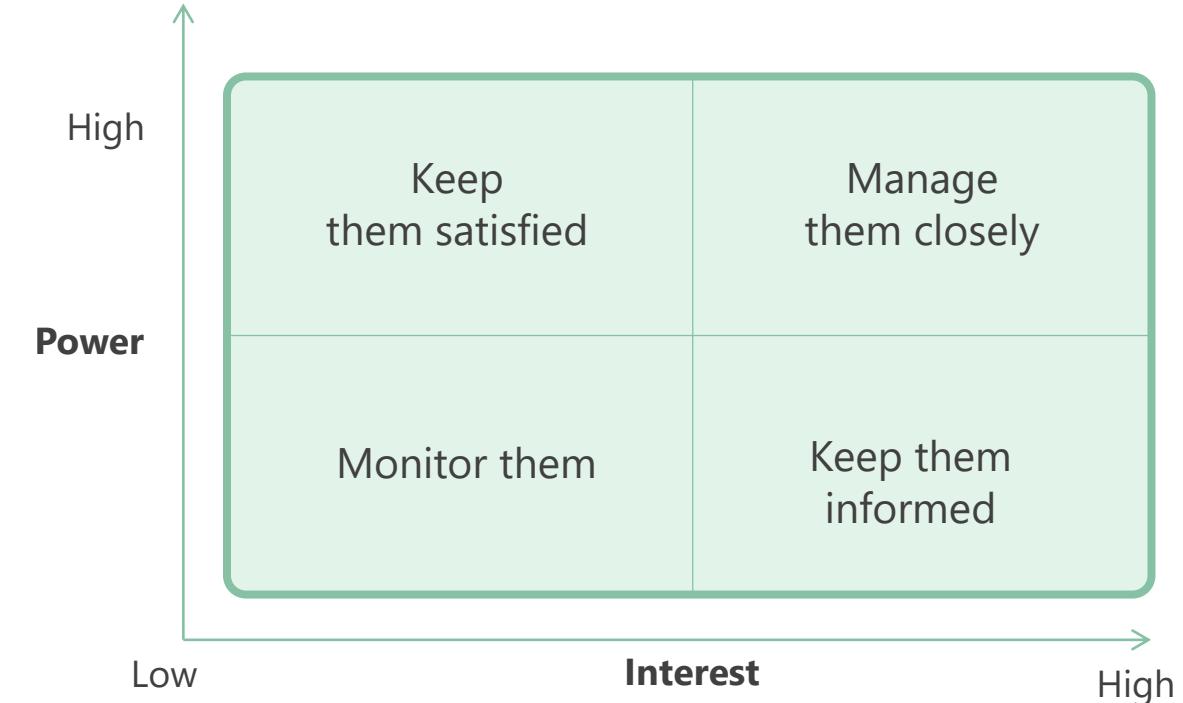


Figure 13-4. Example Power/Interest Grid with Stakeholders



Practice creating power grid for business scenarios. This will help in understanding the level of engagement a project manager needs to maintain with various stakeholders.

Stakeholder Engagement Assessment Matrix

Stakeholder engagement assessment matrix helps in visualizing the current and desired states of a stakeholder's involvement in a project.

Unaware

Stakeholder is not aware of the project and its impact.

Resistant

Stakeholder is aware of the impact and is resistant to change.

Neutral

Stakeholder is aware of the project, but is neither supportive nor has resistance.

Supportive

Stakeholder is aware of the project and is supportive of change.

Leading

Stakeholder is aware of the project and is actively engaged to ensure project's success.

Stakeholder Engagement Assessment Matrix (Contd.)

The table given here shows a sample stakeholder engagement assessment matrix:

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Stakeholder 1	C			D	
Stakeholder 2		C	D		
Stakeholder 3			C	D	
Stakeholder 4			C		D
Stakeholder 5				D, C	

Figure 13-6. Stakeholder Engagement Assessment Matrix

Stakeholder Management Skills

Project managers need to demonstrate the following traits while managing stakeholders:

Interpersonal Skills

The project manager must possess the following interpersonal skills to manage stakeholder:

- Building trust
- Resolving conflict
- Active listening
- Overcoming resistance to change

Managerial Skills

The project manager has to use the following managerial skills to accomplish the project objectives:

- Facilitate consensus
- Influence people
- Negotiate agreements
- Modify organizational behavior

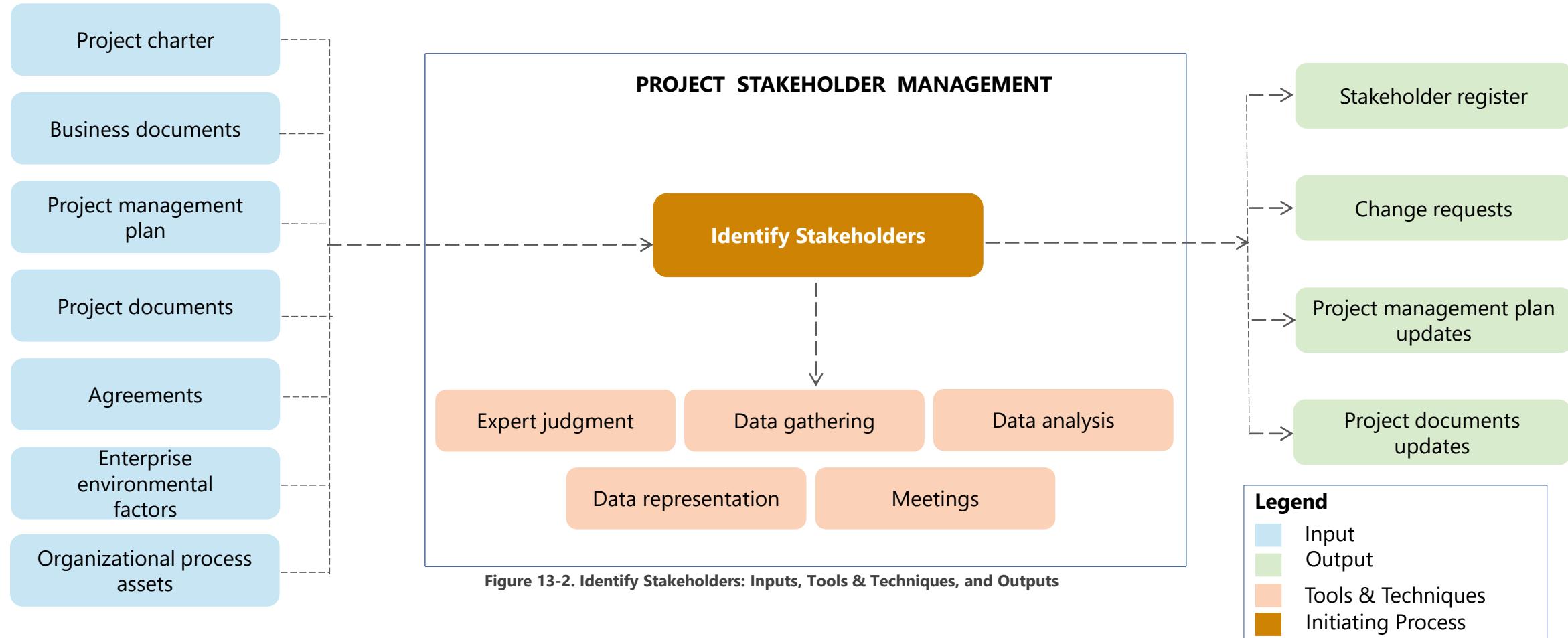
Project Stakeholder Management Processes

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

Table 1-4. Project Management Process Group and Knowledge Area Mapping

Identify Stakeholders

"Identify Stakeholders is the process of identifying project stakeholders regularly and analyzing and documenting relevant information regarding their interests, involvement, interdependencies, influence, and potential impact on project success." It belongs to the Initiating Process Group.



Plan Stakeholder Engagement

"Plan Stakeholder Engagement is the process of developing approaches to involve project stakeholders based on their needs, expectations, interests, and potential impact on the project." It belongs to the Planning Process Group.

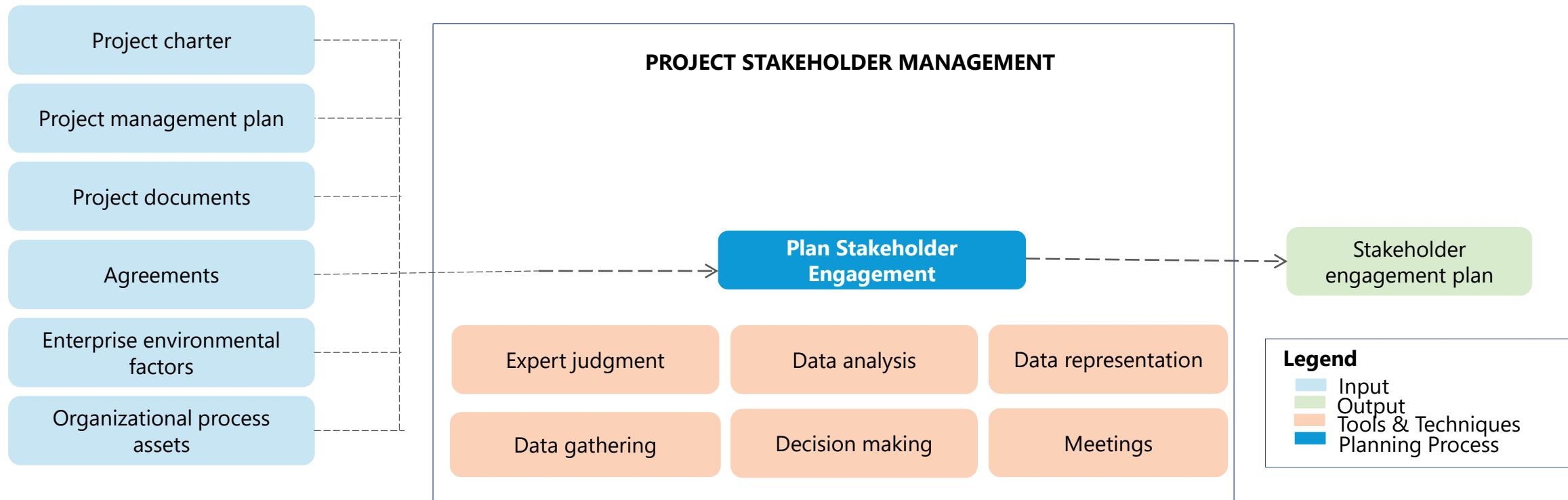


Figure 13-4. Plan Stakeholder Engagement: Inputs, Tools & Techniques, and Outputs

Manage Stakeholder Engagement

"Manage Stakeholder Engagement is the process of communicating and working with stakeholders to meet their needs or expectations, address issues as they occur, and foster appropriate stakeholder engagement in project activities throughout the project life cycle. It belongs to the Executing Process Group."

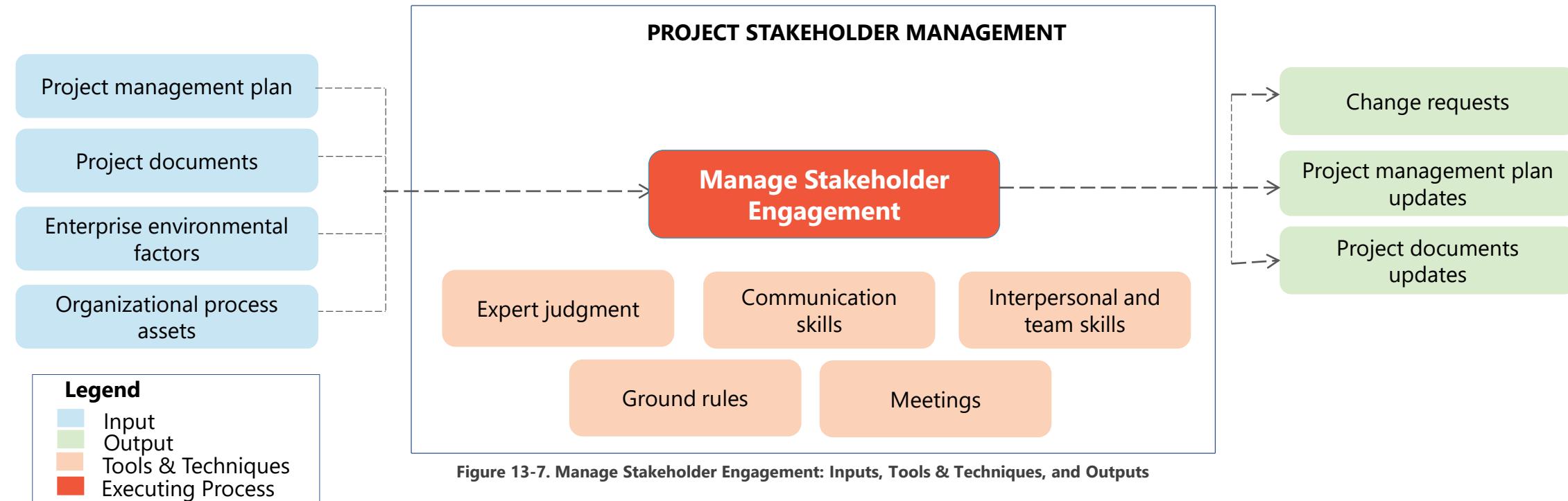


Figure 13-7. Manage Stakeholder Engagement: Inputs, Tools & Techniques, and Outputs



Study the process of managing stakeholder engagement to answer concept based questions.

Monitor Stakeholder Engagement

"Monitor Stakeholder Engagement is the process of monitoring project stakeholder relationships and tailoring strategies for engaging stakeholders through modification of engagement strategies and plans." It belongs to the Monitoring and Controlling Process Group.

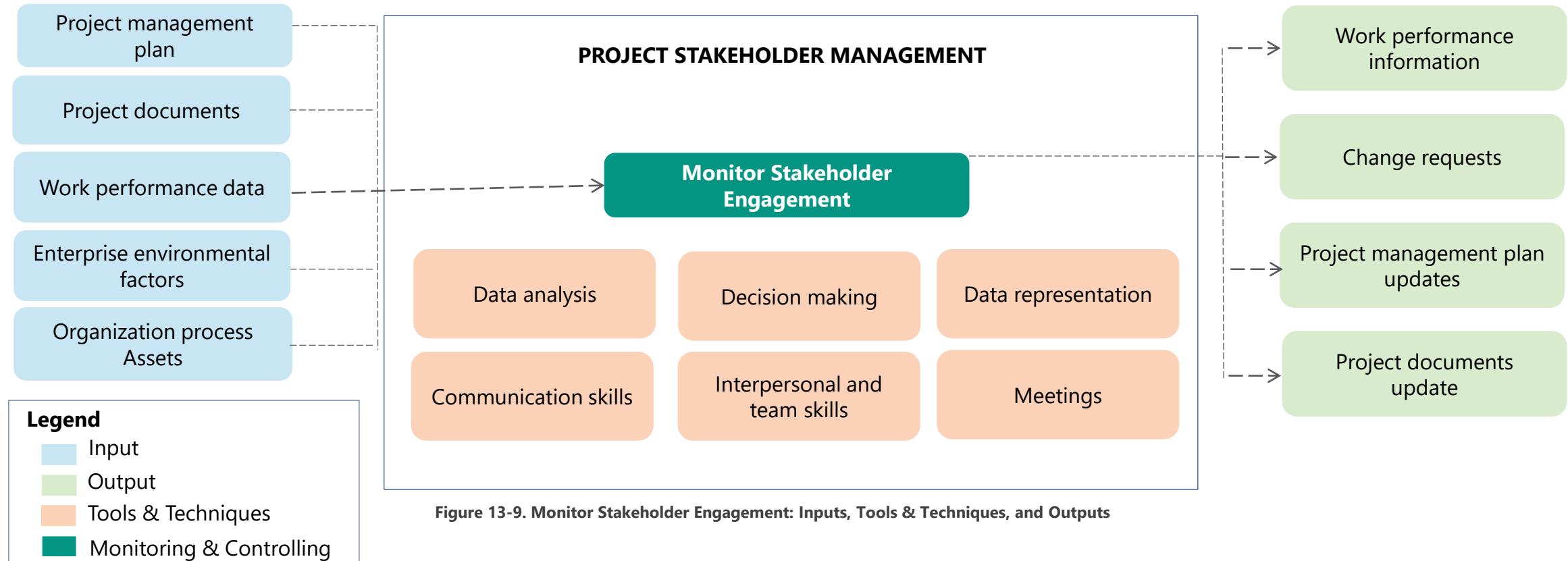


Figure 13-9. Monitor Stakeholder Engagement: Inputs, Tools & Techniques, and Outputs



Quiz



Quiz



1. The power/interest grid is a tool that helps to:

- A ➤ Assign more authority to the interested stakeholders
- B ➤ Assess the correct type and level of engagement desired with different stakeholders
- C ➤ Identify as many stakeholders as possible
- D ➤ Identify ways to make the project more interesting

Quiz



1. The power/interest grid is a tool that helps to:

- A ➤ Assign more authority to the interested stakeholders
- B ➤ Assess the correct type and level of engagement desired with different stakeholders
- C ➤ Identify as many stakeholders as possible
- D ➤ Identify ways to make the project more interesting



The correct answer is: **B**

The power/interest grid is a tool to determine the most appropriate type of engagement with a stakeholder based on an assessment of their degree of influence and their interest in the project.

Quiz



2. Which of the following is the best/preferred level during the stakeholder engagement?

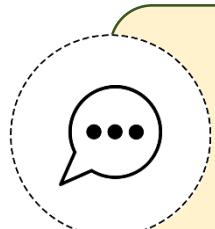
- A ➤ Unaware
- B ➤ Resist
- C ➤ Neutral
- D ➤ Support

Quiz



2. Which of the following is the best/preferred level during the stakeholder engagement?

- A ➤ Unaware
- B ➤ Resist
- C ➤ Neutral
- D ➤ Support



The correct answer is: **D**

Support is the best level of engagement.

Quiz



3. A project has been in execution for many months, and you have been regularly sending updates to all stakeholders per the communications management plan. Suddenly, at a phase-gate review, one of the stakeholders complains that she has not been informed about the changes in the project. What is the best thing for you to do?

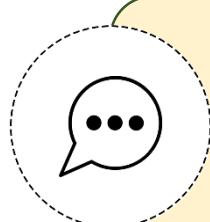
- A ➤ Send her the copies of past correspondence to prove that she has been informed
- B ➤ Escalate the issue to the stakeholder's manager
- C ➤ Review the stakeholder and communications management plans
- D ➤ Ignore this comment and continue working on the plan

Quiz



3. A project has been in execution for many months, and you have been regularly sending updates to all stakeholders per the communications management plan. Suddenly, at a phase-gate review, one of the stakeholders complains that she has not been informed about the changes in the project. What is the best thing for you to do?

- A ➤ Send her the copies of past correspondence to prove that she has been informed
- B ➤ Escalate the issue to the stakeholder's manager
- C ➤ Review the stakeholder and communications management plans
- D ➤ Ignore this comment and continue working on the plan



The correct answer is: **C**

It seems like either the mode of communication was not appropriate or the stakeholder might not have understood those communications about the project. So, the best thing to do is to review these plans and see if any changes are needed.

Quiz



4. A project manager has recently been assigned to a long running project and wants to know the key influencers on the project and their level of involvement. The best document to get this kind of information is:

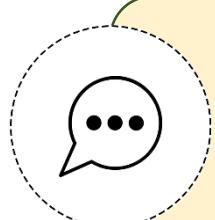
- A ➤ Stakeholder register
- B ➤ Stakeholder management plan
- C ➤ Project staffing plan
- D ➤ Project management plan

Quiz



4. A project manager has recently been assigned to a long running project and wants to know the key influencers on the project and their level of involvement. The best document to get this kind of information is:

- A ➤ Stakeholder register
- B ➤ Stakeholder management plan
- C ➤ Project staffing plan
- D ➤ Project management plan



The correct answer is: **A**

The stakeholder register lists the stakeholders on a project and their involvement with the project.

Quiz



5. What is the best way to manage stakeholders who are extremely supportive and have a high level of interest in the project but do not have a large influence on the project?

- A ➤ Ignore
- B ➤ Keep them informed
- C ➤ Use them as champions
- D ➤ Manage them closely

Quiz



5. What is the best way to manage stakeholders who are extremely supportive and have a high level of interest in the project but do not have a large influence on the project?

- A ➤ Ignore
- B ➤ Keep them informed
- C ➤ Use them as champions
- D ➤ Manage them closely



The correct answer is: **B**

The low power, high interest stakeholders need to be kept informed, but they cannot necessarily become champions due to their low degree of influence in the organization.

Quiz



6. Which of the following is NOT an input to the Monitor Stakeholder Engagements process?

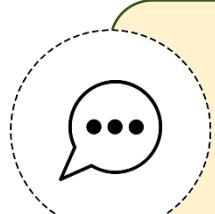
- A ➤ Issue log
- B ➤ Project management plan
- C ➤ Work performance data
- D ➤ Change requests

Quiz



6. Which of the following is NOT an input to the Monitor Stakeholder Engagements process?

- A ➤ Issue log
- B ➤ Project management plan
- C ➤ Work performance data
- D ➤ Change requests



The correct answer is: **D**

Change requests are the output of the Monitor Stakeholder Engagements process.

Quiz



7. Which of the following techniques can be used by the project manager while identifying stakeholders for a project?

- A ➤ Stakeholder Selection Matrix
- B ➤ Expert Judgment
- C ➤ Communication Skills
- D ➤ Interpersonal Skills

Quiz



7. Which of the following techniques can be used by the project manager while identifying stakeholders for a project?

- A ➤ Stakeholder Selection Matrix
- B ➤ Expert Judgment
- C ➤ Communication Skills
- D ➤ Interpersonal Skills



The correct answer is: **B**

Expert Judgment is a technique for identifying stakeholders. The Stakeholder Selection Matrix is not a recognized PMBOK® term, and Communication Skills and Interpersonal Skills are techniques used to Monitor Stakeholder engagement.

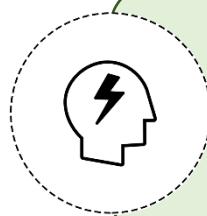
Quiz



8. Henry is a long-time employee of a large organization. He is a subject matter expert in the Accounts Payable function and is a passionate supporter of the new financial system that is being implemented. Henry is respected in his department even though he is an individual contributor without a lot of formal authority. How would you classify Henry on a Power/Influence Grid?

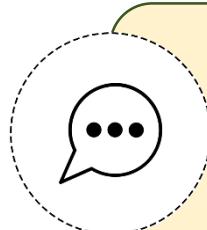
- A ➤ High Power, High Interest
- B ➤ High Power, Low Interest
- C ➤ Low Power, High Interest
- D ➤ Low Power, Low Interest

Quiz



8. Henry is a long-time employee of a large organization. He is a subject matter expert in the Accounts Payable function and is a passionate supporter of the new financial system that is being implemented. Henry is respected in his department even though he is an individual contributor without a lot of formal authority. How would you classify Henry on a Power/Influence Grid?

- A ➤ High Power, High Interest
- B ➤ High Power, Low Interest
- C ➤ Low Power, High Interest
- D ➤ Low Power, Low Interest



The correct answer is: **C**

As an individual contributor, Henry would have low power but high interest in the success of the project.



Key Takeaways

- ▷ Stakeholder is an individual, group, or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project.
- ▷ The different stakeholder classification models are power/interest, power/influence, or influence/impact grids and Salience model.
- ▷ Stakeholder engagement assessment matrix helps in visualizing the current and desired states of a stakeholder's involvement in a project.
- ▷ Project managers need to demonstrate certain interpersonal and managerial skills to manage the stakeholders and accomplish the project objectives successfully.
- ▷ The four Project Stakeholder Management processes are Identify Stakeholders, Plan Stakeholder Management, Manage Stakeholder Engagement, and Monitor Stakeholder Engagement.

This concludes
"Project Stakeholder
Management."

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