Project Management Professional – PMP

Exam Preparation Training Course

Hussam Mandil

PM Consultant & Coach

About the Instructor – Hussam Abdelmoniem Mandil

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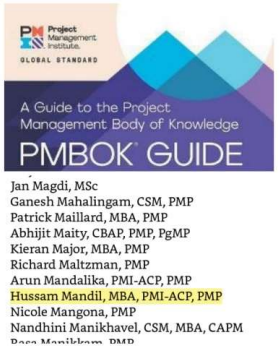
Versatile expert with close to 20 years of practical experience in the fields of project management, business process reengineering and risk management. Since 2010, he has been delivering PMI courses for individuals and organizations with a high success rate.

- Certified PMO-Certified Practitioner
- Certified Agile Hybrid Project Pro
- Certified Enterprise Business Agility Strategist
- Certified Project Management Professional
- Certified PMI-Risk Management Professional
- Certified PMI-Scheduling Professional
- Certified PMI-Agile Certified Practitioner
- Certified PMI-Professional in Business Analysis
- Certified Balanced Scorecard Professional
- Certified Innovation Manager
- Certified Business Process Professional
- Certified Change Manager
- Certified ISO 20K Consultant
- Certified PRojects IN Controlled Environments 2
- Certified Project+
- PMBoK 7th edition Contributor

- Sr. PMO Manager – present
- Risk & Compliance Manager
- PM instructor UAEU
- Others ..



Timetable – UAE time (07:00 – 10:00) p.m.

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07:00 p.m. – 08:30 p.m.	(90 mins)	Input Session 1
08:30 p.m. – 08:45 p.m.	(15 mins)	Tea Break
08:45 p.m. – 10:00 p.m.	(75 mins)	Input Session 2

What is PMP®?

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The Project Management Professional (PMP)® is the world's leading project management certification offered by PMI. Now including predictive, agile and hybrid approaches, the PMP® proves project leadership experience and expertise in any way of working. It supercharges careers for project leaders across industries and helps organizations find the people they need to work smarter and perform better.

Why PMP®?

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- Higher Earning Potential: PMP certification holders earn on average 20% more than their non-certified peers.
- Increased Employability: PMP certification demonstrates that you have the knowledge, experience and competency to manage projects effectively. It is a highly sought after certification by employers.
- Higher Project Success Rates: PMP certified project managers have a higher success rate for project completion and are more likely to stay on budget and on schedule.
- Enhanced Credibility: PMP certified project managers are considered to have a higher level of expertise and are respected in the industry.
- Increased Job Opportunities: PMP certified project managers have access to more job opportunities and a larger selection of employers.
- Improved Leadership Skills: PMP certification teaches the skills needed to manage projects and the knowledge to solve problems effectively.
- Professional Recognition: PMP certification is a globally recognized certification and is respected in the industry.

Project Management Certifications offered by PMI

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- Project Management Professional (PMP)®
- Program Management Professional (PgMP)®
- Disciplined Agile Coach (DAC)™
- Disciplined Agile Scrum Master (DASM)™
- Disciplined Agile Senior Scrum Master (DASSM)™
- Disciplined Agile Value Stream Consultant (DAVSC)™
- PMI Agile Certified Practitioner (PMI-ACP)®
- PMI Professional in Business Analysis (PMI-PBA)®
- Portfolio Management Professional (PfMP)®
- PMI Risk Management Professional (PMI-RMP)®
- PMI Scheduling Professional (PMI-SP)®

Certification Requirements

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Educational Requirements:

- Four-Year Degree: Candidates must have a four-year degree (bachelor's degree or equivalent).
- High School Diploma/GED: Alternatively, candidates can have a high school diploma or an associate degree (or global equivalent).

Experience Requirements:

- With a Four-Year Degree: Candidates must have at least 36 months of experience leading projects within the past eight years.
- With a High School Diploma/GED: Candidates must have at least 60 months of experience leading projects within the past eight years.

Project Management Education:

- Candidates must complete 35 hours of project management education/training or hold a CAPM (Certified Associate in Project Management) certification.

Objectives of the Training Course

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- Understand the fundamentals and concepts of Project Management as outlined in the PMBOK® Guide.
- Familiarize yourself with common project management terminology as defined by the Project Management Institute, Inc.
- Explore the details of Project Management Domains, including People, Process, and Business Environment.
- Learn about the various project management life cycles, including Predictive, Adaptive, and Hybrid approaches.
- Earn 35 Contact Hours of formal Project Management Training, fulfilling part of the PMP® Certification requirements.
- Prepare thoroughly for the PMP® certification examination.

Facts About the Exam

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180 Questions in 230 minutes – Situational and Interpretational

- MCQs - select the best answer(s)
- Drag and Drop
- Fill-in the Blanks
- Hotspot - Click on the chart

Breaks

- 60 Questions – Break 10mins
- 60 Questions – Break 10mins
- 60 Questions

Taking Notes During the Exam

- Notes on Screen

Passing score – based on a psychometric analysis

Legal and Copyright Notice

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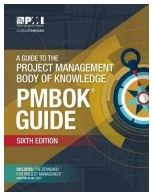
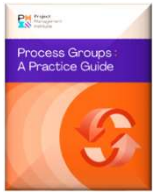
Materials in this training course are based on the text from:

- A Guide to the Project Management Body of Knowledge (PMBoK® Guide)-6th edition (2017)

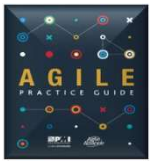


- A Guide to the Project Management Body of Knowledge (PMBoK® Guide)-7th edition (2020)

- Process Groups: A Practice Guide (2022)



- Agile Practice Guide (2017)



PMBOK is a registered mark of the PMI, Inc.

Overview & Purpose of PMBOK® Guide

Generally recognized: Knowledge & Practices described are applicable to most projects most of the time & there is consensus about their value and usefulness

Good practice: There is general agreement that the application of the knowledge, skills, tools and techniques to project management processes can enhance the chance of success over many projects in delivering the expected business values and results

PMBOK® Guide is different from methodology. Methodology is a system of practices, techniques, procedures & rules used by those who work in discipline.

Organizations can build methodologies, policies, procedures, rules, tools and techniques needed to practice project management.

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Are you guys ready ?

If yes, give a thumbs-up please

Course Topics & References used

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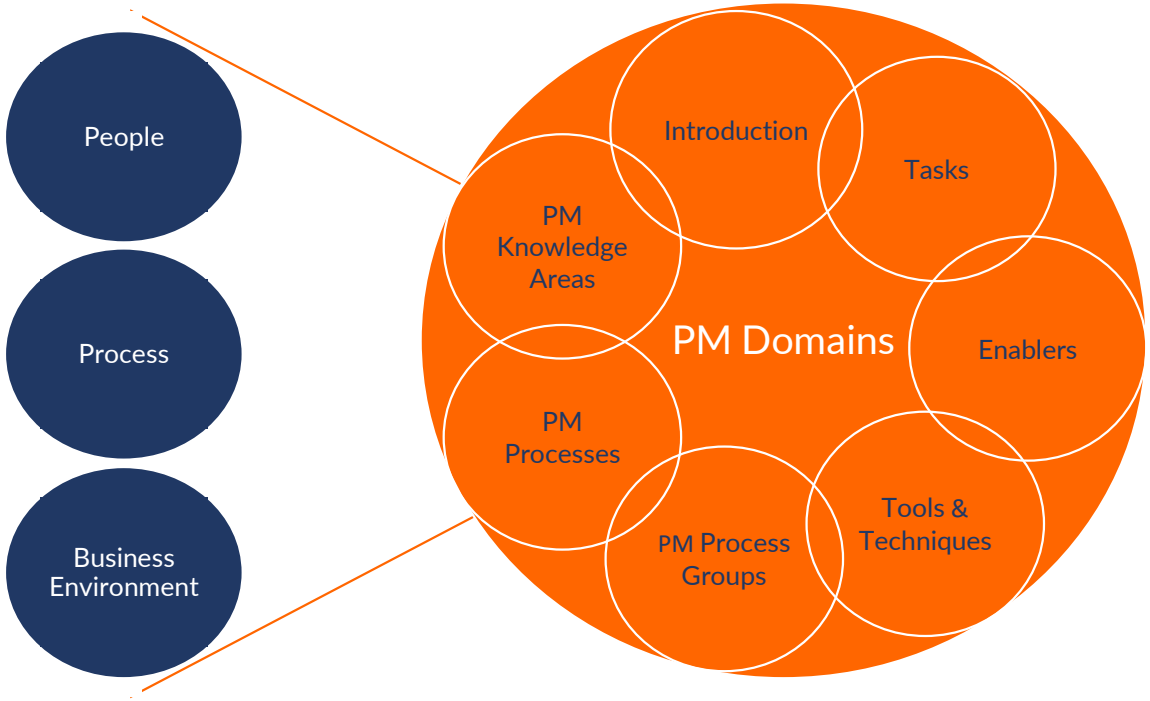

Historical Overview

A Story of Evolution

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- Project management existed long time ago when there were projects like The Giza Pyramids, and The Taj Mahal.
- Organizations run on the basis of relationships, connections and trust that build over years.
- This is the time when project management related activities were performed without using any software, computers and records were maintained on papers.
- Planning for all projects was usually done by skilled technical persons and complex project were taken up by experts themselves.

Historical Overview

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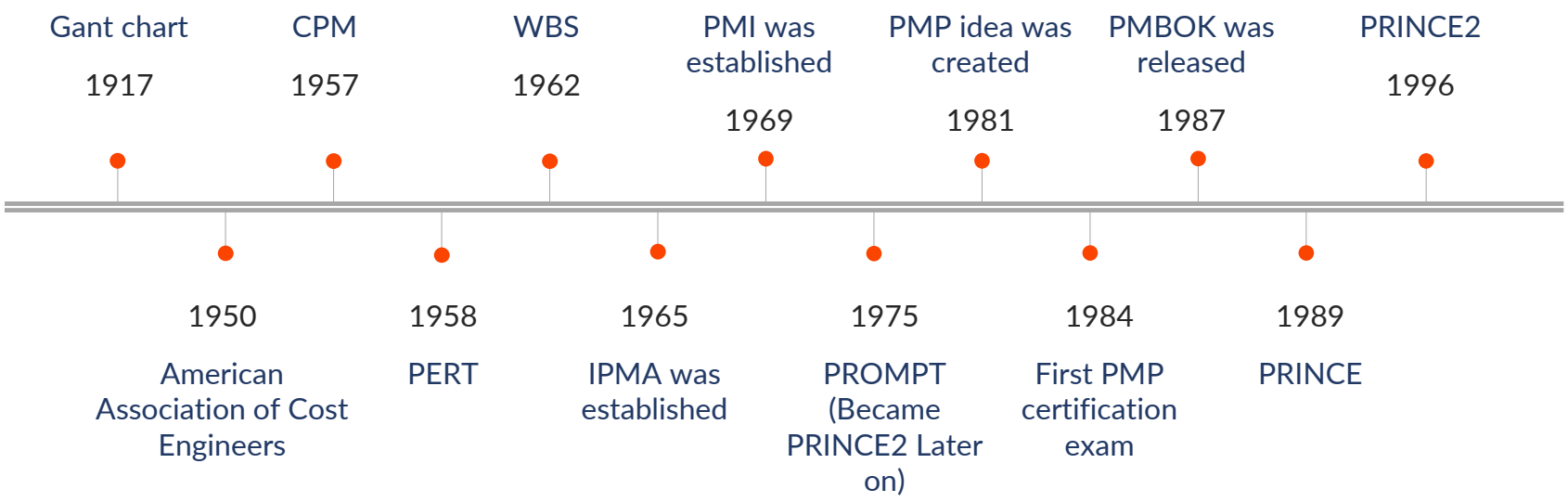

Introduction

Section Objective

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- In this section we will learn about:
- Project
- Project management
- Benefits of project management
- Project Constraints

What is a Project?

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- A project is a temporary endeavor undertaken to create a unique product, service, or result.
- **Operations management** is a subject area that is outside the scope of formal project management as described in this standard. It is an area of management concerned with ongoing production of goods and/or services.

Projects	Operations
• Temporary Endeavor • Unique • Product or Service • Defined Time Scale • Limited Budget & Resources (CAPEX) • Major Change • Results Driven • Achieve Strategic Plan	• Continuous & On-going • Repetitive • On Going Results • Indefinite • Operational Budget (OPEX) • Daily Improvements • Process Driven • Sustain Business Continuity

What is project management?

- **Project Management** is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.
- Accomplished through the appropriate application and integration of the **49** logically grouped project management processes. Those processes are logically grouped in to five "Process Groups":
  - Initiating
  - Planning
  - Executing
  - Monitoring and Controlling
  - Closing
- Enables organizations to execute projects effectively and efficiently.

"Projects do not simply produce outputs, but more importantly, enable those outputs to drive **outcomes** that ultimately deliver value to the organization and its stakeholders."

- *PMBOK® Guide* - Seventh edition

Project & Development Lifecycle

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➢ Project life cycles can be Predictive, Adaptive or Hybrid

- Within a project life cycle, there are generally one or more phases that are associated with the development of the product, service, or result. These are called a development life cycle.
- Development life cycles can be:
  - **Predictive**: the project scope, time, and cost are determined in the early phases of the life cycle. Any changes to the scope are carefully managed. May also be referred to as **waterfall** life cycles.
  - **Adaptive:** adaptive life cycles are agile, iterative, or incremental. The detailed scope is defined and approved before the start of an iteration. May also referred to as agile or change-driven life cycles.
    - **Iterative**: the project scope is generally determined early in the project life cycle, but time and cost estimates are routinely modified as the project team's understanding of the product increases. Iterations develop the product through a series of repeated cycles, while increments successively add to the functionality of the product.
    - **Incremental:** the deliverable is produced through a series of iterations that successively add functionality within a predetermined time frame. The deliverable contains the necessary and sufficient capability to be considered complete only after the final iteration.
  - **Hybrid:** hybrid life cycle is a combination of a predictive and an adaptive life cycle. Those elements of the project that are well known or have fixed requirements follow a predictive development life cycle, and those elements that are still evolving follow an adaptive development life cycle.

Types of Business Value

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Financial Gain

New Customers

Social Benefit

First to Market

Improvement
Technological, process, etc.

Regularization
Alignment or compliance with standards and regulations

Project Initiation Context

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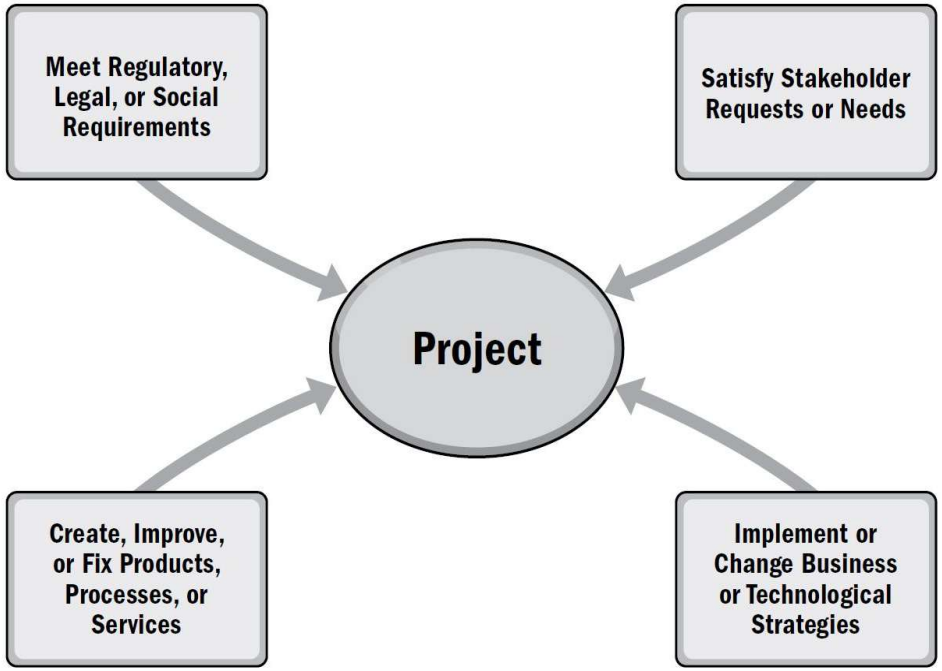

Project success depends on:

- Organizational project maturity
- Project manager effectiveness
- Funding and resource availability
- Team member skill levels
- Collaboration and communication within the team and with key stakeholders
- Understanding of the core problem and related needs

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

Benefits of Project Management

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Meet business objectives
Satisfy stakeholder expectations
Be more predictable
Increase chances of success
Deliver the right products at the right time
Resolve problems and issues
Respond to risks in a timely manner
Optimize the use of organizational resources
Identify, recover, or terminate failing projects
Manage constraints & balance their influence on the project
Manage change in a better manner

Project Constraints

Project, Program and Portfolio Management

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- **Project Management** **(Enables achievement of organizational goals and objectives)**
- **Program Management** **(Realize Benefits)** is the application of knowledge, skills, and principles to a program to achieve the program objectives and to obtain benefits and control not available by managing program components individually.
- **Portfolio Management** **(Aligns with business strategies)** refers to the centralized management of one or more portfolios. It includes identifying, prioritizing, authorizing, managing, and controlling projects, programs, and other related work, to achieve specific strategic business objectives.

Portfolio - Program - Project

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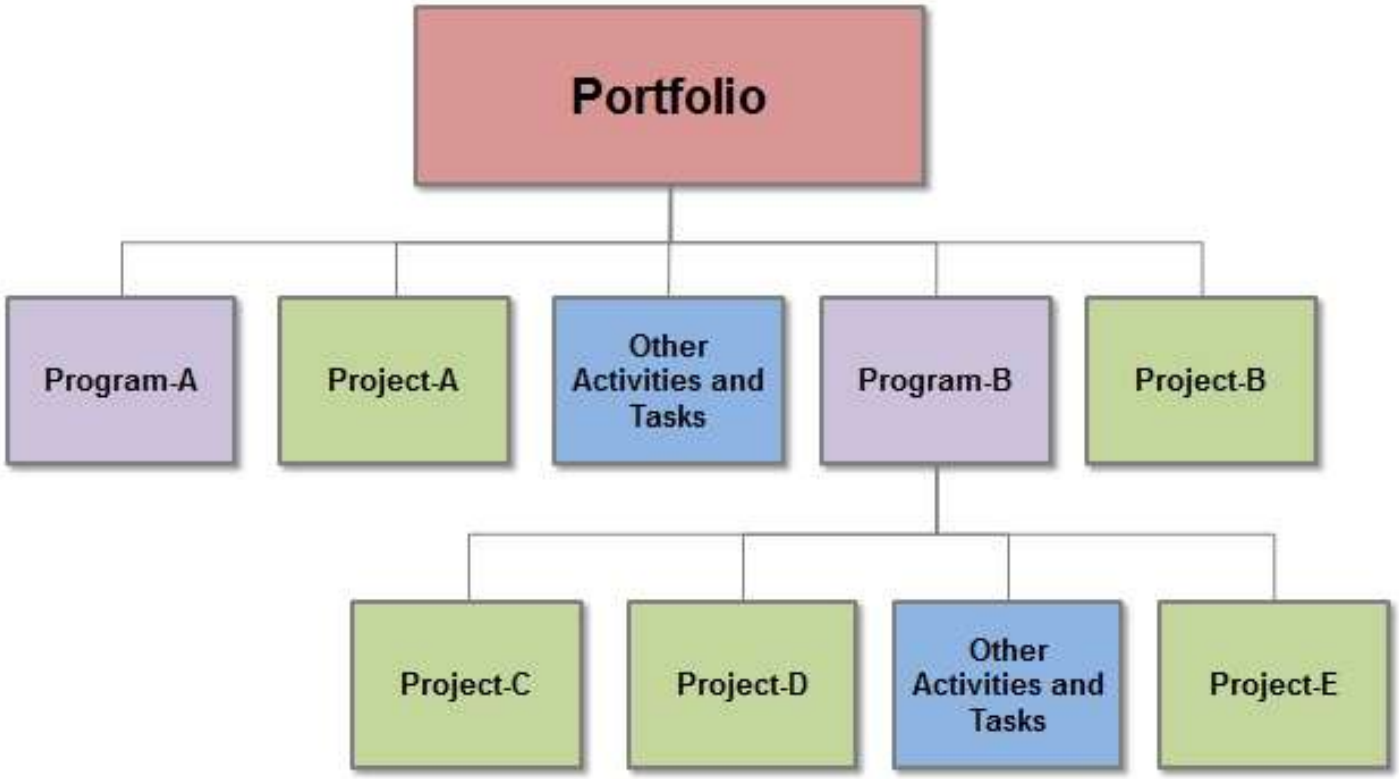

Exercise

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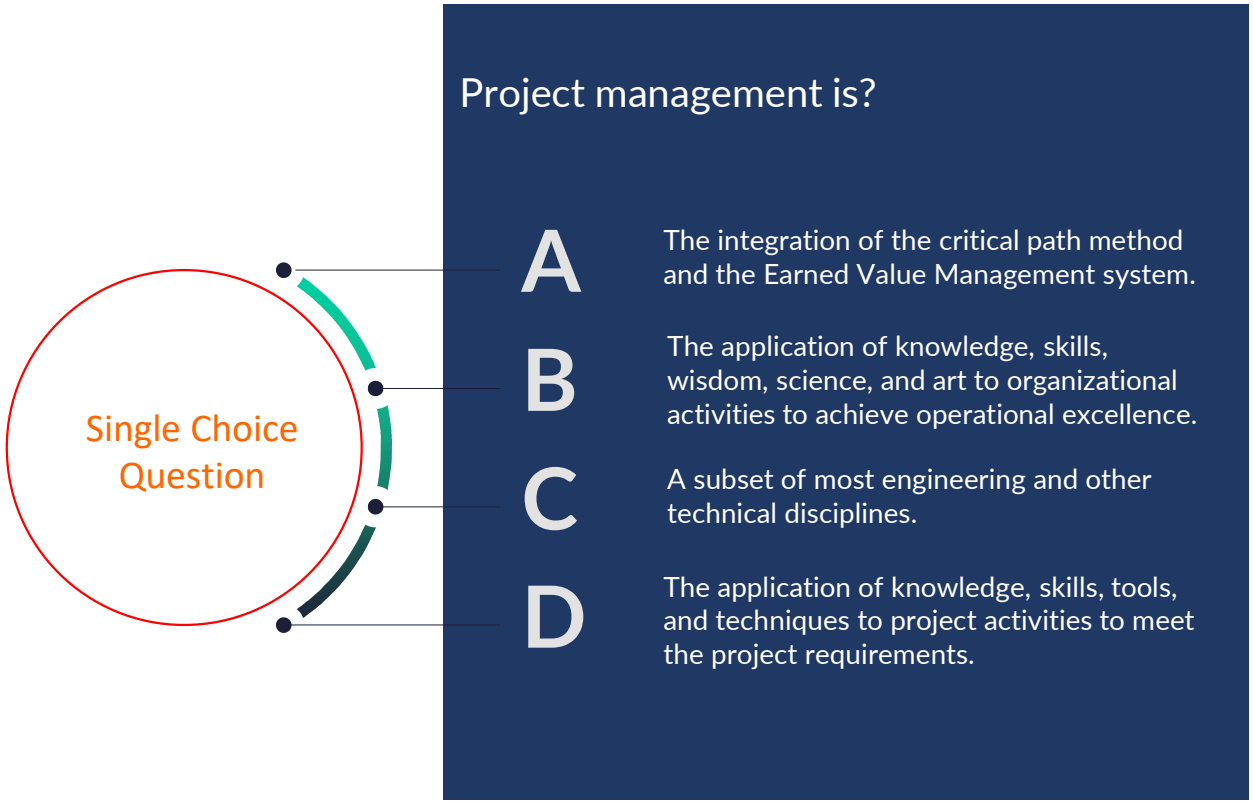

Section Summary

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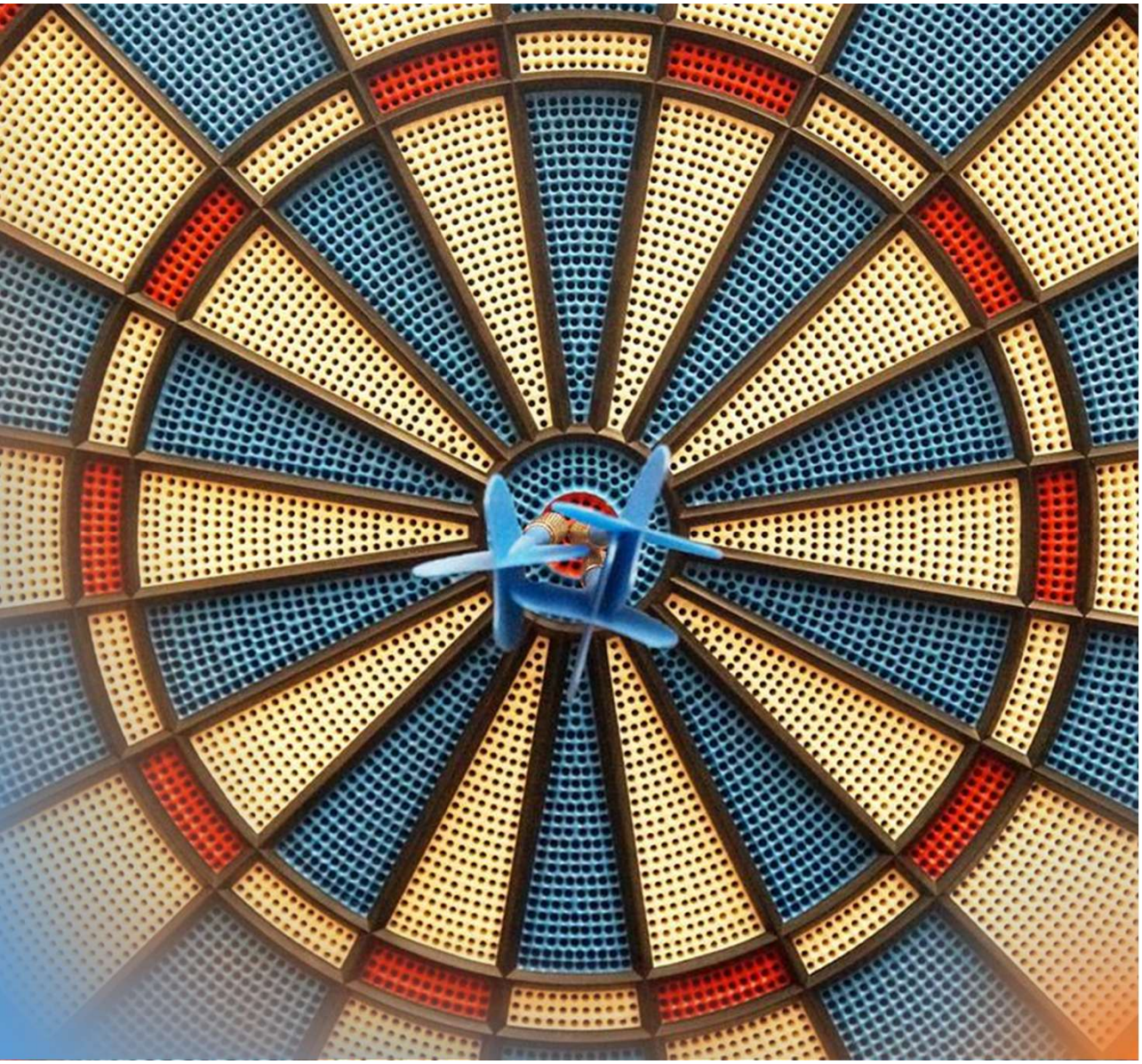
- **In this section we learnt about:**
- Project Initiation Context
- Program and Portfolio Management
- Portfolio, Programs and Project Interactions



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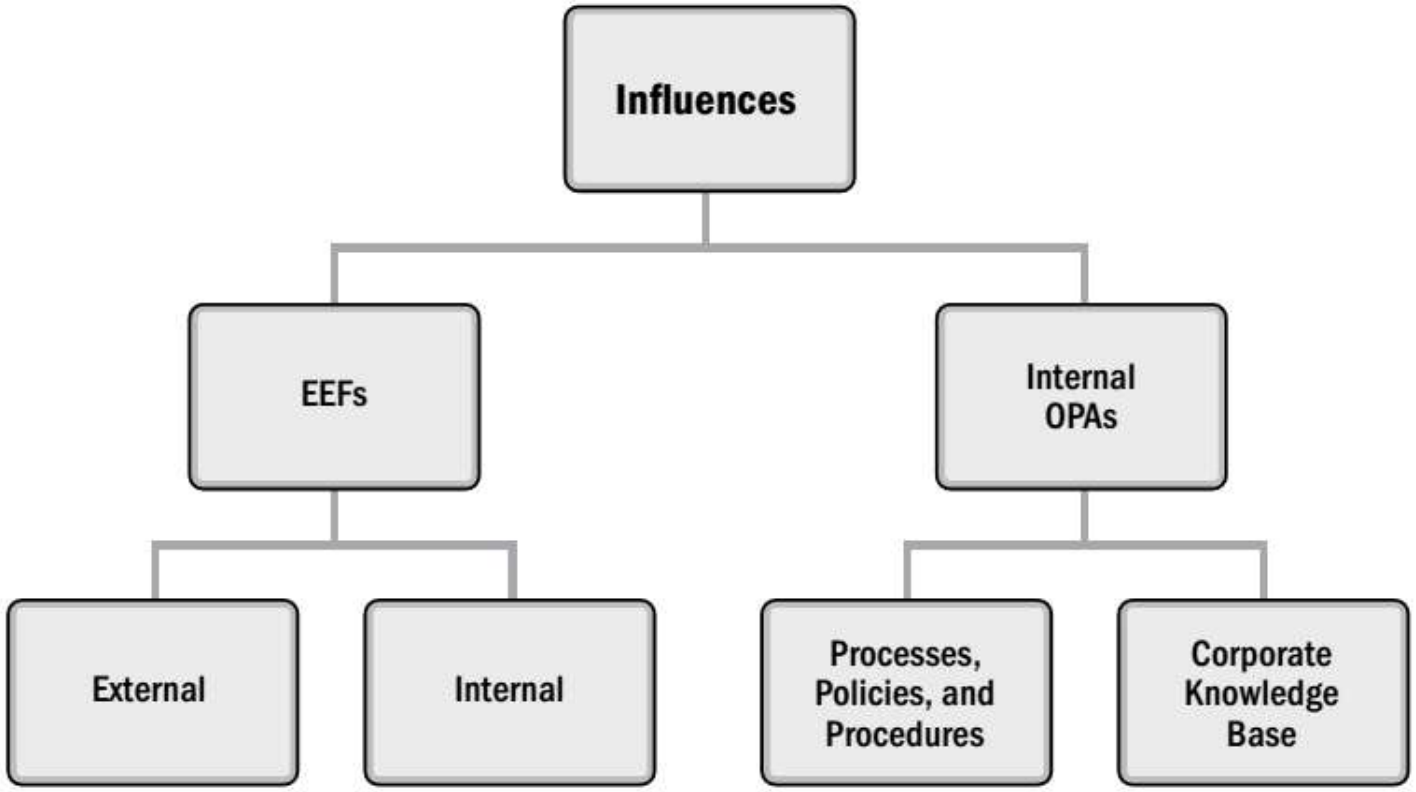
Section Objective

- **In this section we will learn about:**
- Project Influences
- Enterprise Environmental Factors
- Organizational Process Assets
- Organizational Structures Types
- Project Management Office (PMO)

Project Influences



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

Enterprise Environmental Factors

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- **Enterprise environmental factors (EEF)** refer to conditions, not under the control of the project team, that influence, constrain, or direct the project. EEF are considered inputs to most planning processes, may enhance or constrain project management options.
- Enterprise environmental factors vary widely in type or nature. Include, but are not limited to:
  - Organizational culture, structure, and governance.
  - Geographic distribution of facilities and resources.
  - Government or industry standards (e.g., regulatory agency regulations, codes of conduct, product standards, quality standards, and workmanship standards).

Organizational Process Assets

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- **Organizational process assets (OPA)** include any or all process related assets, from any or all of the organizations involved in the project that can be used to influence the project's success.
- These process assets include formal and informal plans, policies, procedures, and guidelines.
- The process assets also include the organization's knowledge bases such as lessons learned and historical information.

Processes and Procedures	Corporate Knowledge Base
• Organizational standard processes such as standards, policies. • Standardized guidelines, work instructions, proposal evaluation criteria, and performance measurement criteria. • Templates (e.g., risk, work breakdown structure, project schedule network diagram, and contract templates). • Guidelines and criteria for tailoring the organization's set of standard processes to satisfy the specific needs of the project. • Organization communication requirements. • Change control procedures and project closure guidelines or requirements. • Financial controls procedures (e.g., time reporting, required expenditure and disbursement reviews) • Risk control procedures and issue and defect management procedures. • Procedures for prioritizing, approving, and issuing work authorizations.	• Process measurement databases. • Project files (e.g., scope, cost, schedule). • Historical information and lessons learned knowledge bases. • Issue and defect management databases. • Configuration management knowledge bases. • Financial databases.

Organizational Structures Types

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Org. Structure Type	Project Characteristics					
	Work Groups arranged by	Project Manager Authority	Project Manager Role	Resource Availability	Who Manage Budget?	Administrative Staff
Functional (centralized)	Job being done (e.g., engineering, manufacturing)	Little / None	Part-time; may or may not be a designated job role like coordinator	Little / None	Functional Manager	Part Time
Matrix - Weak	Job Function	Low	Part-time; done as part of another job and not a designated job role like coordinator	Low	Functional Manager	Part Time
Matrix - Balanced	Job Function	Low to Moderate	Part-time; embedded in the functions as a skill and may not be a designated job role like coordinator	Low to Moderate	Mixed	Part Time
Matrix - Strong	By job function, with project manager as a function	Moderate to High	Full-time designated job role	Moderate to High	Project Manager	Full Time
Project-Oriented (Composite, Hybrid)	Project	High to almost total	Full-time designated job role	High to almost total	Project Manager	Full Time

Project Management Office (PMO)

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- The **PMO** is the natural liaison between the organization's portfolios, programs, projects, and the corporate measurement systems (e.g. balanced scorecard).
- A primary function of a PMO is to support project managers in a variety of ways which may include, but are not limited to:
  - Managing shared resources across all projects administered by the PMO;
  - Identifying and developing project management methodology, best practices, and standards.
  - Coaching, mentoring, training, and oversight.
  - Monitoring compliance with project management standards, policies, procedures, and templates by means of project audits.
  - Developing and managing project policies, procedures, templates, and other shared documentation (organizational process assets); and Coordinating communication across projects.

Project Management Office (PMO)

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- A **project management office (PMO)** is a management structure that standardizes the project-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques. The responsibilities of a PMO can range from providing project management support functions to actually being responsible for the direct management of one or more projects.
- There are **several types of PMO** structures in organizations, each varying in the degree of control and influence they have on projects within the organization, such as:
  - **Supportive**: Supportive PMOs provide a consultative role to projects by supplying templates, best practices, training, access to information and lessons learned from other projects. This type of PMO serves as a project repository. The degree of control provided by the PMO is low.
  - **Controlling**: Controlling PMOs provide support and require compliance through various means. Compliance may involve adopting project management frameworks or methodologies, using specific templates, forms and tools, or conformance to governance. The degree of control provided by the PMO is moderate.
  - **Directive**: Directive PMOs take control of the projects by directly managing the projects. The degree of control provided by the PMO is high.
  - **Agile Center of Excellence (ACoE) : enable, rather than manage - >** Coach teams, Build agile mindset, skills and capabilities throughout the organization, tor sponsors and product owners.

Exercise

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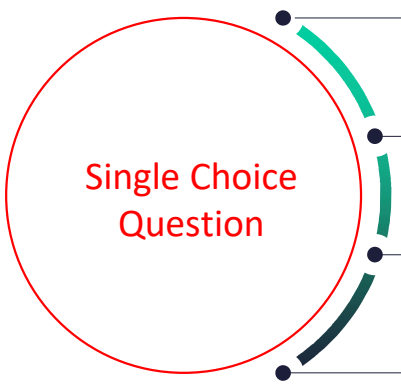

In which of the following organizational structure types is the project manager's role full time?

A Balanced matrix

B Multi-divisional

C Project-oriented

D Functional

Section Summary

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- **In this section we learnt about:**
- Factors that influence the constrain or direct the project
- Types of organizational structures
- Types of PMO structures in organizations

Section Objective

In this section we will learn about:

- Project Manager Competencies
- The Project Manager's Sphere of Influence
- Leadership & Management

Project Manager Competencies

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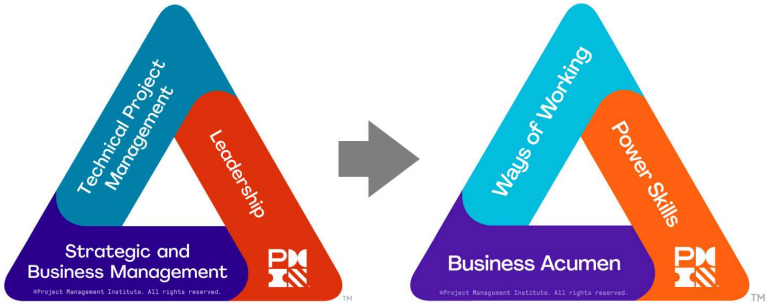
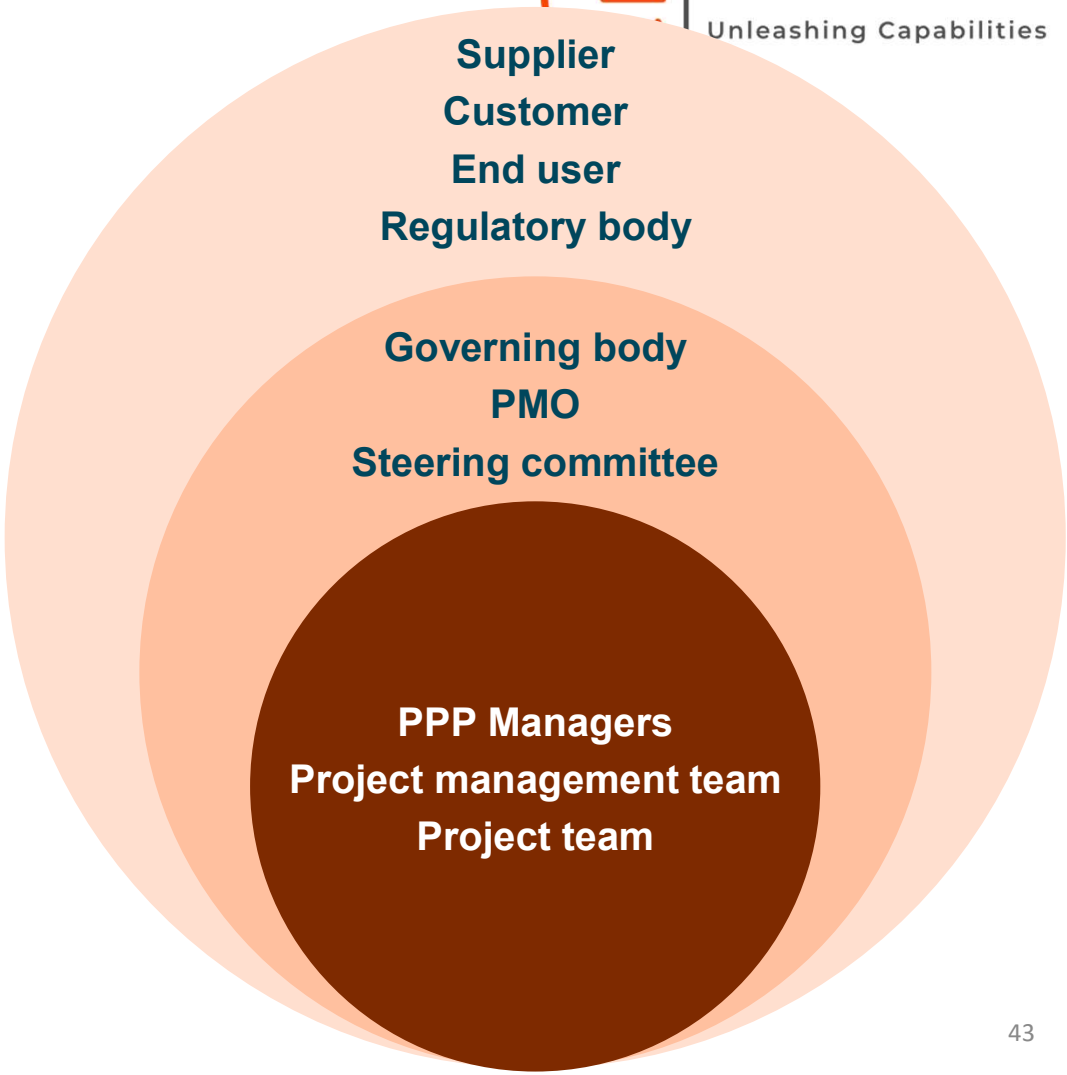
- **PEOPLE - Power Skills:** These interpersonal skills include collaborative leadership, communication, an innovative mindset, for-purpose orientation, and empathy..
- **PROCESS - Ways of Working:** Whether it's predictive, agile, design thinking, or new practices still to be developed, it's clear that there is more than one way that work gets done today. That's why we encourage professionals to master as many ways of working as they can — so they can apply the right technique at the right time, delivering winning results..
- **BUSINESS EVIRONMENT - Business Acumen:** Professionals at all levels need to be able to cultivate effective decision-making and understand how their projects align with the big picture of broader organizational strategy and global trends.

The PMI Talent Triangle® is Evolving



The Project Manager's Sphere of Influence



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

Predictive: Project Manager

- The project manager leads the project team to meet the project's objectives and stakeholders' expectations.
- The project manager works to balance the competing constraints on the project with the resources available.
- Also performs communication roles between the project sponsor, team members, and other stakeholders.
- This includes providing direction and presenting the vision of success for the project.
- The ability to communicate with stakeholders, including the team and sponsors applies across multiple aspects of the project including:
    - Developing finely tuned skills using multiple methods (e.g., verbal, written, and nonverbal);
    - Creating, maintaining, and adhering to communications plans and schedules;
    - Communicating predictably and consistently;
    - Seeking to understand the project stakeholders' communication needs (communication may be the only deliverable that some stakeholders received until the project's end product or service is completed);

Leadership & Management

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- The words leadership and management are often used interchangeably. However, they are not synonymous.
- **management** is more closely associated with directing another person to get from one point to another using a known set of expected behaviours.
- In contrast, **leadership** involves working with others through discussion or debate in order to guide them from one point to another.

Leadership	Management
• Guide, influence, and collaborate using relational power • Develop • Innovate • Focus on relationships with people • Inspire trust • Focus on long-range vision • Ask what and why • Focus on the horizon • Challenge status quo • Do the right things • Focus on vision, alignment, motivation, and inspiration	• Direct using positional power • Maintain • Administrate • Focus on systems and structure • Rely on control • Focus on near-term goals • Ask how and when • Focus on bottom line • Accept status quo • Do things right • Focus on operational issues and problem solving

Exercise

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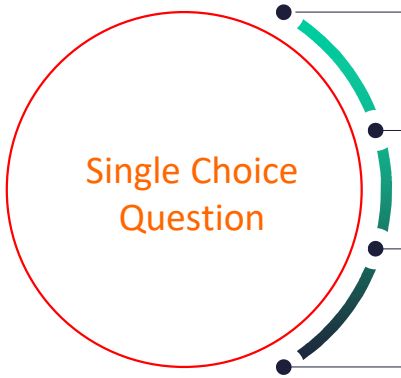

The three factors namely management elements, governance frameworks and organizational structures which interact and determine the power, influence, interests, competence and political capabilities of the people in an organization, are together known as?

A The project environment

B The program environment

C Company culture

D An organizational system

Section Summary

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- **In this section we learnt about:**
- Influences of Project manager
- Competencies of the Project manager
- Difference between Leadership and management

Module Objective

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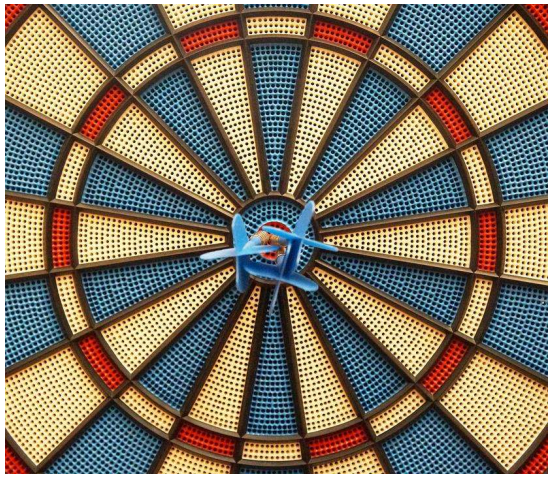
- **In this section we will learn about:**
- Key definitions
- Project Management Processes Groups
- Project Life Cycle
- Project & Development Lifecycle



Key Definitions

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- **Project Life Cycle**: the series of phases that a project passes through from its start to its completion
- **Product Life Cycle**: is a series of phases that represent the evolution of a product from its initial concept through its delivery, growth, maturity, and eventual retirement.
- **Project Phase**: a collection of logically related project activities that culminates in the completion of one or more deliverables.
- **Phase Gate**: a review at the end of a phase in which a decision is made to continue to the next phase, continue with modification, or end a program or project.
- **Project Management Process**: systematic series of activities directed toward causing an end result where one or more inputs will be acted upon to create one or more outputs.
- **Project Management Process Group**: a logical grouping of project management inputs, tools and techniques, and outputs. The Project Management Process Groups include Initiating, Planning, Executing, Monitoring and Controlling, and Closing. Project Management Process Groups are not project phases.
- **Project Management Knowledge Area**: an identified area of project management defined by its knowledge requirements and described in terms of its component processes, practices, inputs, outputs, tools, and techniques.

Project Lifecycle

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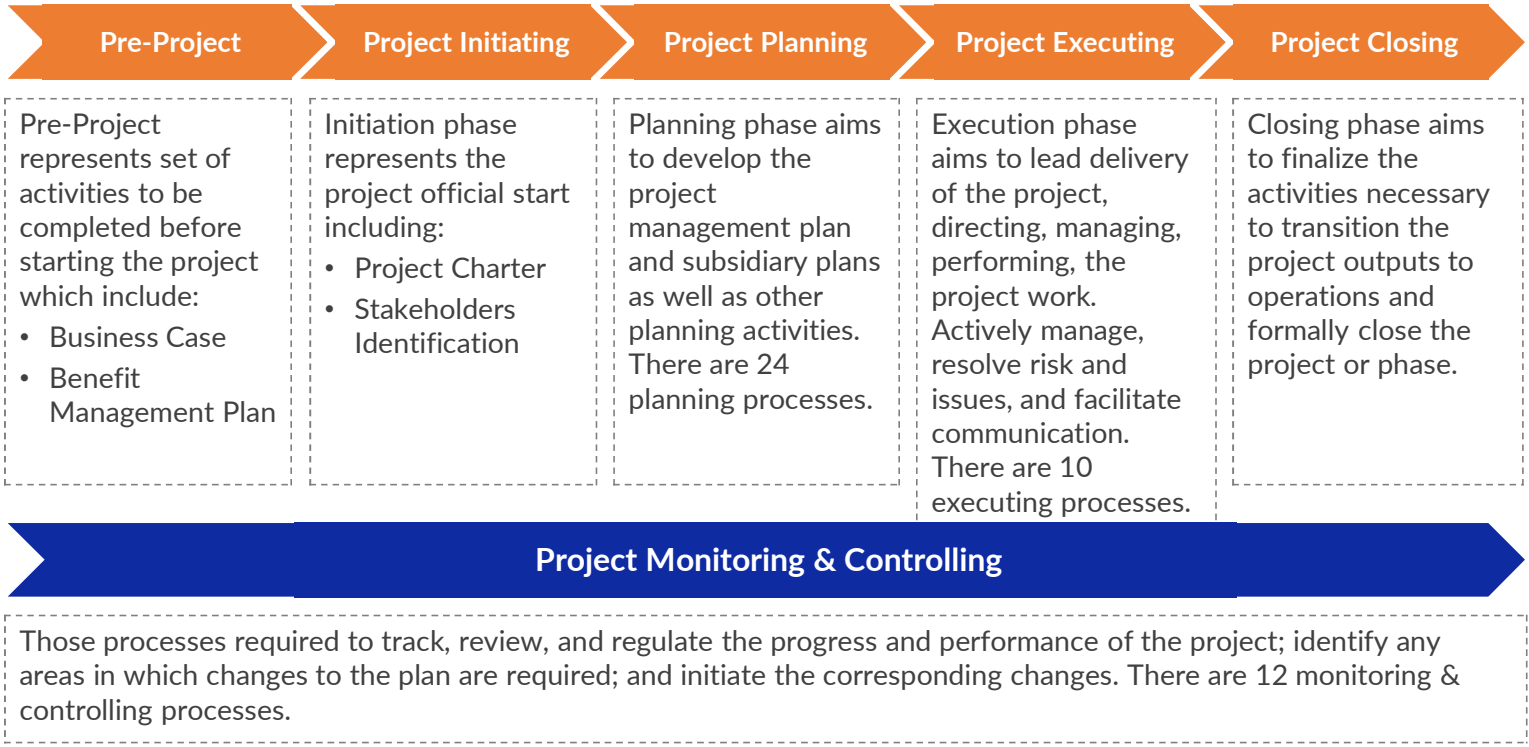


Product Lifecycle

- The Product Lifecycle is longer than the Project Lifecycle

Product Lifecycle

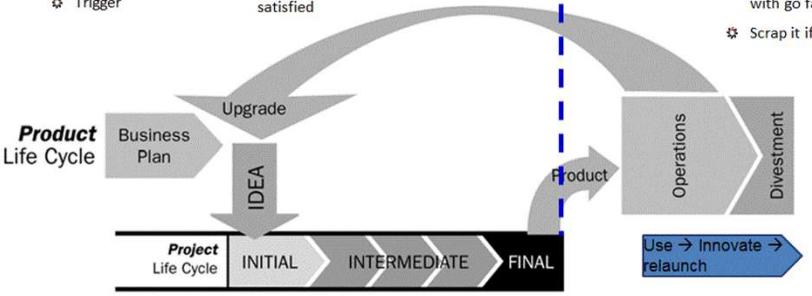
- Idea
- Study
- Trigger

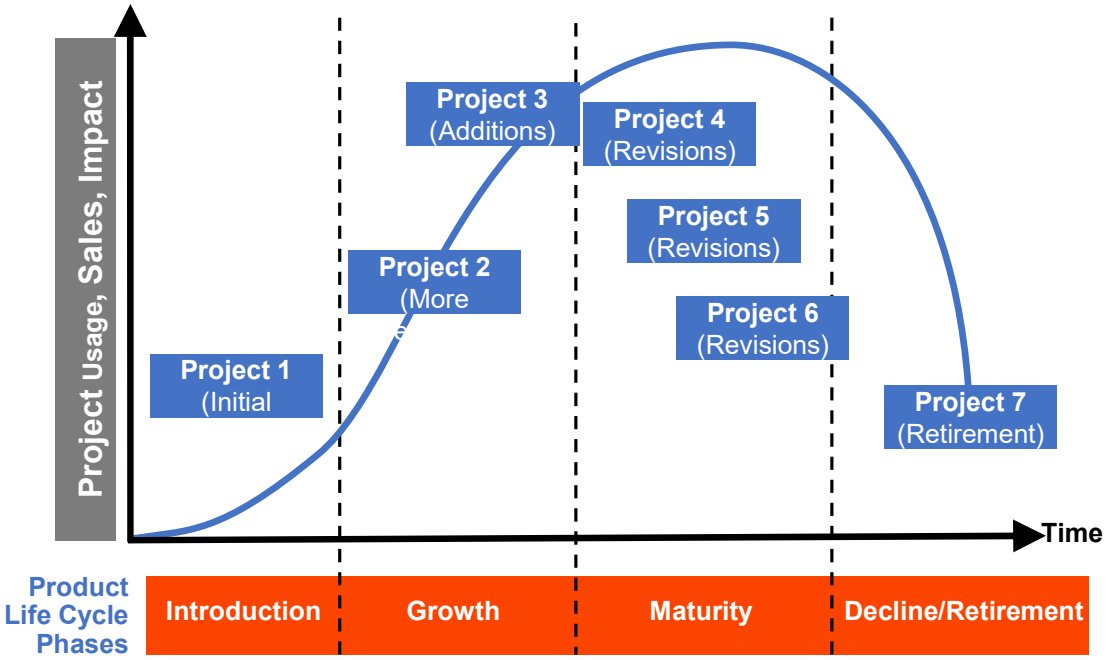
Project Life Cycle

- Specify the requirements
- Produce the Design Spec
- Develop the product and deliverables
- Do the user acceptance testing and authoring of the installation and support manuals
- Implementation – handover – customer satisfied

Product Lifecycle

- Product now being used
- Value to the business being assessed
- Product Innovation; relaunch with go faster stripes
- Scrap it if it is of no further use





Process Group Interactions within a Project or Phase

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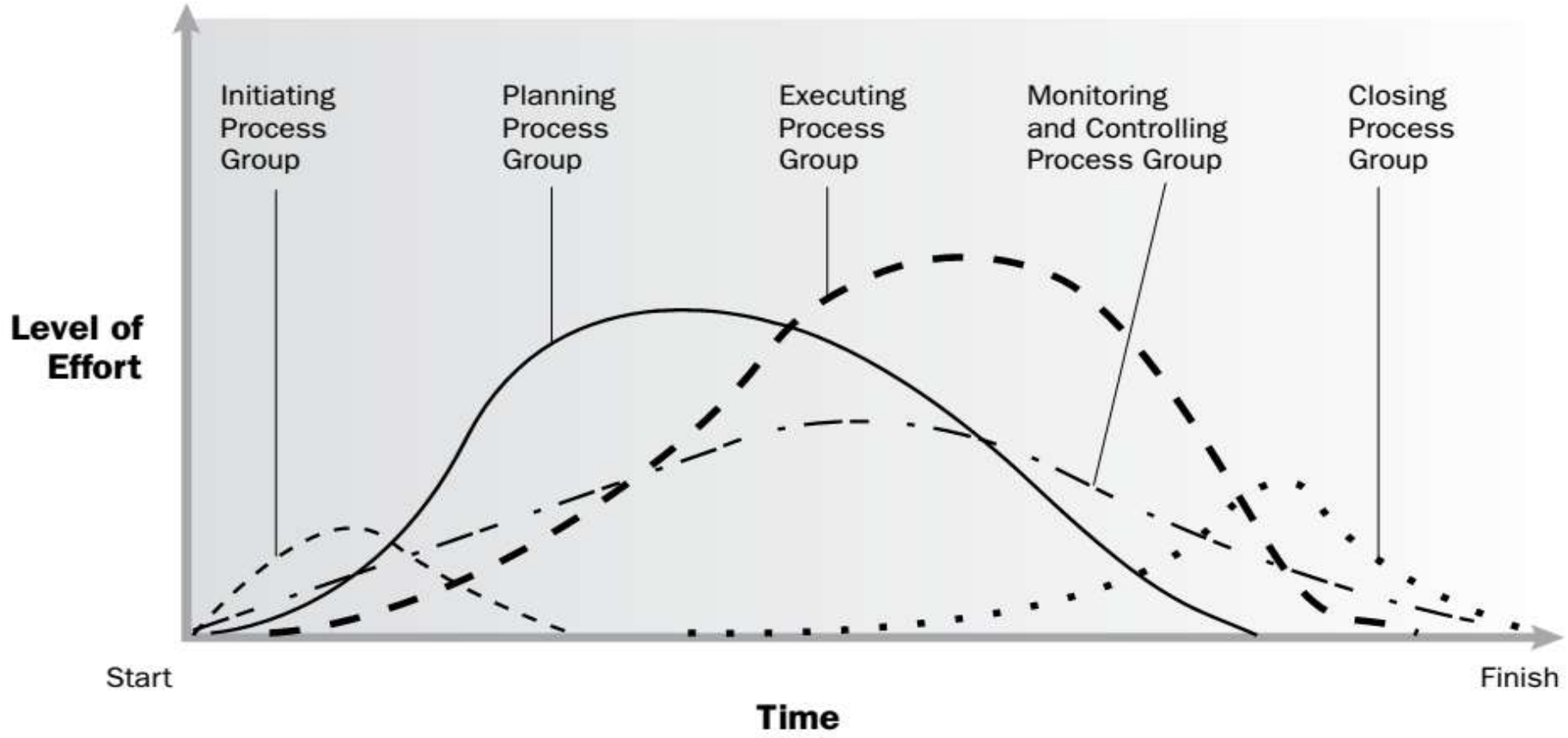

A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition, Project Management Institute Inc.,

Project Management Processes

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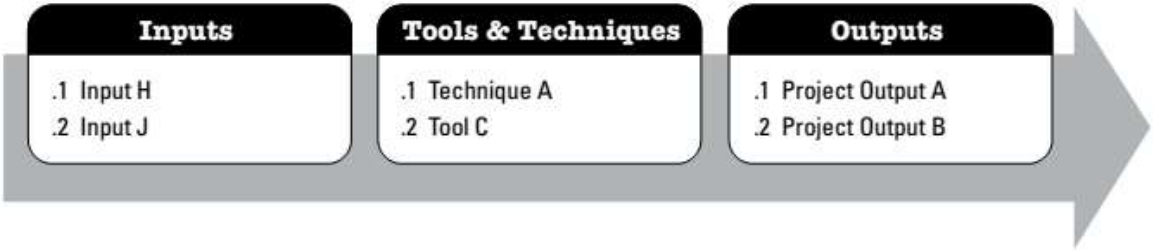
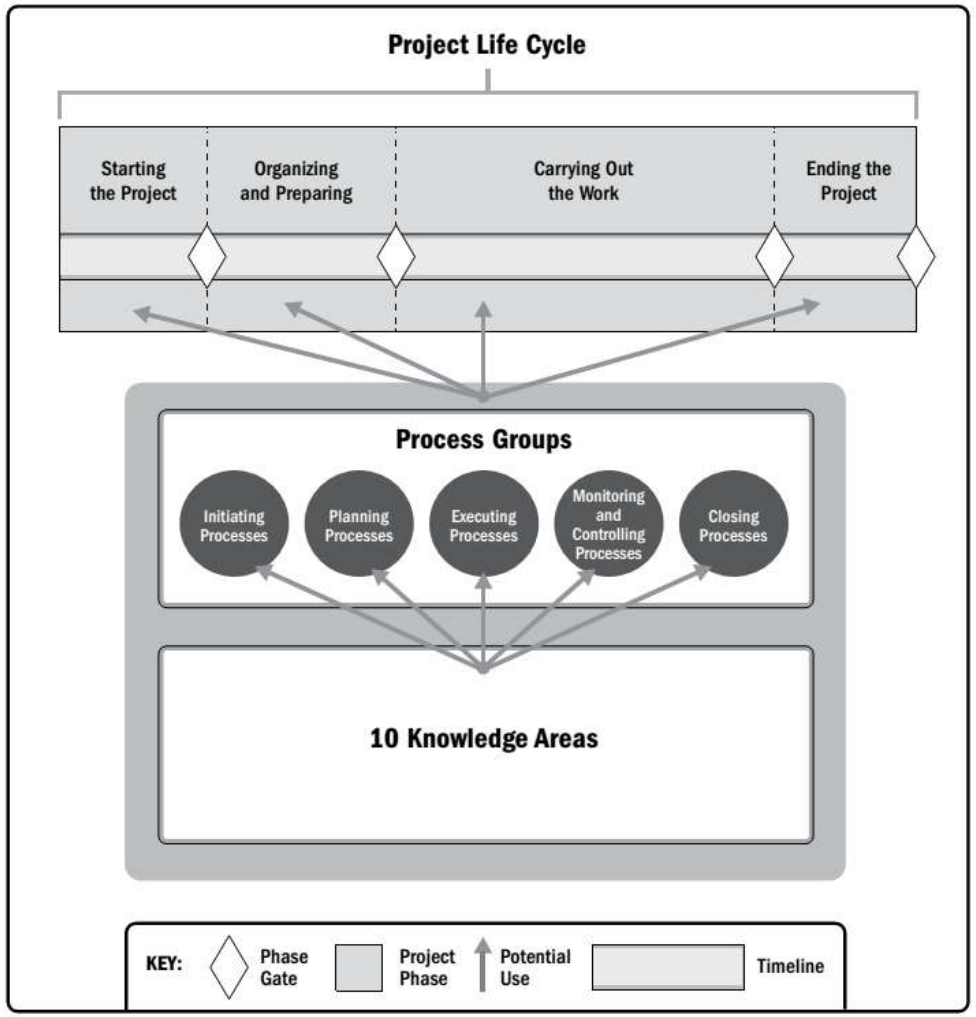
- There are **49** processes grouped into **5** process groups.
- These processes generally fall into one of three categories:
  - **Used once or at predefined points in the project.**
  - **Performed periodically as needed.**
  - **Performed continuously throughout the project.**

- The project management processes are linked by specific **inputs** and **outputs** where the result or outcome of one process may become the input to another process that is not necessarily in the same Process Group.



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

Linking Lifecycle with Processes Groups and Knowledge Areas



Project 10 Management Knowledge Areas

- 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 Integration Management

Knowledge Area and Process Groups Mapping – Page 25 PMBoK 6th

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Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
6. Project Schedule Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule	
7. Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	

Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
8. Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
9. Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
10. Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Processes and Key Outputs

PG	Process Name	Key Outputs
Project Initiating	**Develop Project Charter**	• Project charter
	Identify Stakeholders	• Stakeholders register
Project Planning	**Develop Project Management Plan**	• Project management plan
	Plan Scope Management	• Scope management plan • Requirements management plan
	Collect Requirements	• Requirements documentation • Requirements traceability matrix
	Define Scope	• Project scope statement
	Create WBS	• Scope baseline
	Plan Schedule Management	• Schedule management plan
	Define Activities	• Activity list • Activity attributes • Milestone list
	Sequence Activities	• Project schedule network diagrams
	Estimate Activity Durations	• Duration estimates • Basis of estimates
	Develop Schedule	• Schedule baseline • Project schedule • Schedule data • Project calendars

PG	Process Name	Key Outputs
Project Planning	**Plan Cost Management**	• Cost management plan
	Estimate Costs	• Cost estimates • Basis of estimates
	Determine Budget	• Cost baseline
	Plan Quality Management	• Quality management plan • Quality metrics
	Plan Resource Management	• Resource management plan • Team charter
	Estimate Activity Resources	• Resource requirements • Basis of estimates • Resource breakdown structure
	Plan Communications Management	• Communications management plan
	Plan Risk Management	• Risk management plan
	Identify Risks	• Risk register • Risk report
	Perform Qualitative Risk Analysis	• Project documents updates
	Perform Quantitative Risk Analysis	• Project documents updates
	Plan Risk Responses	• Change requests

Processes and Key Outputs – cont.

PG	Process Name	Key Outputs
Project Planning	Plan Procurement Management	• Procurement management plan • Procurement strategy • Bid documents • Procurement statement of work • Source selection criteria • Make-or-buy decisions • Independent cost estimates
	Plan Stakeholder Engagement	• Stakeholder engagement plan
Project Executing	Direct and Manage Project Work	• Deliverables • Change requests
	Manage Project Knowledge	• Lessons learned register
	Manage Quality	• Quality reports • Test and evaluation documents
	Acquire Resources	• Physical resource assignments • Project team assignments • Resource calendars
	Develop Team	• Team performance assessments
	Manage Team	• Change requests
	Manage Communications	• Project communications
	Implement Risk Responses	• Change requests
	Conduct Procurements	• Selected sellers • Agreements
	Manage Stakeholder Engagement	• Stakeholder engagement plan

PG	Process Name	Key Outputs
Project Monitoring & Controlling	Monitor and Control Project Work	• Work performance reports • Change requests
	Perform Integrated Change Control	• Approved change requests
	Validate Scope	• Accepted deliverables
	Control Scope	• Change requests
	Control Schedule	• Schedule forecasts • Change requests
	Control Costs	• Cost forecasts • Change requests
	Control Quality	• Quality control measurements • Verified deliverables
	Control Resources	• Change requests
	Monitor Communications	• Change requests
	Monitor Risks	• Work performance information • Change requests
	Control Procurements	• Closed procurements
	Monitor Stakeholder Engagement	• Work performance information • Change requests
Project Closing	Close Project or Phase	• Final product, service, or result transition • Final report

Effective communication between processes

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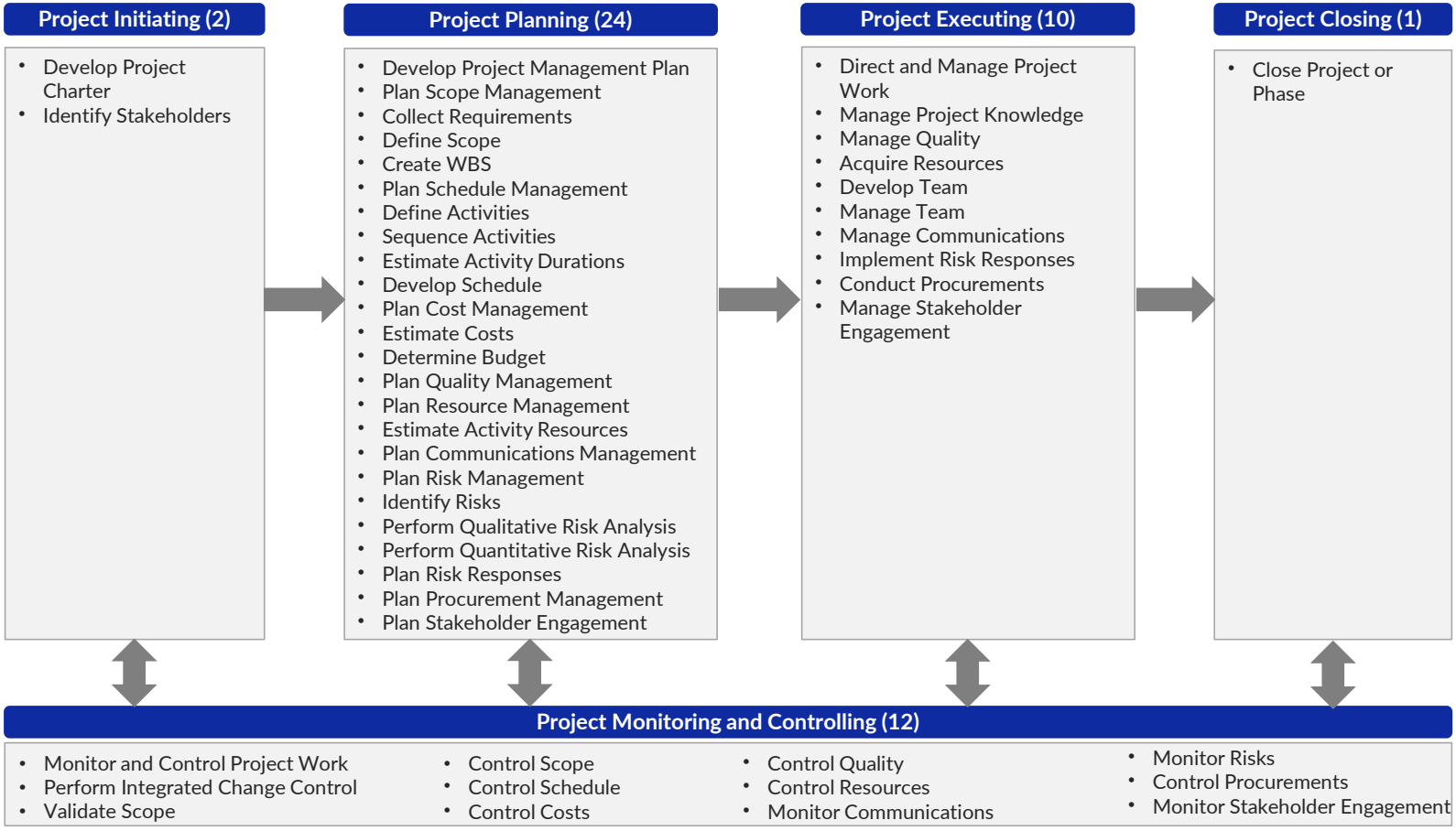

Considerations for Agile/Adaptive Environments

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Knowledge Area	Agile Considerations
Scope	Scope is generally not understood early, but objectives are used to sort initial business requirements from real business requirements. Scope is defined and redefined throughout the project.
Schedule	Short cycles are used to undertake and review work and adapt as necessary.
Cost	Projects with very flexible scope may not benefit from Intense scrutiny of cost. Lightweight estimation methods can be used to generate a fast, high-level forecast of project labor costs, which can then be easily adjusted.
Quality	Quality activities are built into the iterations, with frequent review. Retrospectives evaluate processes to determine if they are working and should be continued, changed, or removed.
Resource	Teams that maximize focus and collaboration have more autonomy and accountability- self-organizing teams with generalizing specialists. The project manager adopts a more mature leadership role.
Communications	Need to communicate evolving work and details more frequently and quickly. Streamlining team member to Information, frequent checkpoints, collocating as much as possible.
Risk	Frequent reviews of incremental work and cross-functional product teams to accelerate knowledge sharing and ensure that risk Is understood and managed.
Procurement	Collaboration with sellers can lead to a shared risk and rewards relationship.
Stakeholder	Active engagement and participation by and with stakeholders. Adaptive teams engage with stakeholders directly, not through layers of management. Aggressive transparency is promoted.
Integration	Team members determine how components Integrate, The project manager's focus is on building a collaborative decision-making environment and ensuring the team has the ability to respond to changes. This collaborative approach can be further enhanced when team members possess a broad skill base rather than a narrow specialization

Exercise

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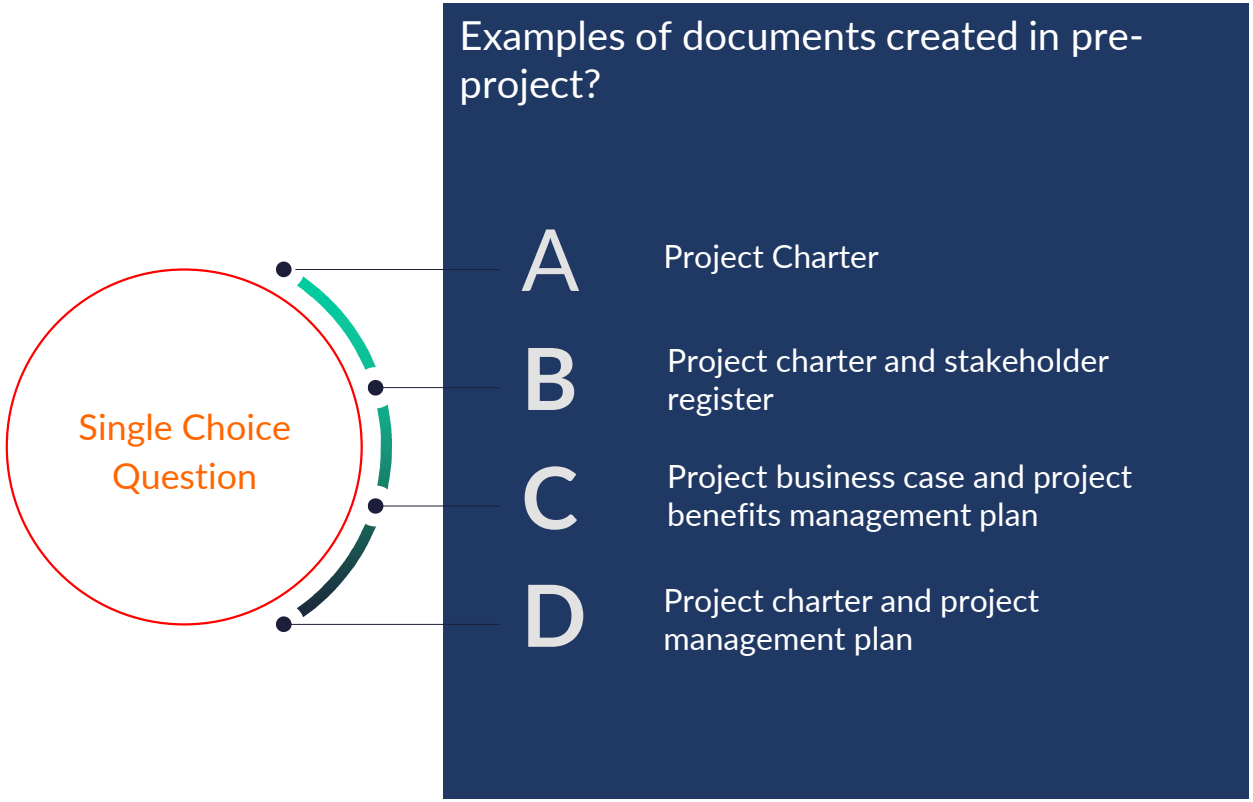

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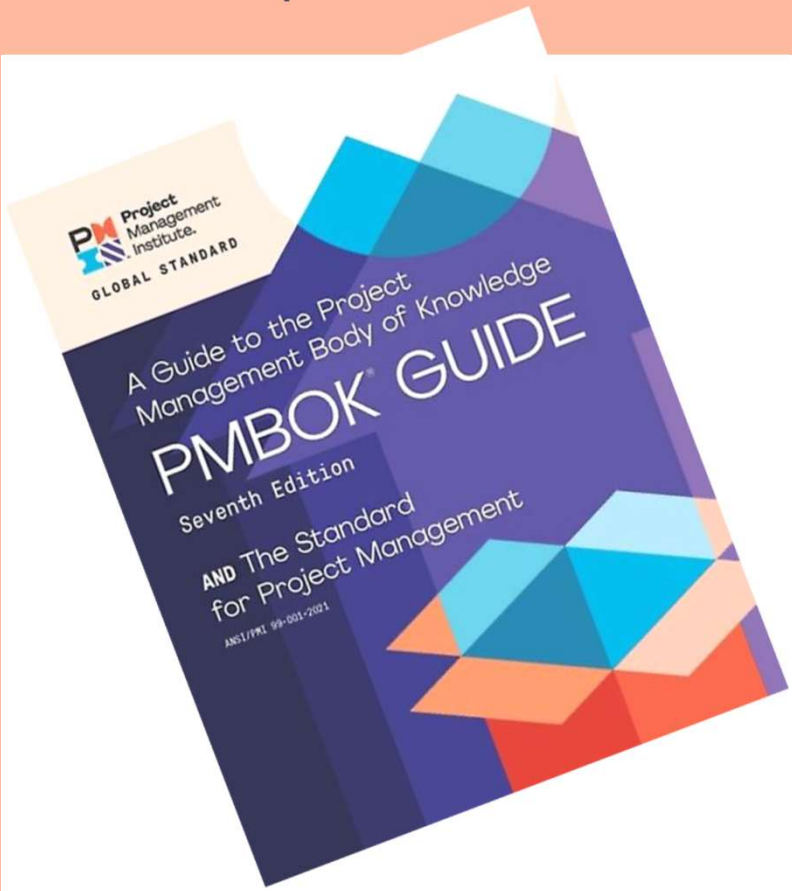
Principles-based and Performance Domain-focused Framework.

PMBoK 7th Edition



Project Management Principles - Guidance for All Project Practitioners

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Project Management Principles provide a foundational framework for all project practitioners, guiding them in effectively managing and delivering projects. The PMBOK® Guide – Seventh Edition outlines these principles, emphasizing their importance in achieving successful project outcomes. Here are the key insights:

- Reflects Full Range of Development Approaches
- Tailoring Development Approaches and Processes
- Expanded List of Tools and Techniques
- Focus on Project Outcomes

Principles – Guidance for All Project Practitioners

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1. Be a diligent, respectful and caring steward
2. Recognize, evaluate and respond to system interactions
3. Navigate complexity
4. Create a collaborative project team environment
5. Demonstrate leadership behaviors
6. Optimize risk responses
7. Effectively engage with stakeholders
8. Tailor based on context
9. Embrace adaptability and resiliency
10. Focus on value
11. Build quality into processes and deliverables
12. Enable change to achieve the envisioned future state

PMBOK® Guide – Seventh Edition outlines these principles

Performance Domains - Guidance for All Project Practitioners

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Use the 12 principles to guide behavior in the 8 project performance domains

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Mapping the relationship between the 12 Principles and the 8 Performance Domains

PMBOK® Guide Principle	Related Performance Domains	Description of the Relationship
1. Stewardship	Governance, Stakeholder Engagement	Ensuring ethical and responsible management, aligning the project with organizational governance, and considering stakeholder impacts.
2. Team	Team, Stakeholder Engagement	Promoting a collaborative environment, focusing on team dynamics, and effectively engaging stakeholders.
3. Stakeholders	Stakeholder Engagement, Planning	Focusing on understanding and addressing stakeholder needs and expectations throughout the project life cycle.
4. Value	Value Delivery, Planning, Measurement	Prioritizing value creation by ensuring that the project's outcomes align with stakeholder needs and deliver measurable benefits.
5. Systems Thinking	Planning, Risk, Development Approach & Life Cycle	Recognizing the interdependencies in the project environment and managing them holistically to achieve project objectives.
6. Leadership	Team, Stakeholder Engagement, Planning	Guiding, motivating, and influencing the project team and stakeholders to achieve project goals.

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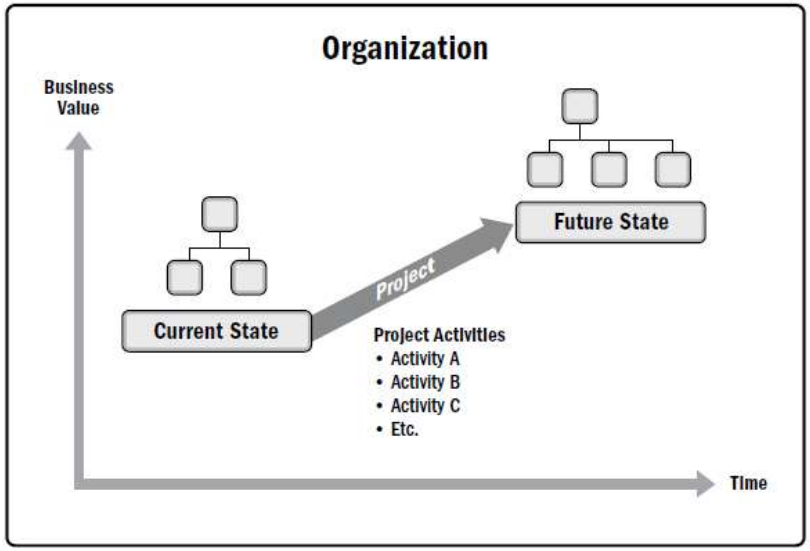
Mapping the relationship between the 12 Principles and the 8 Performance Domains

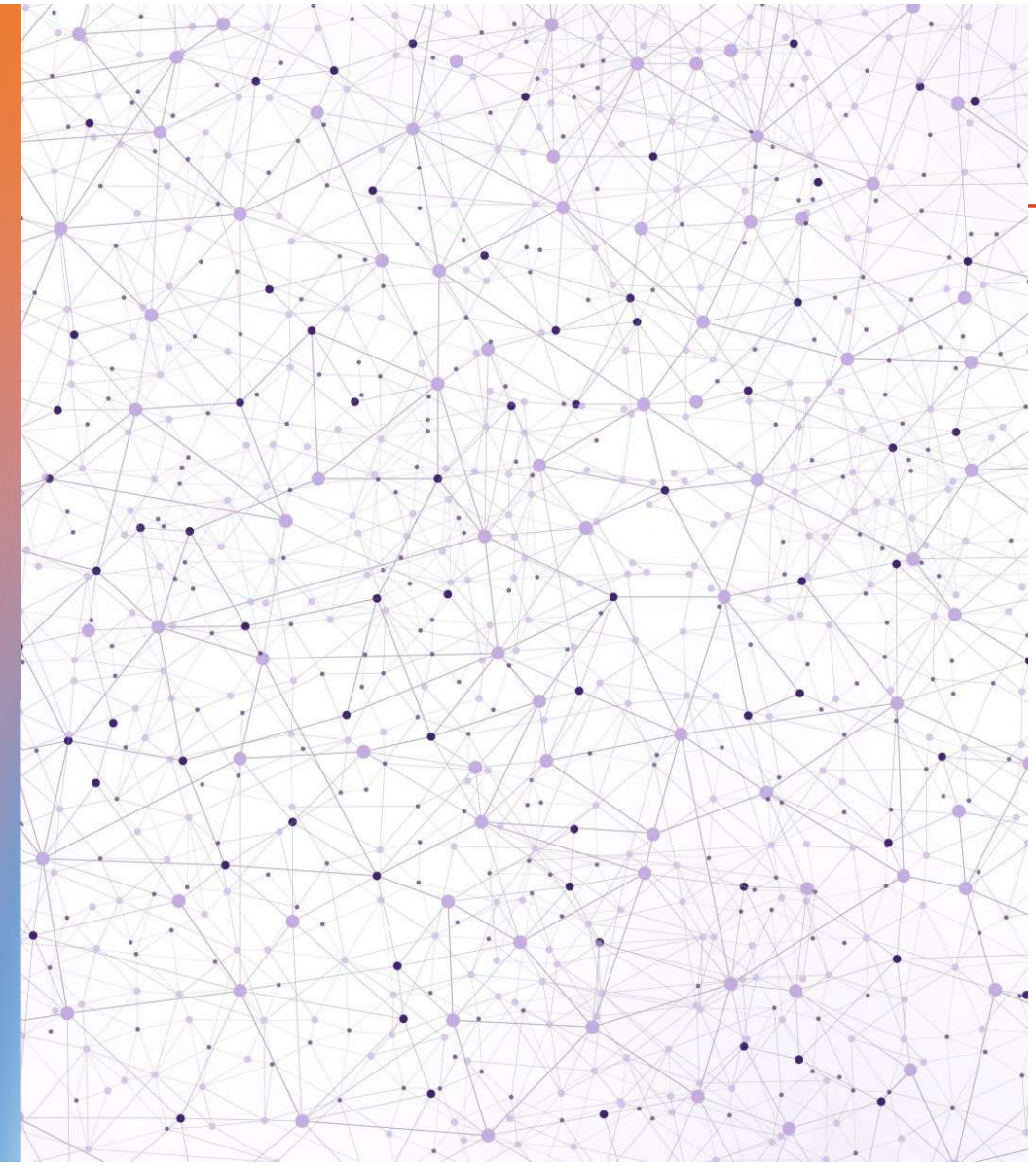
PMBOK® Guide Principle	Related Performance Domains	Description of the Relationship
7. Tailoring	Development Approach & Life Cycle, Planning, Measurement	Customizing project management practices and processes based on the specific context and needs of the project and its environment.
8. Quality	Quality, Measurement, Planning	Ensuring that the project's outputs meet the agreed-upon standards and requirements, focusing on continuous improvement.
9. Complexity	Risk, Planning, Development Approach & Life Cycle	Managing the inherent complexity in projects by anticipating challenges, reducing uncertainty, and planning effectively.
10. Risk	Risk, Planning	Identifying, assessing, and managing risks proactively to minimize negative impacts and exploit opportunities.
11. Adaptability and Resilience	Planning, Development Approach & Life Cycle, Risk, Measurement	Emphasizing flexibility, adaptability, and resilience in responding to changing conditions, while maintaining project alignment with strategic goals.
12. Change	Stakeholder Engagement, Planning, Governance, Development Approach & Life Cycle	Facilitating positive change, managing resistance, and ensuring that changes align with the project's value proposition and stakeholder expectations.

Projects drive Change in organization



Organizational State Transition via a Project

- The project aims to transition the organization from its current state to a new, future state.
- Prior to the project's commencement, the organization is characterized as being in its "current state.
- The intended outcome of the project's efforts is referred to as the "future state."



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Projects for Business Value Creation

Projects create **value** for businesses by driving growth, optimizing operations, improving customer experiences, enhancing competitiveness, and aligning with strategic goals. The specific value generated depends on the nature and objectives of each project and how effectively it is executed.

Major Stakeholders: Common Role

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Customers/Users: The customers/users are the persons or organizations that will use the project's product or service or result.

Functional Managers : Functional Managers are key individuals who play management role within an administrative or functional area of the business, such as Human Resources , Finance, Accounting , Legal or Procurement. Functional Managers does serve as Subject Matter Expert and related technical services towards the project.

Sellers: Sellers, Vendors, Suppliers, or Contractors are External companies that enter into a contractual agreement to provide components or service necessary for the project.

Business partners: Provides specialized expertise or fill a specified role such as installation, customization, training or support. They may have special relationship with the enterprise , sometimes attained through a Certification process. - > collaborate with a company or organization to achieve mutual goals or objectives

Other Project Stakeholders

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Tailoring

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- Project Management Body of Knowledge, (PMBOK® Guide) is a reference for "Tailoring" as these are generally recommended 'good practices'
- Tailoring is necessary as every project is 'Unique'
- Not every process, tool, technique, input, output in the PMBOK® Guide is required on every project
- Tailoring should address the competing constraints of Scope, Schedule, Cost, Resources, Quality & Risks
- In tailoring project management , the project manager should also consider the varying levels of governance that may be required and within which the project will operate as well as considering the culture of the organization

Agile Project Management: Introduction

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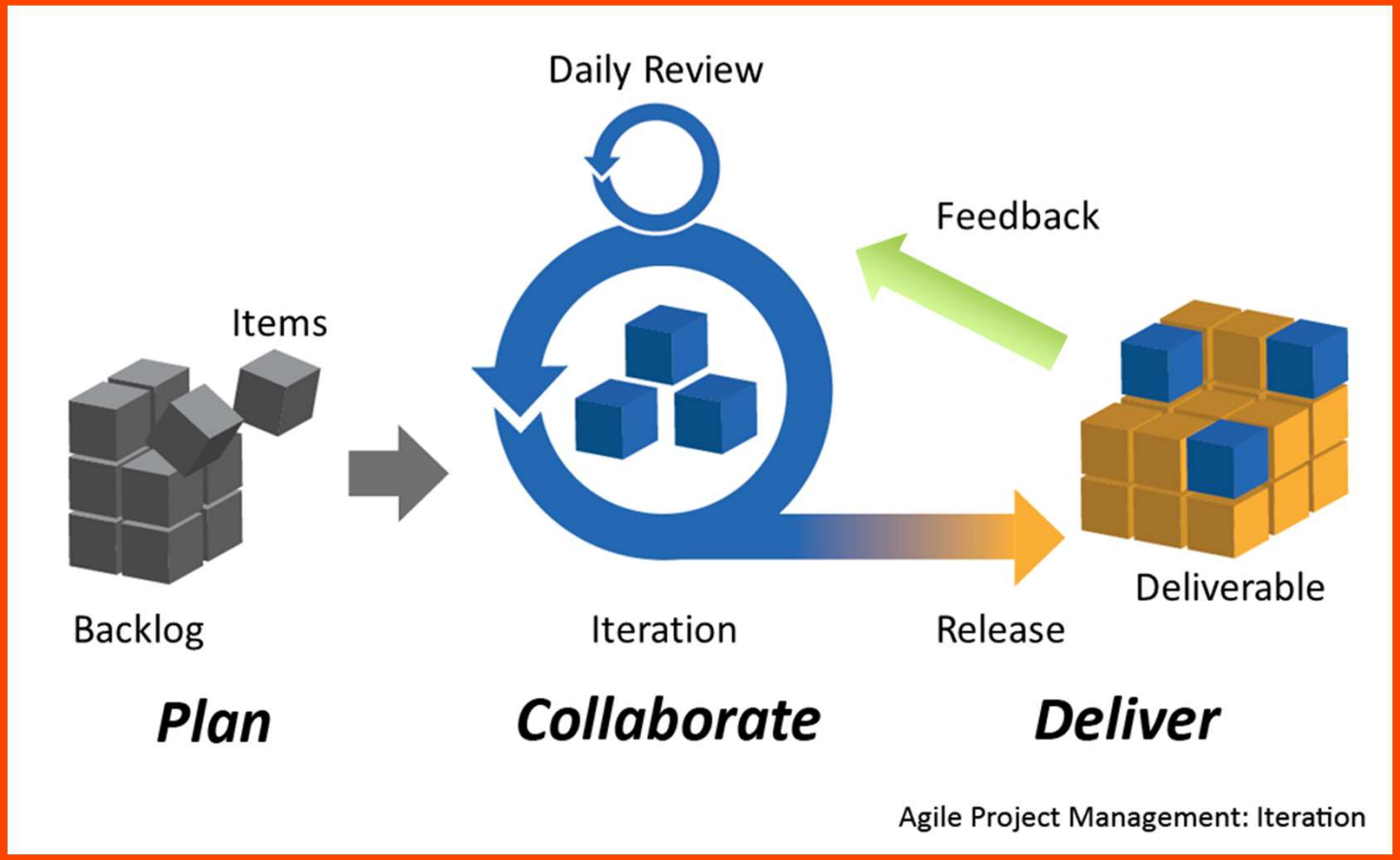

Agile Project Management: Iteration

Agile Project Management: Introduction

- High uncertainty projects have high rates of change, complexity & risks. These characteristics can present problems for traditional predictive approach.
- Agile approaches were created to explore feasibility in short cycles and quickly adapt based on evaluation and feedback

What is Agile Methodology ?

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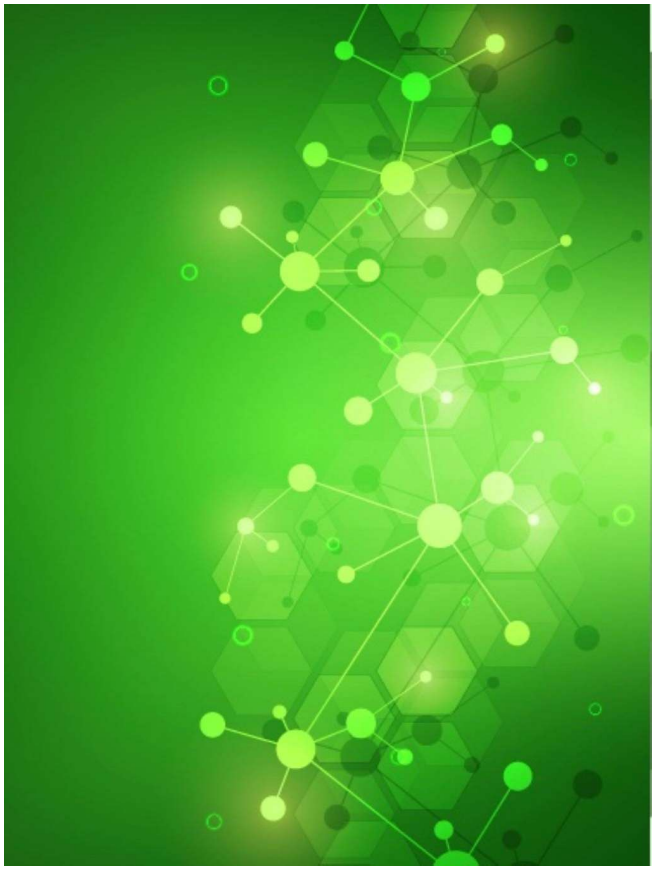

- Agile is a process by which a team can manage a project by breaking it up into several stages and involving constant collaboration with stakeholders and continuous improvement and iteration at every stage.
- The Agile methodology begins with clients describing how the end product will be used and what problem it will solve. This clarifies the customer's expectations to the project team.
- Once the work begins, teams cycle through a process of planning, executing, and evaluating — which might just change the final deliverable to fit the customer's needs better.
- Continuous collaboration is key, both among team members and with project stakeholders, to make fully-informed decisions

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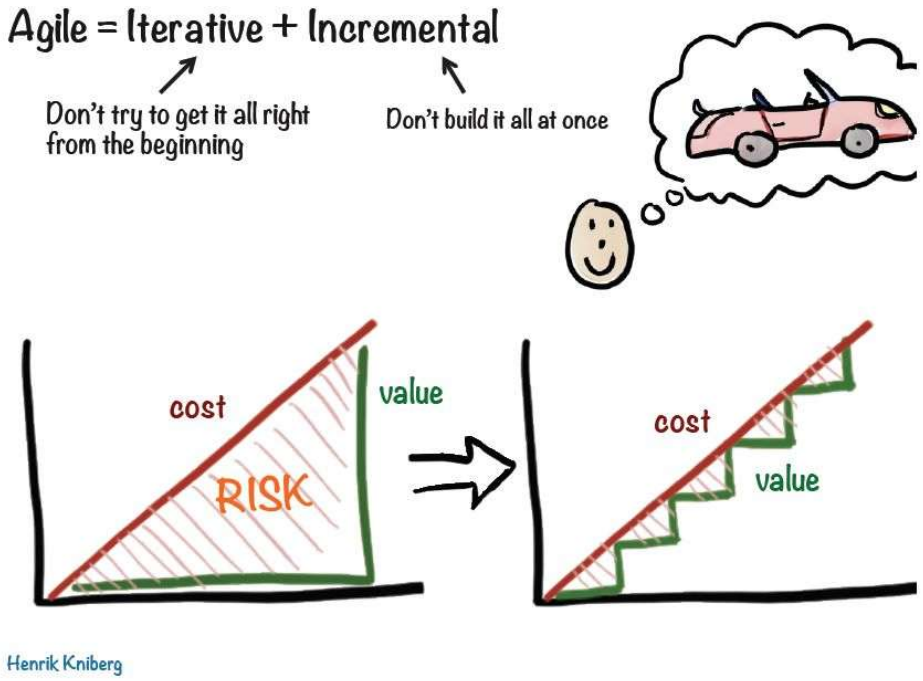
Agile basics:

- **Agile** project management is an iterative development methodology that values human communication and feedback, adapting to change, and producing working results.

- Iterative, meaning that it is done in pieces (sprints), with each sprint building and improving off the lessons from the previous sprint.



Agile Manifesto:

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✓ **Individuals and Interactions**	over	processes & tools
✓ **Working software**	over	comprehensive documentation
✓ **Customer collaboration**	over	contract negotiation
✓ **Responding to change**	over	following a plan

- **"While there is a value in the items on the RIGHT, we value the items on LEFT more"**

Agile: Twelve clarifying principles flowed from values

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1. Our highest priority is to satisfy the customer through **early** and **continuous delivery** of valuable software
2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale
4. Businesspeople and developers must work together daily throughout the project

Agile: Twelve clarifying principles flowed from values

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5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done
6. The most efficient and effective method of conveying information to and within a development team is face to face conversation
7. Working software is the primary measure of progress
8. Agile processes promote sustainable development. The sponsors developers and users should be able to maintain a constant pace indefinitely

Agile: Twelve clarifying principles flowed from values

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9. Continuous attention to technical excellence and good design enhances agility
10. Simplicity – the art of maximizing the amount of work not done – is essential
11. The best architects, requirements, and designs emerge from self-organizing teams
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly

Change driven or Agile method: Basic terminologies

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- **Agile:** A term used to describe a mindset of values and principles as set forth in the Agile Manifesto
- **Iteration:** A time boxed cycle of development on a product or deliverable in which all of the work that is needed to deliver value is performed
- **Incremental:** An approach that provides finished deliverables that the customer may be able to use immediately
- **Scrum:** An Agile framework for developing and sustaining complex products, with specific roles, events, & artifacts
- **Product backlog:** An ordered list of user-centric requirements that a team maintains for a product
- **Burndown chart:** A graphical representation of the work remaining versus the time left in a time box
- **Burnup chart:** A graphical representation of the work completed toward the release of a product
- **Continuous delivery:** The practice of delivering feature increments immediately to customers, often through the use of small batches of work and automation technology
- **Retrospective:** A regularly occurring workshop in which participants explore their work and results in order to improve both process & product

SCRUM - Framework

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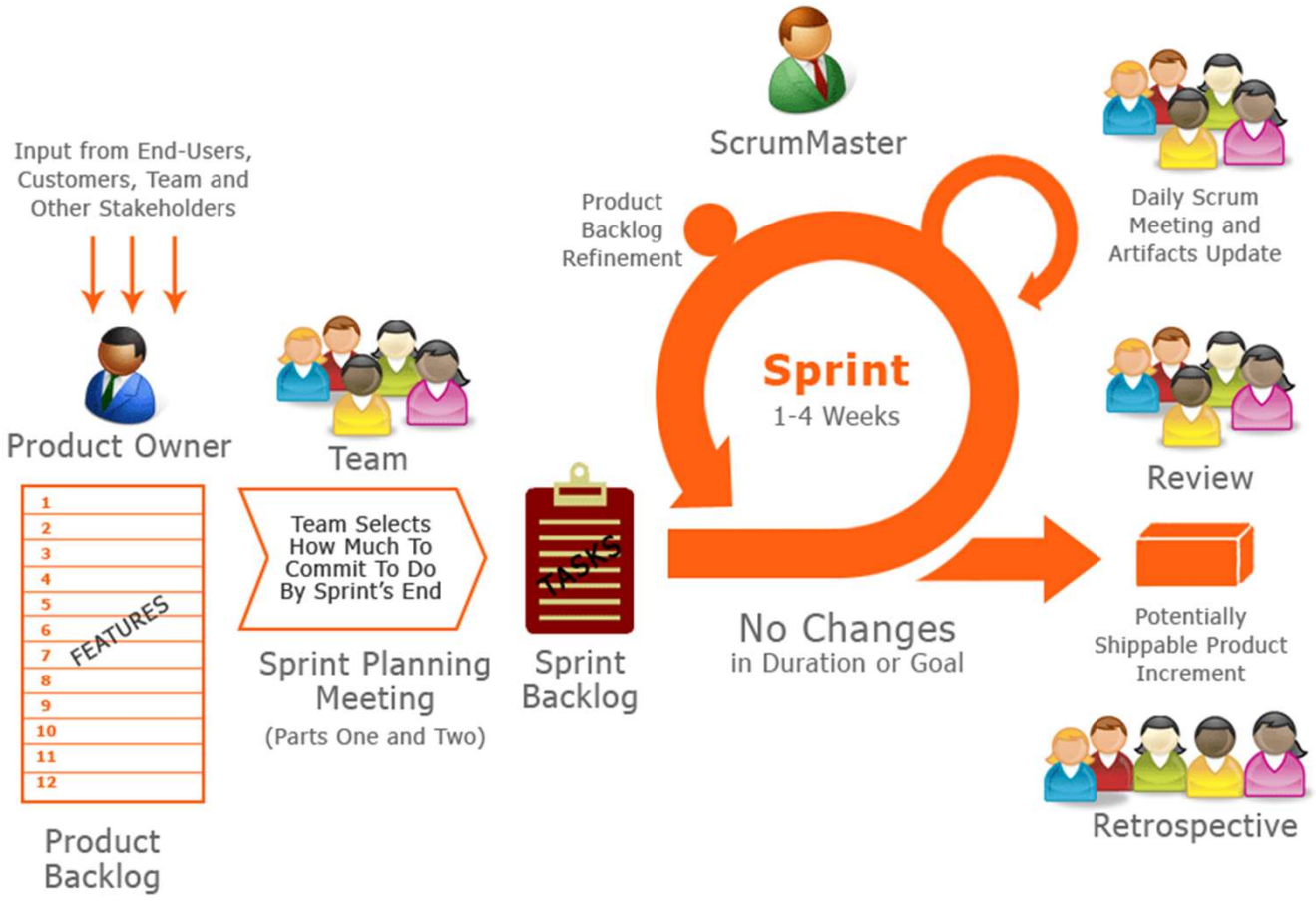

Examples of **Leadership** styles:

- **Servant leader**- "secondary" – commitment to serve keeping other people first, focus on other people learning, growth, development, autonomy and well being, concentrate on community and collaboration relationship .
- **Laissez- faire** – "Hands off style" – allowing team to take own decisions, set own goals
- **Transactional (**managerial**)** – "by exception" – focus on goals, feedback, accomplishments to rewards
- **Transformational** – empowering followers, inspirational motivation, innovative, creativity
- **Charismatic** – able to inspire, is high energy, enthusiastic, self confident
- **Interactional** – combination of ' Transactional – Transformational – Charismatic'

Servant Leadership:

A **servant leader** focuses on the needs of others before considering your own. It's a longer-term approach to **leadership**, rather than a technique that you can adopt in specific situations. Therefore, one can use it with other **leadership styles**

➢ **4 principles of servant leadership:**

1. Encourage diversity of thoughts
2. Create a culture of trust
3. Have an unselfish mindset
4. Foster leadership in others

10 Characteristics of Servant leadership:

1. Listening
2. Empathy
3. Healing
4. Awareness
5. Persuasion
6. Conceptualization
7. Foresight
8. Stewardship
9. Commitment to the growth of people
10. Building a community

PMP – SCRUM Quiz

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1. What are the three roles in a Scrum team?
   - A) Product Owner, ScrumMaster, Team
   - B) Product Owner, Project Manager, Team
   - C) ScrumMaster, Project Manager, Team
   - D) Product Owner, ScrumMaster, Stakeholders

2. What is the primary responsibility of the Product Owner?
   - A) Managing the team
   - B) Ensuring the business value of the project
   - C) Facilitating Scrum meetings
   - D) Writing code

PMP – SCRUM Quiz

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3. What is the main role of the ScrumMaster?
   - A) Writing user stories
   - B) Ensuring the team is functional and productive
   - C) Prioritizing the backlog
   - D) Developing the product

4. What does the Team do in Scrum?
   - A) Manages the project budget
   - B) Self-organizes to get the work done
   - C) Writes the project charter
   - D) Approves the final product

PMP – SCRUM Quiz

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5. What are the three questions answered in a daily Scrum meeting?

- A) What did you do yesterday? What will you do today? Any impediments?
- B) What is the project status? What are the risks? What are the next steps?
- C) What is the budget? What is the timeline? What are the deliverables?
- D) What are the requirements? Who are the stakeholders? What is the scope?

6. How long should tasks be estimated in Scrum?

- A) 1 to 2 hours
- B) 4 to 16 hours
- C) 1 to 2 days
- D) 1 to 2 weeks

PMP – SCRUM Quiz

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7. What is the purpose of the daily Scrum meeting?
   - A) To review the project budget
   - B) To monitor progress, address problems quickly, and enhance team commitment and dynamics
   - C) To write user stories
   - D) To present the final product to stakeholders

8. What is the Agile Manifesto?
   - A) A project management methodology
   - B) A declaration of four values and twelve principles to guide agile project management
   - C) A software development tool
   - D) A project scheduling technique

PMP – SCRUM Quiz

9. What is the significance of the third question in the daily Scrum meeting?

- A) It helps the Product Owner prioritize the backlog
- B) It helps the ScrumMaster identify and remove impediments to enhance teamwork
- C) It helps the team estimate tasks
- D) It helps stakeholders understand the project scope

10. What is the role of the ScrumMaster in addressing problems?

- A) The ScrumMaster addresses problems quickly since there is daily visibility of the work performed
- B) The ScrumMaster writes code to solve problems
- C) The ScrumMaster delegates problems to the Product Owner
- D) The ScrumMaster ignores problems until the Sprint Review

Types of specialists

I shaped : Refers to a person with a single deep area of specialization and no interest or skill in the rest of the skills required by the team

T shaped : Refers to a person with one deep area of specialization and broad ability in the rest of the skills required by the team

Broken Comb (extension of the T shaped): Refers to a person with various depths of specialization in multiple skills required by the team. (Also known as 'Paint Drip')

Code of Conduct & Ethics of Profession

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Responsibility

Respect

Fairness

Honesty

- **Responsibility:**

It is our duty to take ownership for the decisions we make or fail to make, the actions we take or fail to take & the consequences that result.

- **Respect:**

Involves showing high regard for ourselves, others, and entrusted resources, understanding norms, listening to others, addressing conflicts directly, conducting ourselves professionally, and negotiating in good faith without misusing our position.

- **Fairness:**

Fairness is our duty to make decisions and act impartially & Objectively. Our conduct must be free from competing self interest and favoritism.

- **Honesty:**

Honesty is our duty to understand the truth and act in a truthful manner both in our communication and in our conduct.

Let's Assess...

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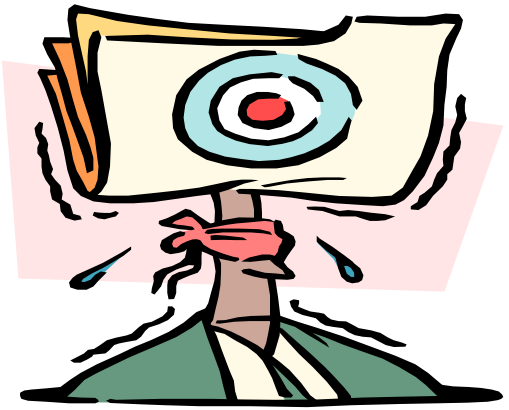
- What is a Project ? What is Project Management ?
- What is the difference between Project & Operations ?
- What is a phase of a project ? Phase relationships?
- What is the difference between Predictive & Agile life cycle?
- What is Agile 'manifesto' ?
- What is Program management and portfolio management?
- What is PMO ? Specific difference between Predictive and Agile PMO?
- What is Project manager's role towards "Project & Organization" ?
- What is hybrid project management?
- What are the key Leadership styles ? Servant leadership ?
- What is expected with the term 'Tailoring' ?
- What is the role of Product owner?
- What is the role of Scrum master?
- What is self organizing team?
- What are the key categories of Professional responsibilities?



Organizational Governance Framework

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- Governance refers to organizational or structural arrangements at all levels of an organization designed to determine and influence the behavior of the organization's members
- Governance is the framework within which authority is exercised in organizations

Governance Framework includes:

- Rules
- Policies
- Procedures
- Norms
- Relationships
- Systems & processes

Governance Framework influences How?:

- Objectives of the organization are set and achieved
- Risk is monitored and assessed
- Performance is optimized

Pre-Project Phase

What is a Pre-Project Phase

The pre-project phase is a critical stage in project management that occurs before the official start of a project. This phase involves essential planning and decision-making activities to ensure the project's viability and alignment with organizational goals

Pre-Project Phase: Main Outputs (Business Documents)

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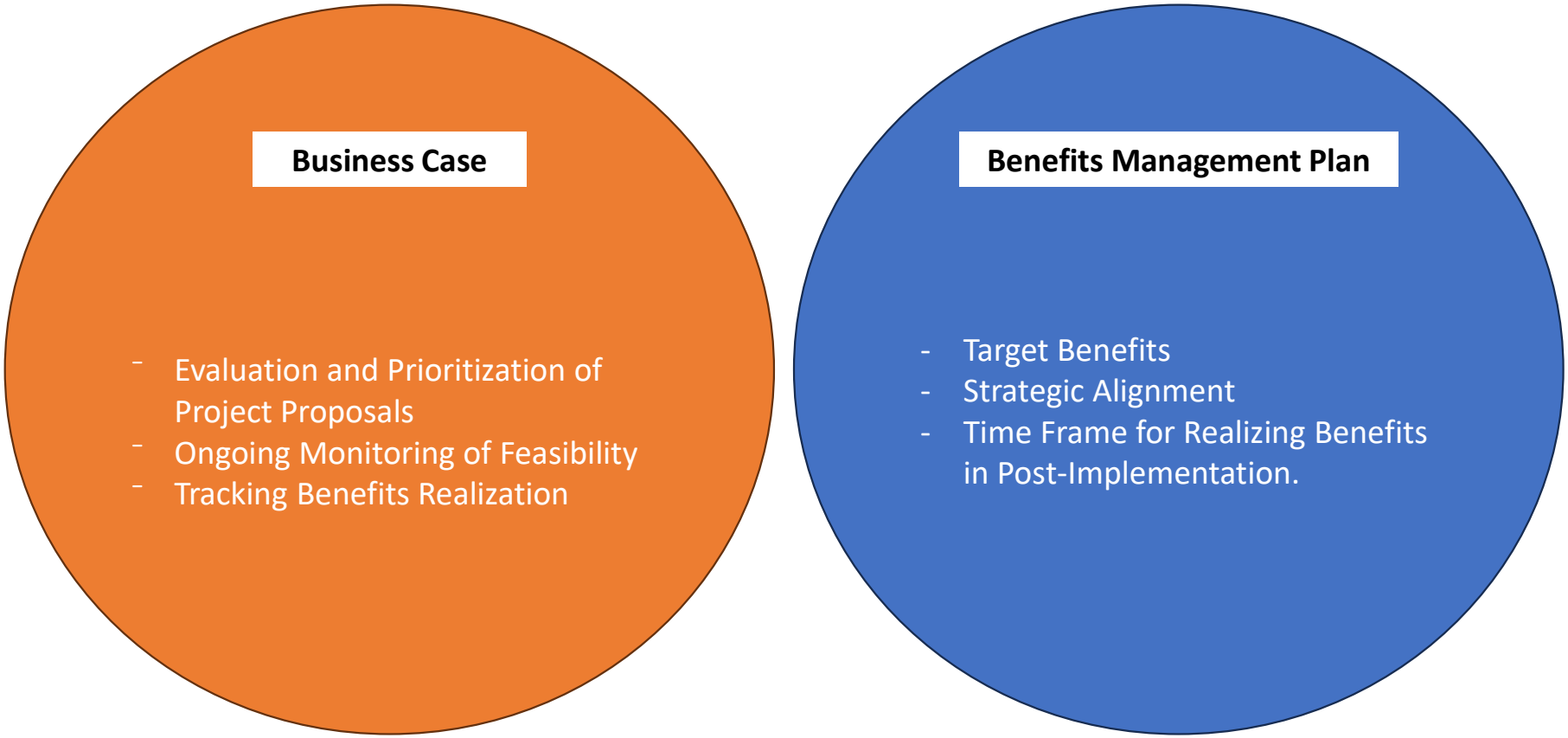

Basic Parameters of Financial Measures

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Business Case: Financial measures in the business case are used to **justify** the initiation of the project. They help in evaluating the project's **potential value**, **costs**, and **risks**, providing a basis for decision-making. Key financial measures such as Net Present Value (NPV), Return on Investment (ROI), and Benefit-Cost Ratio (BCR) are often included to demonstrate the project's financial **viability** and expected benefits.

Benefits Management Plan: In the benefits management plan, financial measures are used to **track** and **manage** the realization of the project's benefits **over time**. This plan outlines how the benefits will be identified, measured, and managed **throughout the project lifecycle**. Financial metrics help ensure that the project delivers the expected value and that the benefits are sustained post-implementation.

Financial Measure	Description	Interpretation
Net Present Value (NPV)	Difference between the present value of cash inflows and outflows over a project's lifetime.	Positive NPV indicates the project is expected to generate more value than its cost; negative NPV suggests it may not be worth pursuing.
Return on Investment (ROI)	Percentage return on the investment made in a project.	Higher ROI indicates a more profitable project; lower ROI may signal a less attractive investment.
Internal Rate of Return (IRR)	Discount rate that makes the NPV of a project zero.	Project is acceptable if IRR exceeds the required rate of return or the cost of capital.
Payback Period (PBP)	Time it takes for a project to recover its initial investment from its cash inflows.	Shorter payback period is preferred as it indicates a quicker return on investment and reduced risk.
Benefit-Cost Ratio (BCR)	Ratio of the present value of benefits to the present value of costs.	BCR greater than 1 indicates benefits outweigh costs; BCR less than 1 suggests costs exceed benefits.

Business Case - Content

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- **Executive Summary**: A brief overview of the project, including its objectives, key benefits, costs, and recommendations. This section provides a high-level summary for executives and stakeholders.
- **Problem Statement**: A detailed description of the problem or opportunity that the project aims to address. This section outlines the current conditions, constraints, and the need for the proposed solution.
- **Proposed Solution**: An explanation of the proposed solution, including its scope, objectives, and how it addresses the problem. This section includes assumptions, data about current conditions, and any evaluation criteria used to develop the solution.
- **Alternatives Analysis**: A comparison of alternative solutions, including the potential impact of doing nothing. This section evaluates the pros and cons of each alternative in terms of costs, risks, and benefits.
- **Cost-Benefit Analysis**: A detailed analysis of the expected costs and benefits of the proposed solution. This section includes financial projections, return on investment (ROI), and payback period.
- **Risk Assessment**: An initial assessment of potential risks associated with the project. This section identifies, analyzes, and prioritizes risks, and outlines mitigation strategies.
- **Implementation Plan**: A high-level plan for implementing the proposed solution, including key milestones, timelines, resource requirements, and responsibilities.
- **Evaluation Plan**: A plan for evaluating the project's success, including key performance indicators (KPIs) and metrics. This section outlines how the project's outcomes will be measured and monitored.

Benefits Management Plan- Content

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- **Target Benefits**: The expected tangible and intangible value to be gained by the implementation of the project. Financial value is often expressed as net present value (NPV).
- **Strategic Alignment**: The alignment of the project to the business strategies of the organization. This ensures that the project supports the broader goals and objectives of the organization.
- **Time Frame for Realizing Benefits**: The length of time required to realize the benefits, which can be short-term, long-term, ongoing, or by phase. This helps in setting realistic expectations and planning for benefit realization.
- **Benefits Owner**: The individual or group responsible for ensuring that the benefits are realized. This person or team will oversee the tracking and reporting of benefits throughout the project lifecycle.
- **Metrics**: The specific measures used to quantify the benefits. These metrics help in assessing whether the project is delivering the expected value and allow for ongoing monitoring and evaluation.
- **Assumptions and Risks**: The assumptions made in the benefits management plan and the potential risks that could impact the realization of benefits. This section helps in identifying and mitigating factors that could affect the project's success.
- **Benefits Realization Plan**: A detailed plan outlining how and when the benefits will be realized. This includes the steps and activities required to achieve the benefits and the timeline for their realization.

Initiating the Project

Processes and Key Outputs

PG	Process Name	Key Outputs
Project Initiating	Develop Project Charter	• Project charter
	Identify Stakeholders	• Stakeholders register
Project Planning	Develop Project Management Plan	• Project management plan
	Plan Scope Management	• Scope management plan • Requirements management plan
	Collect Requirements	• Requirements documentation • Requirements traceability matrix
	Define Scope	• Project scope statement
	Create WBS	• Scope baseline
	Plan Schedule Management	• Schedule management plan
	Define Activities	• Activity list • Activity attributes • Milestone list
	Sequence Activities	• Project schedule network diagrams
	Estimate Activity Durations	• Duration estimates • Basis of estimates
	Develop Schedule	• Schedule baseline • Project schedule • Schedule data • Project calendars

PG	Process Name	Key Outputs
Project Planning	Plan Cost Management	• Cost management plan
	Estimate Costs	• Cost estimates • Basis of estimates
	Determine Budget	• Cost baseline
	Plan Quality Management	• Quality management plan • Quality metrics
	Plan Resource Management	• Resource management plan • Team charter
	Estimate Activity Resources	• Resource requirements • Basis of estimates • Resource breakdown structure
	Plan Communications Management	• Communications management plan
	Plan Risk Management	• Risk management plan
	Identify Risks	• Risk register • Risk report
	Perform Qualitative Risk Analysis	• Project documents updates
	Perform Quantitative Risk Analysis	• Project documents updates
	Plan Risk Responses	• Change requests

Develop Project Charter

Develop Project Charter

Definition

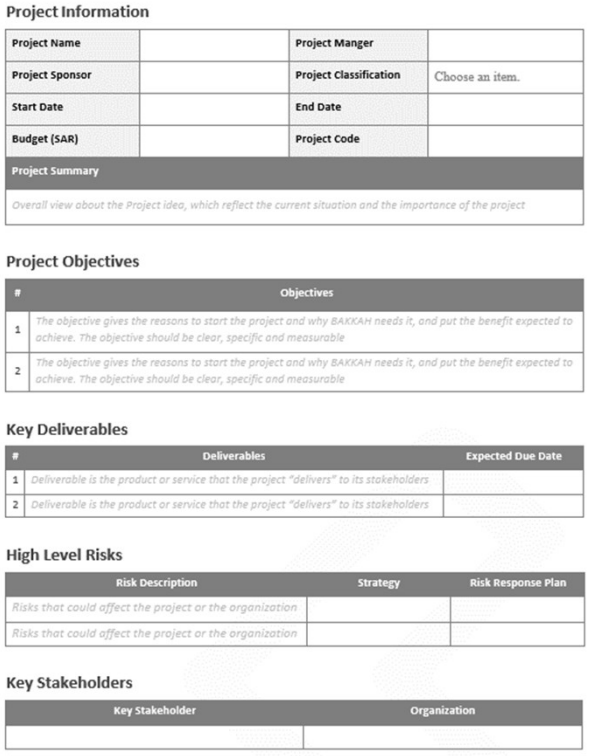
The process of developing a document that would **formally authorize** the project or a phase, and **document initial requirements** meet stakeholder's needs and their expectations.

Benefit

- To link the project to the strategic objectives.
- To formally authorize the project and get commitment of resources.

Notes

- This process is performed once or at predefined points in the project.
- Project charter should be authored by sponsor.
- Project sponsor should have the ability to fund the project.
- Projects are authorized due to internal business needs or external influences.



Project Information

Project Name		Project Manger	
Project Sponsor		Project Classification	Choose an item.
Start Date		End Date	
Budget (SAR)		Project Code	
Project Summary			
Overall view about the Project idea, which reflect the current situation and the importance of the project			

Project Objectives

#	Objectives
1	*The objective gives the reasons to start the project and why BAKKAH needs it, and put the benefit expected to achieve. The objective should be clear, specific and measurable*
2	*The objective gives the reasons to start the project and why BAKKAH needs it, and put the benefit expected to achieve. The objective should be clear, specific and measurable*

Key Deliverables

#	Deliverables	Expected Due Date
1	*Deliverable is the product or service that the project "delivers" to its stakeholders*	
2	*Deliverable is the product or service that the project "delivers" to its stakeholders*	

High Level Risks

Risk Description	Strategy	Risk Response Plan
Risks that could affect the project or the organization		
Risks that could affect the project or the organization		

Key Stakeholders

Key Stakeholder	Organization

Develop Project Charter - Process

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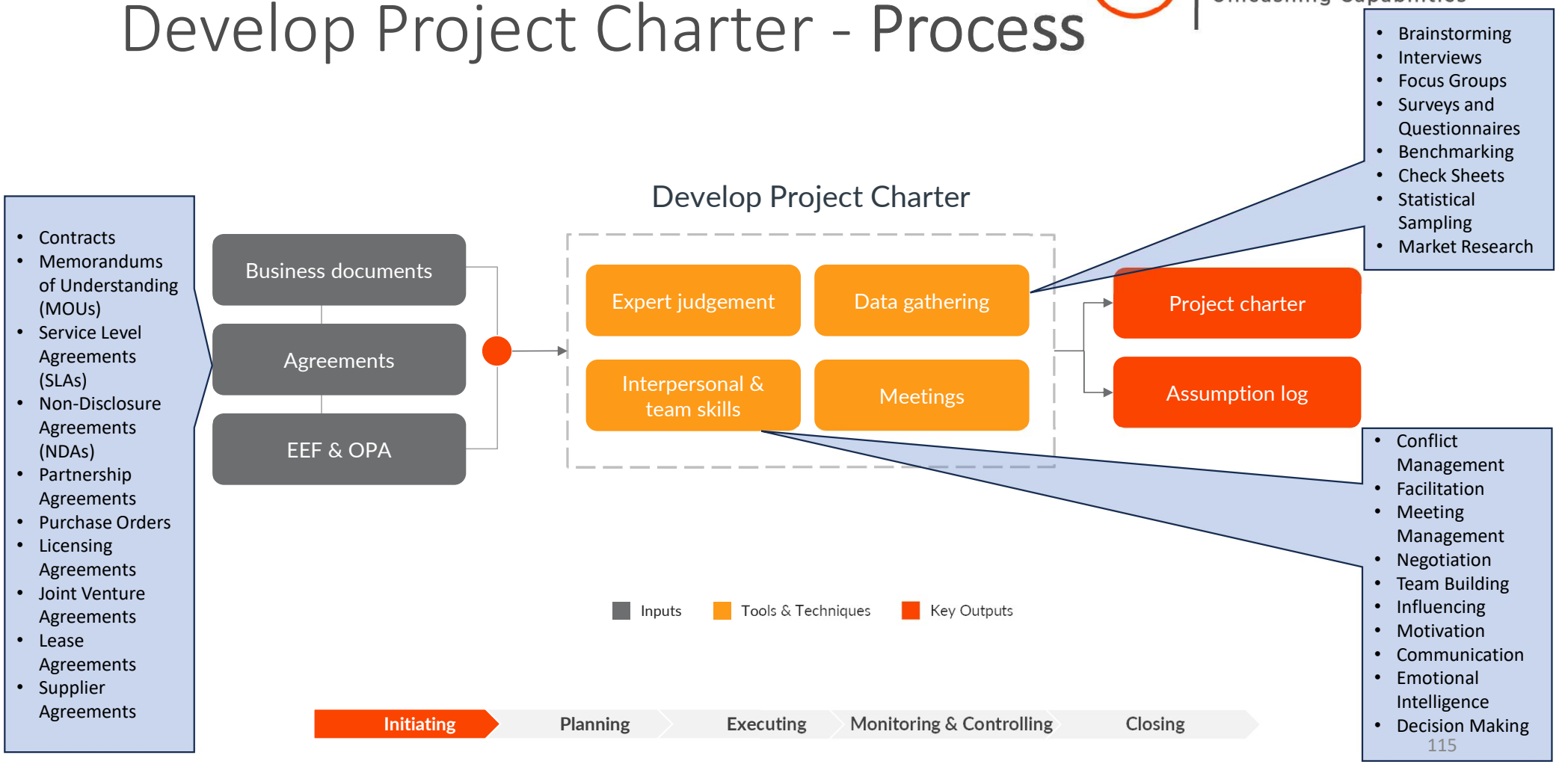

Project Charter - Content

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Project Purpose or Justification
Measurable Project Objectives and Related Success Criteria
High-Level Requirements: A summary of the key requirements that the project must meet.
High-Level Project Description and Boundaries
High-Level Risks with high-level mitigation strategies.
Summary Milestone Schedule and Budget: A timeline of major milestones and deliverables.
Project Approval Requirements: Criteria that must be met for the project to be considered complete and successful.
Assigned Project Manager, Responsibility, and Authority Level
Name and Authority of the Sponsor or Other Person(s) Authorizing the Project Charter.

Processes and Key Outputs

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Identify Stakeholders

Identify Stakeholders

Definition

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**.

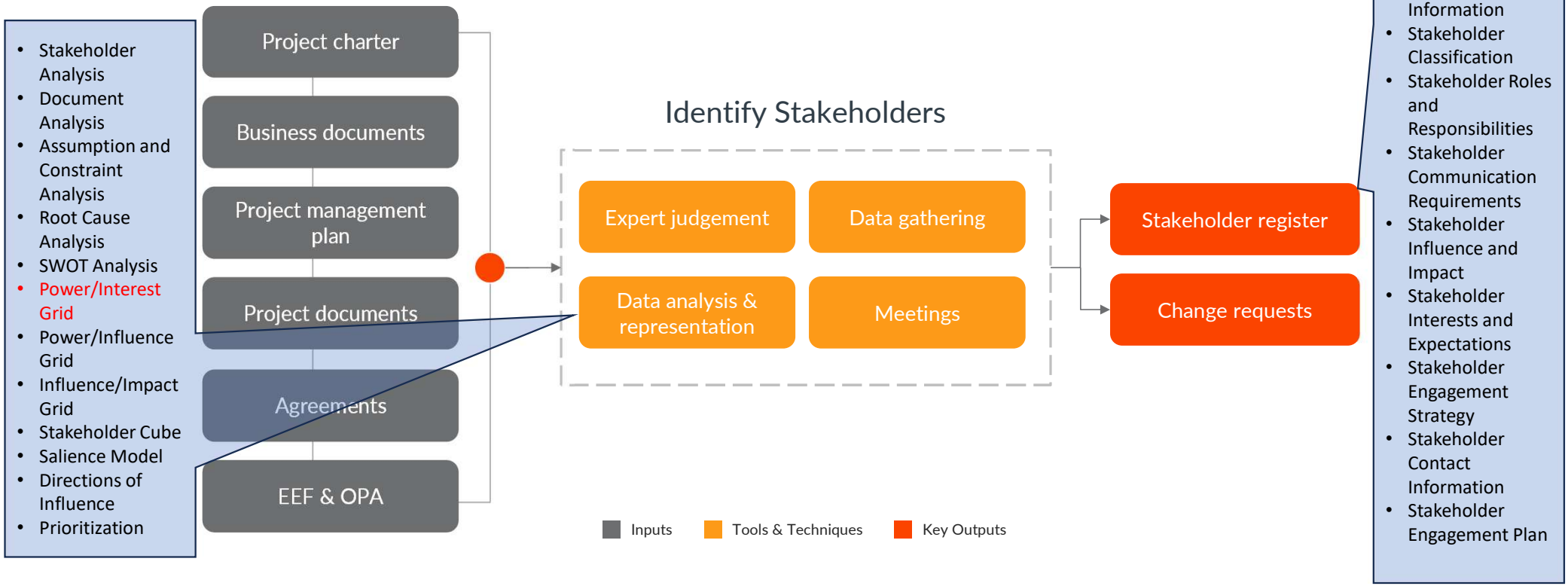
Benefit

Enables the project team to identify the appropriate focus for engagement of each stakeholder or group of stakeholders.

Notes

- This process is performed periodically throughout the project as needed.
- A **Stakeholder** is an individual, group, or organization that may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project, program, or portfolio.

Identify Stakeholders - Process



Initiating | Planning | Executing | Monitoring & Controllin | Closing

Data Representation

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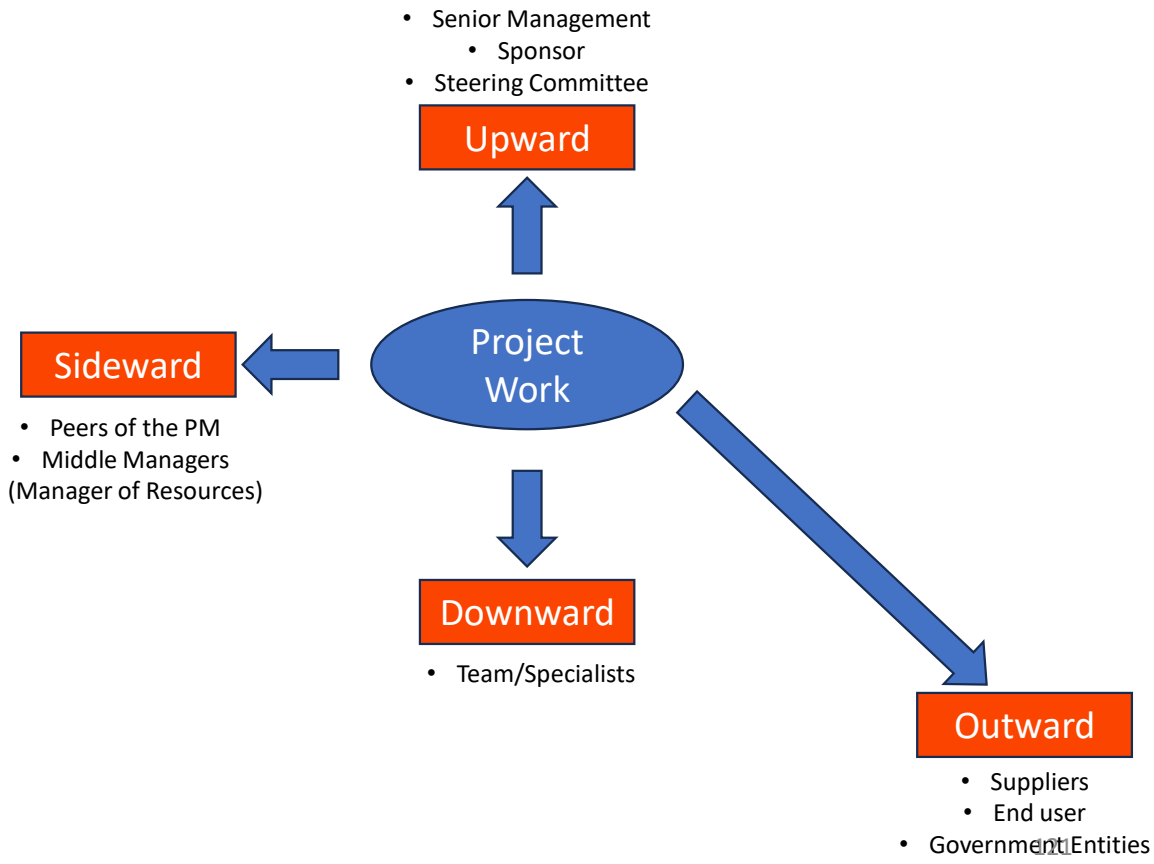
Power/Interest Grid

Stakeholder Classification (Power/Interest Matrix)		Power Scale	
		High	Low
Interest Scale	High	Manage Closely	Keep Informed
	Low	Keep Satisfied	Monitor

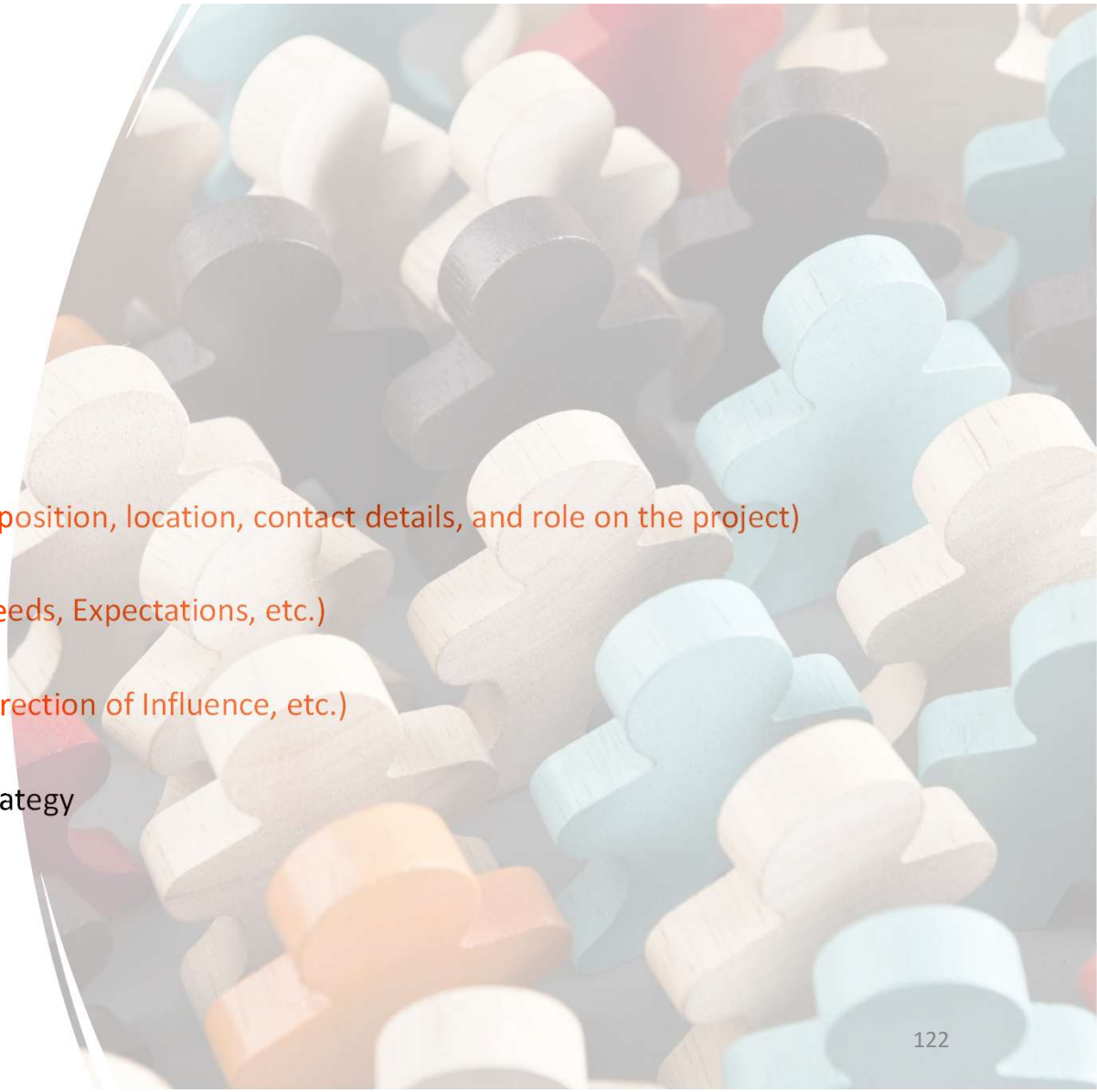
A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition, Project Management Institute Inc., 2017.

Direction of Influence



Stakeholder Register- Content

- Stakeholder Identification (Name, organizational position, location, contact details, and role on the project)
- Assessment Information (Major requirements, Needs, Expectations, etc.)
- Stakeholder Classification (Internal / External / Direction of Influence, etc.)
- Stakeholder Engagement and Communication Strategy



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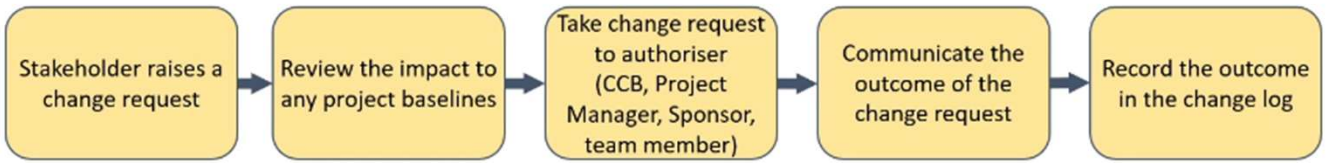
Change Requests – as an Output

- Any request from a stakeholder to change a baseline document should be submitted as a formal change request. Since these changes may impact the project's outcomes, they must be controlled.
- Change requests are processed according to the change management plan.

For example:



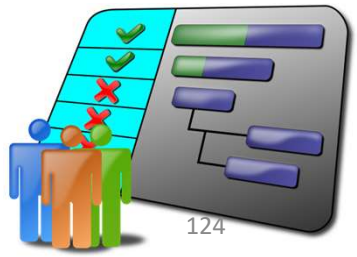
Identify Stakeholder – Agile Consideration

The Whole Team Approach

Close to Customers

Co-located Teams

Information Radiator



Planning the Project

Processes and Key Outputs

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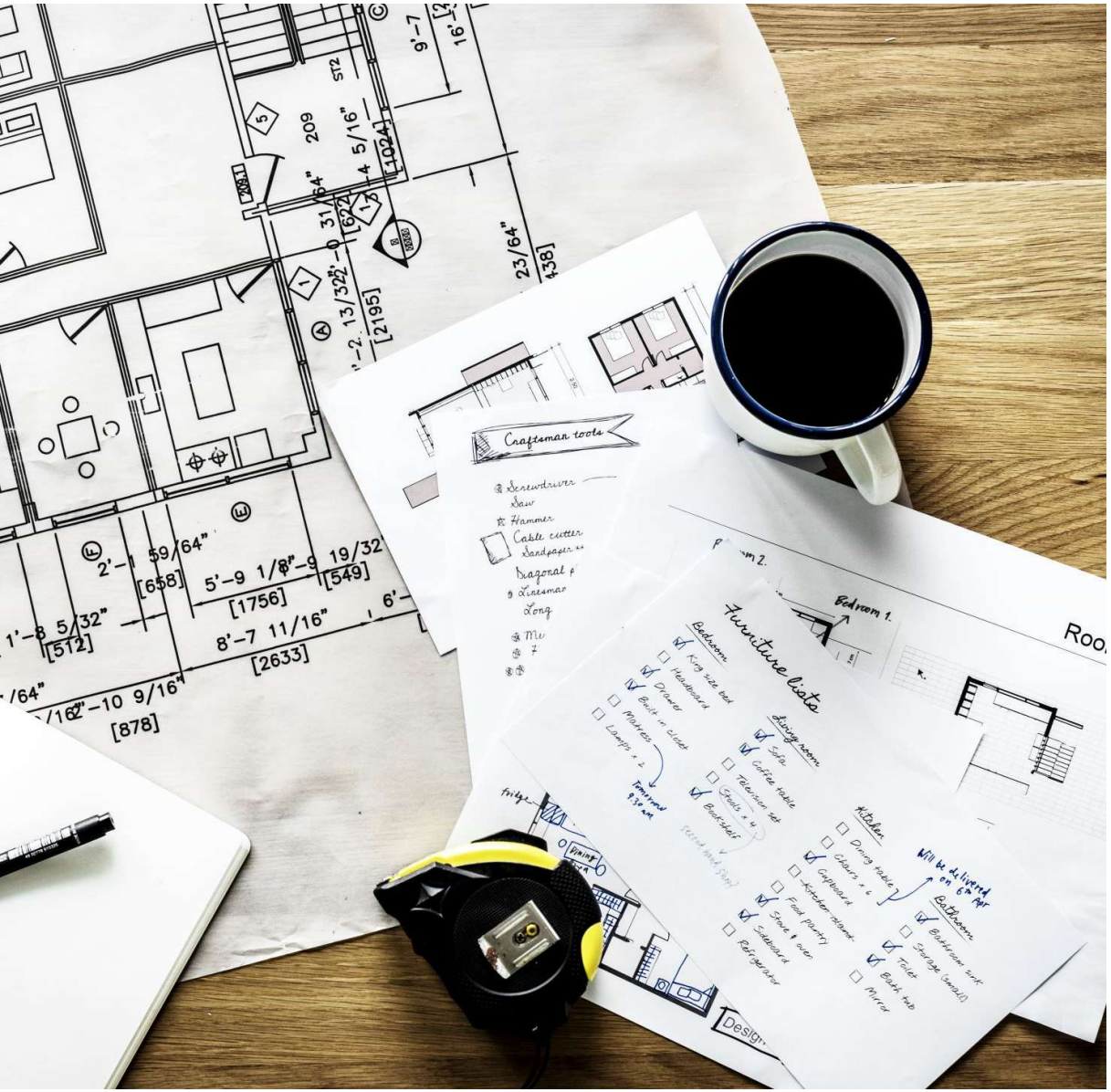
	Plan Risk Responses	• Change requests



Develop Project Management Plan

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Develop Project Management Plan

Definition

Develop Project Management Plan is the process of defining, preparing, and coordinating **all plan components** and consolidating them into an **integrated** project management plan.

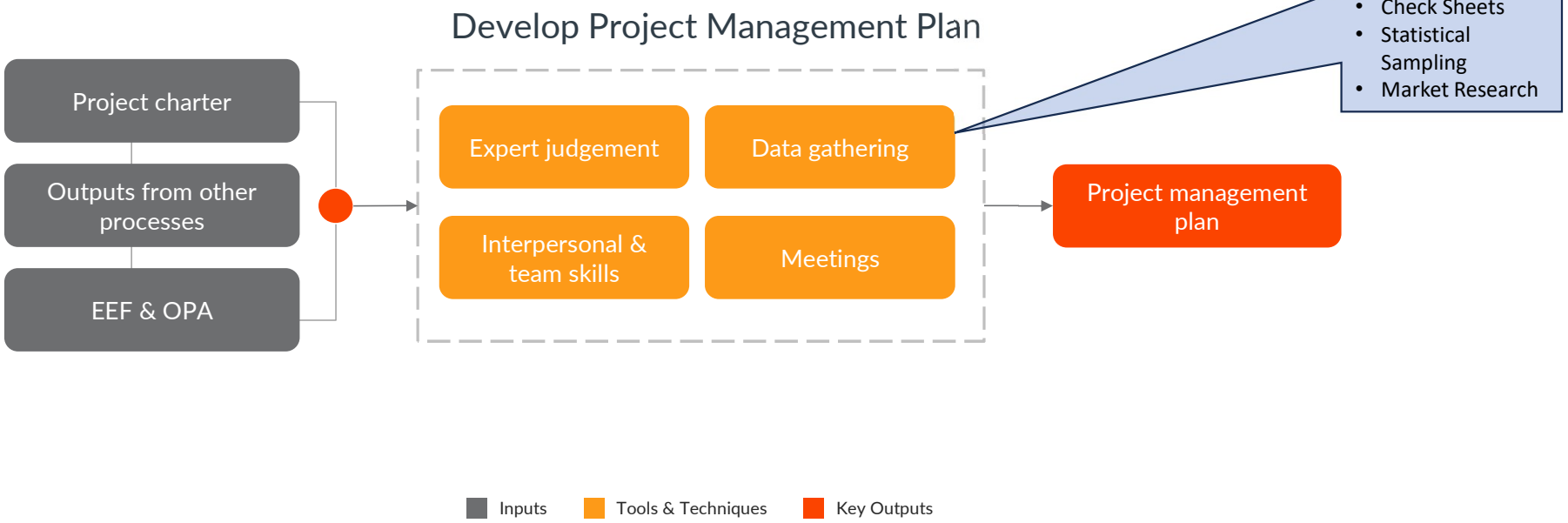
Benefit

The production of a comprehensive document that defines the basis of all project work.

Notes

- This process is performed once or at predefined points in the project.
- Is the document that describes how the project will be executed.
- It integrates and consolidates all of the subsidiary management plans and baselines.
- The project management plan may be either summary level or detailed and it should be baselined.

Develop Project Management Plan - Process

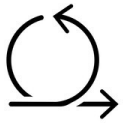


Initiating | Planning | Executing | Monitoring & Controlling | Closing

Project Management Plan - Content

Project Scope Management Plan
Project Schedule Management Plan
Project Cost Management Plan
Project Quality Management Plan
Project Resource Management Plan
Project Communications Management Plan
Project Risk Management Plan
Project Procurement Management Plan
Project Stakeholder Management Plan
Project Integration Management Plan
Change Management Plan
Configuration Management Plan
Performance Measurement Baseline
Project Life Cycle Description
Development Approach

Project Management Plan – Agile Consideration



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Roadmap, Guideline, Approach of the work to be performed in the Sprint is planned at the Sprint Planning.

This plan is created by the collaborative work of the entire Scrum Team.

Sprint Planning is time-boxed generally to a maximum of eight hours for a one-month Sprint.

Sprint Planning answers the following:

- What can be delivered in the Increment resulting from the upcoming Sprint?

- How will the work needed to deliver the Increment be achieved?

Sprint planning is a collaborative efforts of Scrum master – Product owner – Development Team

Sprint backlog and Sprint goal:

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Sprint Goal: The Sprint Goal is an objective set for the Sprint that can be met through the implementation of the Product Backlog. It provides guidance to the Development Team on why it is building the Increment. It is created during the Sprint Planning meeting. The Sprint Goal gives the Development Team some flexibility regarding the functionality implemented within the Sprint. As the Development Team works, it does so with the Sprint Goal always in mind.

Work is selected from the Product Backlog and pulled into the Sprint Backlog.

The work in the Sprint Backlog is not a commitment, it is a forecast.

The only container of a Sprint is its time box, not the work planned for the Sprint.

Project Management Plan & Project Documents

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

Processes and Key Outputs – cont.

PG	Process Name	Key Outputs
Project Planning	Plan Procurement Management	• Procurement management plan • Procurement strategy • Bid documents • Procurement statement of work • Source selection criteria • Make-or-buy decisions • Independent cost estimates
	Plan Stakeholder Engagement	• Stakeholder engagement plan
Project Executing	Direct and Manage Project Work	• Deliverables • Change requests
	Manage Project Knowledge	• Lessons learned register
	Manage Quality	• Quality reports • Test and evaluation documents
	Acquire Resources	• Physical resource assignments • Project team assignments • Resource calendars
	Develop Team	• Team performance assessments
	Manage Team	• Change requests
	Manage Communications	• Project communications
	Implement Risk Responses	• Change requests
	Conduct Procurements	• Selected sellers • Agreements
	Manage Stakeholder Engagement	• Stakeholder engagement plan

PG	Process Name	Key Outputs
Project Monitoring & Controlling	Monitor and Control Project Work	• Work performance reports • Change requests
	Perform Integrated Change Control	• Approved change requests
	Validate Scope	• Accepted deliverables
	Control Scope	• Change requests
	Control Schedule	• Schedule forecasts • Change requests
	Control Costs	• Cost forecasts • Change requests
	Control Quality	• Quality control measurements • Verified deliverables
	Control Resources	• Change requests
	Monitor Communications	• Change requests
	Monitor Risks	• Work performance information • Change requests
	Control Procurements	• Closed procurements
	Monitor Stakeholder Engagement	• Work performance information • Change requests
Project Closing	Close Project or Phase	• Final product, service, or result transition • Final report

Plan Stakeholder Engagement

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Plan Stakeholder Engagement

Definition

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

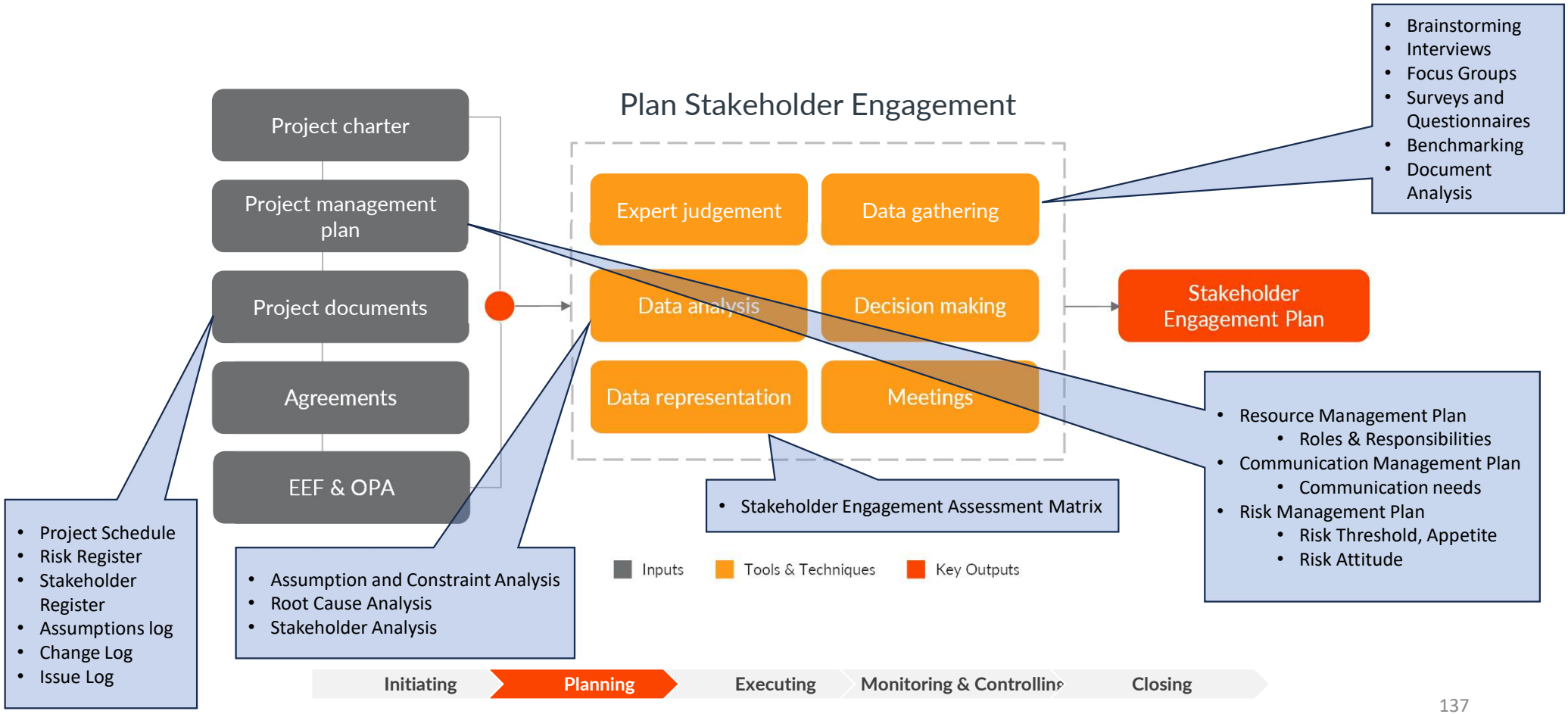
Benefit

Provides an actionable plan to interact effectively with stakeholders.

Notes

- This process is performed periodically throughout the project as needed.
- The first version of the stakeholder engagement plan is developed after the initial stakeholder community has been identified by the Identify Stakeholder process.
- The stakeholder engagement plan is updated regularly to reflect changes to the stakeholder community.

Plan Stakeholder Engagement - Process



Plan Stakeholder Engagement

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- **Stakeholder engagement plan:** is a component of the project management plan that identifies the strategies and actions required to promote productive involvement of stakeholders in decision making and execution. It can be formal or informal and highly detailed or broadly framed, based on the needs of the project and the expectations of stakeholders. The stakeholder engagement plan may include but is not limited to specific strategies or approaches for engaging with individuals or groups of stakeholders.
- **Benchmarking (most used in data gathering):** the results of stakeholder analysis are compared with information from other organizations or other projects that are considered to be world class.
- **Stakeholder engagement assessment matrix**: supports comparison between the current engagement levels of stakeholders and the desired engagement levels required for successful project delivery. The engagement level of the stakeholders can be classified as follows:
  - **Unaware:** unaware of project and potential impacts.
  - **Resistant**: aware of project and potential impacts and resistant to change.
  - **Neutral**: aware of project yet neither supportive nor resistant.
  - **Supportive:** aware of project and potential impacts and supportive to change.
  - **Leading**: aware of project and potential impacts and actively engaged in ensuring the project is a success.

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

C: Current D: Desired

Plan Stakeholder Engagement - Agile Consideration

Agile projects are only successful if the Agile team is **cohesive, productive, and engaged**. Strong project managers encourage active involvement to ensure the team has a clear understanding of the project requirements and stakeholder expectations

- Servant Leadership (Remove Blockers and Grow the Team)
- Encourage early involvement
- Connect the dots and explain product benefits
- Ensure inclusion in priority discussions
- Collaborate during release planning
- Solicit feedback during reviews

Processes and Key Outputs

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Plan Scope Management

Key Concepts and Terms

- Accepted deliverables
- Alternatives analysis
- Benchmarking
- Brainstorming
- Context diagram
- Data analysis
- Data gathering
- Development approach
- Enterprise environmental factors
- Expert judgment
- Facilitation
- Focus groups
- Interviews
- Mind mapping
- Multi-criteria decision analysis
- Nominal group technique
- Observation/conversation
- Organizational process assets
- Product analysis
- Project charter
- Project documents
- Project life cycle description
- Project management plan
- Project scope statement
- Prototypes
- Questionnaires and surveys
- Requirements documentation
- Requirements management plan
- Requirements traceability matrix
- Scope baseline
- Scope creep
- Scope management plan
- Trend analysis
- Variance analysis
- Verified deliverables
- Voting
- Work performance data
- Work performance information

Plan Scope Management

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Definition

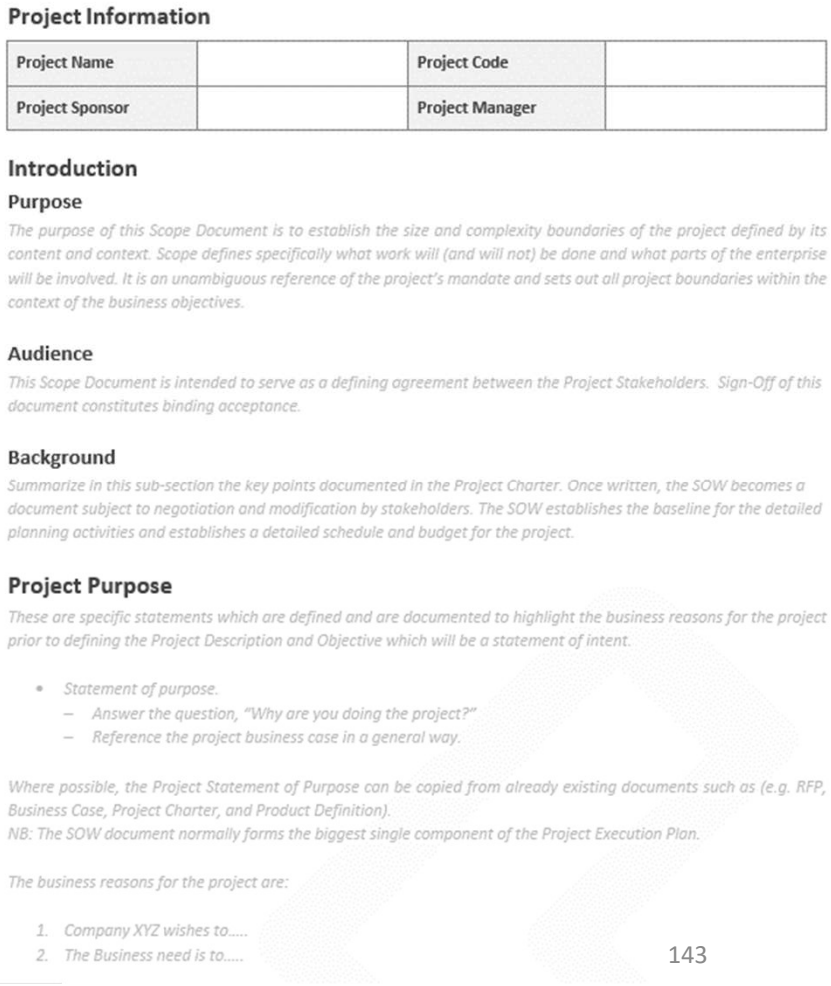
Plan Scope Management is the process of creating a scope management plan that documents **how** the project and product scope will be defined, validated, and controlled.

Benefit

- It provides guidance and direction on how scope will be managed throughout the project.

Notes

- This process is performed once or at predefined points in the project.
- **Scope Management Plan**: describe how the scope will be defined, developed, controlled and verified.
- **Requirements Management Plan**: describe how requirements will be analyzed, documented and managed. Phase to phase relationship strongly influence how requirements are managed.



Project Information

Project Name		Project Code	
Project Sponsor		Project Manager	

Introduction

Purpose

The purpose of this Scope Document is to establish the size and complexity boundaries of the project defined by its content and context. Scope defines specifically what work will (and will not) be done and what parts of the enterprise will be involved. It is an unambiguous reference of the project's mandate and sets out all project boundaries within the context of the business objectives.

Audience

This Scope Document is intended to serve as a defining agreement between the Project Stakeholders. Sign-Off of this document constitutes binding acceptance.

Background

Summarize in this sub-section the key points documented in the Project Charter. Once written, the SOW becomes a document subject to negotiation and modification by stakeholders. The SOW establishes the baseline for the detailed planning activities and establishes a detailed schedule and budget for the project.

Project Purpose

These are specific statements which are defined and are documented to highlight the business reasons for the project prior to defining the Project Description and Objective which will be a statement of intent.

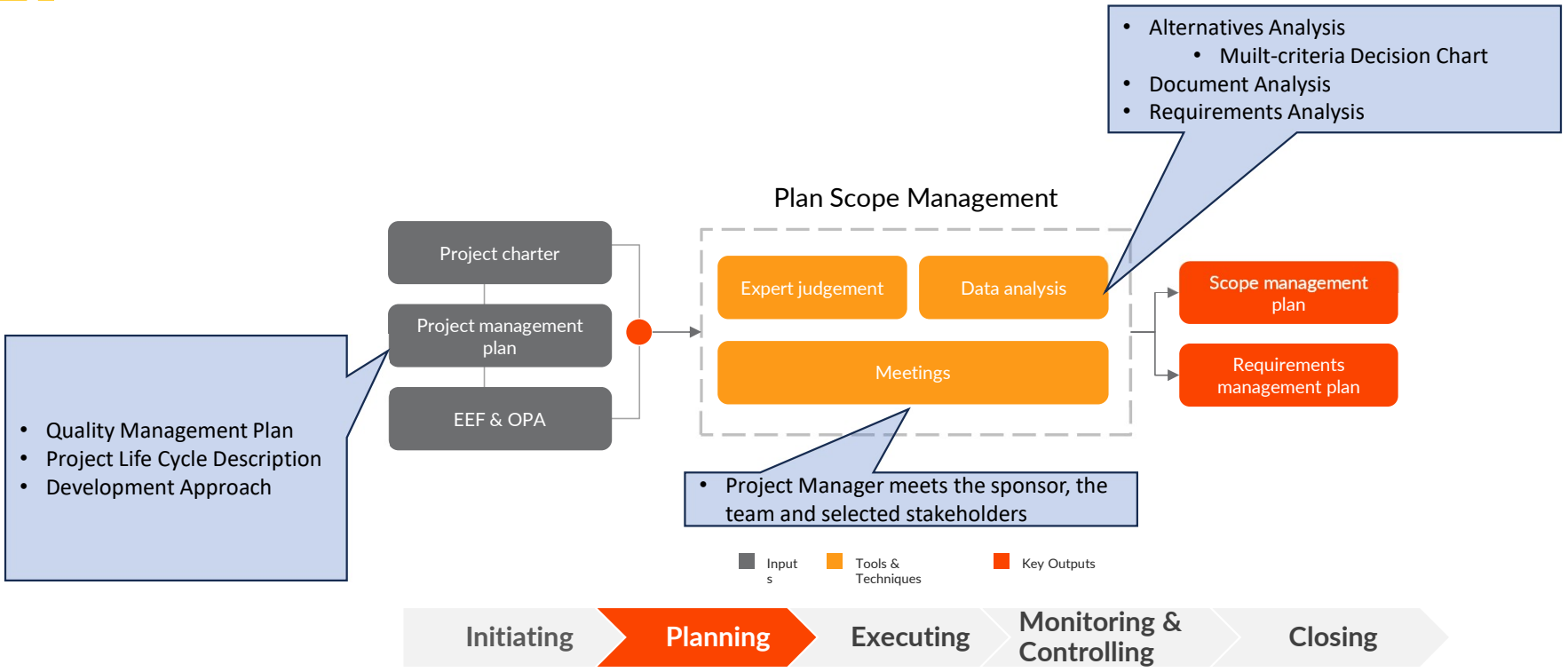
- *Statement of purpose.*
  - *Answer the question, "Why are you doing the project?"*
  - *Reference the project business case in a general way.*

Where possible, the Project Statement of Purpose can be copied from already existing documents such as (e.g. RFP, Business Case, Project Charter, and Product Definition).
NB: The SOW document normally forms the biggest single component of the Project Execution Plan.

The business reasons for the project are:

1. *Company XYZ wishes to.....*
2. *The Business need is to.....*

Plan Scope Management - Process



Multi-criteria Decision Chart - Content

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Criteria	Weight	Alternative A	Alternative B	Alternative C
Cost	0.3	8	6	9
Risk	0.2	7	5	8
Feasibility	0.25	9	7	6
Time to Implement	0.15	6	8	7
Stakeholder Support	0.1	7	9	6
Total Score		7.65	6.75	7.35

Is an effective tool for evaluating different project alternatives based on various criteria. By assigning weights to each criterion and scoring/ranking (1-10) each alternative, project managers can make more informed and balanced decisions.

This method ensures that all relevant factors are considered, leading to a more comprehensive evaluation of the options available.

Requirements Management Plan - Content

Process for Requirements Management: Describes how requirements will be gathered, analyzed, documented, and managed throughout the project.

Requirements Prioritization: The criteria and process for prioritizing requirements based on factors such as business value, risk, and stakeholder needs or **MoSCoW**.

Requirements Traceability Matrix (RTM): A tool used to track requirements throughout the project lifecycle, ensuring that each requirement is linked to its origin and that it is fulfilled by the project deliverables.

Requirements Documentation: The format and structure for documenting requirements, including templates and standards to be used.

Change Control Process for Requirements: The process for managing changes to requirements, including how changes will be documented, reviewed, and approved.

Roles and Responsibilities: Defines the roles and responsibilities of team members and stakeholders in managing requirements.

Tools and Techniques: The tools and techniques that will be used for requirements management, such as interviews, surveys, focus groups, and document analysis.

Requirements Validation and Verification: The process for ensuring that requirements are complete, accurate, and feasible, and that they meet stakeholder needs and expectations.

Communication Plan for Requirements: How requirements-related information will be communicated to stakeholders, including frequency, format, and channels of communication.

Scope Management Plan - Content

Process for Scope Management: Describes how the scope will be defined, developed, monitored, controlled, and verified.

Scope Statement: A detailed description of the project scope, including deliverables, boundaries, and acceptance criteria.

Work Breakdown Structure (WBS): A hierarchical decomposition of the total scope of work to accomplish the project objectives and create the deliverables.

Scope Baseline: The approved version of the scope statement, WBS, and WBS dictionary, which can only be changed through formal change control procedures.

Scope Verification: The process for formalizing acceptance of the completed project deliverables.

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

Roles and Responsibilities: Defines the roles and responsibilities of team members and stakeholders in managing the project scope.

Tools and Techniques: The tools and techniques that will be used for scope management, such as expert judgment, data analysis, and meetings.

Change Control Process: The process for managing changes to the project scope, including how changes will be documented, reviewed, and approved.

Scope Management Plan- Agile Consideration

In an Agile environment, the Scope Management Plan must be adapted to accommodate the iterative and flexible nature of Agile methodologies. Here are the key considerations for scope management in Agile projects:

- **Iterative Planning**: Agile projects use iterative planning processes, such as sprint planning, to define and refine the project scope incrementally. This allows for continuous feedback and adjustments based on stakeholder needs and project progress.
- **Product Backlog:** The scope is managed through a prioritized product backlog, which contains all the features, enhancements, and fixes required for the product. The backlog is continuously updated and reprioritized based on stakeholder feedback and changing requirements.
- **Sprint Backlog:** Work is selected from the product backlog and pulled into the sprint backlog for each iteration. The sprint backlog contains the tasks and user stories that the team commits to completing during the sprint.
- **Scope Flexibility:** Agile projects embrace scope flexibility, allowing changes to be made as new information and feedback are received. This flexibility helps ensure that the final product meets stakeholder needs and delivers maximum value.
- **Definition of Done:** Agile teams use a "Definition of Done" to ensure that all work items meet the required quality standards and are complete before being considered done. This helps maintain a consistent level of quality and ensures that deliverables are ready for release.
- **Continuous Feedback and Improvement:** Agile projects rely on continuous feedback from stakeholders and team members to refine and improve the project scope. Regular reviews, retrospectives, and feedback loops help identify areas for improvement and ensure that the project stays aligned with stakeholder expectations.
- **Burn Charts and Velocity Calculations:** Agile teams use burn charts and velocity calculations to track progress and predict future performance. These tools help manage scope by providing visibility into the team's capacity and the amount of work remaining.

Scope Management Plan- Agile Consideration

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Release & Iteration Planning

"Planning is also conducted during the standup meeting, where teams delve into the specifics of ongoing tasks."

- **Incremental or iterative development**
- **User stories propose an alternative way of viewing the requirements process**

In collaborative planning sessions, the scope is divided into broader releases, followed by iterations or sprints.

- During release planning, which is a part of the Agile methodology, the following decisions are made:

1. Determining the number of iterations or sprints required to accomplish each release.
2. Identifying the features that will be included in the release.
3. Establishing target dates for each release.

- In iteration planning, also known as sprint planning, the following steps are taken:

1. Evaluating the highest-priority user stories or key outcomes.
2. Asking relevant questions to clarify details.
3. Reaching consensus on the effort needed to complete the user story in the current iteration.
4. Defining the necessary activities to achieve the iteration's objectives.

Scope Management Plan- Agile Consideration

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- **Prioritized list of the known scope of work**
- **Information presented in story form**
- **Continually updated by the product owner in collaboration with teams**

Example:

In a typical scenario, a product owner initiates the process by constructing a product backlog. In close cooperation with both the team and stakeholders, they identify and incorporate user stories. These work items essentially outline the sought-after product features.

The primary responsibility of the product owner is to arrange these work items in order of importance, based on their value. Subsequently, the product owner and the team work together collaboratively to transition these work items into the iteration or sprint backlog..

Other Names for Backlogs — e.g., requirements backlog, sprint backlog, lean backlog.

Scope Management Plan- Agile Consideration

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Prioritize and Refine the Product Backlog

Ongoing refinement carried out by the product owner or customer occurs before the iteration planning phase. Additionally, the team collaborates with the product owner during the sprint or iteration to further refine the work items. This continuous refinement process enables the team to rearrange and prioritize tasks, ensuring that higher-priority items that deliver value are addressed first. It also involves breaking down epics into more manageable user stories.

Processes and Key Outputs

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Project Initiating	**Develop Project Charter**	• Project charter
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Project Planning	**Develop Project Management Plan**	• Project management plan
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	Collect Requirements	• Requirements documentation • Requirements traceability matrix
	Define Scope	• Project scope statement
	Create WBS	• Scope baseline
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	Define Activities	• Activity list • Activity attributes • Milestone list
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	Estimate Activity Durations	• Duration estimates • Basis of estimates
	Develop Schedule	• Schedule baseline • Project schedule • Schedule data • Project calendars

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	Determine Budget	• Cost baseline
	Plan Quality Management	• Quality management plan • Quality metrics
	Plan Resource Management	• Resource management plan • Team charter
	Estimate Activity Resources	• Resource requirements • Basis of estimates • Resource breakdown structure
	Plan Communications Management	• Communications management plan
	Plan Risk Management	• Risk management plan
	Identify Risks	• Risk register • Risk report
	Perform Qualitative Risk Analysis	• Project documents updates
	Perform Quantitative Risk Analysis	• Project documents updates
	Plan Risk Responses	• Change requests

Collect Requirements

Collect Requirements

Definition

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

Benefit

It provides the basis for defining the product scope and project scope.

Notes

- This process is performed once or at predefined points in the project.
- The project's success is directly influenced by active stakeholder involvement
- **Requirements traceability matrix**: is a table that links requirements to their source and traces them throughout the project life cycle.

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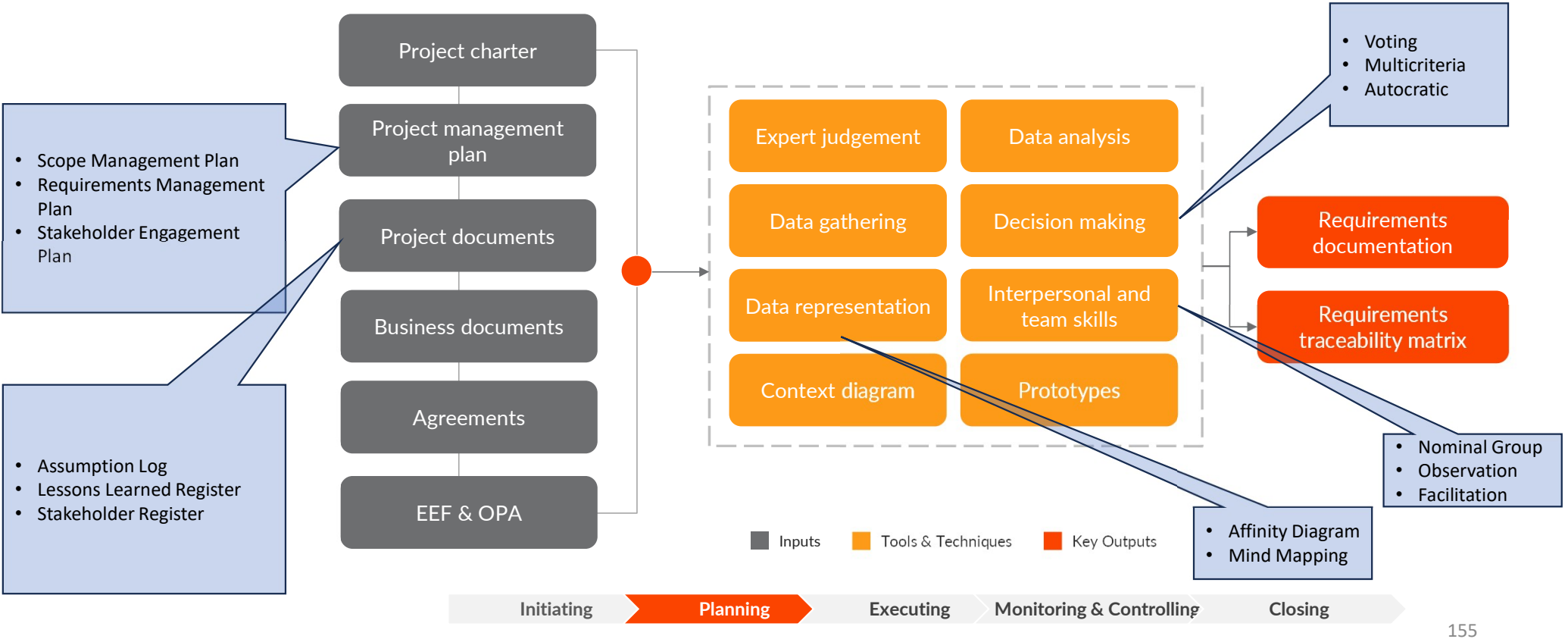
Collect Requirements - Process



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Collect Requirements – Tools and Techniques

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Decision making

- Unanimity: a decision that is reached whereby everyone agrees on a single course of action.
- Majority: a decision that is reached with support obtained from more than 50% of the members of the group.
- Plurality: a decision that is reached whereby the largest block in a group decides, even if a majority is not achieved. Generally used when the number of options nominated is more than two.

------- > Voting methods in Agile: Fist of Five, Planning Poker, Dot voting, Roman voting(thumbs), Polling

Data representation

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

Types of requirements:

- Business requirements: describe the higher-level needs of the organization.
- Stakeholder requirements: describe needs of a stakeholder or stakeholder group.
- Solution requirements: describe features, functions, and characteristics of the product, service, or result
- Project requirements: describe the actions, processes, or other conditions the project needs to meet.
- Quality requirements: capture any condition or criteria needed to validate the successful completion of a project

Collect Requirements – Tools and Techniques

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Interpersonal & Team Skills

- **Nominal Group Technique:**
  - Idea Generation: Participants individually write down their ideas.
  - Round-Robin Feedback: Each participant shares one idea at a time until all ideas are recorded.
  - Discussion: The group discusses each idea for clarity and understanding.
  - Ranking: Participants rank the ideas, and the highest-ranked ideas are selected.
- **Observation/Conversation:**
  - Direct Observation: Watching stakeholders perform their tasks to gather insights into their needs.
  - Interviews: Engaging in one-on-one conversations with stakeholders to elicit detailed requirements.
  - Shadowing: Following stakeholders throughout their workday to understand their processes and challenges.
- **Facilitation:**
  - Meeting Management: Organizing and leading meetings to gather requirements.
  - Conflict Resolution: Addressing and resolving conflicts that arise during discussions.
  - Encouraging Participation: Ensuring that all stakeholders have the opportunity to contribute.

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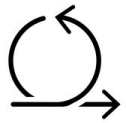
Collect Requirements - Output

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

Requirements traceability matrix is a table that links requirements to their source and traces them throughout the project life cycle. The implementation of a requirements traceability matrix helps ensure that each requirement adds business value by linking it to the business and project objectives. It provides a means to track requirements throughout the project life cycle, helping to ensure that requirements approved in the requirements documentation are delivered at the end of the project. Finally, it provides a structure for managing changes to the product scope.

Collect Requirements - Agile Consideration



Product Backlog Creation:

- The Product Owner creates and maintains the Product Backlog, which is a prioritized list of all features, enhancements, and bug fixes required for the product.
- Requirements are captured as user stories, which describe the desired functionality from the end user's perspective.

Sprint Planning:

- At the beginning of each sprint, the Scrum team conducts a Sprint Planning meeting.
- The team selects the highest-priority items from the Product Backlog that can be completed within the sprint.

Daily Stand-ups:

- Daily Stand-up meetings (or Daily Scrums) are held to discuss progress, identify any impediments, and make necessary adjustments.
- These meetings help ensure that the team remains aligned and that any changes in requirements are quickly addressed.

Sprint Review:

- At the end of each sprint, the team conducts a Sprint Review meeting to demonstrate the completed work to stakeholders.
- Stakeholders provide feedback, which may result in new or modified requirements being added to the Product Backlog.

Sprint Retrospective:

- After the Sprint Review, the team conducts a Sprint Retrospective to reflect on the sprint and identify areas for improvement.
- Insights gained from the retrospective may lead to changes in how requirements are collected and managed in future sprints.

Backlog Refinement

- Sessions held regularly to review and update the Product Backlog.
- The team and the Product Owner collaborate to clarify, estimate, and prioritize the backlog items.
- This reflects the current priorities and requirements.

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Define Scope

Define Scope

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Definition

Define Scope is the process of developing a **detailed description** of the project and product.

Benefit

- It describes the product, service, or result boundaries and acceptance criteria.
- It develops a detailed description of the project and product, service, or result.

Notes

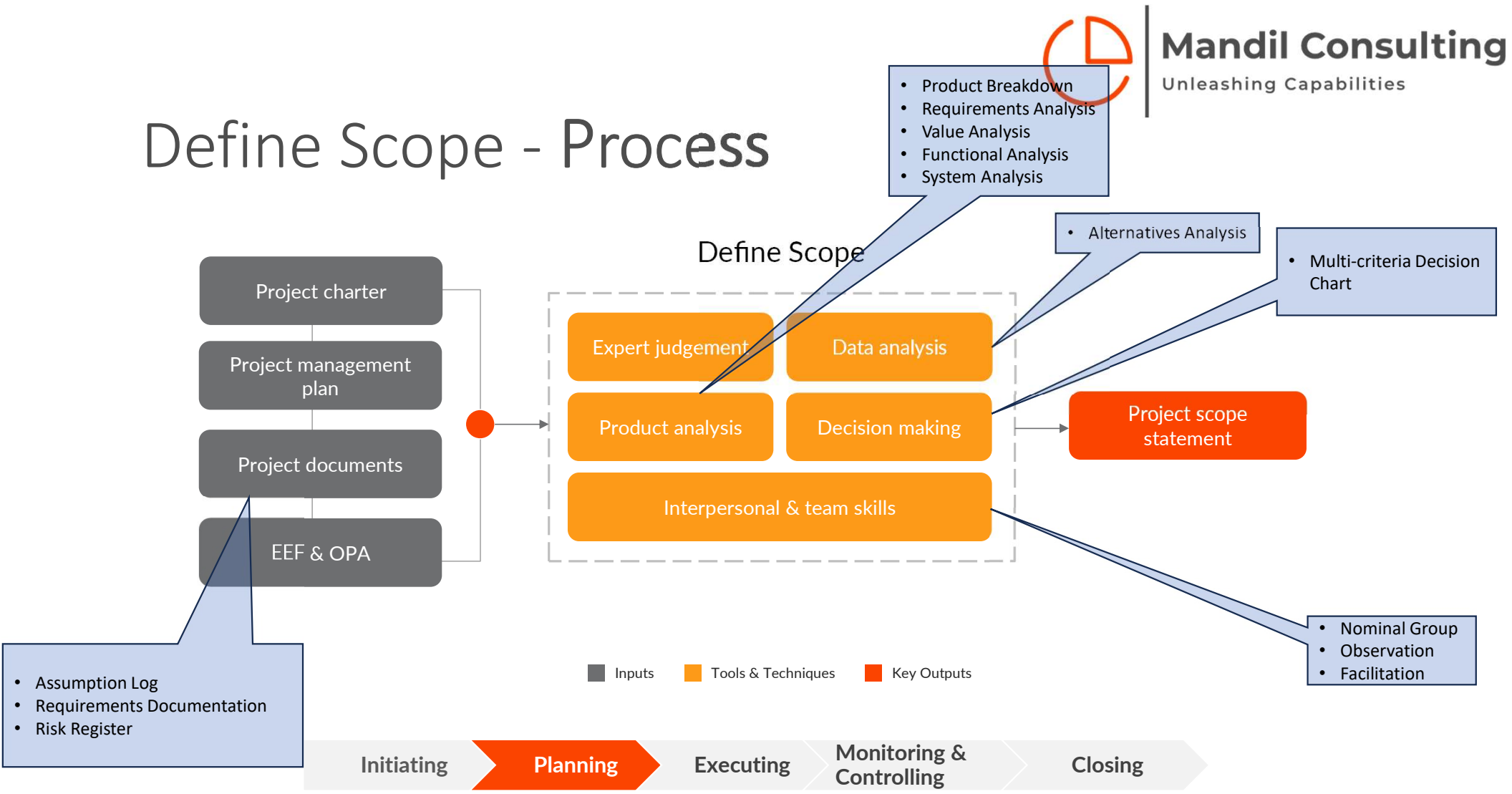
- **Acceptance criteria**: a set of conditions that is required to be met before deliverables are accepted.
- **Deliverable**: any unique and verifiable product, result, or a service that is required to be produced to complete a project.

WHAT'S

IN

OUT

Define Scope - Process



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Assumptions log - Content

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ID	Assumption	Date Logged	Owner	Impact if False	Status
001	The project team will have access to all necessary resources.	2024-01-15	Project Manager	High - Project delays	Open
002	Stakeholders will provide timely feedback.	2024-01-15	Project Manager	Medium - Minor delays in decision-making	Open
003	Required software licenses will be available by the project start date.	2024-01-16	IT Manager	High - Inability to start project tasks	Open
004	All team members are trained and familiar with the project management tools.	2024-01-17	HR Manager	Low - Additional training sessions required	Open
005	Market conditions will remain stable throughout the project duration.	2024-01-18	Business Analyst	High - Potential changes in project scope	Open

Risk Register - Content

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ID	Risk Description	Date Identified	Owner	Probability	Impact	Risk Score	Risk Response	Status
001	Delay in obtaining necessary resources	2024-01-15	Project Manager	High	High	9	Develop a resource acquisition plan	Open
002	Stakeholders not providing timely feedback	2024-01-15	Project Manager	Medium	Medium	6	Schedule regular stakeholder meetings	Open
003	Software licenses not available by project start date	2024-01-16	IT Manager	High	High	9	Procure licenses in advance	Open
004	Team members not trained on project management tools	2024-01-17	HR Manager	Low	Medium	3	Conduct training sessions	Open
005	Market conditions changing during project	2024-01-18	Business Analyst	Medium	High	6	Monitor market trends	Open

Requirements Documentation- Content

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ID	Requirement	Description	Priority	Owner	Status
001	User Authentication	The system must allow users to log in using a username and password.	High	IT Manager	Approved
002	Data Encryption	All sensitive data must be encrypted in transit and at rest.	High	Security Officer	In Progress
003	User Interface	The application must have a user-friendly interface that is easy to navigate.	Medium	UX Designer	Draft
004	Reporting	The system must generate monthly performance reports.	Medium	Business Analyst	Approved
005	Mobile Access	The application must be accessible on mobile devices.	Low	Mobile Developer	Draft

Alternative Analysis - Content

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Criteria

ID	Alternative	Description	Risk	Liabilities	Costs	Feasibility	Selected
001	Alternative A	Implementing a new software system.	Medium	Low	$50,000	High	Yes
002	Alternative B	Outsourcing the project to a third-party vendor.	High	Medium	$70,000	Medium	No
003	Alternative C	Upgrading the existing system.	Low	Low	$30,000	High	No

It's a technique used to produce as many ideas as possible to accomplish the project objectives that involves generating, evaluating, and selecting the best project alternatives to achieve the project objectives.

Done by:

- Brainstorming sessions with the project team.
- Consultation with subject matter experts.
- Review of similar past projects for potential solutions.

Product Analysis - Content

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Component	Features	Functions	Requirements	Value
User Interface	Login screen, dashboard, navigation menu	User authentication, data display, navigation	- Must be user-friendly and intuitive. - Should support multiple languages.	High value due to direct user interaction.
Database	User data storage, transaction records	Data retrieval, data storage, data management	- Must handle high volumes of transactions. - Should ensure data security and integrity.	High value due to critical data management.

- **Objective:** To understand the product in detail and define its features and functions.
- **Methods Used:**
  - **Product Breakdown:** Decomposing the product into smaller, manageable components.
  - **Requirements Analysis:** Identifying and documenting the requirements for each component.
  - **Value Analysis:** Evaluating the value of each component to ensure it meets the project objectives.
  - **Functional Analysis:** Understanding the functions and interactions of each component.
  - **System Analysis:** Examining the product as a whole and its interaction with other systems.

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Project Scope Statement - Content

Project scope description

- Provides a detailed description of the project scope.
- Includes the major deliverables and the work required to create them.

Acceptance criteria

- Defines the conditions that must be met for the deliverables to be accepted.
- Specifies the standards and criteria for acceptance.

Project deliverables

- Lists the specific outputs or products that will be delivered by the project.
- Includes both tangible and intangible deliverables.

Project exclusions

- Clearly states what is not included in the project scope.
- Helps to manage stakeholder expectations by defining boundaries.

Define Scope – Process - Tailoring Considerations

- Knowledge and requirements management: Does org has existing formal or informal knowledge & requirements management system ?
- Validation & Control: Does org has existing formal or informal validation & control related policies, procedures and guidelines ?
- Development approach: Does the org uses agile approaches in managing projects? Development approach is iterative , incremental or predictive?
- Stability of requirements : Are the areas with projects that have unstable requirements? Does instability require the use of lean, agile, adaptive, or other techniques until the requirements stabilize?

Consideration for Agile/adaptive environments:

- Environments with emerging requirements find that there is often a gap between a real business requirements and the business requirements that were originally stated
- In Agile approach, requirements constitute the backlog as the scope is defined & redefined again and again throughout the project

Define Scope - Agile Consideration

Product Backlog Creation:

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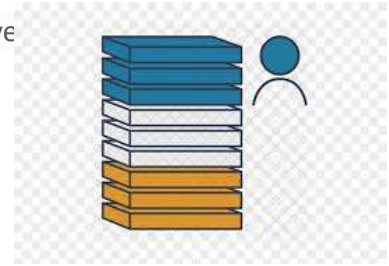
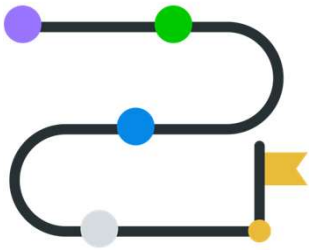
- Requirements are captured as user stories, which describe the desired functionality from the end user's perspective



Product Roadmap:

- A product roadmap in an agile project is a strategic tool.
- Outlines the vision, direction, and planned features of a product over time.
- Helps in defining the scope by providing a clear picture of product goals and functionalities.
- Dynamic and adaptable to align with changing business priorities and stakeholder feedback.
- Regular reviews and updates maintain focus and direction.
- Facilitates effective communication and planning.



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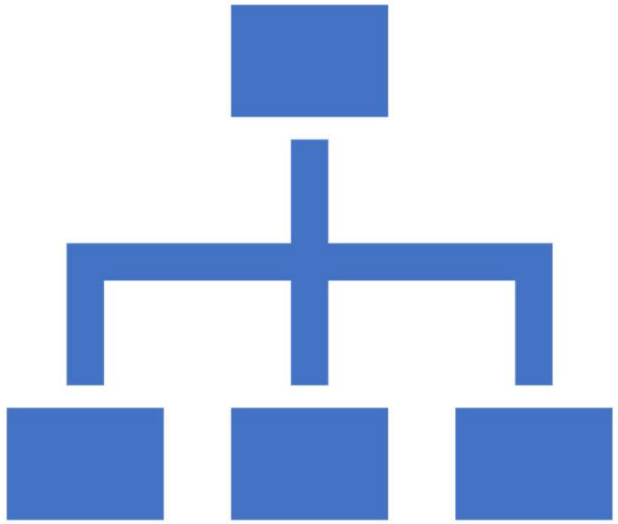

Create Work Breakdown Structure (WBS)

Create Work Breakdown Structure (WBS)

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Definition

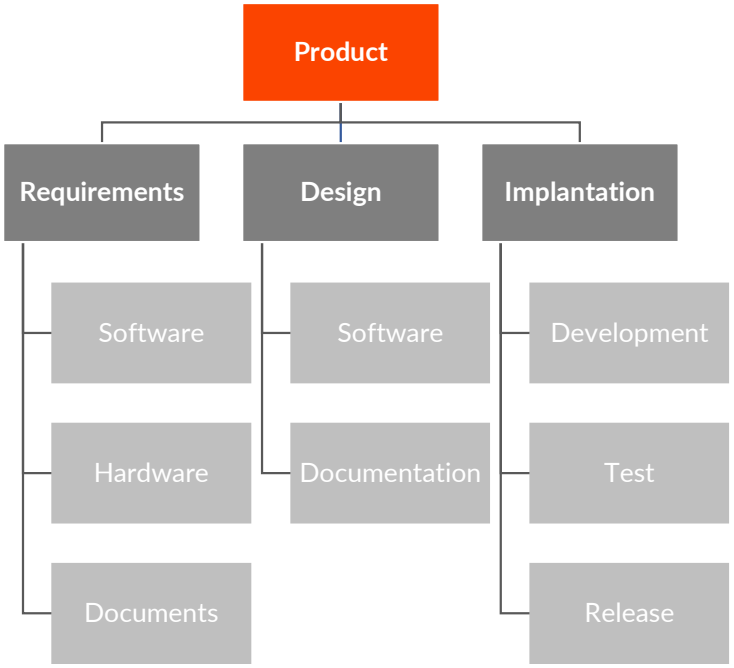
Create WBS is the process of **subdividing** project deliverables and project work into smaller, more manageable components.

Benefit

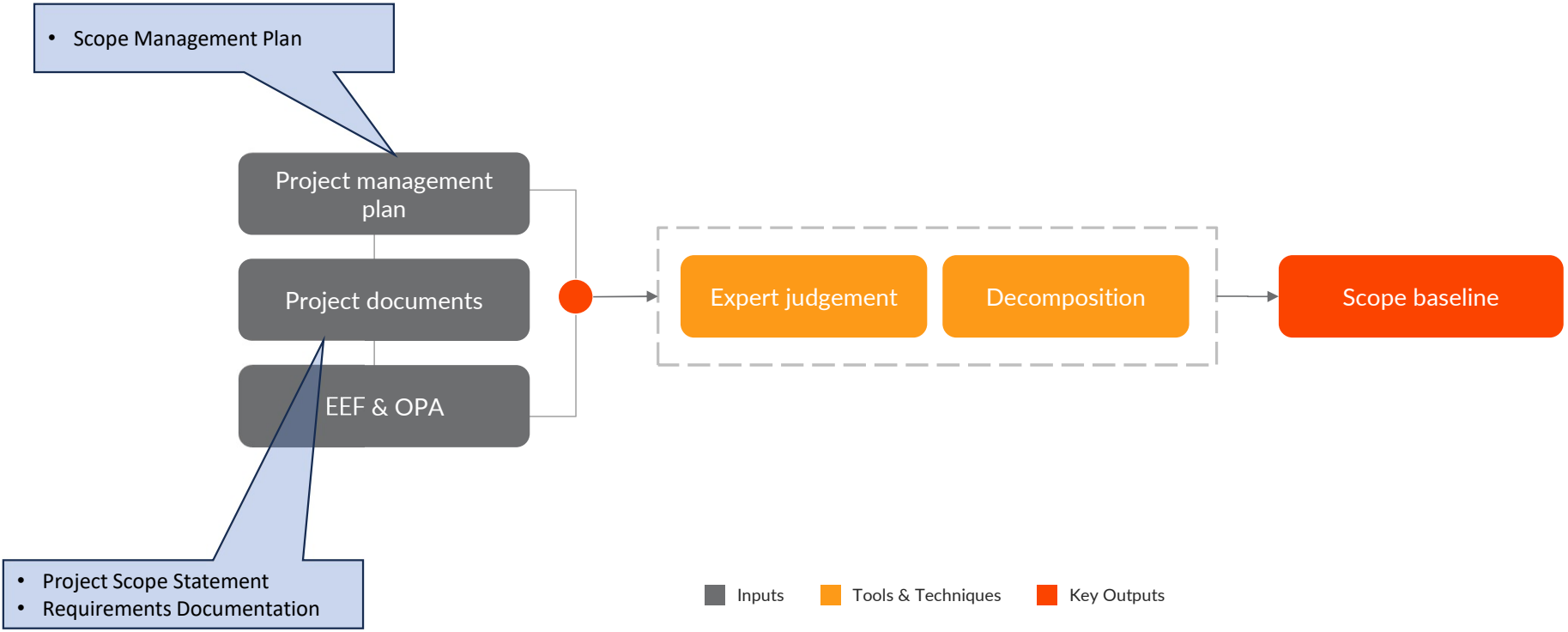
It provides a framework of what has to be delivered.

Notes

- This process is performed once or at predefined points in the project.
- **WBS** is a hierarchical decomposition of the total scope of work
- **Work package**: is the work defined at the lowest level of the WBS for which cost and duration can be estimated and managed.
- **Decomposition**: is a technique used for dividing and subdividing the project scope and project deliverables into smaller, more manageable parts.
- **100% Rule:** WBS represents all product and project work.



Create Work Breakdown Structure (WBS) - Process



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Create Work Breakdown Structure (WBS)

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- Scope baseline: contains three components:
  - Approved scope statement - Describes the project scope in detail
  - Work breakdown structure (WBS) - Hierarchical decomposition of the total scope of work
  - WBS dictionary - detailed information about each WBS element

- Decomposition may not be possible for a deliverable or subcomponent that will be accomplished far into the future. The project management team usually waits until the deliverable or subcomponent is agreed on, so the details of the WBS can be developed. This technique is sometimes referred to as rolling wave planning (form of progressive elaboration where 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.)

- A WBS structure may be created through various approaches. Some of the popular methods include the top-down approach, the use of organization-specific guidelines, and the use of WBS templates. A bottom-up approach can be used during the integration of subcomponents. The WBS structure can be represented in a number of forms such as:
  - Using phases of the project life cycle as the second level of decomposition, with the product and project deliverables inserted at the third level.
  - Using major deliverables as the second level of decomposition.

Create Work Breakdown Structure (WBS)

- The level of decomposition is often guided by the degree of control needed to effectively manage the project
- The level of details for work packages will vary with the size and complexity of the project
- Decomposition generally involves:
  - Identifying & analyzing the deliverables and related work
  - Structuring & organizing the WBS
  - Decomposing into lower detailed work components with identified codes
  - Verifying degree of decomposition is appropriate
- Decomposition may not be possible for a deliverable or subcomponent that will be accomplished far into the future

WBS Features

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- WBS is a deliverable oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables.

1. Organizes and defines total scope of the project
2. WBS subdivides the project work into smaller, more, manageable pieces of work
3. The lowest level is called "Work Package" & is assigned to a control account
4. Work package helps creating & monitoring schedules, cost estimates better
5. Work Package: Stop at a level where work can be assigned to a person or group of people without further decomposition required at Project Manager level.
6. Control account: Management control point where Scope, Budget, Actual cost & Schedule are integrated and compared against work performed to measure the project performance.

- For WBS examples: refer PMBOK® Guide 6th edition : Page 158-159-160

Constructing a House WBS - Example

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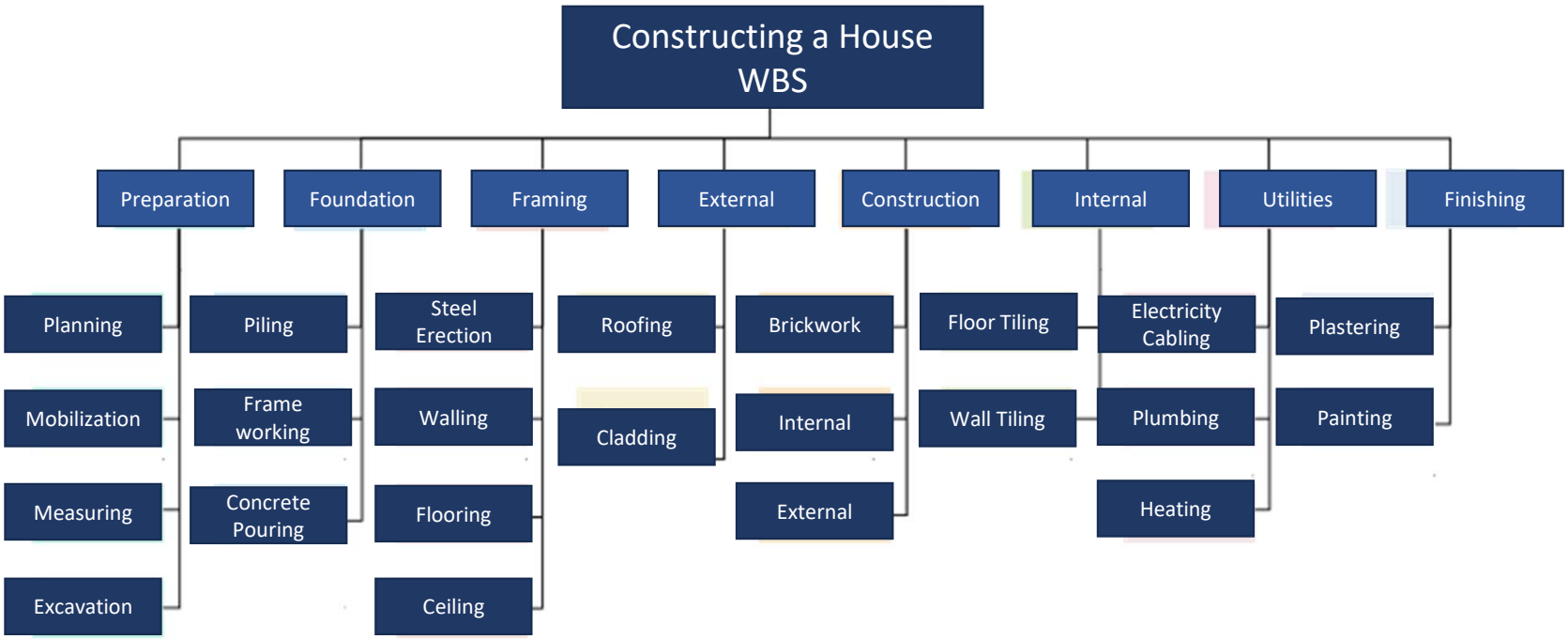
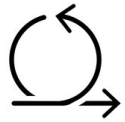


Create WBS - Agile Consideration



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- As the global environment becomes more complex , organizations are starting to recognize how to use business analysis to their competitive advantage by defining , managing and controlling requirements activities

Trends and emerging practices for Project Scope Management includes but not limited to:

- Determine problems & identify business needs
- Identify & recommend viable solutions
- Elicit , document & manage stakeholder requirements

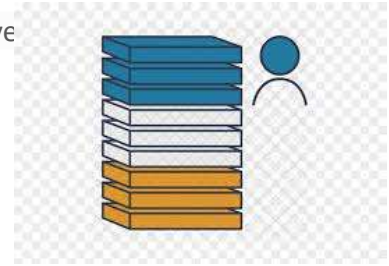
- The role & the responsibility to conduct business analysis should be assigned to resources with sufficient business analysis skills & expertise
- The relationship between project manager and business analyst should be a collaborative partnership

Create WBS - Agile Consideration

Product Backlog Creation:

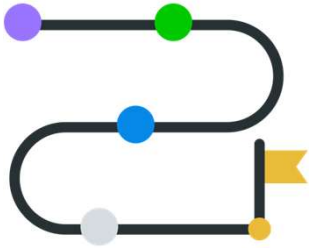
- The Product Owner creates and maintains the Product Backlog, which is a prioritized list of all features, enhancements, and bug fixes required for the product.

- Requirements are captured as user stories, which describe the desired functionality from the end user's perspective



Product Roadmap:

- A product roadmap in an agile project is a strategic tool.
- Outlines the vision, direction, and planned features of a product over time.
- Helps in defining the scope by providing a clear picture of product goals and functionalities.
- Dynamic and adaptable to align with changing business priorities and stakeholder feedback.
- Regular reviews and updates maintain focus and direction.
- Facilitates effective communication and planning.



Create WBS - Agile Consideration

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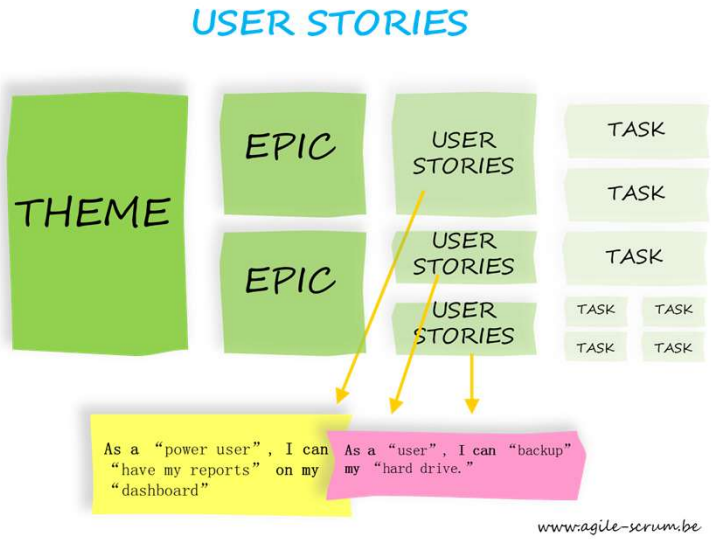
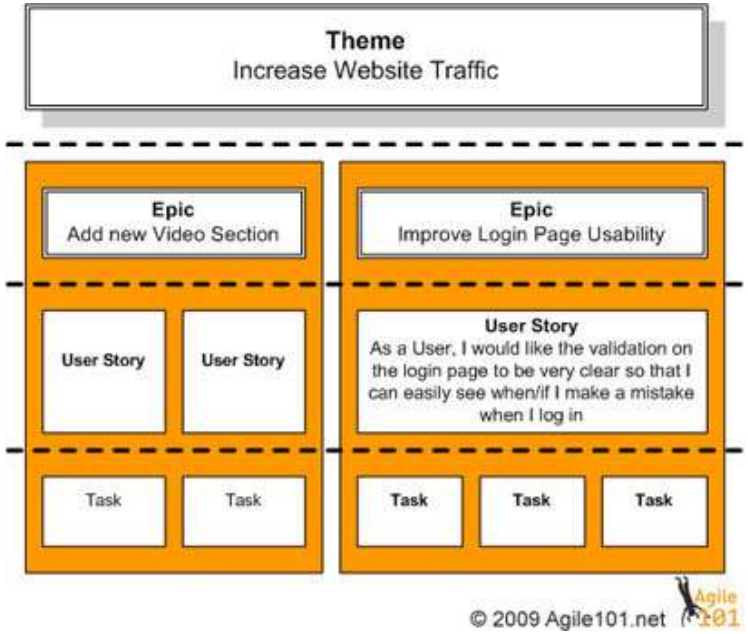
EPIC

A large body of work that can be broken down into smaller pieces—features and user stories. Epics can take months to complete.

FEATURE

A set of related requirements that allows the user to satisfy a business objective or need.





Create WBS - Agile Consideration

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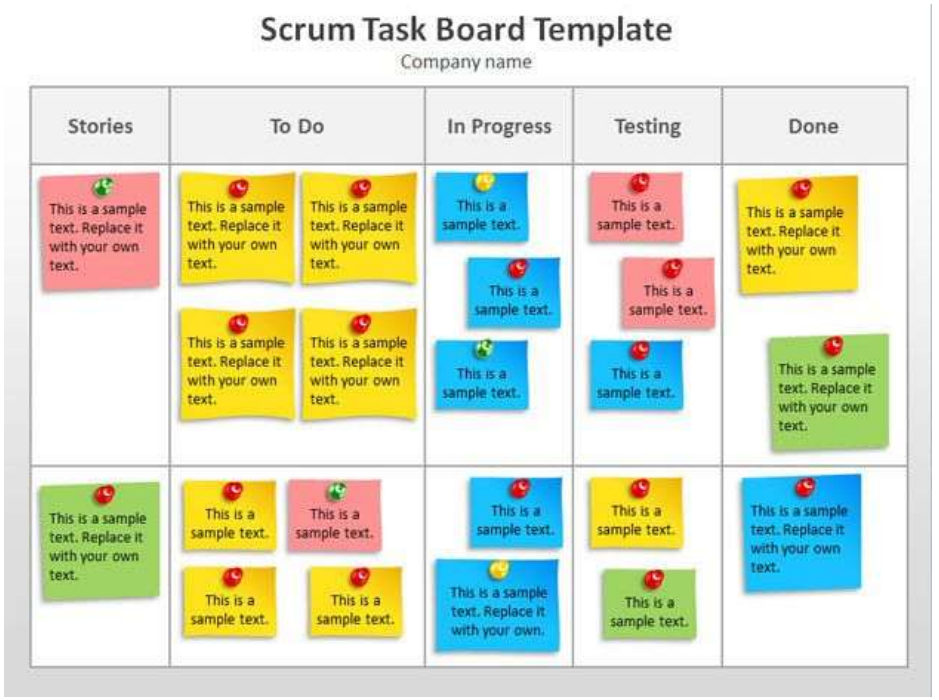
"A story map arranges user stories into functional clusters while also fitting them into the broader narrative of the product roadmap, providing a holistic view of the product's overall direction. It proves invaluable for uncovering, conceptualizing, and determining the priorities for the product's future path."



Requirements features:

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- Requirements Documentation: Description of HOW individual requirements meet the business need for the project. It may start at high level and get progressively elaborated For detailed understanding.
- Features: Unambiguous (measurable and testable) , Traceable, Complete, Consistent & Acceptable to key stakeholders.

1. Business need describing limitations & why project
2. Business & project objectives
3. Functional requirements – business process- interactions
4. Non functional requirements
5. Quality requirements and acceptance criteria
6. Impacts to other organizational areas
7. Support and training requirements
8. Assumptions & Constraints

User story:

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- A user story is the smallest unit of work in an agile framework. It's an end goal, not a feature, expressed from the software user's perspective. ... Stories fit neatly into agile frameworks like scrum and kanban. In scrum, user stories are added to sprints and “burned down” over the duration of the sprint.
- User stories are short, simple descriptions of a feature told from the perspective of the person who desires the new capability, usually a user or customer of the system. They typically follow a simple template: As a < type of user >, I want < some goal > so that < some reason >.

User story: Examples – better understanding

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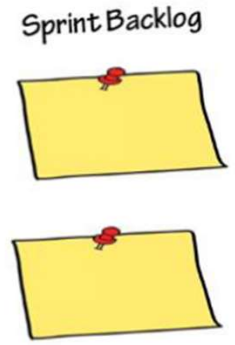
- ✓ As a customer , I would like to set up my password, so that I can log to the website
- ✓ As a sales person, I would like to see a list of qualified leads, so that I can call them
- ✓ As a manager, I would like to be able to assign tasks, so that I can keep processes moving when someone calls in sick
- ✓ As a passenger, I would like to be able to review my satisfaction with each flight, so that service can be improved
- ✓ As an investor, I would like to be able to trade stocks pre-market, so that I can react more quickly to news



Processes and Key Outputs

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Project Initiating	**Develop Project Charter**	• Project charter
	Identify Stakeholders	• Stakeholders register
Project Planning	**Develop Project Management Plan**	• Project management plan
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	Define Scope	• Project scope statement
	Create WBS	• Scope baseline
	Plan Schedule Management	• Schedule management plan
	Define Activities	• Activity list • Activity attributes • Milestone list
	Sequence Activities	• Project schedule network diagrams
	Estimate Activity Durations	• Duration estimates • Basis of estimates
	Develop Schedule	• Schedule baseline • Project schedule • Schedule data • Project calendars

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	Determine Budget	• Cost baseline
	Plan Quality Management	• Quality management plan • Quality metrics
	Plan Resource Management	• Resource management plan • Team charter
	Estimate Activity Resources	• Resource requirements • Basis of estimates • Resource breakdown structure
	Plan Communications Management	• Communications management plan
	Plan Risk Management	• Risk management plan
	Identify Risks	• Risk register • Risk report
	Perform Qualitative Risk Analysis	• Project documents updates
	Perform Quantitative Risk Analysis	• Project documents updates
	Plan Risk Responses	• Change requests

Plan Schedule Management

Key Concepts and Terms

- Activity attributes
- Activity list
- Agile release planning
- Agreements
- Alternatives analysis
- Analogous estimating
- Basis of estimates
- Bottom-up estimating
- Critical path method
- Data analysis
- Dependency determination and integration
- Duration estimates
- Earned value analysis
- Free Float and Total Float
- Iteration burn-down chart
- Lead and Lag
- Milestone list
- Parametric estimating
- Performance reviews
- Precedence diagramming method
- Project calendars
- Project management information system
- Project schedule
- Project schedule network diagrams
- Reserve analysis
- Resource optimization
- Rolling wave planning
- Schedule baseline
- Schedule compression
- Schedule data
- Schedule forecasts
- Schedule management plan
- Schedule network analysis
- Simulation
- Three-point estimating
- Trend analysis
- Variance analysis
- What-if scenario analysis

Plan Schedule Management - Process

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Definition

Plan Schedule Management is the process of establishing the policies, procedures, and documentation for **how** to plan, develop, managing, execute, and control the project schedule.

Benefit

- It provides guidance and direction on how the project schedule will be managed throughout the project

Notes

- This process is performed once or at predefined points in the project.
- **Schedule Management Plan**: contains the scheduling methodology and the scheduling tool to be used, level of accuracy, units of measure, organizational procedures links (WBS), project schedule model maintenance, control thresholds, rules of performance measurement, reporting formats.

Project Information

Project Name		Project Code	
Project Sponsor		Project Manager	

Introduction

Purpose

ose of this Scope Document is to establish the size and complexity boundaries of the project defined by its nd context. Scope defines specifically what work will (and will not) be done and what parts of the enterprise volved. It is an unambiguous reference of the project's mandate and sets out all project boundaries within the f the business objectives.

Audience

This Scope Document is intended to serve as a defining agreement between the Project Stakeholders. Sign-Off of this document constitutes binding acceptance.

Background

Summarize in this sub-section the key points documented in the Project Charter. Once written, the SOW becomes a document subject to negotiation and modification by stakeholders. The SOW establishes the baseline for the detailed planning activities and establishes a detailed schedule and budget for the project.

Project Purpose

These are specific statements which are defined and are documented to highlight the business reasons for the project prior to defining the Project Description and Objective which will be a statement of intent.

tatement of purpose.
- *Answer the question, "Why are you doing the project?"*
- *Reference the project business case in a general way.*

Where possible, the Project Statement of Purpose can be copied from already existing documents such as (e.g. RFP, Business Case, Project Charter, and Product Definition).
NB: The SOW document normally forms the biggest single component of the Project Execution Plan.

The business reasons for the project are:

1. *Company XYZ wishes to.....*
2. *The Business need is to.....*

Plan Schedule Management - Process

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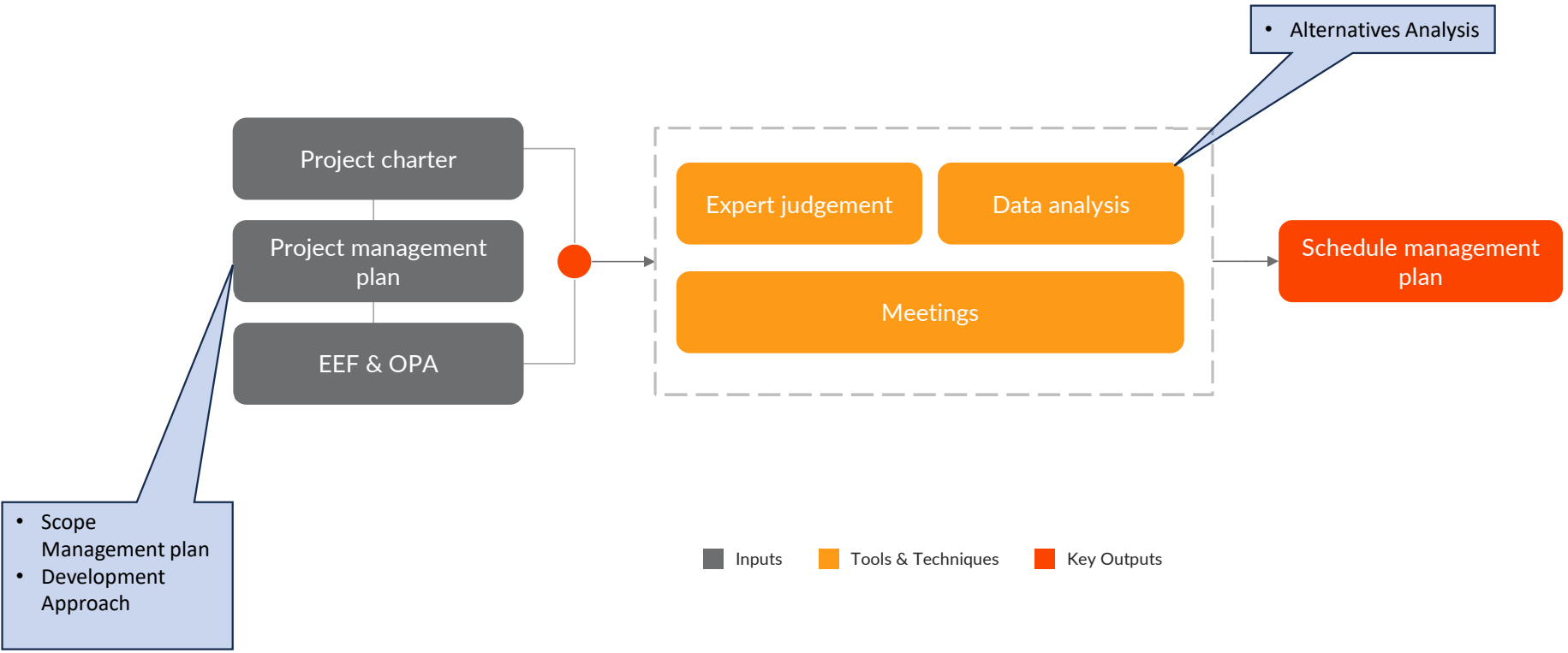

Initiating | Planning | Executing | Monitoring & Controlling | Closing

Alternative Analysis - Content

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Option	Description	Advantages	Disadvantages
Option 1: Fast Tracking	Performing activities in parallel that were originally planned in sequence.	- Reduces project duration - Can be implemented without additional resources	- Increases risk of rework - May lead to resource conflicts
Option 2: Crashing	Adding more resources to critical path activities to complete them faster.	- Reduces project duration - Can be effective for critical path activities	- Increases project costs - May lead to team burnout
Option 3: Resource Leveling	Adjusting the start and finish dates based on resource constraints.	- Balances resource usage - Reduces over-allocation of resources	- May extend project duration - Can delay critical path activities

This technique involves evaluating different strategies to manage the project schedule effectively. Each option has its own set of advantages and disadvantages, and the choice depends on the project's specific needs and constraints.

Done by:

- Brainstorming sessions with the project team.
- Consultation with subject matter experts.
- Review of similar past projects for potential solutions.

Plan Schedule Management – Tailoring Consideration

- **Life cycle approach:** What is the most appropriate life cycle approach
- **Resource availability:** Available resources and their productivity
- **Project dimensions:** How will “project complexity , technological uncertainty, product novelty, pace, or progress tracking (EVM) will impact
- **Technology support:** Is technology used to develop, record, transmit, receive and store project schedule model information & its accessibility
- Adaptive approaches use short cycles to undertake work, review the results, and adapt as necessary
- **The role of the project manager does not change while managing predictive development life cycle or adaptive environments. However to be successful in using adaptive , PM will need to be familiar with the tools and techniques.**

Plan Schedule Management – Common Terminology

- **Duration:** the amount of time it takes to complete a task or project, and it is usually measured in working days or hours. It is the planned or estimated time for completing a task or project.
- **Elapsed Time:** refers to the actual time it takes to complete a task or project, including any delays or interruptions that may occur. It is the time that has passed between the start and end of a task or project.
- **Free Float:** The amount of time that a schedule activity can be delayed without delaying the early start of any successor activity or violating a schedule constraint
- **Total Float (Sharable Float) :** The amount of time that a schedule activity can be delayed from its early start date without delaying the project finish date or violating a schedule constraint

Schedule Management Plan- Content

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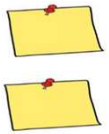
- Project Schedule Model Development: Specifies the scheduling methodology and the scheduling tool to be used in the development of the project schedule model.
- Release and Iteration Length: Defines the timeboxed periods for releases, waves, and iterations, especially when using an adaptive life cycle.
- Level of Accuracy: Establishes the acceptable range used in determining realistic activity duration estimates.
- Units of Measure: Defines the units of measure (e.g., staff hours, days) for each resource.
- Organizational Procedures Links: Provides the framework for how schedule management will be performed, including links to organizational procedures.
- Project Schedule Model Maintenance: Describes the process for updating and maintaining the project schedule model.
- Control Thresholds: Specifies the variance thresholds for monitoring schedule performance.
- Rules of Performance Measurement: Defines the rules for measuring performance, such as Earned Value Management (EVM) techniques.
- Reporting Formats: Identifies the formats and frequency of schedule performance reports.
- Process Descriptions: Details the processes for schedule management, including how changes to the schedule will be managed and controlled.

Plan Schedule Management- Agile Consideration



Metric/Tool	Description	Planning Considerations	Benefits
Velocity	The sum of story points completed in an iteration.	- Track historical velocity to set realistic goals. - Use velocity to forecast future work capacity. - Adjust based on team performance and changes.	- Helps in setting achievable iteration goals. - Provides a basis for capacity planning. - Improves predictability.
Cycle Time	The time taken to complete a task from start to finish.	- Measure cycle time for different types of work. - Identify bottlenecks and areas for improvement. - Use cycle time to set WIP limits.	- Enhances process efficiency. - Helps in identifying and eliminating delays. - Improves workflow predictability.
Lead Time	The total time from when a task is added to the backlog until it is completed.	- Track lead time to understand overall process efficiency. - Use lead time to identify waiting times. - Plan to reduce lead time for faster delivery.	- Provides a comprehensive view of process efficiency. - Helps in improving speed to market. - Enhances stakeholder satisfaction.
Product Roadmap	A high-level view of product features and their delivery sequence.	- Align with strategic goals and milestones. - Update regularly based on current needs and priorities. - Communicate changes to stakeholders.	- Provides a clear vision of product evolution. - Helps in strategic planning and prioritization. - Enhances stakeholder alignment and transparency.

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Define Activities

Define Activities – Process

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Definition

Define Activities is the process to **identify and document** the specific **actions** to be performed to produce the project deliverables.

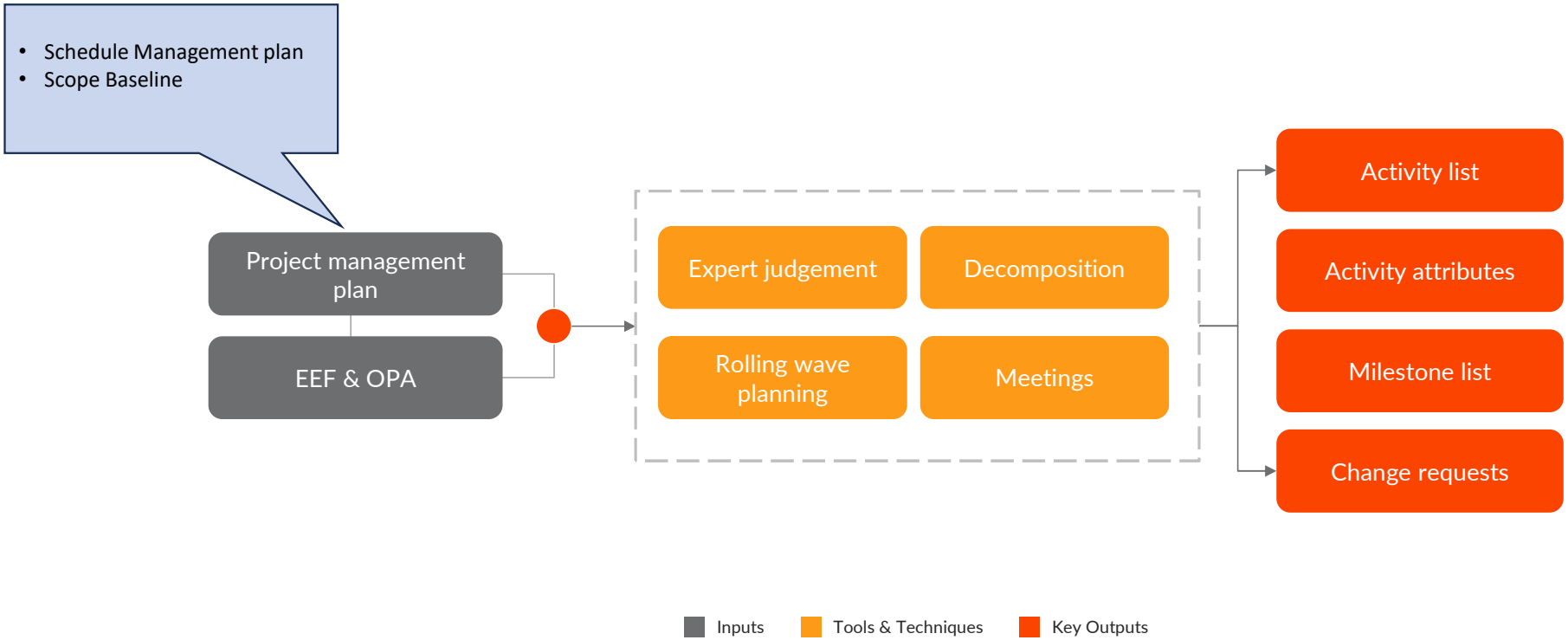
Benefit

It decomposes work packages into schedule activities that provide a basis for estimating, scheduling, executing, monitoring, and controlling the project work.

Notes

- This process is performed throughout the project.
- Decomposition is a technique used for dividing and subdividing the project scope and project deliverables into smaller, more manageable parts.

Define Activities – Process



Initiating | Planning | Executing | Monitoring & Controlling | Closing

Define Activities – Tools, Techniques & Outputs

- **Decomposition:** Decomposition is a technique used for dividing and subdividing the project scope and project deliverables into smaller, more manageable parts. Activities represent the effort needed to complete a work package. The Define Activities process defines the final outputs as activities rather than deliverables, as done in the Create WBS process. Involving team members in the decomposition can lead to better and more accurate results.
- **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.
- **Activities list:** a comprehensive list includes all the schedule activities to be implemented in the project. The activity list, WBS, and WBS dictionary can be developed either sequentially or concurrently, with the WBS and WBS dictionary as the basis for development of the final activity list.
- **Activity attributes:** include the activity ID, WBS ID, the name of the activity, activity codes, activity description, previous activities, future activities, logical relationship, resource requirements, and imposed dates, restrictions, and assumptions, Leads and lags, the person responsible for the work implementation, or geographical area or the place where the work will be performed. Activity attributes can be used to identify the person responsible for executing the work, geographic area, or place where the work has to be performed, the project calendar the activity is assigned to, and activity type such as level of effort (often abbreviated as LOE), discrete effort, and apportioned effort.
- **Milestone list:** an important point or event in the project. A milestone list identifies all milestones and whether they are mandatory or optional. Milestones are similar to regular schedule activities, with the same structure and attributes, but they have zero duration because milestones represent a moment in time.

Activity List - Content

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Activity ID	Activity Name	Activity Description	Predecessors	Duration (Days)	Resources Required
A001	Project Kickoff Meeting	Conduct a meeting to officially start the project and align all stakeholders.	-	1	Project Manager, Team
A002	Requirements Gathering	Collect and document the project requirements from stakeholders.	A001	5	Business Analyst
A003	Design Phase	Develop the design documents based on the gathered requirements.	A002	10	Design Team
A004	Development Phase	Implement the design into a working product.	A003	20	Development Team
A005	Testing Phase	Test the developed product to ensure it meets the requirements and is free of defects.	A004	7	QA Team
A006	User Training	Train the end-users on how to use the new system.	A005	3	Training Team
A007	Project Closure	Conduct a final review and formally close the project.	A006	2	Project Manager, Team

Activity list helps in planning, scheduling, and tracking project activities. It provides a clear and detailed description of each activity, its dependencies, duration, and required resources, ensuring that all team members are aligned and understand their tasks.

Activity Attribute - **Content**

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Activity ID	Activity Name	Activity Description	Predecessors	Successors	Duration (Days)	Resource Requirements	Constraints	Assumptions	Leads and Lags	Logical Relationships
A001	Project Kickoff Meeting	Conduct a meeting to officially start the project and align all stakeholders.	-	A002	1	Project Manager, Team	Must be completed before any other activity	All stakeholders will attend	None	Start-to-Start (SS)
A002	Requirements Gathering	Collect and document the project requirements from stakeholders.	A001	A003	5	Business Analyst	Must be completed within 5 days	Stakeholders will provide complete information	None	Finish-to-Start (FS)
A003	Design Phase	Develop the design documents based on the gathered requirements.	A002	A004	10	Design Team	Must follow company design standards	Requirements are complete and clear	None	Finish-to-Start (FS)
A004	Development Phase	Implement the design into a working product.	A003	A005	20	Development Team	Must use specified technology stack	Design documents are accurate	None	Finish-to-Start (FS)

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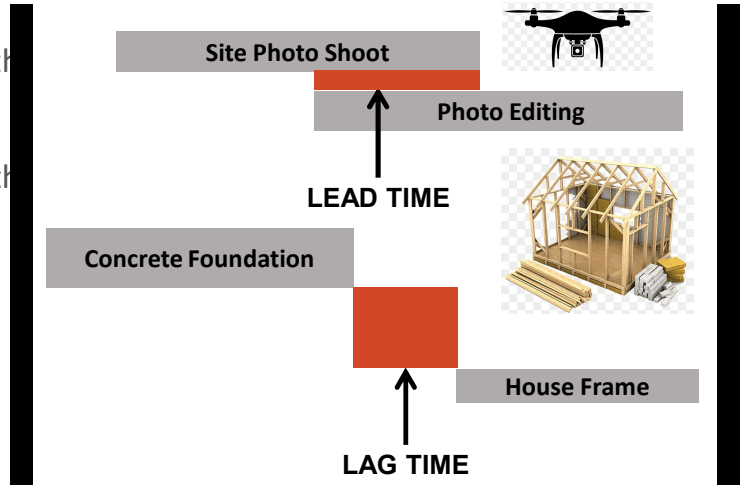
Lead, Lag and Milestone List

- **Lead:** Amount of time whereby a successor activity can be advanced with respect to a predecessor activity
- **Lag:** Amount of time whereby a successor activity will be delayed with respect to a predecessor activity



- **Milestone List:** is a document that identifies all significant points or events in the project timeline

Milestone ID	Milestone Name	Milestone Description	Completion Date	Status	Mandatory/Optional
M001	Project Kickoff	Official start of the project with all stakeholders.	2024-01-10	Completed	Mandatory
M002	Requirements Sign-off	Approval of the documented project requirements.	2024-01-20	Pending	Mandatory
M003	Design Approval	Approval of the design documents by stakeholders.	2024-02-05	Not Started	Mandatory
M004	Prototype Completion	Completion of the initial prototype for stakeholder review.	2024-02-20	Not Started	Optional

Define Activities – Agile Consideration

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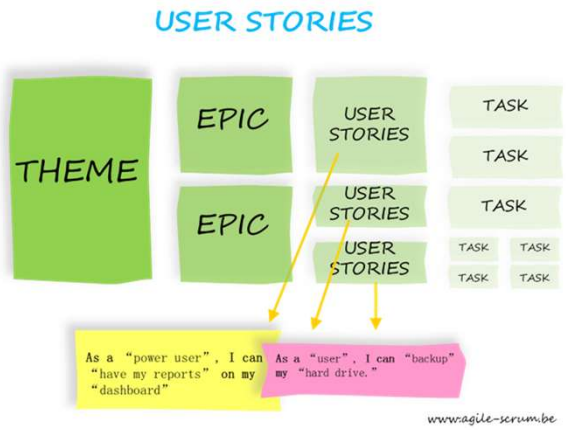
- **User Stories and Backlog**: Agile projects use user stories to define activities. These user stories are maintained in a product backlog, which is a prioritized list of features, enhancements, and bug fixes.
- **Decomposition:** Activities are broken down into smaller, manageable tasks during sprint planning. This decomposition helps in better estimation and assignment of tasks.
- **Collaboration and Team Involvement:** The entire Agile team collaborates to define activities. This ensures that all team members have a clear understanding of the work to be done and can contribute their expertise.
- **Flexibility and Adaptability:** Agile projects embrace change. Activities are defined iteratively, allowing for adjustments based on feedback and changing requirements.
- **Timeboxing:** Activities are planned within fixed time periods called sprints or iterations. This helps in managing scope and ensuring that work is completed within the set timeframe.
- **Prioritization:** Activities are prioritized based on business value, customer needs, and project goals. This ensures that the most important work is done first.
- **Continuous Improvement:** Agile teams regularly review and refine their activities through retrospectives. This helps in identifying areas for improvement and making necessary adjustments.



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Sequence Activities

Sequence Activities – Process

Definition

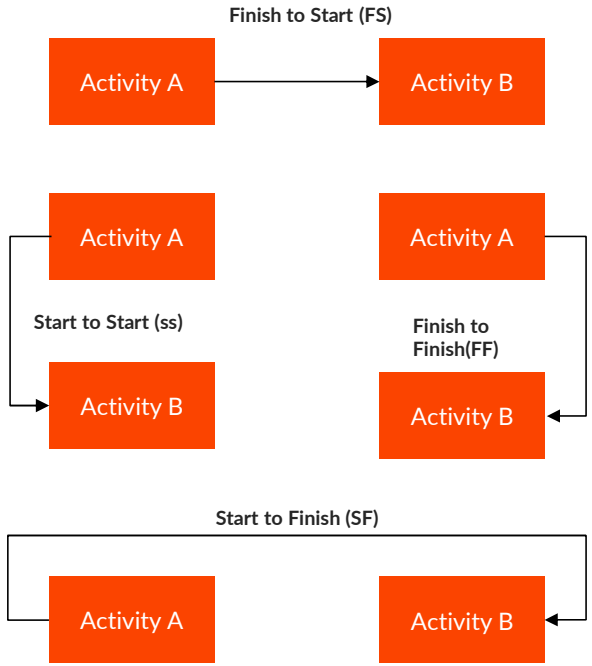
Sequence Activities is the process to **identify and document relationships** among the project activities.

Benefit

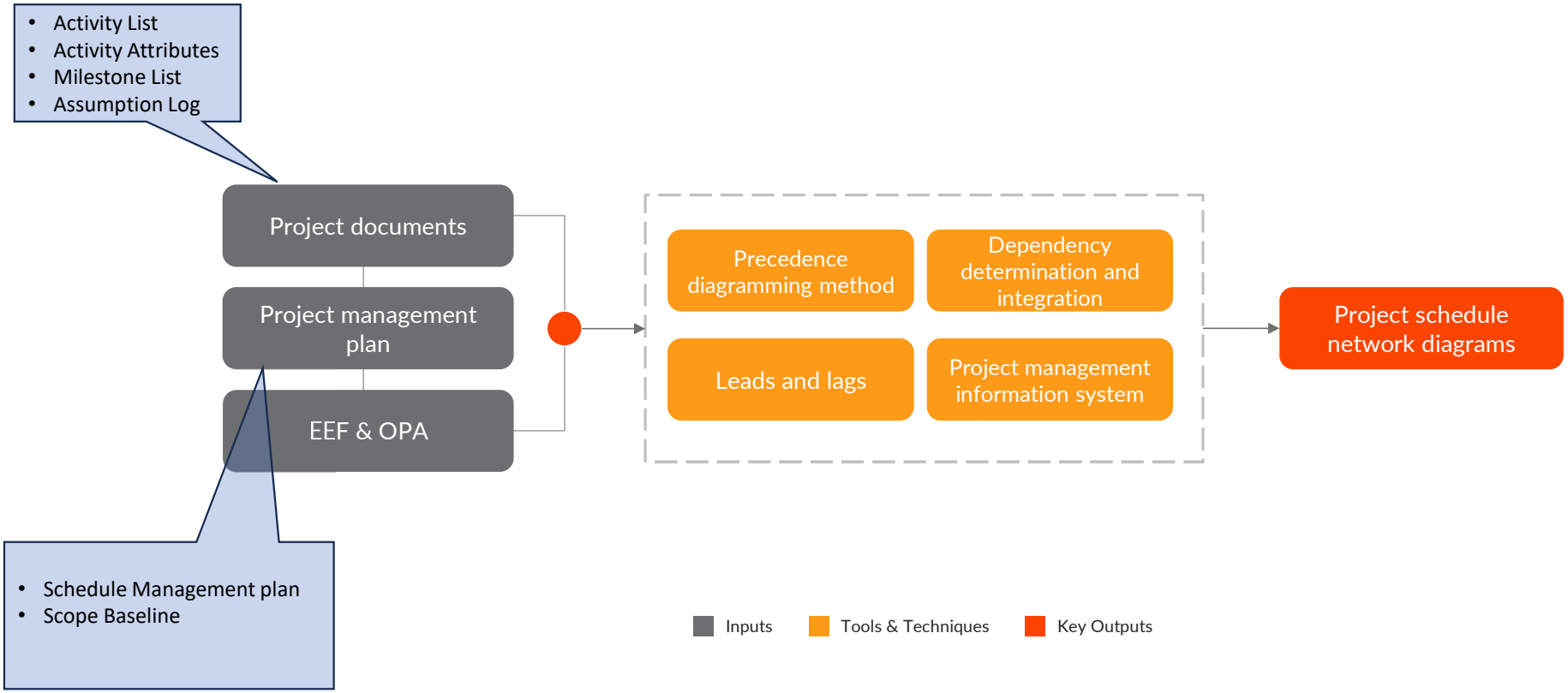
It defines the logical sequence of work to obtain the greatest efficiency given all project constraints.

Notes

- This process is performed throughout the project.
- Every activity except the first and last should be connected to at least one predecessor and at least one successor activity with an appropriate logical relationship.
- Logical relationships should be designed to create a realistic project schedule.



Sequence Activities – Process



Initiating | Planning | Executing | Monitoring & Controlling | Closing

Sequence Activities – Tools

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Precedence diagramming method (PDM): is a technique used for constructing a schedule model in which activities are represented by nodes and are graphically linked by one or more logical relationships to show the sequence in which the activities are to be performed.

Activity-on-node (AON) is one method of representing a precedence diagram. This is the method used by most project management software packages.

PDM includes four types of logical relationships:

- **Finish-to-start (FS)** * **:** the closer of the previous activity identifies the initiation of the following activity.
- **Finish-to-finish (FF):** the closer of the previous activity identifies the closer of the following activity.
- **Start-to-start (SS):** the initiation of the previous activity identifies the initiation of the following activity.
- **Start-to-finish (SF):** the closer of the following activity depends upon the initiation of the previous activity.

* *Finish-to-Start is the most used type of precedence relationship and Start-to-Fnish relationship is rarely used.*

Sequence Activities – Tools cont.

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Dependency Determination and Integration: It has four attributes, but two can be applicable at the same time in following ways: mandatory external dependencies, mandatory internal dependencies, discretionary external dependencies or discretionary internal dependencies.

- Mandatory Dependencies: that are required under the contract or inherent in the nature of the work, sometimes referred to as hard logic or hard dependencies. The project team determines which dependencies are mandatory during the process of sequencing the activities.
- Discretionary Dependencies: are established based on knowledge of best practices within a particular application area or some unusual aspect of the project where a specific sequence is desired, even though there may be other acceptable sequences, sometimes referred to as preferred logic, preferential logic, or soft logic. The project team determines which dependencies are discretionary during the process of sequencing the activities.
- Internal Dependencies: involve a precedence relationship between project activities and are generally inside the project team's control. For example, if the team cannot test a machine until they assemble it, this is an internal mandatory dependency. The project management team determines which dependencies are internal during the process of sequencing the activities.
- External Dependencies: involve the relationship between project activities and activities outside the project. These dependencies are usually outside the project team's control. The project management team determines which dependencies are external during the process of sequencing the activities.

Sequence Activities – Key Output.

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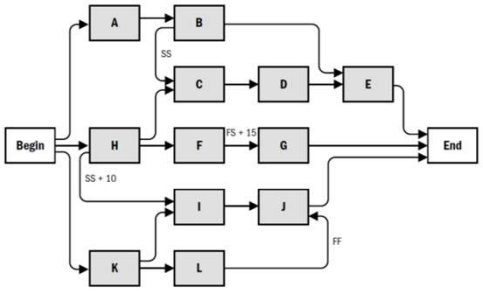
A graphical representation of the logical relationships, also referred to as dependencies, among the project schedule activities. It is an essential tool for understanding the sequence of activities and their interdependencies, which helps in planning, scheduling, and monitoring the project effectively.

- Visual Representation: The diagram visually displays the sequence of activities and their dependencies, making it easier to understand the project flow.
- Dependencies: It shows different types of dependencies such as Finish-to-Start (FS), Start-to-Start (SS), Finish-to-Finish (FF), and Start-to-Finish (SF).
- Critical Path: The diagram helps identify the critical path, which is the longest path through the project with the least amount of slack. This is crucial for determining the minimum project duration.
- Path Convergence and Divergence: Activities with multiple predecessor activities indicate path convergence, while activities with multiple successor activities indicate path divergence. These points are at greater risk as they are affected by or can affect multiple activities.
- Flexibility: The project schedule network diagram can be produced manually or using project management software and can include full project details or summary activities.



Project schedule network diagram

Sequence Activities – Agile Considerations

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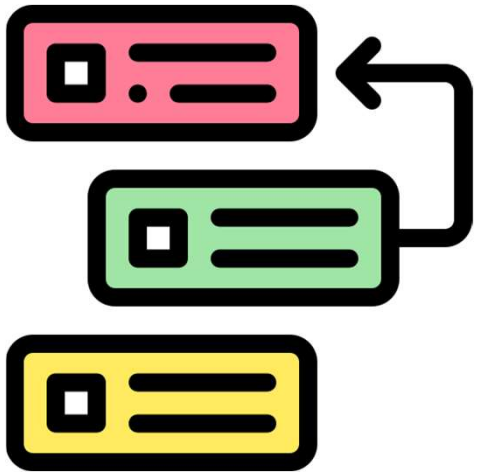
- **User Stories and Backlog**: Agile projects use user stories to define activities. These user stories are maintained in a product backlog, which is a prioritized list of features, enhancements, and bug fixes.
- **Decomposition:** Activities are broken down into smaller, manageable tasks during sprint planning. This decomposition helps in better estimation and assignment of tasks.
- **Collaboration and Team Involvement:** The entire Agile team collaborates to define activities. This ensures that all team members have a clear understanding of the work to be done and can contribute their expertise.
- **Flexibility and Adaptability:** Agile projects embrace change. Activities are defined iteratively, allowing for adjustments based on feedback and changing requirements.
- **Timeboxing:** Activities are planned within fixed time periods called sprints or iterations. This helps in managing scope and ensuring that work is completed within the set timeframe.
- **Prioritization:** Activities are prioritized based on business value, customer needs, and project goals. This ensures that the most important work is done first.
- **Continuous Improvement:** Agile teams regularly review and refine their activities through retrospectives. This helps in identifying areas for improvement and making necessary adjustments.



Processes and Key Outputs

PG	Process Name	Key Outputs
Project Initiating	**Develop Project Charter**	• Project charter
	Identify Stakeholders	• Stakeholders register
Project Planning	**Develop Project Management Plan**	• Project management plan
	Plan Scope Management	• Scope management plan • Requirements management plan
	Collect Requirements	• Requirements documentation • Requirements traceability matrix
	Define Scope	• Project scope statement
	Create WBS	• Scope baseline
	Plan Schedule Management	• Schedule management plan
	Define Activities	• Activity list • Activity attributes • Milestone list
	Sequence Activities	• Project schedule network diagrams
	Estimate Activity Durations	• Duration estimates • Basis of estimates
	Develop Schedule	• Schedule baseline • Project schedule • Schedule data • Project calendars

PG	Process Name	Key Outputs
Project Planning	**Plan Cost Management**	• Cost management plan
	Estimate Costs	• Cost estimates • Basis of estimates
	Determine Budget	• Cost baseline
	Plan Quality Management	• Quality management plan • Quality metrics
	Plan Resource Management	• Resource management plan • Team charter
	Estimate Activity Resources	• Resource requirements • Basis of estimates • Resource breakdown structure
	Plan Communications Management	• Communications management plan
	Plan Risk Management	• Risk management plan
	Identify Risks	• Risk register • Risk report
	Perform Qualitative Risk Analysis	• Project documents updates
	Perform Quantitative Risk Analysis	• Project documents updates
	Plan Risk Responses	• Change requests

Estimate Activity Durations

Estimate Activity Durations – Process

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Definition

Estimate Activity Durations is the process of **estimating the number of work periods needed** to complete individual activities with estimated resources.

Benefit

It provides the amount of time each activity will take to complete.

Notes

- This process is performed throughout the project.
- Estimating activity durations uses information from the scope of work, required resource types or skill levels, estimated resource quantities, and resource calendars.
- The duration estimate is **progressively elaborated**, and the process considers the quality and availability of the input data.

Estimate Activity Durations – Considerations

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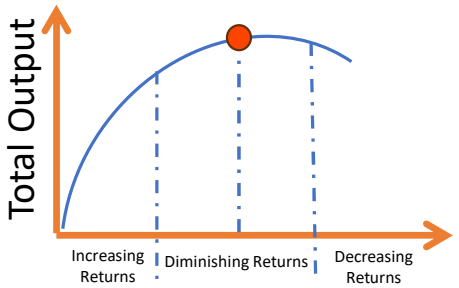
1. Number of resources expected & skill proficiency of those resources
2. Law of Diminishing Returns: Point of saturation beyond which yield becomes progressively smaller OR diminishing increases in output
3. Number of Resources: Optimum number of resources, (Doubling the resource is not half the duration!)
4. Advances in Technology: Use of latest technology may result in decrease in duration and use of resources
5. Motivation of Staff: Motivated resources is one of the important factor for the overall efficiency,



Work expands to fit the time allocated

Parkinson's Law

People wait until the last minute

Student Syndrome

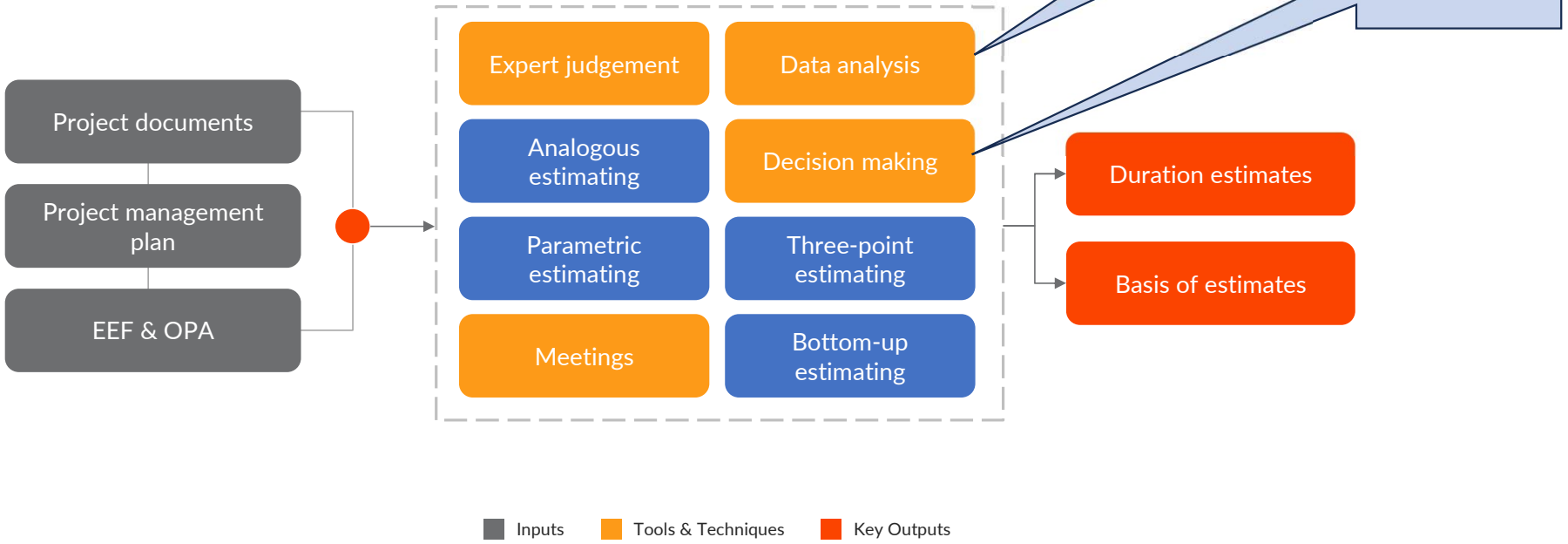
Motivate emp. by external things like money

Extrinsic Motivation

Emp finds motivation in the work through trainings, autonomy, responsibility, etc

Intrinsic Motivation

Estimate Activity Durations – Process



Initiating | Planning | Executing | Monitoring & Controlling | Closing

Estimate Activity Durations – Tools & Techniques

Estimating Technique	Description	Advantages	Disadvantages	Use Cases
Analogous Estimating	Uses historical data from similar projects to estimate costs and durations.	- Quick and easy to use - Useful when limited information is available	- Less accurate - Relies on the similarity of past projects	- Early project phases - High-level estimates
Parametric Estimating	Uses statistical relationships between historical data and other variables.	- More accurate than analogous - Can be applied to parts of a project	- Requires reliable historical data - May not account for unique project conditions	- Detailed estimates - Projects with quantifiable parameters
Bottom-Up Estimating	Estimates costs and durations by aggregating the estimates of individual tasks.	- Highly accurate - Provides detailed insights into project components	- Time-consuming - Requires detailed project information	- Detailed project planning - Complex projects
Three-Point Estimating	Uses optimistic, pessimistic, and most likely estimates to calculate an average.	- Accounts for uncertainty - Provides a range of possible outcomes	- More complex to calculate - Requires expert judgment	- Risk management - Projects with high uncertainty
Expert Judgment	Relies on the expertise and experience of professionals to estimate costs and durations.	- Leverages specialized knowledge - Can be quick and flexible	- Subjective - May be biased or inconsistent	- Unique or innovative projects - When historical data is not available
Data Analysis	Uses various data analysis techniques such as reserve analysis and cost of quality.	- Provides detailed insights - Can improve accuracy and reliability	- Requires detailed data - Can be complex to perform	- Detailed cost and schedule analysis - Projects with significant data availability

Estimate Activity Durations – Tools & Techniques

- **Alternatives analysis:** alternatives analysis is used to compare various levels of resource capability or skills; scheduling compression techniques; different tools (manual versus automated); and make, rent, or buy decisions regarding the resources.
- **Reserve analysis:** estimated duration within the schedule baseline, which is allocated for identified risks that are accepted and for which contingent or mitigation responses are developed. Contingency reserves are associated with the "known-unknowns". Duration estimates may include contingency reserves, sometimes referred to as time reserves or buffers, into the project schedule to account for schedule uncertainty.
- **Contingency reserve:** may be a percentage of activity duration estimating, or a specific number of periods of work, or may be identified by using quantitative analysis methods.
- **Management reserves:** are a specified amount of the project duration withheld for management control purposes and are reserved for unforeseen work that is within scope of the project. Management reserves are intended to address the **"unknown-unknowns"** that can affect a project. It is not included in the baseline, and it requires a change request (re-baseline) in order to use.

Estimate Activity Durations – Tools & Techniques

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Decision making - Voting

- Unanimity: a decision that is reached whereby everyone agrees on a single course of action.
- Majority: a decision that is reached with support obtained from more than 50% of the members of the group.
- Plurality: a decision that is reached whereby the largest block in a group decides, even if a majority is not achieved. Generally used when the number of options nominated is more than two.

------- › **Voting methods in Agile:** Fist of Five, Planning Poker, Dot voting, Roman voting(thumbs), Polling

Example of Voting in Duration Estimation:

Activity ID	Activity Name	Proposed Duration 1	Proposed Duration 2	Proposed Duration 3	Selected Duration
A001	Requirements Gathering	5 days (3 votes)	7 days (5 votes)	6 days (2 votes)	7 days
A002	Design Phase	10 days (4 votes)	12 days (4 votes)	11 days (2 votes)	10 days
A003	Development Phase	20 days (2 votes)	25 days (6 votes)	22 days (2 votes)	25 days

Estimate Activity Durations – Key Outputs

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Duration Estimates

- **Estimate Ranges**: Instead of settling on a single duration, it is often more practical to estimate a range of possible durations. This approach accounts for uncertainties and variations in task performance.
  - **Low and High Ranges**: Activity or control account managers should estimate the low and high ranges of possible durations. This helps in capturing the best-case and worst-case scenarios.
  - **Percentage Ranges**: A common method is to apply a percentage range (e.g., minus 20 percent and plus 30 percent) to all activities in the project schedule. Alternatively, activities can be grouped by similar risk characteristics, and percentage ranges can be applied to these groups.
- **Probability Distributions**: Modern project management software can model uncertainty by generating likely ranges of estimates based on PERT (Program Evaluation and Review Technique) estimates, which include:
  - **Optimistic Duration**: The shortest time in which an activity can be completed.
  - **Most Likely Duration**: The best estimate of the time required to complete an activity, assuming everything proceeds as normal.
  - **Pessimistic Duration**: The longest time an activity might take if everything goes wrong.
- **Monte Carlo Simulation**: This technique can be used to show the range of possible outcomes and their relative probabilities. It involves running many simulations to predict the likelihood of different project durations.

We can further refine the estimates as the project progresses.

Estimate Activity Durations – Key Outputs cont.

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Basis of Estimates

Element	Description
Estimate Purpose	The reason for creating the estimate (e.g., budgeting, planning, decision-making).
Scope of Estimate	What is included and excluded in the estimate.
Methodology	The approach used to develop the estimate (e.g., analogous, parametric, bottom-up).
Assumptions	Key assumptions made during the estimation process.
Data Sources	The sources of data used to develop the estimate (e.g., historical data, expert judgment).
Estimate Range	The range of possible values (e.g., optimistic, most likely, pessimistic).
Confidence Level	The level of confidence in the estimate (e.g., high, medium, low).
Risk and Uncertainty	Identification of risks and uncertainties that could impact the estimate.
Review and Approval	Details of the review and approval process for the estimate.
Date of Estimate	The date when the estimate was prepared.

Estimate Activity Durations – Agile Considerations

Element	Description
User Stories	Estimations are based on user stories, which are small, manageable units of work.
Story Points	Relative estimation technique using story points to measure the complexity and effort required.
Velocity	The rate at which the team completes work, usually measured in story points per iteration.
Iterations/Sprints	Fixed time periods (e.g., 2-4 weeks) during which a set amount of work is completed.
Planning Poker	A consensus-based estimation technique where team members use cards to estimate effort.
Historical Data	Using past performance data to inform future estimates.
Team Capacity	The total amount of work the team can handle in a given iteration, considering availability and other commitments.
Daily Stand-ups	Short daily meetings to track progress and adjust estimates as needed.
Burndown Charts	Visual tools to track the amount of work remaining versus time, helping to adjust estimates dynamically.
Flexibility	Agile allows for adjustments in estimates based on ongoing feedback and changing requirements.
T-shirt Sizing	A relative estimation technique using T-shirt sizes (XS, S, M, L, XL) to represent the effort required to complete a task. Simplifies the estimation process and encourages team collaboration.

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Develop Schedule

Develop Schedule – Process

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Definition

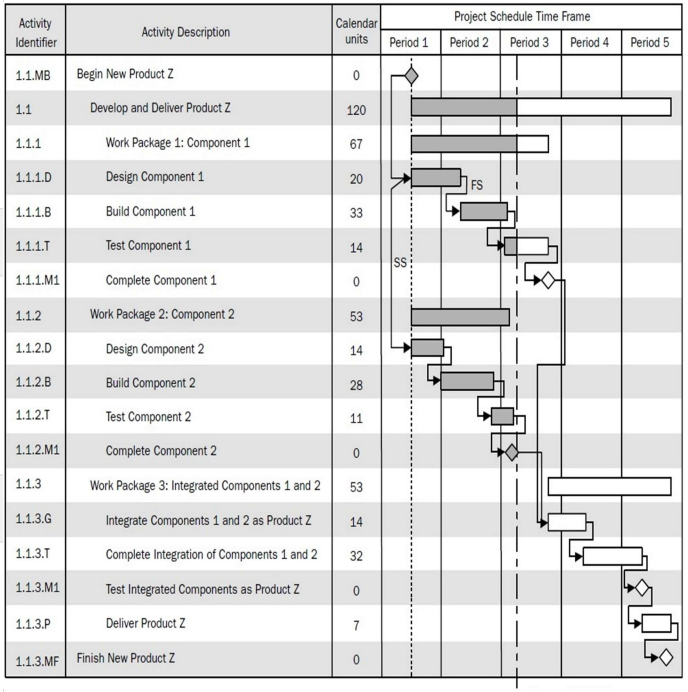
Develop Schedule is the process of **analyzing activity sequences, durations, resource requirements, and schedule constraints to create a schedule model** for project execution and monitoring and controlling.

Benefit

It generates a schedule model with planned dates for completing project activities.

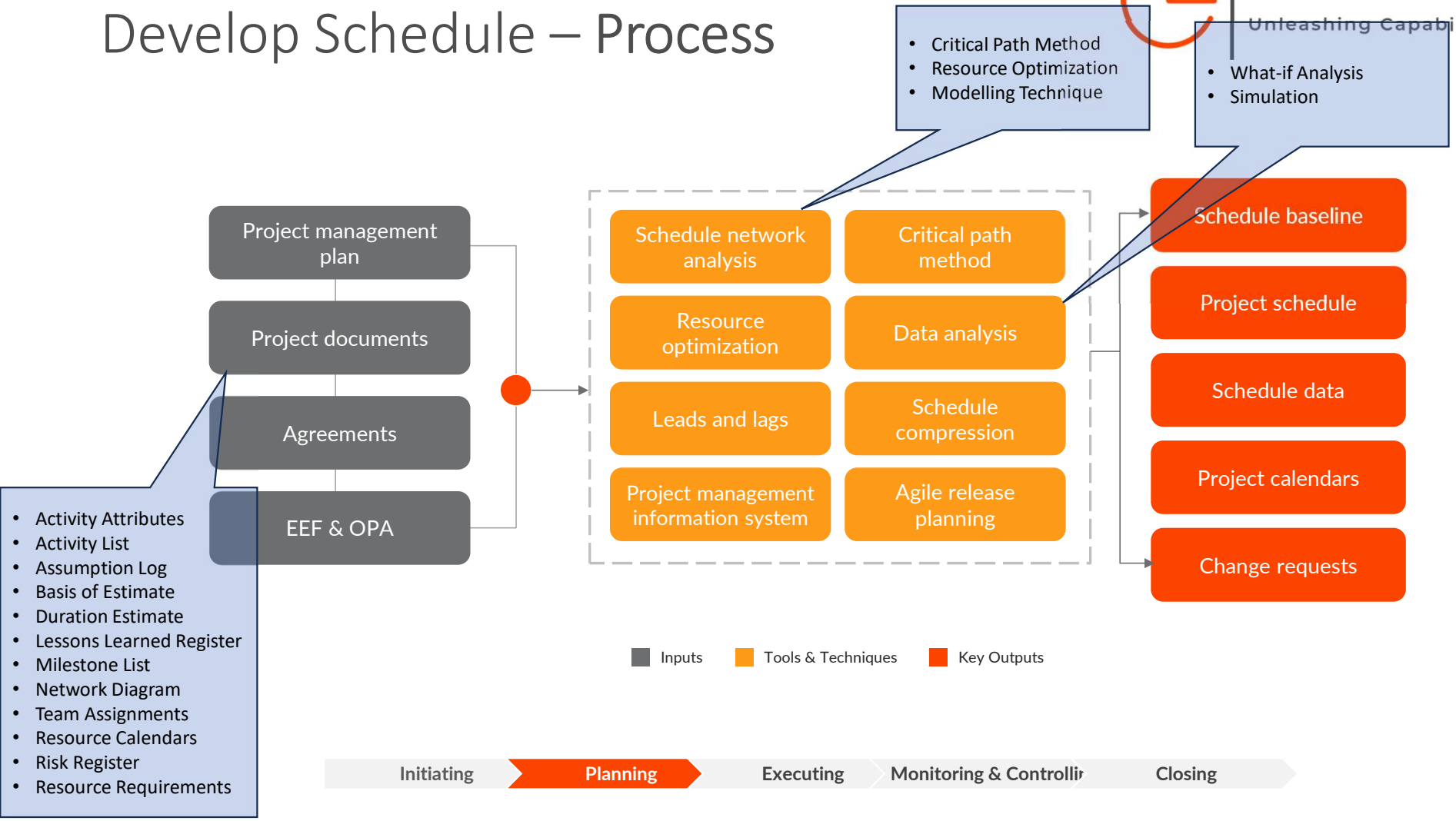
Notes

- This process is performed throughout the project.
- Developing an acceptable project schedule is an **iterative process**
- The schedule model is used to determine the planned start and finish dates for project activities and milestones based on the best available information.



A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition, Project Management Institute Inc., 2013.

Develop Schedule – Process



Initiating | **Planning** | Executing | Monitoring & Controllir | Closing

Develop Schedule – Tools & Techniques

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Schedule Network Analysis: a comprehensive technique used to develop a project schedule by identifying early and late start and finish dates for activities.

Element	Description
Purpose	To identify early and late start and finish dates for project activities.
Techniques Used	Includes critical path method, resource optimization, and modeling techniques.
Critical Path Method	Identifies the longest path of activities to determine the shortest project duration.
Resource Optimization	Adjusts the schedule based on resource availability and constraints.
Modeling Techniques	Uses simulations and what-if scenarios to predict schedule outcomes.
Schedule Reserves	Aggregates buffers to reduce the probability of schedule slips.
Risk Assessment	Reviews high-risk activities and long-lead items on the critical path.
Iterative Process	Continuously refined until a viable schedule model is developed.
Sensitivity Analysis	Determines which risks have the most potential impact on project outcomes.
Tornado Diagram	Visual tool used in sensitivity analysis to display the impact of variables.

Activity	Duration	Predecessor
A	4	Start
C	5	Start
B	3	A & C
D	10	C
E	5	B & D
Finish	0	E & D

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Develop Schedule – Tools & Techniques

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Schedule Compression Techniques: are strategies used to shorten or accelerate the project schedule without reducing the project scope

Technique	Description
Crashing	Shortening the schedule duration for the least incremental cost by adding resources. Examples include approving overtime, bringing in additional resources, or paying to expedite delivery.
Fast Tracking	Performing activities in parallel that were originally planned to be done sequentially. This can increase risk and may require rework.
Negative Float Analysis	Identifying and addressing activities with negative float to meet schedule constraints or imposed dates.
Time Compression	Managing processes to move non-value-adding activities off the critical path and protect value-adding activities from delays.
Overtime	Extending work hours to accelerate task completion. This can increase costs and may impact team morale.
Multiple Shifts	Using multiple work shifts to ensure continuous progress on critical activities.
Labor Productivity Incentives	Offering incentives to improve labor productivity, especially in regions with strong organized labor.
Expedited Start-Up Schedule	Maintaining tight control over an expedited start-up schedule, ensuring field personnel have adequate authority and capability.

Develop Schedule – Tools & Techniques

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What-if and Simulation Analysis: are powerful techniques used in project management to evaluate the impact of different scenarios and predict potential outcomes

Element	What-If Analysis	Simulation Analysis
Purpose	To evaluate the impact of different scenarios on project objectives.	To predict the range of possible outcomes and their probabilities.
Methodology	Scenario-based analysis to answer "What if scenario X happens?"	Uses statistical techniques to model uncertainties and run multiple simulations.
Techniques Used	Scenario analysis, sensitivity analysis, and decision trees.	Monte Carlo simulation, risk modeling, and probabilistic analysis.
Inputs	Project schedule, risk register, and assumptions.	Historical data, expert opinions, and probability distributions.
Outputs	Impact on project schedule, cost, and performance.	Probability distributions of project outcomes, such as cost and schedule.
Tools	Spreadsheet software, project management software, and decision support systems.	Specialized simulation software and tools like @RISK, Crystal Ball, and Primavera Risk Analysis.
Advantages	- Helps in understanding the impact of different scenarios.	- Provides a comprehensive view of potential project outcomes.
	- Supports decision-making by evaluating alternatives.	- Quantifies risks and uncertainties.
Disadvantages	- May not capture all possible scenarios.	- Requires significant data and computational resources.
	- Can be time-consuming to develop multiple scenarios.	- Can be complex to interpret and communicate results.
Application	- Used in project planning, risk management, and decision-making.	- Used in risk analysis, project forecasting, and contingency planning.
Example	- Evaluating the impact of a delay in a critical activity on the project timeline.	- Running simulations to predict the probability of completing the project within budget and on time.

Develop Schedule – Tools & Techniques

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Resource Optimization: involves techniques like resource leveling and resource smoothing to align resource usage with availability

Element	Description
Purpose	To adjust the start and finish dates of activities to align planned resource use with resource availability.
Techniques Used	Resource leveling and resource smoothing.
Resource Leveling	Adjusts start and finish dates based on resource constraints to balance demand and supply. May change the critical path and extend the project duration.
Resource Smoothing	Adjusts activities within their float to avoid changing the critical path. Ensures resource usage stays within predefined limits.
Inputs	Project schedule, resource calendars, resource requirements, and activity attributes.
Outputs	Optimized project schedule with adjusted start and finish dates for activities.
Tools	Project management software with resource optimization features, such as Microsoft Project, Primavera P6.
Advantages	- Balances resource demand and supply.
	- Reduces resource overallocation and conflicts.
	- Improves resource utilization and efficiency.
Disadvantages	- May extend project duration (resource leveling).
	- Requires accurate resource availability data.
	- Can be complex to implement manually.
Application	- Used in project scheduling, resource management, and capacity planning.
Example	- Adjusting the schedule of a construction project to ensure that key resources like labor and equipment are not overallocated.

Develop Schedule – Tools & Techniques

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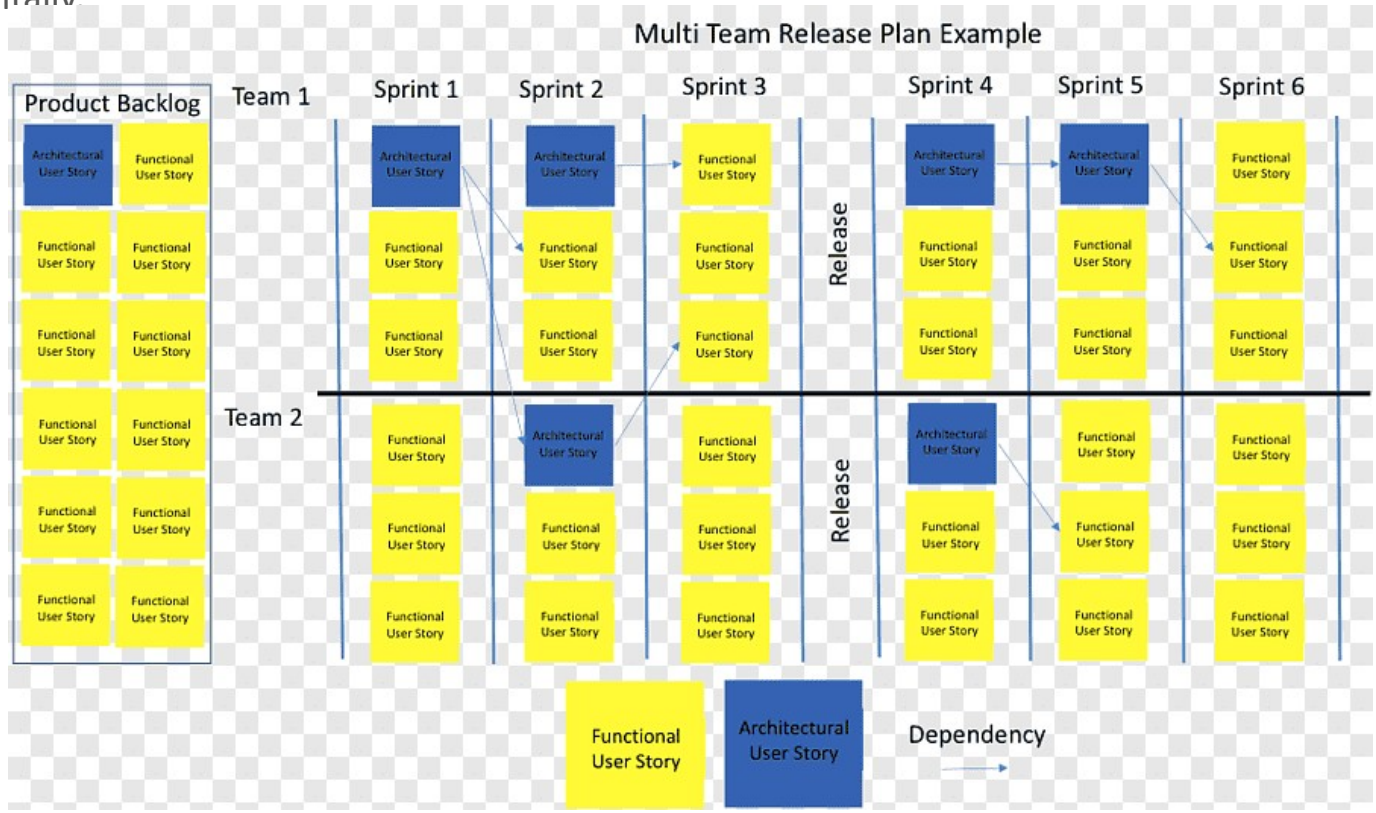
Agile Release Planning: helps teams organize and plan product releases by breaking down tasks, prioritizing them, and aligning with business goals. It allows for flexibility and continuous improvement to adapt to changes and deliver value incrementally



Develop Schedule – Outputs

•**Schedule Baseline**: The approved version of the schedule model that can be changed only through formal change control procedures.

•**Project Schedule:** The planned dates for performing activities and meeting milestones.

•**Schedule Data:** Information on schedule activities, milestones, and other relevant data.

•**Project Calendars:** Calendars that identify working days and shifts available for scheduled activities.

•**Change Requests:** Requests to change the schedule baseline or other components of the project management plan.

•**Project Management Plan Updates:** Updates to the schedule management plan and other components of the project management plan.

•**Project Documents Updates:** Updates to project documents such as activity attributes, assumption log, duration estimates, lessons learned register, resource requirements, and risk register.

Develop Schedule – Agile Considerations

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•**Iterative Scheduling**: Agile projects use iterative scheduling with time-boxed iterations (sprints) to deliver incremental value.

•**Rolling Wave Planning:** Detailed planning is done for near-term work, while future work is planned at a higher level.

•**Backlog Management:** The product backlog is continuously refined and prioritized to ensure the most valuable features are developed first.

•**Daily Stand-ups:** Regular daily meetings help the team stay aligned and address any scheduling issues promptly.

•**Velocity Tracking:** Teams track their velocity (the amount of work completed in a sprint) to improve future planning and predictability.

CPM Exercise

- **For the following table:**
  - Draw the network diagram
  - List the network paths
  - Determine the critical path
  - Determine the float of each activity

Activity	Duration (Days)	Dependency	Float
Start	0	-	
A	8	Start	
B	5	A	
C	6	B, H	
D	8	C	
E	9	D, F	
F	3	C, I	
G	7	Start	
H	8	G	
I	9	H	
J	5	I	
K	2	J	
L	3	J	
Finish	0		

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Plan Cost Management

Plan Cost Management – Process

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Definition

Plan Cost Management is the process of defining **how** the project costs will be estimated, budgeted, managed, monitored, and controlled.

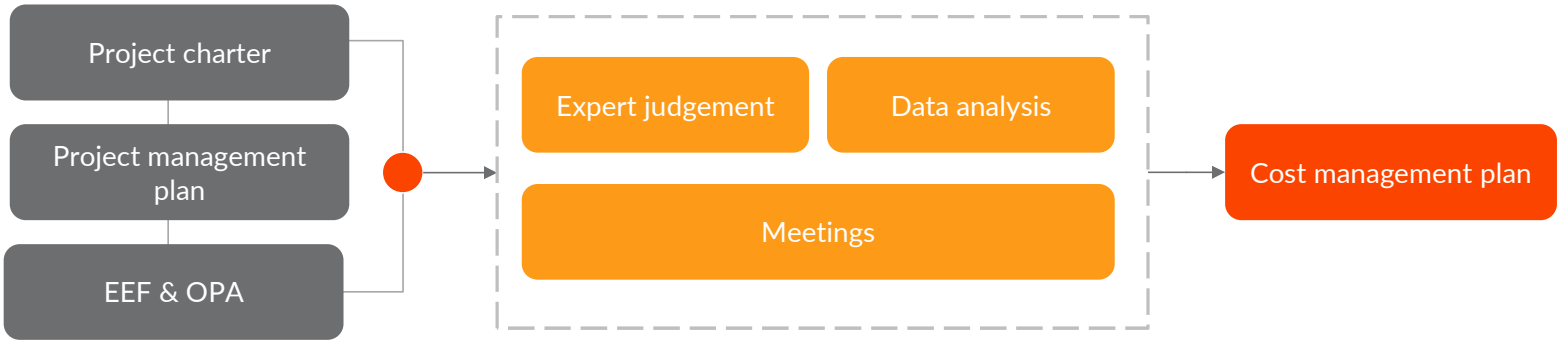
Benefit

It provides guidance and direction on how the project costs will be managed throughout the project.

Notes

- This process is performed once or at predefined points in the project.
- Units of measure.
- Level of accuracy.
- Rules of performance measurement; Control accounts, EVM (e.g., weighted milestones, fixed-formula, percent complete, etc.), Forecasts (FAC).

Plan Cost Management – Process



Inputs Tools & Techniques Key Outputs

Initiation | Planning | Executing | Monitoring & Controlling | Closing

Plan Cost Management – Process

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- The accuracy of a project estimate will increase as the project progresses through the project life cycle. For example, a project in the **initiation phase** may have a **rough order of magnitude (ROM)** estimate in the range of **−25% to +75%.**
- Later in the project, as more information is known, **definitive estimates** could narrow the range of accuracy to **−5% to +10%**

Plan Cost Management – Key Considerations

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- Primarily concerned with the cost of resources needed to complete project activities. It should consider the effect of project decisions on the subsequent recurring cost of using, maintaining & supporting the product, service or result of the project.
- Different stakeholders measure project cost in different ways & different times.
- Ex. Acquired item cost may be measured when ‘ acquisition decision / when committed / order placed / at delivery’
- In few organizations predicting and analyzing the prospective financial performance of the project’s product is performed outside the project, whereas in some organizations it is included in the project
- In case of inclusion , Project Cost management processes include RoI, DCF, and investment payback analysis

Plan Cost Management – Process

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- **Earned Value Management:** Does the organization use EVM ?
- **Use of Agile Approach:** Does the organization use agile methodologies in managing Projects. Projects with high degrees of uncertainty or those where the scope is not yet fully defined may not benefit from detailed cost calculations due to frequent changes
- Lightweight estimation methods can be used to generate a fast, high level forecast of project labor costs which can then be easily adjusted as changes arises

Plan Cost Management – Type of Costs

- **Variable Cost:** Costs that change with the amount of production or the amount of work. (material, wages etc.)
- **Fixed Cost:** Costs that do not change as production changes (setup , rent ,etc.)
- **Direct Cost:** Costs that are directly attributable to the work on the Project. (Cost of material, travel, recognition etc.)
- **Indirect Cost:** Overhead costs incurred for the benefit of more than One project. (taxes, fringe benefits etc.)

Plan Cost Management – Terminologies

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- **Purchase Value:** The initial cost to purchase the resources (or equipment)
- **Salvage Value:** The scrap value of the resources (or equipment) at the end of project
- **Depreciation:** Lost value over time i.e. (Purchase Value – Salvage Value)
- **Accounting for Depreciation:**
  - Straight Line depreciation - The same amount of depreciation is accounted each year
  - Accelerated depreciation (faster than straight line), predefined slope

Plan Cost Management– Agile Considerations

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In Agile environments, cost management is more adaptive and iterative compared to traditional project management. Here are some key Agile considerations:

- **Iterative Budgeting**: Agile projects often use iterative budgeting, where costs are estimated and adjusted at the end of each iteration or sprint.
- **Value-Driven Delivery:** Focus on delivering the highest value features first, which helps in better allocation of budget and resources.
- **Frequent Reviews:** Regular reviews and retrospectives help in monitoring costs and making necessary adjustments promptly.
- **Flexible Scope:** Agile projects allow for scope flexibility, which can impact cost management. The scope is adjusted based on the budget and time constraints.
- **Collaborative Estimation:** Cost estimation is often a collaborative effort involving the entire team, ensuring more accurate and realistic estimates.
- **Minimal Viable Product (MVP):** Emphasis on developing an MVP helps in controlling costs by focusing on essential features first.

Processes and Key Outputs

PG	Process Name	Key Outputs
Project Initiating	**Develop Project Charter**	• Project charter
	Identify Stakeholders	• Stakeholders register
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	Define Scope	• Project scope statement
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	Sequence Activities	• Project schedule network diagrams
	Estimate Activity Durations	• Duration estimates • Basis of estimates
	Develop Schedule	• Schedule baseline • Project schedule • Schedule data • Project calendars

PG	Process Name	Key Outputs
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	Estimate Costs	• Cost estimates • Basis of estimates
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	Plan Risk Management	• Risk management plan
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	Perform Qualitative Risk Analysis	• Project documents updates
	Perform Quantitative Risk Analysis	• Project documents updates
	Plan Risk Responses	• Change requests

Estimate Costs

Estimate Cost – Process

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Definition

Estimate Costs is the process of developing an **approximation of the cost** of resources needed to complete project work.

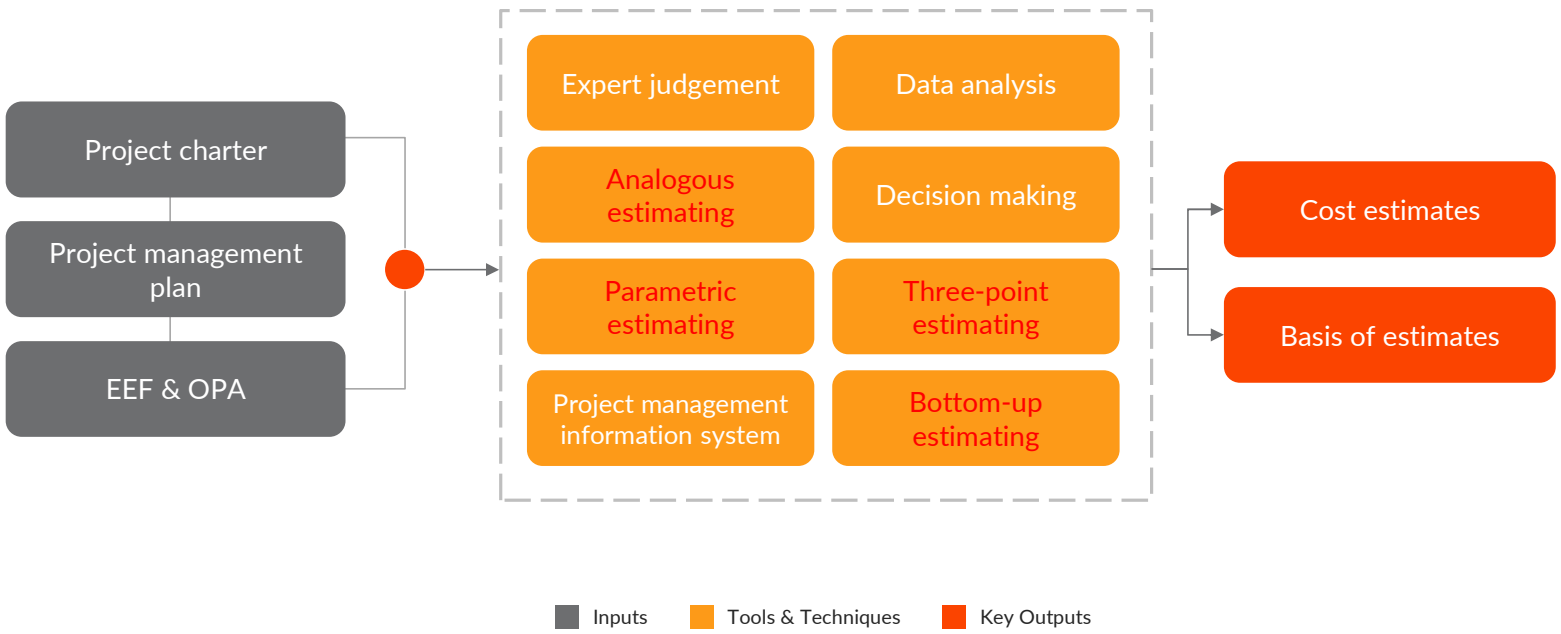
Benefit

It determines the monetary resources required for the project.

Notes

- This process is performed periodically throughout the project as needed.
- A cost estimate is a quantitative assessment.
- The accuracy of a project estimate will increase as the project progresses through the project life cycle.

Estimate Cost – Process



Initiation | **Planning** | Executing | Monitoring & Controlling | Closing

Estimate Cost – Process

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- Estimating Costs includes identifying and considering various costing alternatives
- Cost estimates are generally expressed in units of currency to facilitate comparisons both within and across projects
- The accuracy of the project estimate will increase as the project progresses through the project life cycle
- A schedule activity cost estimate is a quantitative assessment of the likely costs of the resources required to complete the schedule activity.

• (including **Labor, Material, Equipment, Services and facilities** and in cases Inflation **allowance / contingency cost**)

Estimate Cost – Tools & Techniques

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Estimating Technique	Description	Advantages	Disadvantages	Use Cases
Analogous Estimating	Uses historical data from similar projects to estimate costs and durations.	- Quick and easy to use - Useful when limited information is available	- Less accurate - Relies on the similarity of past projects	- Early project phases - High-level estimates
Parametric Estimating	Uses statistical relationships between historical data and other variables.	- More accurate than analogous - Can be applied to parts of a project	- Requires reliable historical data - May not account for unique project conditions	- Detailed estimates - Projects with quantifiable parameters
Bottom-Up Estimating	Estimates costs and durations by aggregating the estimates of individual tasks.	- Highly accurate - Provides detailed insights into project components	- Time-consuming - Requires detailed project information	- Detailed project planning - Complex projects
Three-Point Estimating	Uses optimistic, pessimistic, and most likely estimates to calculate an average.	- Accounts for uncertainty - Provides a range of possible outcomes	- More complex to calculate - Requires expert judgment	- Risk management - Projects with high uncertainty
Expert Judgment	Relies on the expertise and experience of professionals to estimate costs and durations.	- Leverages specialized knowledge - Can be quick and flexible	- Subjective - May be biased or inconsistent	- Unique or innovative projects - When historical data is not available
Data Analysis	Uses various data analysis techniques such as reserve analysis and cost of quality.	- Provides detailed insights - Can improve accuracy and reliability	- Requires detailed data - Can be complex to perform	- Detailed cost and schedule analysis - Projects with significant data availability

Estimate Cost – Process

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- **Activity Cost Estimates:** Quantitative assessments of the probable costs required to complete project work. Costs are estimated for all resources that are applied to the activity cost estimate.
- If the indirect costs are included in the project estimate, can be included at the activity level or at higher levels.
- **Basis of Estimates:** The amount and type of additional details supporting the cost estimate vary by application area. Supporting document should be provide a clear and complete understanding of how the cost estimate was derived.
- **How it was developed?, Assumptions made, Known constraints, Range of estimates, Confidence level of final estimate**

Estimate Cost – Agile Considerations

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In Agile environments, cost estimation is more flexible and iterative compared to traditional project management. Here are some key Agile considerations:

- **Iterative Estimation**: Costs are estimated iteratively at the end of each sprint or iteration, allowing for adjustments based on actual progress and changes.
- **Time and Effort Correlation:** Since cost is closely linked to time and effort, Agile teams often estimate costs based on the time required to complete user stories or tasks.
- **Historical Data Utilization:** Agile teams use historical data and lessons learned from previous iterations to refine cost estimates.
- **Collaborative Estimation:** Cost estimation is a collaborative effort involving the entire team, ensuring more accurate and realistic estimates.
- **Frequent Reviews and Adjustments:** Regular reviews and retrospectives help in monitoring costs and making necessary adjustments promptly.
- **Value-Driven Prioritization:** Focus on delivering the highest value features first, which helps in better allocation of budget and resources.

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Determine Budget

Determine Budget – Process

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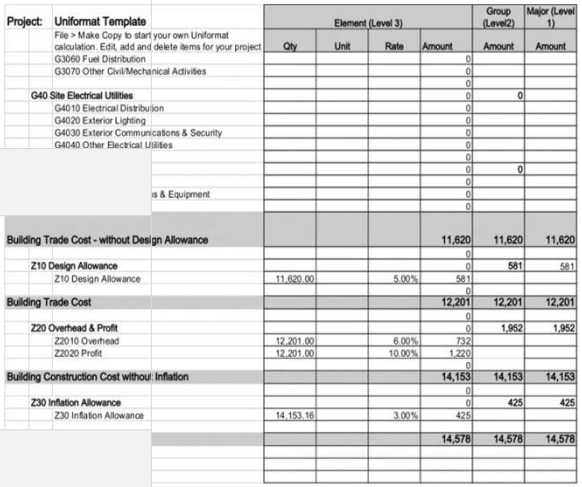
Definition

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



Project:	Uniformat Template File > Make Copy to start your own Uniformat calculation. Edit, add and delete items for your project	Element (Level 3) Qty	Unit	Rate	Amount	Group (Level2) Amount	Major (Level 1) Amount
	G3060 Fuel Distribution				0		
	G3070 Other Civil/Mechanical Activities				0		
					0		
	G40 Site Electrical Utilities				0	0	
	G4010 Electrical Distribution				0		
	G4020 Exterior Lighting				0		
	G4030 Exterior Communications & Security				0		
	G4040 Other Electrical Utilities				0		
					0		
					0	0	
					0		
	s & Equipment				0		
					0		
	Building Trade Cost - without Design Allowance				11,620	11,620	11,620
					0		
	Z10 Design Allowance				0	581	581
	Z10 Design Allowance	11,620.00		5.00%	581		
	Building Trade Cost				12,201	12,201	12,201
					0		
	Z20 Overhead & Profit				0	1,952	1,952
	Z2010 Overhead	12,201.00		6.00%	732		
	Z2020 Profit	12,201.00		10.00%	1,220		
					0		
	Building Construction Cost without Inflation				14,153	14,153	14,153
					0		
	Z30 Inflation Allowance				0	425	425
	Z30 Inflation Allowance	14,153.16		3.00%	425		
					14,578	14,578	14,578

Benefit

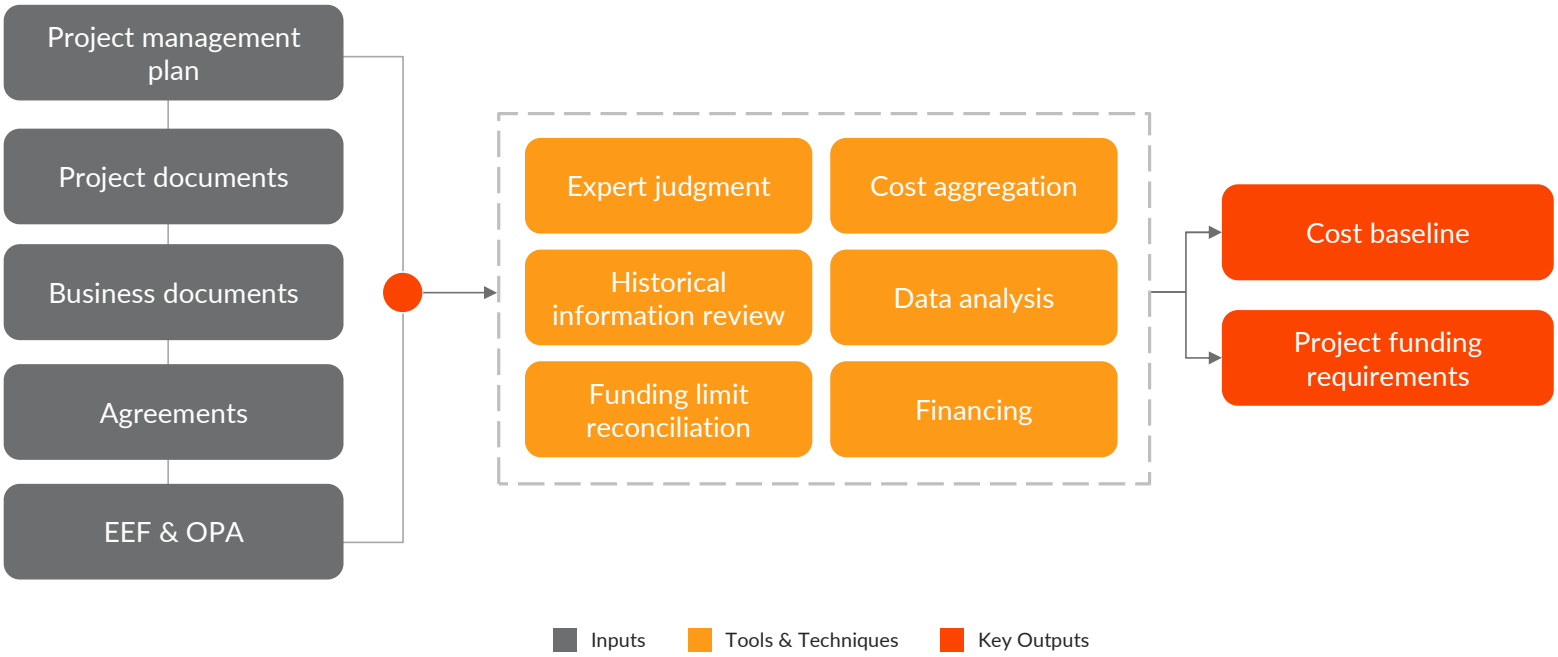
It determines the cost baseline against which project performance can be monitored and controlled.

Notes

- This process is performed once or at predefined points in the project.
- A project budget includes all the funds authorized to execute the project.
- The cost baseline is the approved version of the time-phased project budget that includes contingency reserves but excludes management reserves.

A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) Sixth Edition, Project Management Institute Inc., 2013.

Determine Budget – Process



Initiation | **Planning** | Executing | Monitoring & Controlling | Closing

Determine Budget – Tools & Techniques

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- **Cost Aggregation:** Schedule activity cost estimates are aggregated by work packages in accordance with the WBS. The work package cost estimates are then aggregated for the higher component levels of WBS, such as **control accounts** and ultimately for the entire project.
- **Reserve Analysis:** Management reserves used for "Unknown-Unknowns" and PM must obtain approval before obligating this reserve. **Management reserves are not part of the project cost base-line but are included in the budget for the project. They are not distributed as budget and therefore not part of the EVA.**
- **Funding Limit Reconciliation:** The expenditure of funds is reconciled with funding limits. Reconciliation necessitate the scheduling of work to be adjusted to regulate the expenditures. **This is typically accomplished by placing imposed date constraints for some "work packages, schedule milestones, or WBS components" into the project schedule.**

Determine Budget – Budget Components

Control Accounts (CAs): These are management control points where scope, budget, actual cost, and schedule are integrated and compared to earned value for performance measurement.

Work Packages: The lowest level of the Work Breakdown Structure (WBS) where cost and duration can be estimated and managed.

Planning Packages: WBS components below the control account but above the work package with known work content but without detailed schedule activities.

Contingency Reserve (CR): Budget allocated for identified risks that are accepted and for which contingent or mitigating responses are developed. It can be allocated at the control account, work package, or planning package levels.

Undistributed Budget (UB): Budget associated with project scope that has not yet been linked to specific control accounts or work packages. It is often held for future distribution as the project progresses.

Management Reserve (MR): Budget set aside for unforeseen work that is within the scope of the project. It is not included in the PMB and is controlled by management.

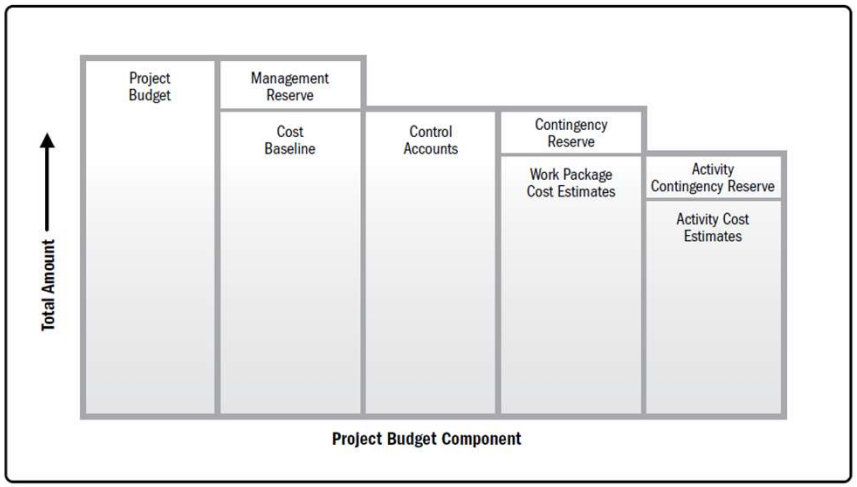

Figure 7-8. Project Budget Components

Determine Budget – Agile Considerations

In Agile environments, the approach to budgeting is more flexible and iterative compared to traditional project management. Here are some key Agile considerations:

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Plan Quality Management

Project Quality Management – Concepts

- Quality **is "the degree to which a set of inherent characteristics fulfill requirements" (ISO 9000[18])**
- Project Quality Management includes the processes for incorporating the organization's quality policy regarding planning, Managing and controlling project & product quality requirements in order to meet stakeholder's objectives
- Project Quality Management also supports continuous process Improvement activities as undertaken on behalf of the performing organization

Plan Quality Management – Concepts

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- Project Quality management addresses the management of the project & the deliverables of the project
- It applies to ALL the projects, irrespective of nature of their deliverables
- Quality measures and techniques are specific to the type of deliverables being produced by the project
- Failure to quality requirements can have serious negative consequences for any or all of the project stakeholders

• Example

1. Meeting customer requirements by overworking the project team may result in decreased project profits & increased levels of project risks, employee attrition, errors, rework etc.
2. Meeting project schedule objectives by rushing planned quality inspections may result in undetected errors, decreased profits, increased post implementation risks

Project Quality Management – Concepts

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- Quality: The degree to which a set of inherent characteristics fulfill requirements
- Grade: Category assigned to products or services having the same functional use but different technical characteristics.
- Prevention: Keeping error out of process
- Inspection: Keeping error out of the hands of customer
- Tolerances: Specified range of acceptable results
- Control limits: Identify the boundaries of common variation in a statistically stable process or process performance
- Attribute sampling: Result either conforms OR does not conform
- Variable sampling: Result is rated over continuous scale of degree of conformity

Project Quality Management – Concepts

- Modern quality management approaches seek to minimize variation and to deliver results that meet identified stakeholder requirements
- Customer Satisfaction: Understand, Evaluate, Define & Manage Requirements
- Continual Improvement: Plan - Do - Check - Act
- Management Responsibility: Responsibility to provide suitable resources at adequate capacities
- Mutually beneficial partnership with suppliers: Relationships based on partnership and cooperation with the supplier are more beneficial to the organization and to the suppliers than traditional supplier management

Project Quality Management – Considerations

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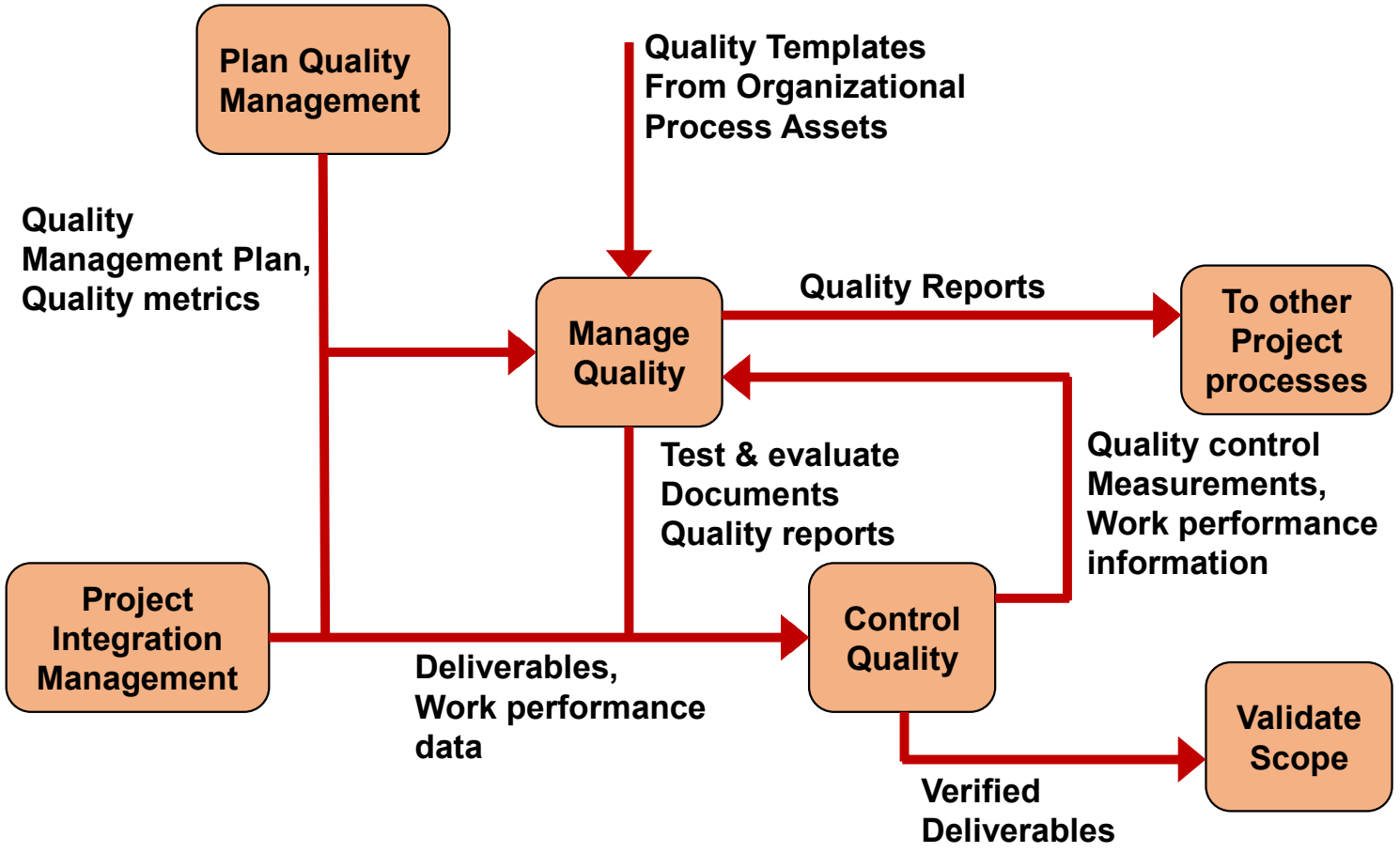
- Policy Compliance & Auditing: What quality policies & procedures exists in org.? What quality tools, techniques, templates are used in organization?
- Standards & Regulatory Compliance: Any specific quality standards that need to be applied? Any specific governmental, legal or regulatory constraints ?
- Continuous Improvement: How quality improvement will be managed in project?
- Stakeholder Engagement: Is there a collaborative environment for stakeholders and suppliers?
- Agile Considerations:
  - Frequent quality and review steps built in throughout the project
  - Recurring retrospective regularly check on the effectiveness of quality processes
  - Small batch systems of agile aim to uncover inconsistencies & quality issues earlier in the project life cycle when the overall costs of change are lower

Project Quality Management – Process flow



Project Quality Management – Concepts

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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.

Prevention is preferred over inspection. It is better to design quality into deliverables, rather than to find quality issues during inspection.
The cost of preventing mistakes is generally much less than the cost of correcting mistakes when they are found by inspection or during usage.

Project Quality Management – Concepts

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Project Quality Management – Concepts

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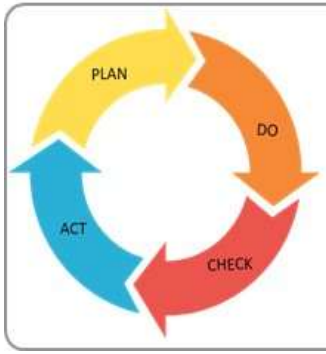
Total Quality Management (TQM)

An integrated management philosophy around quality and continuous improvement.

Kaizen (change for better)

A philosophy that looks for small and continuous improvements in the 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).

Plan Quality Management – Process

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Definition

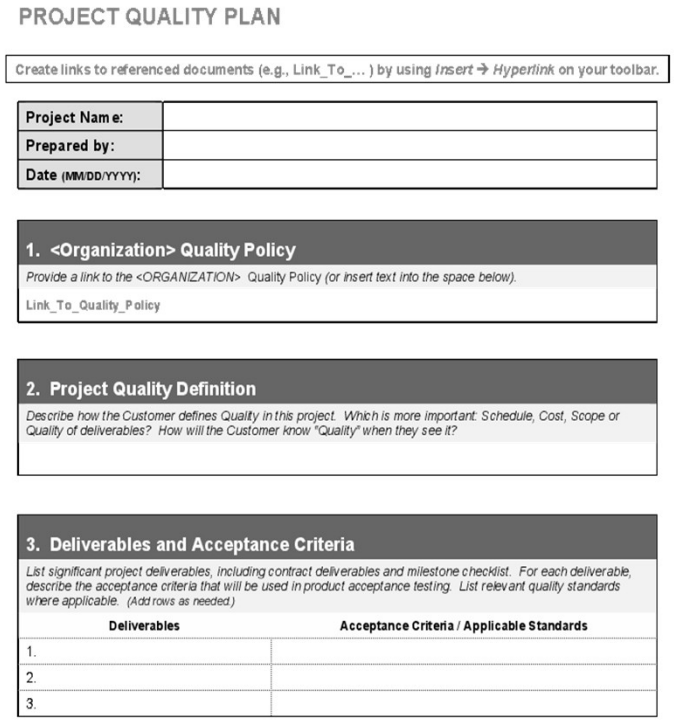
Plan Quality Management is the process of **identifying quality requirements** and/or standards for the project and its deliverables.

Benefit

It provides guidance and direction on how quality will be managed and verified throughout the project.

Notes

- This process is performed once or at predefined points in the project.
- Quality planning should be performed in parallel with the other planning processes.



PROJECT QUALITY PLAN

Create links to referenced documents (e.g., Link_To_...) by using *Insert → Hyperlink* on your toolbar.

Project Name:	
Prepared by:	
Date (MM/DD/YYYY):	

1. <Organization> Quality Policy

Provide a link to the <ORGANIZATION> Quality Policy *(or insert text into the space below).*

Link_To_Quality_Policy

2. Project Quality Definition

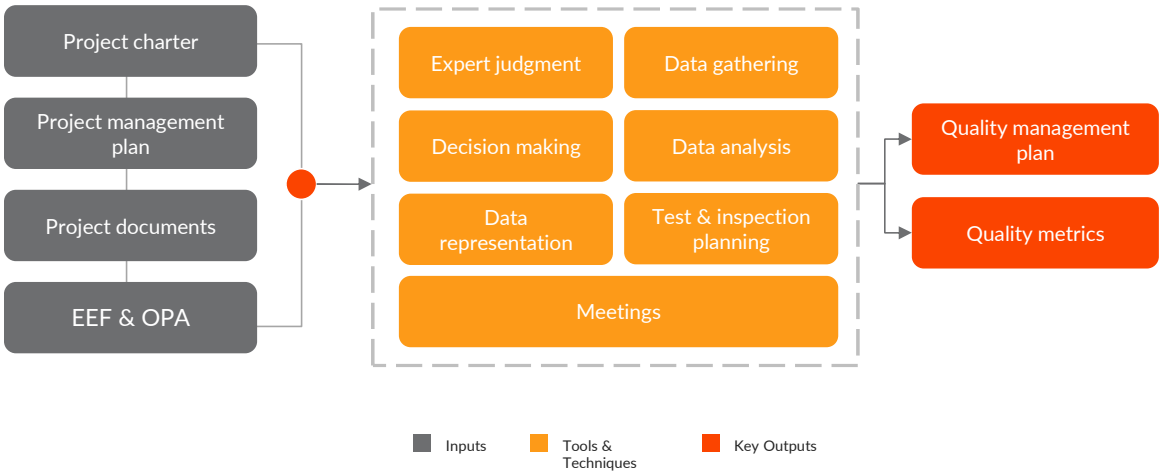
Describe how the Customer defines Quality in this project. Which is more important: Schedule, Cost, Scope or Quality of deliverables? How will the Customer know "Quality" when they see it?

3. Deliverables and Acceptance Criteria

List significant project deliverables, including contract deliverables and milestone checklist. For each deliverable, describe the acceptance criteria that will be used in product acceptance testing. List relevant quality standards where applicable. (Add rows as needed.)

Deliverables	Acceptance Criteria / Applicable Standards
1.	
2.	
3.	

Plan Quality Management – Process



Initiation | **Planning** | Executing | Monitoring & Controlling | Closing

Plan Quality Management – Tools & Techniques

- Data Gathering:
  - Brainstorming: Generating ideas and solutions through group discussions.
  - Interviews: Collecting information from stakeholders through direct conversations.
  - Checklists: Using predefined lists to ensure all aspects of quality are considered.
- Data Analysis:
  - Cost-Benefit Analysis: Comparing the costs and benefits of quality activities to determine the best approach.
  - Cost of Quality (COQ): Analyzing the costs associated with ensuring quality, including prevention, appraisal, and failure costs.
  - Decision Making:
  - Multicriteria Decision Analysis: Using a systematic approach to evaluate and prioritize different quality options based on multiple criteria.
- Data Representation:
  - Flowcharts: Visualizing processes to identify potential quality issues.
  - Logical Data Model: Representing data relationships to ensure data quality.
  - Matrix Diagrams: Displaying relationships between different quality factors.
  - Mind Mapping: Organizing information visually to explore quality requirements and solutions.
- Test and Inspection Planning: Defining how and when testing and inspections will be conducted to ensure quality standards are met.
- Meetings: Conducting discussions with stakeholders to gather input and make decisions regarding quality management.

Plan Quality Management – Key Outputs

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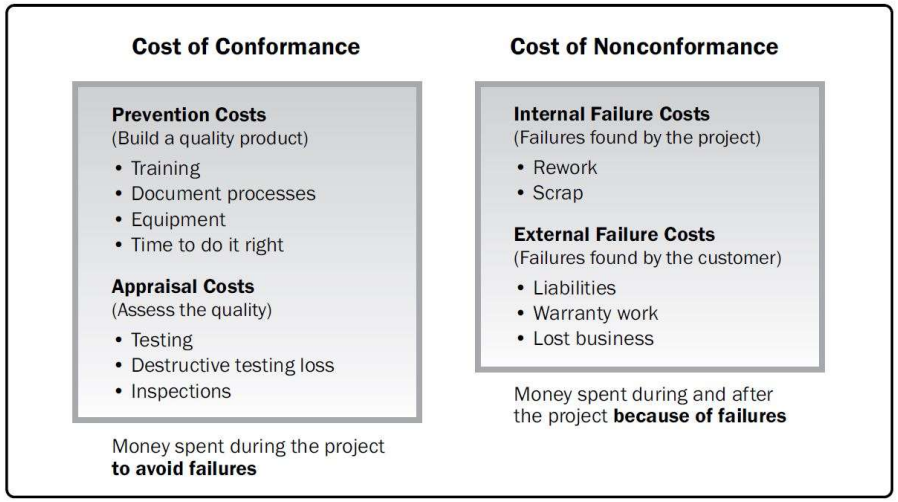
- Cost of quality: COQ associated with a project consists of one or more of the following costs
  - Prevention costs: costs related to the prevention of poor quality
  - Appraisal cost: costs related to evaluating, measuring, auditing, and testing the products.
  - Failure costs (internal/external). Costs related to nonconformance of the products, deliverables, or services to the needs or expectations of the stakeholders.
- Quality Metrics: Quality metrics specifically a project or product attribute and how the Control Quality process will verify compliance to it.
- Ex. " Percentage of task completion against time, cost performance measured by CPI, failure rate, defects identified per day, total down time, errors per lines of code, customer satisfaction scores, etc."



Plan Quality Management – Agile Considerations

- **Continuous Improvement:** Agile methodologies emphasize continuous improvement through regular retrospectives and feedback loops. Teams continuously assess and improve their processes and product quality.
- **Frequent Testing:** Agile projects incorporate frequent testing throughout the development cycle. This includes automated testing, unit testing, integration testing, and user acceptance testing to ensure high-quality deliverables.
- **Customer Collaboration:** Agile projects prioritize customer collaboration and feedback. Regular interactions with customers help ensure that the product meets their quality expectations and requirements.
- **Definition of Done (DoD):** Agile teams use a Definition of Done to ensure that all quality criteria are met before a user story or feature is considered complete. The DoD includes specific quality standards and testing requirements.
- **Iterative Development:** Agile projects use iterative development cycles (sprints) to deliver incremental value. Each iteration includes planning, development, testing, and review, allowing for continuous quality assessment and improvement.
- **Cross-Functional Teams:** Agile teams are cross-functional, meaning they include members with diverse skills and expertise. This diversity helps in identifying and addressing quality issues more effectively.
- **Adaptive Planning**: Agile projects use adaptive planning to respond to changes and new information. Quality management plans are updated iteratively based on feedback and evolving project requirements.

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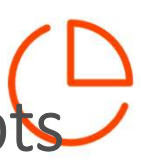
Plan Resource Management

Plan Resource Management – Key Concepts



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- There is a distinction between the skills and competencies needed for the Project Manager to manage team resources versus physical resources.
- Skills are specific, tangible abilities related to performing tasks, while competencies are broader and encompass a combination of skills, knowledge, behaviors, and personal qualities that contribute to overall effectiveness in a particular role
- Physical resources include “equipment, material, facilities and infrastructure”
- Team Resources or Personnel refer to Human Resources
- **There is some overlap between Project Resource Management & Project Stakeholder Management. Project resource management section focuses on the subset of stakeholders who makeup the project team**

Plan Resource Management – Key Concepts

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- The project manager should invest suitable efforts in Acquiring, Managing, Motivating, and Empowering the project team
- Although specific roles and responsibilities for the project team members are assigned, the involvement of all team members in project planning and decision making is beneficial
- Project Manager should be aware of different aspects that influence the team such as:
  - Team environments & geographical locations of team members
  - Communication among stakeholders
  - Organizational change management
  - Internal and external politics & Cultural issues organizational uniqueness
- Project manager is also responsible for proactively developing Team Skills and Competencies while retaining and improving team satisfaction and motivation

Plan Resource Management – Trends

- Resource Management Methods: Just in time (JIT), Total productive maintenance (TPM), Theory of Constraints (TOC) -> focuses on identifying and removing constraints that limit throughput etc.
- Emotional intelligence (EI): Improve inbound (self awareness, self management) and outbound (relationship management) competencies
- Self Organizing Teams: The increase in using agile approaches mainly for the Execution of IT projects has given rise to the self organizing team, where the team functions with an absence of centralize control. Somebody who performs a role of Project manager provides the team with environment and support needed and trusts the team to get the job done
- Virtual Teams / Distributed Teams: The globalization projects has created the need of having virtual teams that work on the same project but are not co-located at same site. Good communication technologies has made virtual team feasible. Unique advantage is being able to use special expertise on a project team even from different Location, work from home or people with mobility limitation – disabilities.

Plan Resource Management – Tailoring Considerations

- Project manager will need to tailor the way Project Resource Management processes are applied: Major considerations:
  - Diversity, Physical location
  - Industry specific resources, Acquisition of team members
  - Management of team, Life cycle approaches

- Considerations for Agile/ Adaptive Environment:
  - Projects with high variability benefit from focused team, collaboration such as Self organizing team with generalizing specialization. Collaboration is intended to boost productivity and facilitate innovative problem solving.
  - Collaborative teams are often critical to the success of projects with high degree of variability and rapid changes as there is less time for centralized tasking and decision making

Plan Resource Management – Terminologies

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- Colocation
- Communication technology
- Conflict management
- Decision making
- Emotional intelligence
- Influencing
- Interpersonal and team skills
- Leadership
- Motivation
- Negotiation
- Physical resource assignments
- Pre-assignment
- Project schedule
- Project team assignments
- Resource breakdown structure
- Resource calendars
- Resource requirements
- Resource management plan
- Stakeholder register
- Team building
- Team charter
- Virtual teams

Plan Resource Management – Process

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Definition

Plan Resource Management is the process of defining **how** to estimate, acquire, manage, and use team and physical resources.

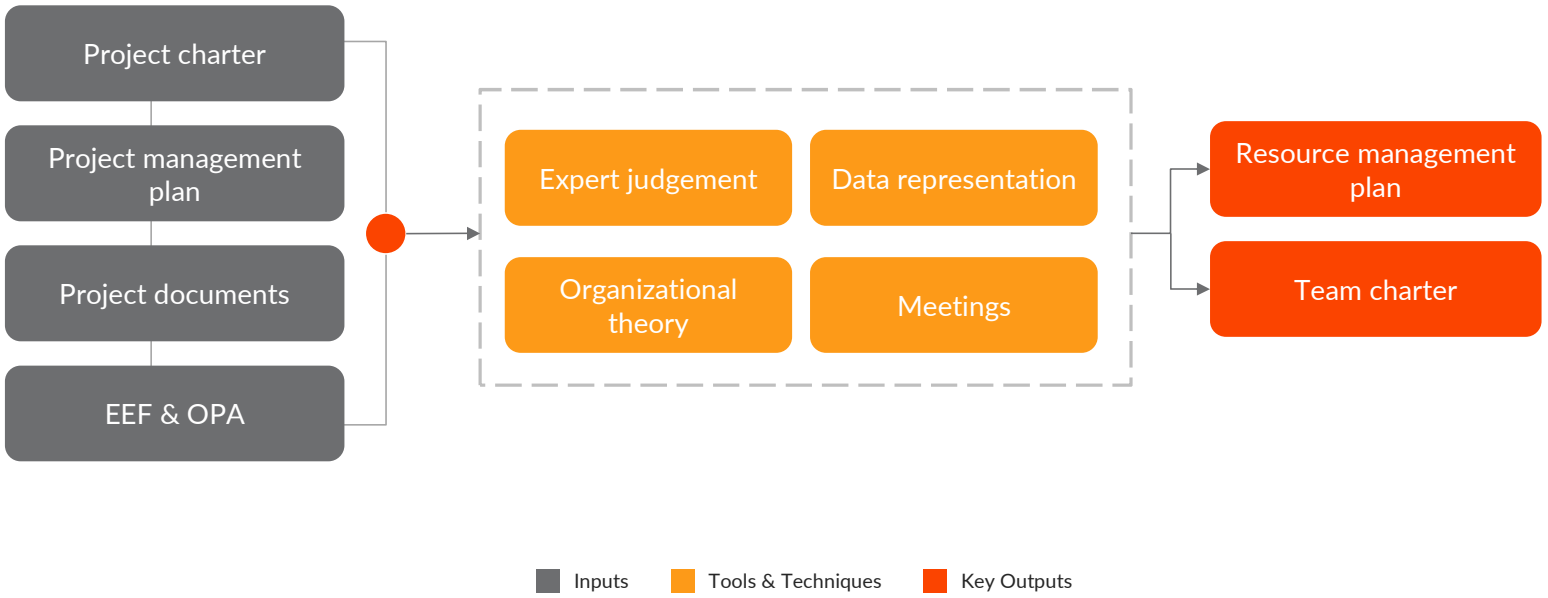
Benefit

Establishes the approach and level of management effort needed for managing project resources based on the type and complexity of the project.

Notes

- This process is performed once or at predefined points in the project.
- Resource planning is used to determine and identify an approach to ensure that sufficient resources are available for the successful completion of the project.
- Project resources may include team members, supplies, materials, equipment, services and facilities.
- Those resources can be obtained from the organization's internal assets or from outside the organization through a procurement process.

Plan Resource Management – Process



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Plan Resource Management – Process

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- Resource planning is used to determine and identify an approach to ensure that sufficient resources are available for the successful completion of the project
- Project resources may include , team members, supplies , materials , equipment, Services and facilities
- Those resources can be obtained from the organization's internal assets or from outside the organization through project procurement process
- Other projects may be competing for the same resources required for the project at the same time and location. This may significantly impact project costs, schedules, Risks, quality and other project areas

Plan Resource Management – Tools & Techniques

- **Data representation:** Various formats exist to document and communicate team member roles & responsibilities. Regardless of the methods used to document team member roles the objective is to ensure that each work package has an unambiguous owner and team members have clear understanding about their role & responsibilities
- **Hierarchical Charts:**
- Work Breakdown Structure
- Organizational Breakdown Structure - existing departments, units, or teams, with the project activities or work packages listed under each department
- Resource Breakdown Structure - hierarchical list of team and physical resources related by category and resource type that is used for planning, managing and controlling project work.

Plan Resource Management – Tools & Techniques

- **RAM - RACI (Responsible, Accountable, Consult, Inform)** is one of the example of RAM. The assigned resources can be individual resources or groups
- **Text Oriented Formats:** Team members responsibilities that require detailed descriptions can be specified in text oriented formats. Usually in the outline form with information like "responsibilities, authorities, competencies, and qualifications".
- **Organizational theory:** provides information regarding the way in which people, teams, and organizational units behave.
- **Team charter:** Document that establishes the team values, agreements, and operating guidelines for the team. The team charter may include **Team values, Communication guidelines, Decision-making criteria and process, Conflict resolution process, Meeting guidelines and Team agreements**. The team charter establishes clear expectations regarding acceptable behaviour by project team members.

Plan Resource Management – Tools & Techniques - RACI

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R: Responsible

A: Accountable

C: Consulted

I: Informed

Activity	Project Manager	Consultant	Architect	Contractor	Client
Determine useful and decorative needs	I	I	C	I	R
Risk Assessment	A	R	I	C	I
Characterize requirements	A	R	I	I	I
Make a Design	A	C	R	I	R
Start Construction	A	C	C	R	I
Construction Approval	I	I	C	C	R

Plan Resource Management – Content

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•**Identification of Resources**: Methods for identifying and quantifying team and physical resources needed for the project.
•**Acquiring Resources:** Guidance on how to acquire team and physical resources for the project.
•**Roles and Responsibilities:** Definition of the roles, responsibilities, and competencies required for the project team members.
•**Resource Calendars:** Information on when and for how long identified team and physical resources will be available during the project.
•**Staffing Management Plan:** Procedures for staff acquisition and mobilization, including staff release plans and training needs.
•**Team Development:** Strategies for developing the project team, including training, team-building activities, and performance assessments.
•**Resource Utilization:** Plans for how resources will be used throughout the project, including resource leveling and smoothing techniques.
•**Resource Control:** Methods for monitoring and controlling resource usage to ensure that the project stays on track.
•**Competency and Training Needs:** Identification of any additional skills or training required for team members to perform their roles effectively.

Team Charter

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Team Charter is a document that establishes the team values, agreements and operating guidelines for the team. The Team Charter may include but is not limited to:

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

Motivation Theories

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- Motivation is one of the most important factor to generate a team spirit and enhance the efficiency of individual as well as of team.
- It is also important to understand that along with 'Motivation' the care must be taken that team members are not getting 'De-motivated'.
- Project manager should know following theories to develop and **manage Project Team**:

1. Maslow's theory
2. Herzberg's Satisfiers and Dis-satisfiers
3. McGregor's Theory X and Theory Y

Plan Resource Management – Organizational Theories

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Theory/Model	Description	Key Concepts
Maslow's Hierarchy of Needs	A motivational theory proposing that people are motivated by five levels of needs, which are structured in a hierarchy. Lower-level needs must be satisfied before higher-level needs can become motivators.	- **Physiological Needs**: Basic survival needs like food and shelter. - **Safety Needs**: Security and protection from harm. - **Social Needs**: Relationships, love, and belonging. - **Esteem Needs**: Respect, self-esteem, and recognition. - **Self-Actualization**: Realizing personal potential and self-fulfillment.
Herzberg's Two-Factor Theory	A theory that identifies two sets of factors that influence job satisfaction and motivation: hygiene factors and motivators.	- **Hygiene Factors**: Elements that can cause dissatisfaction if missing but do not necessarily motivate if increased (e.g., salary, company policies, working conditions). - **Motivators**: Factors that truly motivate employees, leading to higher satisfaction and performance (e.g., achievement, recognition, the work itself, responsibility, advancement).
McGregor's Theory X and Theory Y	A theory that describes two contrasting views of workers and their motivations.	- **Theory X**: Assumes that employees are inherently lazy, dislike work, and must be coerced or controlled to achieve organizational goals. - **Theory Y**: Assumes that employees are self-motivated, seek responsibility, and can be creative and committed to organizational objectives if properly motivated.

Plan Resource Management – Agile Consideration

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- A **self-organizing team** is a team where team members get to decide among themselves who does what; the team gets to work on problems and have some power to remove their own blockages. Clearly, there are teams who are more self-organizing than others and teams which have more authority than others

1. Higher speed
2. Extreme agility
3. Increased quality / customer focus
4. Less need for team management
5. True teams v/s hidden managers
6. Increased employee satisfaction

Processes and Key Outputs

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	Define Activities	• Activity list • Activity attributes • Milestone list
	Sequence Activities	• Project schedule network diagrams
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	Estimate Activity Resources	• Resource requirements • Basis of estimates • Resource breakdown structure
	Plan Communications Management	• Communications management plan
	Plan Risk Management	• Risk management plan
	Identify Risks	• Risk register • Risk report
	Perform Qualitative Risk Analysis	• Project documents updates
	Perform Quantitative Risk Analysis	• Project documents updates
	Plan Risk Responses	• Change requests

Estimate Activity Resources

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Estimate Activity Resources - Process

Definition

The process of **estimating** team resources and the type and quantities of materials, equipment, and supplies necessary to perform project work.

Benefit

Identifies the type, quantity, and characteristics of resources required to complete the project.

Notes

- This process is performed periodically.
- Resource breakdown structure. a hierarchical representation of resources by category and type.

Estimate Activity Resources - Process

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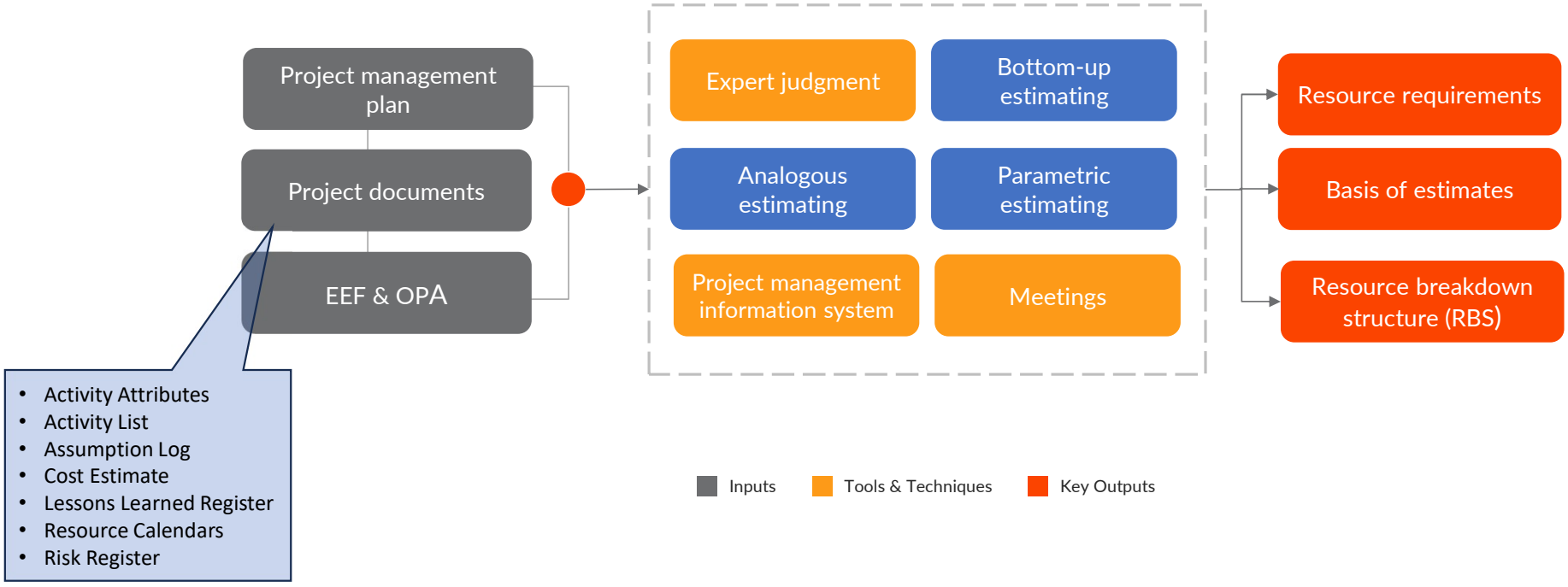

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Estimate Activity Resources – Key Inputs

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- **Resource calendars:** identifies the working days, shifts, start and end of normal business hours, weekends, and public holidays when each specific resource is available. Information on which resources (such as team resource, equipment, and material) are potentially available during a planned activity period is used for estimating resource utilization. Resource calendars also specify when, and for how long, identified team and physical resources will be available during the project.
- **Alternatives analysis:** assists in providing the best solution to perform the project activities, within the defined constraints.

Estimate Activity Resources – Key Outputs

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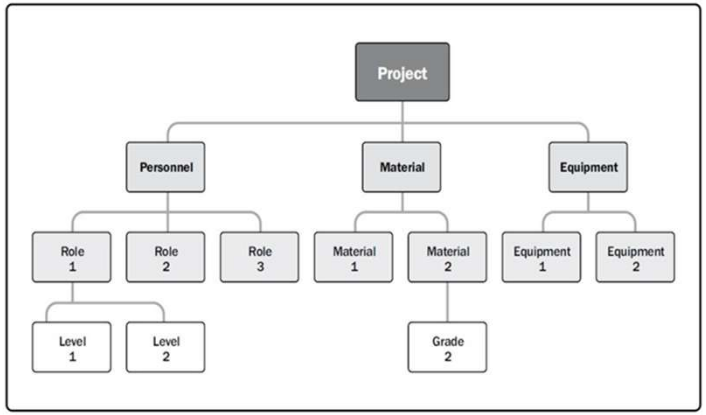
- **Resource requirements:** the types and quantities of resources required for each work package or activity in a work package and can be aggregated to determine the estimated resources for each work package, each WBS branch, and the project as a whole.
- **Basis of estimates:** The amount and type of additional details supporting the resource estimate vary by application area. Supporting detail for resource estimates may include:
  - Method used to develop the estimate,
  - Resources used to develop the estimate (such as information from previous similar projects),
  - Assumptions associated with the estimate,
  - Known constraints,
  - Range of estimates,
  - Confidence level of the estimate, and
  - Documentation of identified risks influencing the estimate.



- **Resource Breakdown Structure:**

A Resource Breakdown Structure (RBS) is a hierarchical chart that categorizes all the resources required for a project. It helps project managers organize and manage resources effectively by breaking them down into categories and types.

Estimate Activity Resources – Agile Considerations

- **Iterative Planning**:
  - Resource estimation is done iteratively, typically at the beginning of each sprint or iteration.
  - Teams reassess resource needs based on the backlog and adjust estimates as new information becomes available.
- **Cross-Functional Teams:**
  - Agile teams are usually cross-functional, meaning they possess all the skills needed to complete tasks within the team.
  - Resource estimation focuses on the team as a whole rather than individual roles.
- **Time-Boxed Sprints:**
  - Resources are estimated based on the fixed duration of sprints (e.g., 2-4 weeks).
  - The team commits to completing a set amount of work within the sprint, making resource estimation more predictable.
- **Collaboration and Communication:**
  - Frequent communication and collaboration within the team help in accurately estimating resources.
  - Daily stand-ups and sprint planning meetings are used to discuss and adjust resource needs.
- **Use of Historical Data:**
  - Agile teams often use historical data from previous sprints to inform resource estimates.
  - Velocity (the amount of work completed in a sprint) is a key metric used for future planning.
- **Flexibility and Adaptability:**
  - Agile methodologies allow for changes in resource allocation as project requirements evolve.

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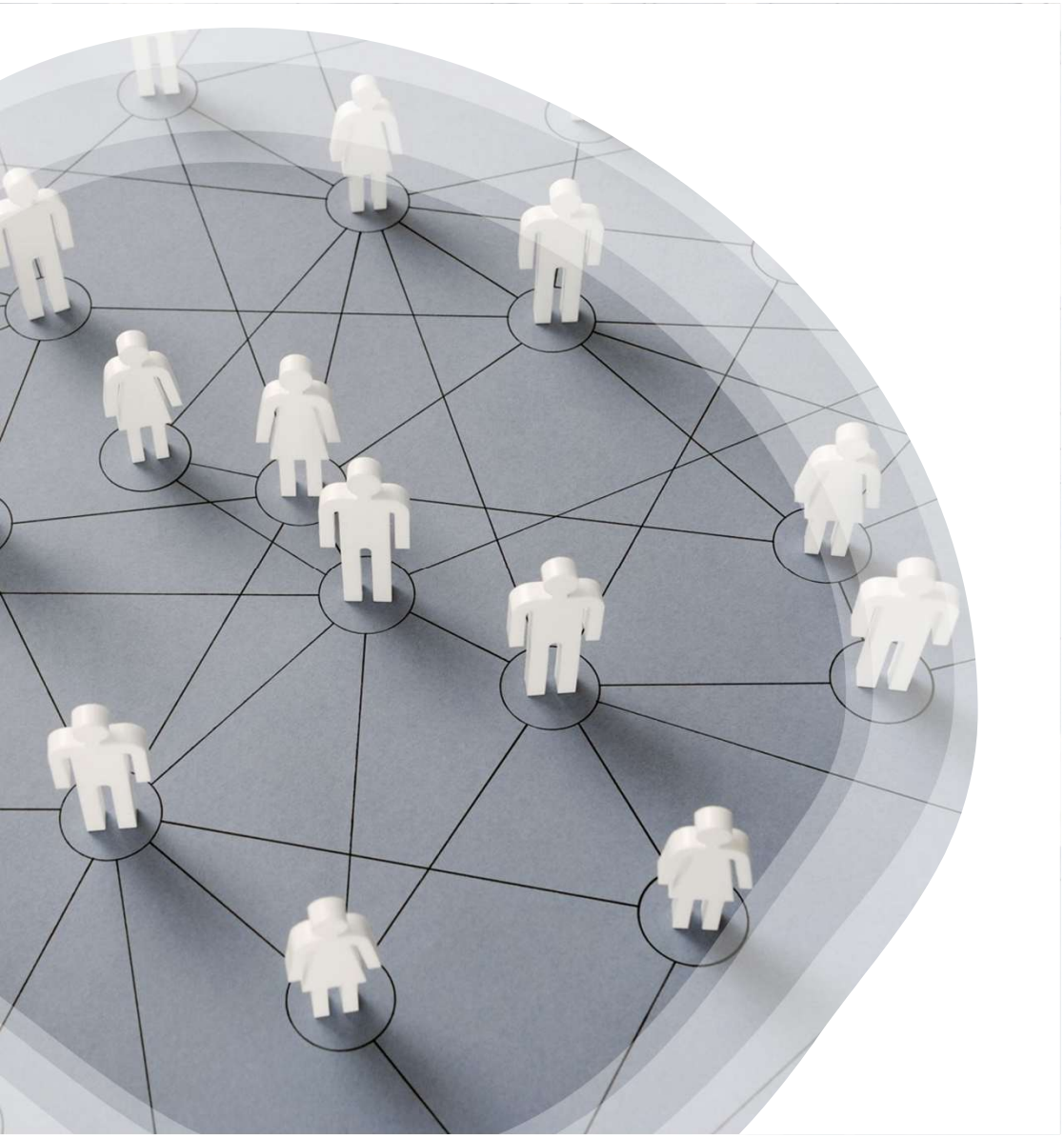

Plan Communications Management

Plan Communication Management – Concepts

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- Communications Management includes the processes required to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and the ultimate disposition of project information
- **Written Form:** Either physical or electronic
- **Spoken:** Either face to face or remote
- **Formal or Informal**
- **Through Gestures:** Tone of voice & facial expression
- **Through Media:** Pictures, actions, even just choice of words
- **Choice of Words:** Often more than one word to express an idea. Understand subtle differences in the meaning of each word/ phrase

Plan Communication Management – Concepts

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- **5 C's of Written Communication:**
- **C**orrect grammar & spelling
- **C**oncise expression & elimination of excess words
- **C**lear purpose and expression directed to the needs of the reader
- **C**oherent logical flow of ideas
- **C**ontrolling flow of words and ideas

- **Supported Communication Skills:**
  - Listening actively
  - Awareness of cultural and personal differences
  - Identifying, Setting, and managing stakeholder expectations
  - Enhancement of skills

Plan Communication Management – Concepts

- Inclusion of stakeholders in project reviews
- Inclusion of stakeholders in project meetings
- Increased use of social computing
- Multifaceted approaches to communication

Plan Communication Management – Concepts

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- **Stakeholders:** Internal – External ? Or both ?
- **Physical Location:** Co located ? Virtual teams ? Time zones ?
- **Communications Technology:** What technology is available to "develop, record, transmit, retrieve, track and store comm. artifacts?
- **Language:** Is one language used? Multi language requirement?
- **Knowledge Management:** Does the organization have a formal knowledge management repository ? Usable repository?

Plan Communication Management – Concepts

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- As the number of people involved in the communication increase, the number of communication channels increase geometrically.
- As the number of communication channels will increase, chances of different types of ‘noise’ / resistances affecting the communication efficiency are increased.
- Understand importance of Organization Structure, Reporting relationship , Work Authorization System etc.

Plan Communication Management – Terms

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- Active listening
- Communication competence
- Communication methods
- Communication models
- Communication requirements analysis
- Communication styles assessment
- Communication technology
- Communications management plan
- Conflict management
- Cultural awareness
- Data representation
- Feedback
- Interpersonal and team skills
- Meeting management
- Networking
- Nonverbal
- Observation/conversation
- Presentations
- Project communications

Plan Communication Management – Process

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Definition

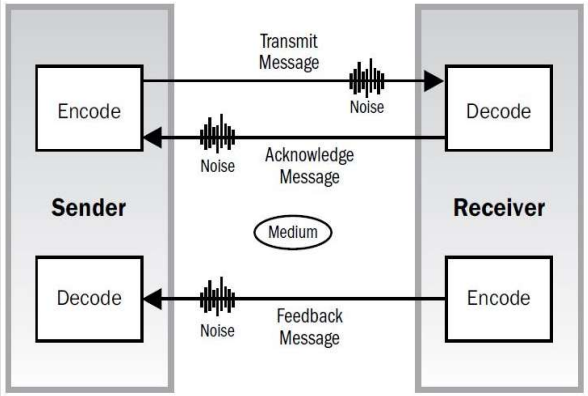
Plan Communications Management is the process of developing an appropriate **approach** and plan for project communications activities based on the information needs of each stakeholder or group, available organizational assets, and the needs of the project.

Benefit

Provides a documented approach to effectively and efficiently engage stakeholders by presenting relevant information in a timely manner.

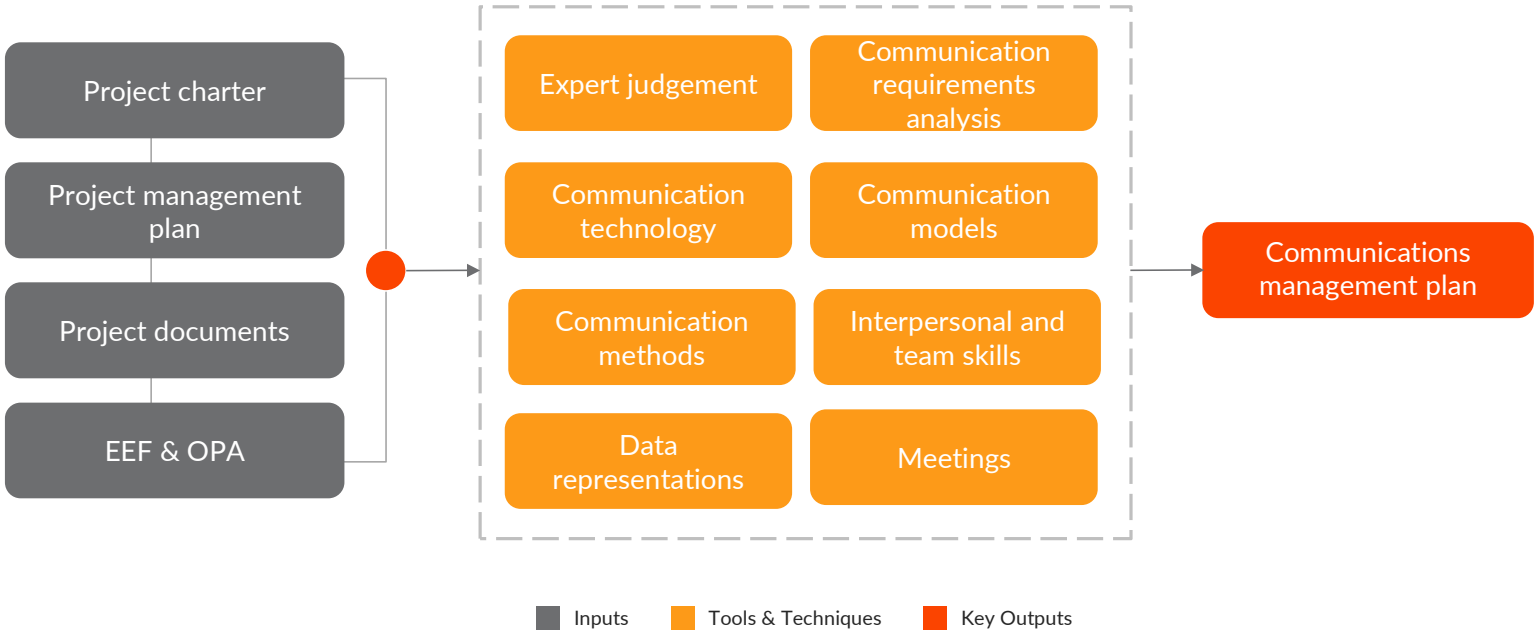
Notes

- This process is performed periodically throughout the project as needed.
- An effective communications management plan that recognizes the diverse information needs of the project's stakeholders is developed early in the project life cycle. It should be reviewed regularly and modified when necessary, when the stakeholder community changes or at the start of each new project phase.
- Communications planning is performed very early, during stakeholder identification and project management plan development.
- Techniques and considerations for effective communications management include sender-receiver models, choice of media, writing style, meeting management, presentations, facilitations and active listening.



A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition, Project Management Institute Inc., 2013.

Plan Communication Management – Process



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Plan Communication Management – Tools

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- **Communication requirements analysis** determines the information needs of the project stakeholders. These requirements are defined by combining the type and format of information needed with an analysis of the value of that information. Sources of information includes:
  - Stakeholder information and communication requirements
  - Number of potential communication channels or paths, including one-to-one, one-to-many, and many-to-many communications **(N (N-1) / 2)** ; where N is the number of stakeholders.
  - Organizational charts;
  - Project organization and stakeholder responsibility, relationships, and interdependencies;
  - Development approach;
  - Disciplines, departments, and specialties involved in the project;
  - Logistics of how many persons will be involved with the project and at which locations;
  - Internal information needs (e.g., when communicating within organizations);
  - External information needs (e.g., when communicating with the media, public, or contractors); and
  - Legal requirements

Plan Communication Management – Tools

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Communication methods: there are several communication methods that are used to share information among project stakeholders. These methods are broadly classified as follows:

- **Interactive communication**: between two or more parties performing a multidirectional exchange of information. It is the most efficient way to ensure a common understanding by all participants on specified topics, and includes meetings, phone calls, instant messaging, video conferencing, etc.
- **Push communication**: sent to specific recipients who need to receive the information. This ensures that the information is distributed but does not ensure that it actually reached or was understood by the intended audience. Push communications include letters, memos, reports, emails, faxes, voice mails, blogs, press releases, etc.
- **Pull communication**: used for very large volumes of information, or for very large audiences, and requires the recipients to access the communication content at their own discretion. These methods include intranet sites, e-learning, lessons learned databases, knowledge repositories, etc.

Communication technology: the methods used to transfer information among project stakeholders may vary significantly. Factors that can affect the choice of communication technology include: **Urgency of the need for information, Availability and reliability of technology, Ease of use, Project environment and Sensitivity and confidentiality of the information.**

Plan Communication Management – Key Output

Communications Management Plan: describes how project communications will be planned, structured, implemented, and monitored for effectiveness. The plan contains the following information:

- Stakeholder communication requirements;
- Information to be communicated, including language, format, content, and level of detail;
- Escalation processes;
- Reason for the distribution of that information;
- Timeframe and frequency for the distribution of required information and receipt of acknowledgment or response,
- Person responsible for communicating the information;
- Person responsible for authorizing release of confidential information;
- Person or groups who will receive the information,
- Methods or technologies used to convey the information, such as memos, email, press releases, or social media;
- Resources allocated for communication activities, including time and budget;
- Method for updating and refining the communications management plan
- Glossary of common terminology;
- Flow charts of the information flow in the project, workflows with possible sequence of authorization, list of reports, meeting plans, etc.

Plan Communication Management – Agile Considerations

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- Project environments subject to various elements of ambiguity and change have an inherent need to communicate evolving and emerging details more frequently and quickly
- This motivates streamlining team member access to information, frequent team checkpoints and co-locating team members as much as possible
- Posting project artifacts in a transparent fashion and holding regular stakeholder reviews are intended to promote communication with management & stakeholders.
- Information Radiators:
  - Burndown Chart: Shows how much work is yet to be completed.
  - Burnup Chart: Shows how much work has been completed.
  - Combined Burn Chart: Displays both completed work and remaining work.
  - Team Dashboard: Provides real-time, accurate information about the team's progress, enabling better decision-making and transparency.

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Plan Risk Management

Plan Risk Management – Definitions

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- Project Risk is an uncertain event or condition that, if it occurs, has a positive or a negative effect on at least one project objective - Scope, Schedule, Cost or Quality.
- Project Risk Management includes the processes of conducting risk management ‘Planning, Identification, Analysis, Response planning and Controlling risk on a project.
- The objectives of Project Risk Management are to increase the likelihood and impact of ‘positive events’ and decrease the likelihood and impact of ‘negative events’ in the project.

Plan Risk Management – Definitions

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- Different people & different organizations have different tolerances for risks, which depends on the 'Organizational strategies' / Capacity / Capabilities etc.
- Based on above features broadly organizations are differentiated into following three categories:
- **Risk Averse** : Limited Risk-taking capacities
- **Risk Neutral** : Take Risk only if proportionate to opportunities
- **Risk Seekers** : Take risk even if present opportunities are less, keeping in mind future business prospects.

Plan Risk Management – Concepts

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- Project Risk Management aims to **Identify and Manage Risks** that are not addressed by the other project management processes

Risks exists at two levels within every project:

1. **Individual Risks** that can affect the achievement of project objectives
2. **Riskiness of the overall project** - Risk arising from combination of individual project risks and other sources of uncertainty

- Risks will continue to emerge throughout project, so project risk Management processes are required to be used iteratively
- Project team needs to know **"Acceptable risk exposure through risk thresholds reflecting Risk Appetite"**

Plan Risk Management – Concepts

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- Integrated Risk Management: In an organization risk may exist at Project, Program, Portfolio level . Risk should be owned and managed at the appropriate level.
- A coordinated approach to enterprise-wide risk management ensures alignment and coherence in the way risk is managed across all levels
- Building risk efficiency into the structure of programs and portfolios providing the greatest overall value for a given level of risk exposure

Plan Risk Management – Concepts

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- **Project Size:** Budget, Schedule, Scope, Team size
- **Project Complexity:** Level of innovation, technology, ext. dependency
- **Project Importance:** Strategically importance of project
- **Development Approach:** Waterfall approach, Agile approach

Considerations for Agile: Frequent reviews of incremental work products and cross functional project teams to accelerate knowledge sharing and ensure that risk is understood and managed.

Requirements are kept as live document that is updated regularly and work may be reprioritized as the project progresses based on improved understanding of current risk exposure

Plan Risk Management – Terms

- Alternatives analysis
- Assessment of other risk parameters
- Assumption and constraint analysis
- Contingent response strategies
- Cost-benefit analysis
- Decision tree analysis
- Document analysis
- Hierarchical charts
- Influence diagrams
- Probability and impact matrix
- Prompt lists
- Representations of uncertainty
- Risk data quality assessment
- Risk management plan
- Risk probability and impact assessment
- Risk register
- Risk report
- Sensitivity analysis
- Simulations
- Strategies for opportunities
- Strategies for overall project risk
- Strategies for threats
- SWOT analysis

Plan Risk Management – Process

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Definition

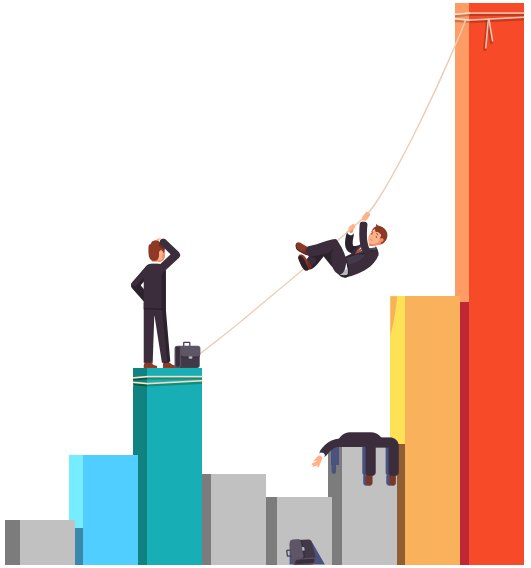
Plan Risk Management is the process of defining **how** to conduct risk management activities for a project.

Benefit

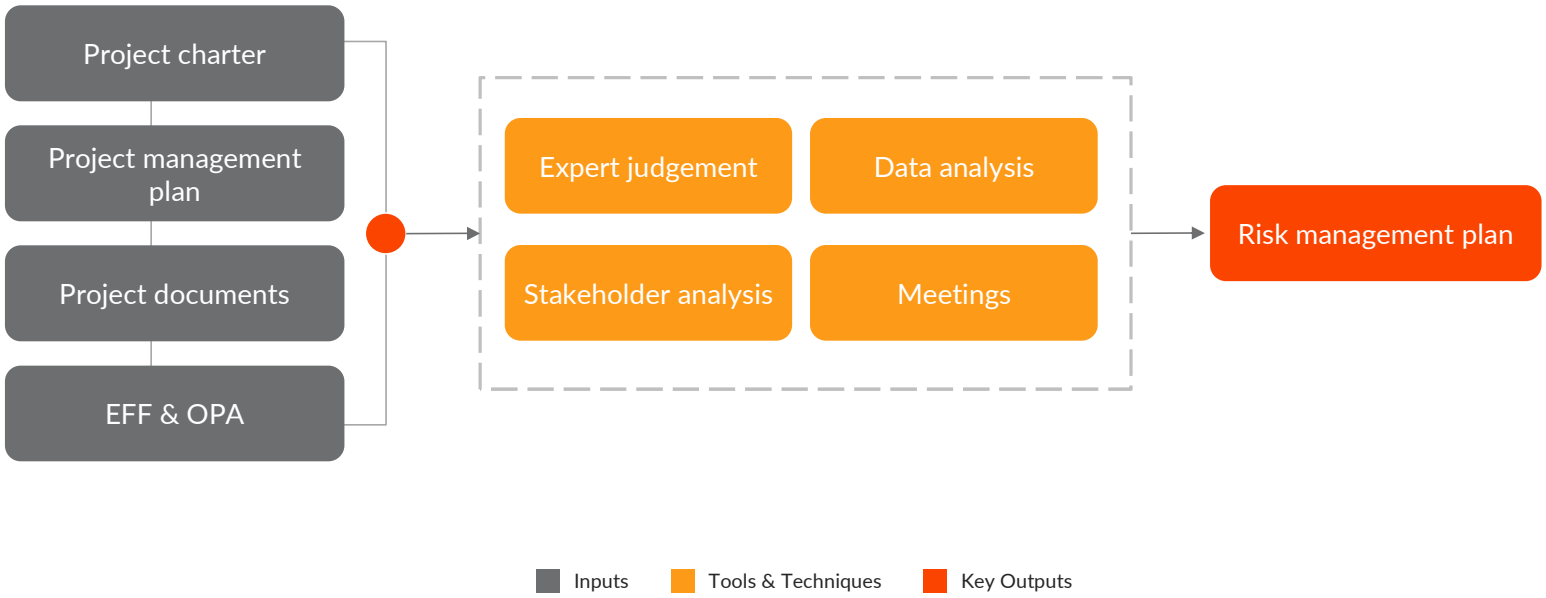
Ensures that the degree, type, and visibility of risk management are proportionate to both risks and the importance of the project to the organization and other stakeholders

Notes

- This process is performed once or at predefined points in the project.
- Risk exists at two levels within every project:
- Individual project risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives.
- Overall project risk is the effect of uncertainty on the project as a whole, arising from all sources of uncertainty including individual risks, representing the exposure of stakeholders to the implications of variations in project outcome, both positive and negative.



Plan Risk Management – Process



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Plan Risk Management – Tools & Techniques

- **Expert Judgment**: Leveraging expertise from individuals or groups with specialized knowledge in risk management to guide the planning process.
- **Data Analysis**:
  - **Stakeholder Analysis**: Identifying and analyzing stakeholders to understand their risk attitudes and tolerance levels.
- **Meetings**: Conducting meetings with project stakeholders to discuss and plan risk management activities.

Plan Risk Management – Output

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Risk management plan content: describes how risk management activities will be structured and performed. The risk management plan may include:

- **Risk strategy:** general approach to managing risk on this project.
- **Methodology:** defines the approaches, tools, and data sources that will be used to perform risk management on the project.
- **Roles and responsibilities:** defines the lead, support, and risk management team members for each type of activity in the risk management plan, and clarifies their responsibilities.
- **Funding:** identifies the funds needed to perform activities related to Project Risk Management. Establishes protocols for the application of contingency and management reserves.
- **Timing:** defines when and how often the risk management processes will be performed throughout the project life cycle, establishes protocols for application of schedule contingency reserves, and establishes risk management activities for inclusion in the project schedule.
- **Stakeholder risk appetite:** expressed as measurable risk thresholds around each project objective.
- **Revised stakeholders' tolerances.** Stakeholders' tolerances, as they apply to the specific project, may be revised in the Plan Risk Management process.

Plan Risk Management – Output cont.

- **Reporting formats.** Reporting formats define how the outcomes of the risk management process will be documented, analyzed, and communicated.
- **Tracking:** Tracking documents how risk activities will be recorded for the benefit of the current project and how risk management processes will be audited.
- **Risk categories:** Provide a means for grouping potential causes of risk. Several approaches can be used, for example, a structure based on project objectives by category. A risk breakdown structure (RBS) helps the project team to look at many sources from which project risk may arise in a risk identification exercise. The RBS is a hierarchical representation of risks according to their risk categories.
- **Probability and impact matrix:** a probability and impact matrix is a grid for mapping the probability of each risk occurrence and its impact on project objectives if that risk occurs. Risks are prioritized according to their potential implications for having an effect on the project's objectives. A typical approach to prioritizing risks is to use a look-up table or a probability and impact matrix.

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

A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition, Project Management Institute Inc., 2013.

Plan Risk Management – Agile Considerations

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- **Iterative Risk Identification**: Risks are identified continuously throughout the project. Each iteration or sprint includes a review of potential risks, allowing the team to address new risks as they arise.
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- **Cross-Functional Team Involvement:** Agile teams are cross-functional, meaning they include members with diverse skills and expertise. This diversity helps in identifying and addressing risks more effectively.
- **Adaptive Planning:** Agile projects use adaptive planning to respond to changes and new information. Risk management plans are updated iteratively based on feedback and evolving project requirements.
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- **Risk Burndown Charts:** Similar to burndown charts for tracking work progress, risk burndown charts can be used to track the mitigation of risks over time. This visual tool helps the team see how effectively they are managing risks.

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Identify Risks

Identify Risks – Process

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Definition

The process of **identifying individual** project risks as well as sources of **overall** project risk, and documenting their characteristics.

Benefit

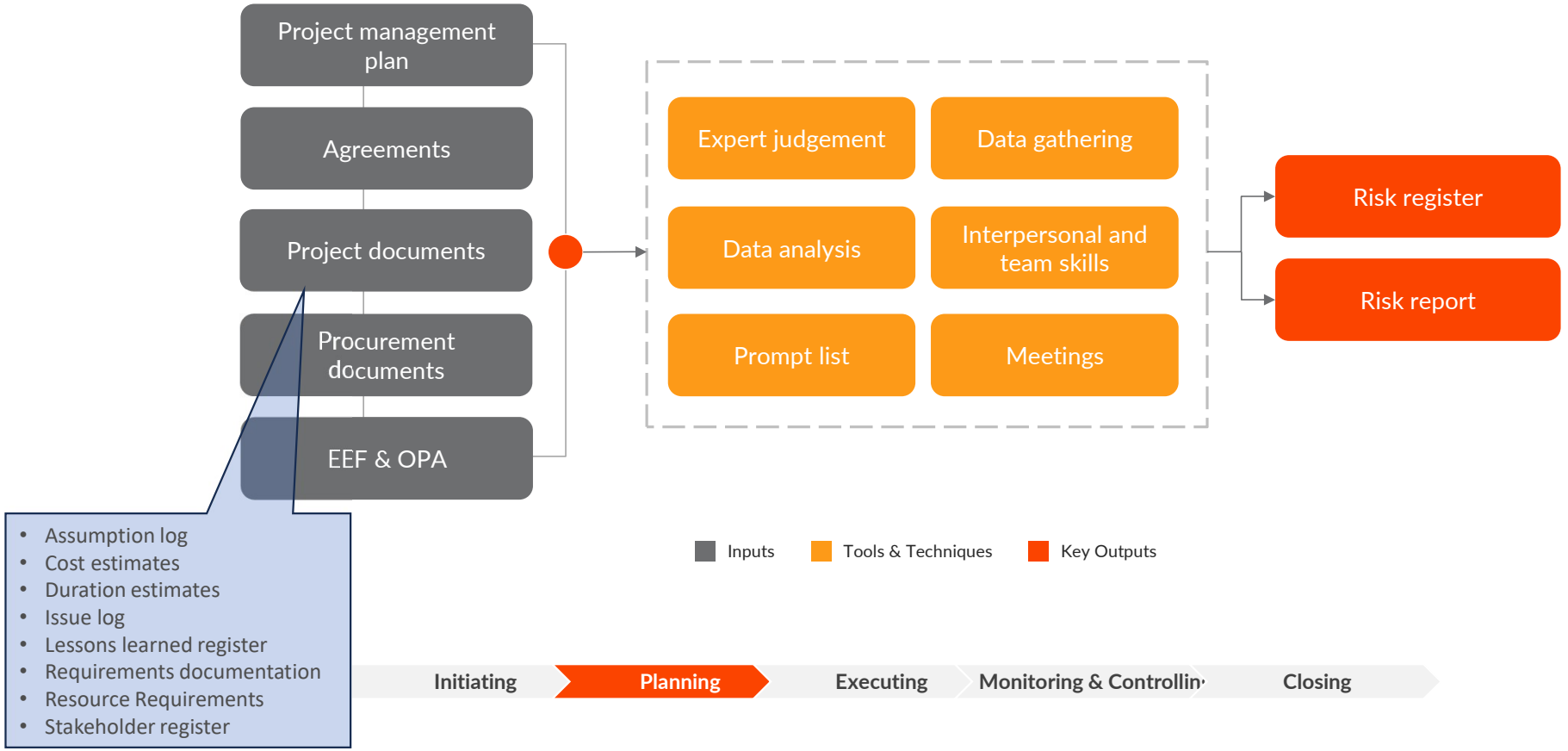
Documentation of existing individual project risks and the sources of overall project risk.

Brings together information so the project team can respond appropriately to identified risks.

Notes

- This process is performed throughout the project.
- Identify risks considers both individual project risks and sources of overall project risk.
- All project stakeholders should be encouraged to identify individual project risks.
- Identify Risks is an iterative process, since new individual project risks may emerge as the project progresses through its life cycle and the level of overall project risk will also change.

Identify Risks – Process



Identify Risks – Process

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Risk register: captures details of identified individual project risks. The results of Perform Qualitative Risk Analysis, Plan Risk Responses, Implement Risk Responses, and Monitor Risks are recorded in the risk register . The content of the risk register may include

- **List of identified risks**: each individual project risk is given a unique identifier in the risk register. Identified risks are described in as much detail as required to ensure unambiguous understanding. A structured risk statement may be used to distinguish risks from their cause(s) and their effect(s).
- **Potential risk owners**: where a potential risk owner has been identified during the Identify Risks process, the risk owner is recorded in the risk register. This will be confirmed during the Perform Qualitative Risk Analysis process.
- **List of potential risk responses**: where a potential risk response has been identified during the Identify Risks process, it is recorded in the risk register. This will be confirmed during the Plan Risk Responses process.
- Additional data may be recorded for each identified risk like a **short risk title, risk category**, **current risk status**, **one or more causes**, **one or more effects on objectives**, **risk triggers** , **WBS reference of affected activities**, and **timing information** (when was the risk identified, when might the risk occur, when might it no longer be relevant, and what is the deadline for taking action).

Risk report: presents information on sources of overall project risk, together with summary information on identified individual project risks. The risk report is developed progressively throughout the Project Risk Management process.

Identify Risks – Suggested Methods

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- Identify risks considers both Individual Project Risks and sources of overall Project Risks
- **Involved Resources:** Project manager, Project team members, Project Risk Specialist, Customers, Subject Matter Experts from outside team, End users, Operational Managers, other resources within organization
- Consistent format should be used for risk statements to ensure that is risk is understood clearly and unambiguously in order to support effective analysis and risk response development.
- Risk owners may be nominated
- It is an iterative process since risk identification involves continuously revisiting and reassessing potential risks throughout the project lifecycle to ensure that emerging risks are captured and addressed effectively

Identify Risks – Tools & Techniques

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- **Interpersonal Skills:** Facilitation improves the effectiveness of many of the techniques used to identify individual project risks and sources of overall project risks
- **PROMPT Lists :** Predetermined list of risk categories that might give rise to individual project risks and that could also act as sources of overall project risk. The risk categories in the lowest level of the risk breakdown structure can be used as a prompt list for individual project risks.
- Some strategic frameworks are more suitable for identifying sources of overall project risk……. For example:
- **PESTLE (Political, Economical, Social, Technology, Legal, Environmental)**
- **TECOP (Technical, Environmental, Commercial, Operational, Political)**
- **VUCA (Volatility, Uncertainty, Complexity, Ambiguity)**

Identify Risks – Tools & Techniques – cont.

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- **Information Gathering Techniques:** Brainstorming , Delphi Technique, Interviewing, Root Cause Analysis
- **Diagramming Techniques:** Cause & effect diagrams, Process Flow Charts, Influence diagrams
- **Data analysis:** Root cause analysis, Assumptions & Constraints analysis, SWOT Analysis, Document Analysis

Identify Risks – Outputs

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Risk Register contains:

- **List of Identified Risks:** The identified risks, including their root causes and uncertain project assumptions. These are the fundamental conditions or events that may give rise to one or more identified risks.
- **Potential Risk Owners:** Potential risk owner has been identified during the identify risks process, the risk owner is recorded in risk register
- **List of Potential Responses:** Potential responses, if identified, may be useful as inputs to the Risk Response Planning process.
- It does get updated as and when further risk management processes are performed. Hence it becomes an IMPORTANT input to all the remaining risk management processes to be performed throughout the project

Identify Risks – Outputs cont.

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- Risk report presents information on sources of overall project risk together with summary information on identified individual project risks
- Risk report is developed progressively throughout project life cycle as various risk management processes are performed

Risk report includes but not limited to:

A. Sources of overall project risk indicating which are the most important drivers of overall project risk exposure

B. Summary information on identified individual project risks, such as number of identified threats and opportunities, distribution of risks across risk categories , metrics, and trends etc.

Identify Risks – Agile Considerations

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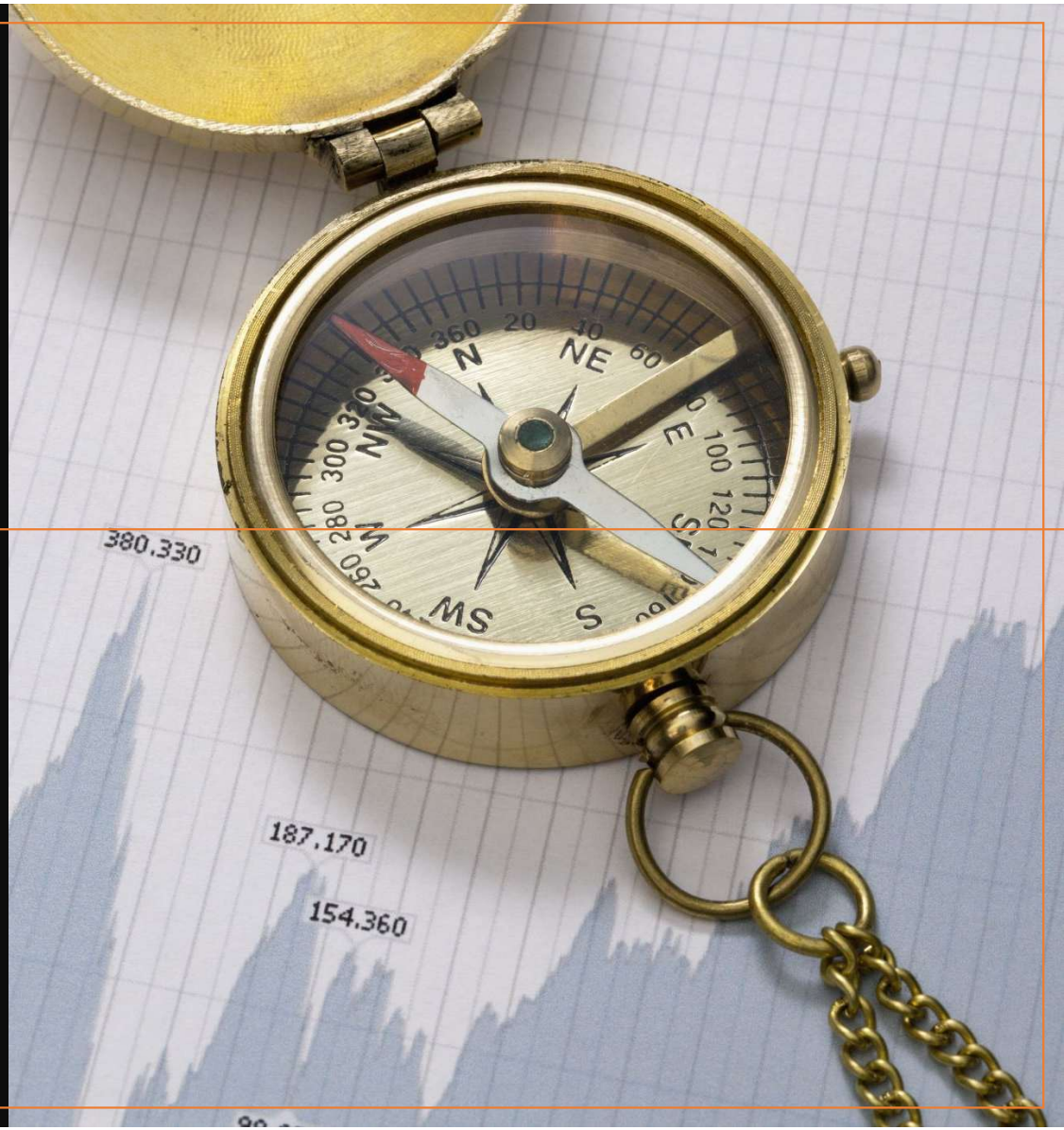
Perform Qualitative Risk Analysis



Perform Qualitative Risk Analysis – Process

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Unleashing Capabilities

Definition

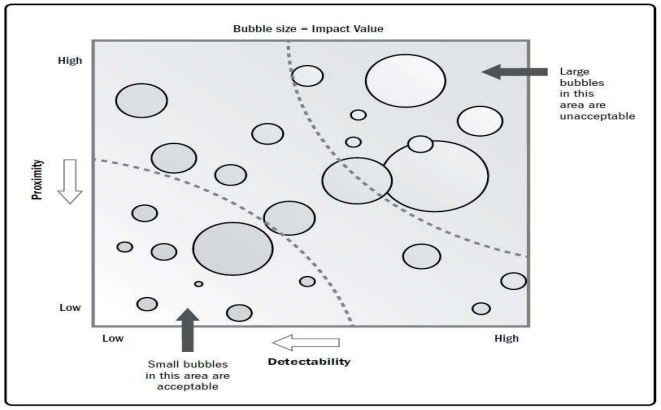
Perform Qualitative Risk Analysis is the process of **prioritizing** individual project risks for further analysis or action by assessing their probability of occurrence and impact as well as other characteristics.

Benefit

Focuses efforts on high-priority risks.

Notes

- This process is performed throughout the project.
- Such assessments are subjective as they are based on perceptions of risk by the project team and other stakeholders.
- An evaluation of the quality of the available information on individual project risks also helps to clarify the assessment of each risk's importance to the project.



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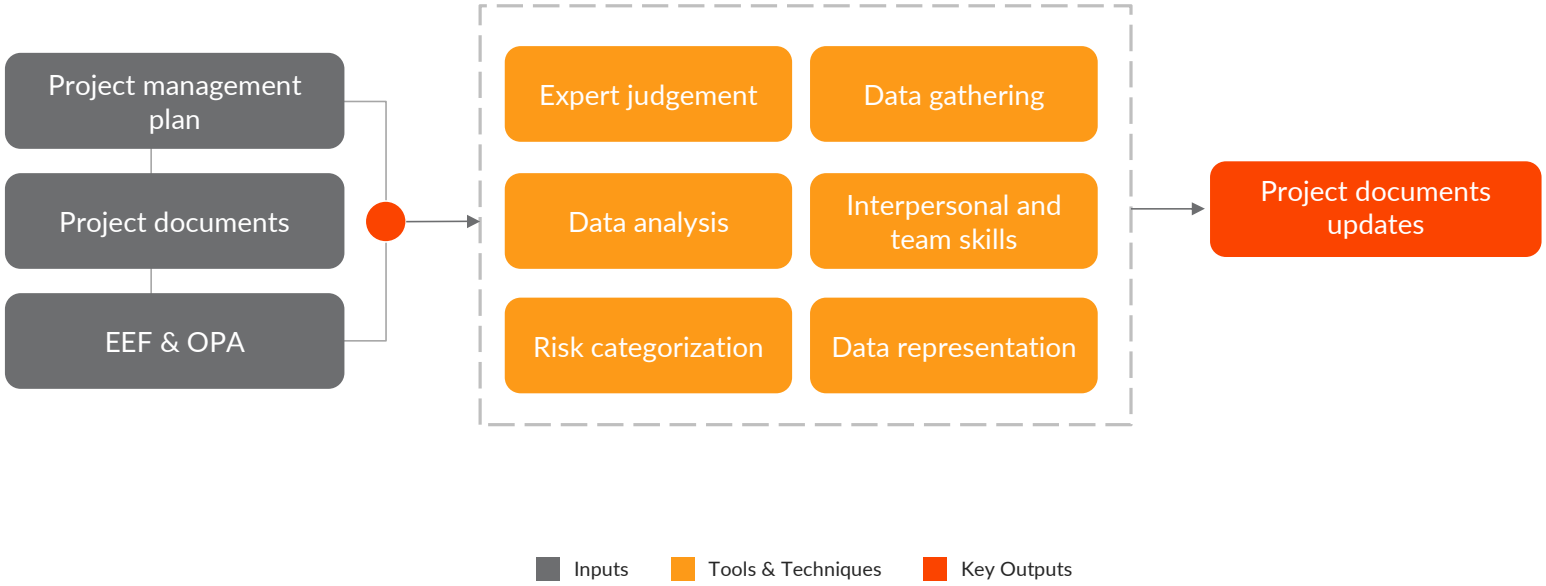
Perform Qualitative Risk Analysis – Process

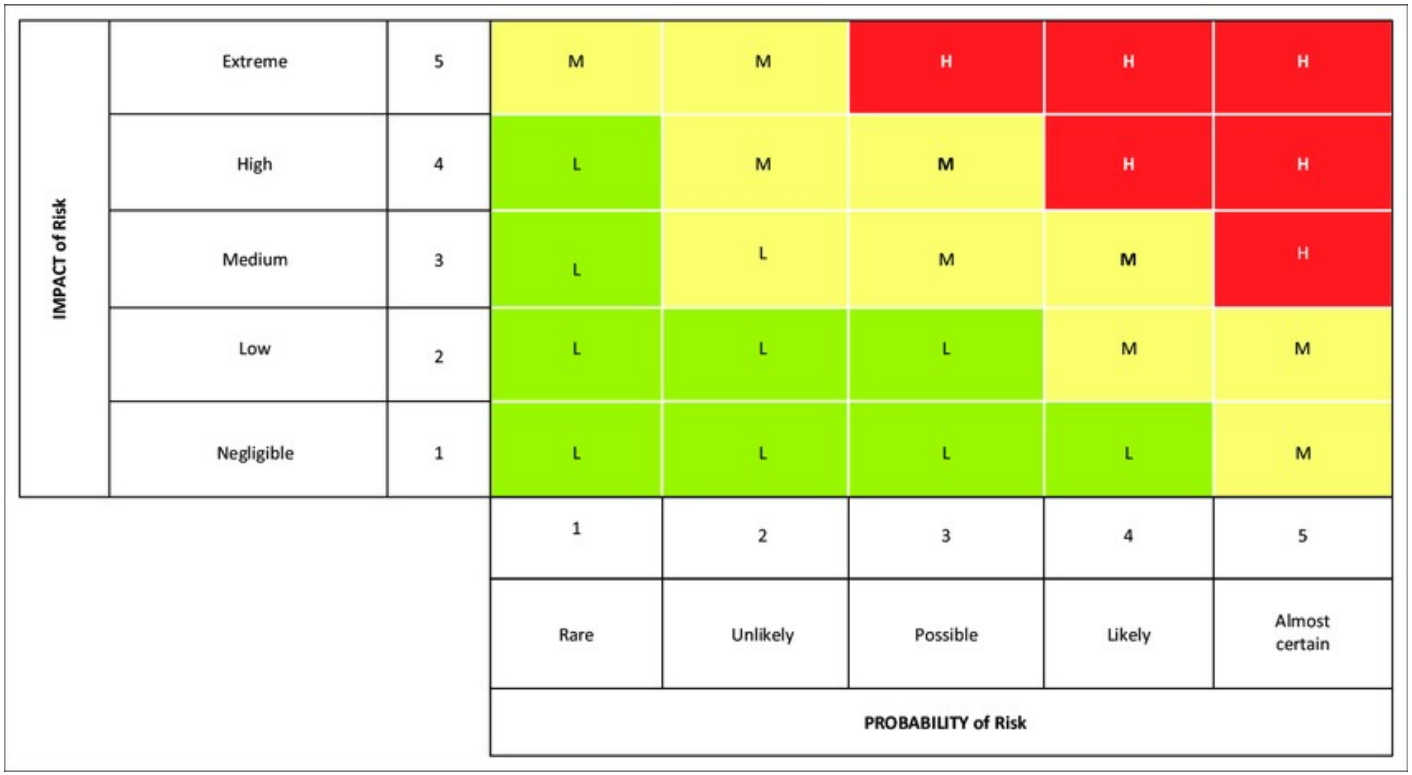


Initiating | Planning | Executing | Monitoring & Controlling | Closing

Perform Qualitative Risk Analysis – Tools & Techniques

- **Risk data quality assessment**: evaluates the degree to which the data about individual project risks is accurate and reliable as a basis for qualitative risk analysis.
- **Risk probability and impact assessment**: considers the likelihood that a specific risk will occur. Risk impact assessment considers the potential effect on one or more project objectives such as schedule, cost, quality, or performance. Impacts will be negative for threats and positive for opportunities.
- **Risk categorization:** Risks to the project can be categorized by **sources of risk** (e.g., using the RBS), the **area of the project affected** (e.g., using the WBS), or **other useful categories** (e.g., project phase) to determine the areas of the project most exposed to the effects of uncertainty. Risks can also be categorized by common root causes. This can lead to the development of effective risk responses.
- **Probability and impact matrix**: grid for mapping the probability of each risk occurrence and its impact on project objectives if that risk occurs. This matrix specifies combinations of probability and impact that allow individual project risks to be divided into priority groups. Risks can be prioritized for further analysis and planning of risk responses based on their probability and impacts.
- **Hierarchical charts**: Used to categorize risks using more than two parameters like Bubble Chart

Perform Qualitative Risk Analysis – Tools & Techniques



IMPACT of Risk							
	Extreme	5	M	M	H	H	H
	High	4	L	M	M	H	H
	Medium	3	L	L	M	M	H
	Low	2	L	L	L	M	M
	Negligible	1	L	L	L	L	M
			1	2	3	4	5
			Rare	Unlikely	Possible	Likely	Almost certain
			PROBABILITY of Risk				

Identify Risks – Agile Considerations

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Unleashing Capabilities

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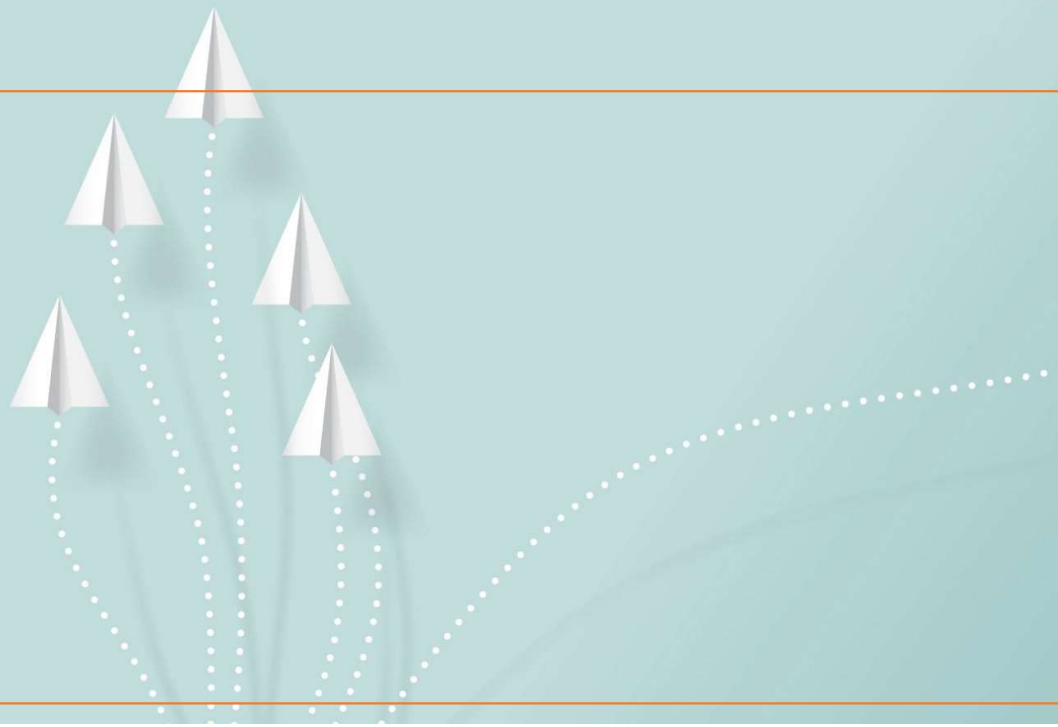
Perform Quantitative Risk Analysis



Perform Quantitative Risk Analysis – Process

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Unleashing Capabilities

Definition

The process of numerically **analyzing the combined effect** of identified individual project risks and other sources of uncertainty on overall project objectives.

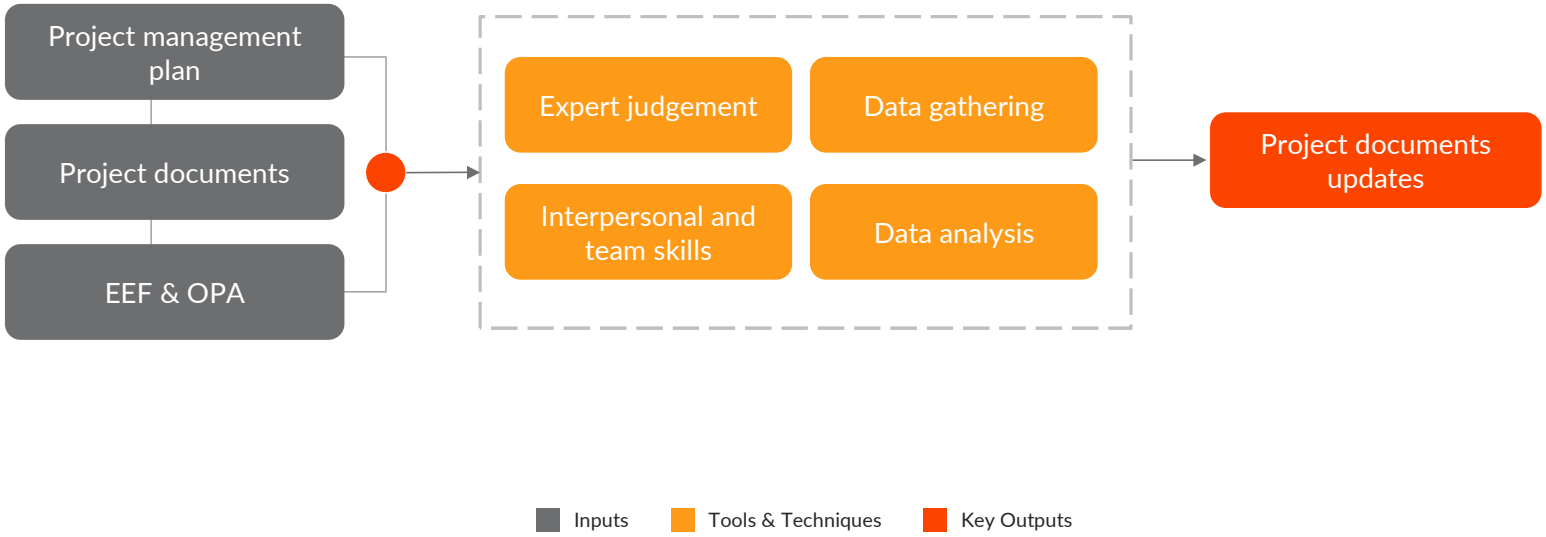
Benefit

Quantifies overall project risk exposure, and it can also provide additional quantitative risk information to support risk response planning.

Notes

- This process is not required for every project.
- Undertaking a robust analysis depends on the availability of high-quality data about individual project risks and other sources of uncertainty, as well as a sound underlying project baseline for scope, schedule, and cost.

Perform Quantitative Risk Analysis – Process



Initiating | Planning | Executing | Monitoring & Controlling | Closing

Perform Quantitative Risk Analysis – Process

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- This process may not be required for all projects.
- Robust analysis depends highly on availability of quality data
- Normally appropriate for large complex projects, strategically important projects, projects where it is a contractual or senior stakeholder requirement
- Uses information on individual project risks assessed qualitatively and having significant potential to affect project's objectives
- Creates input for planning risk responses, particularly for overall project risk & key individual risks

Perform Quantitative Risk Analysis – Tools & Techniques

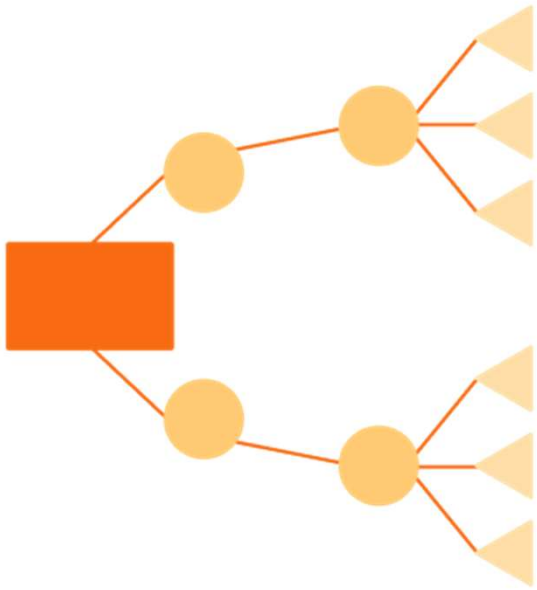
Data Gathering and Data Analysis:

1. **Interviewing:** Mix of experience and historical data to quantify the probability and impact of risks on project objectives. Three-point estimates is commonly used methodology.
2. **Sensitivity Analysis:** Helps to determine which risks have the most potential impact on the project. It helps to understand how the variations in project's objectives correlate with variations in different uncertainties.
3. **Modeling & Simulation:** A project simulation uses a model that translates the specified detailed uncertainties of the project into their potential impact on project objectives.
4. **Monte Carlo Technique:** A project model is computed iterated (many times) with the input values (Time/Cost) chosen at random for each iteration from the probability distributions of these variables. Histogram is calculated from the iterations for objectives like 'Time, Cost,….' etc.

Perform Quantitative Risk Analysis – Tools & Techniques

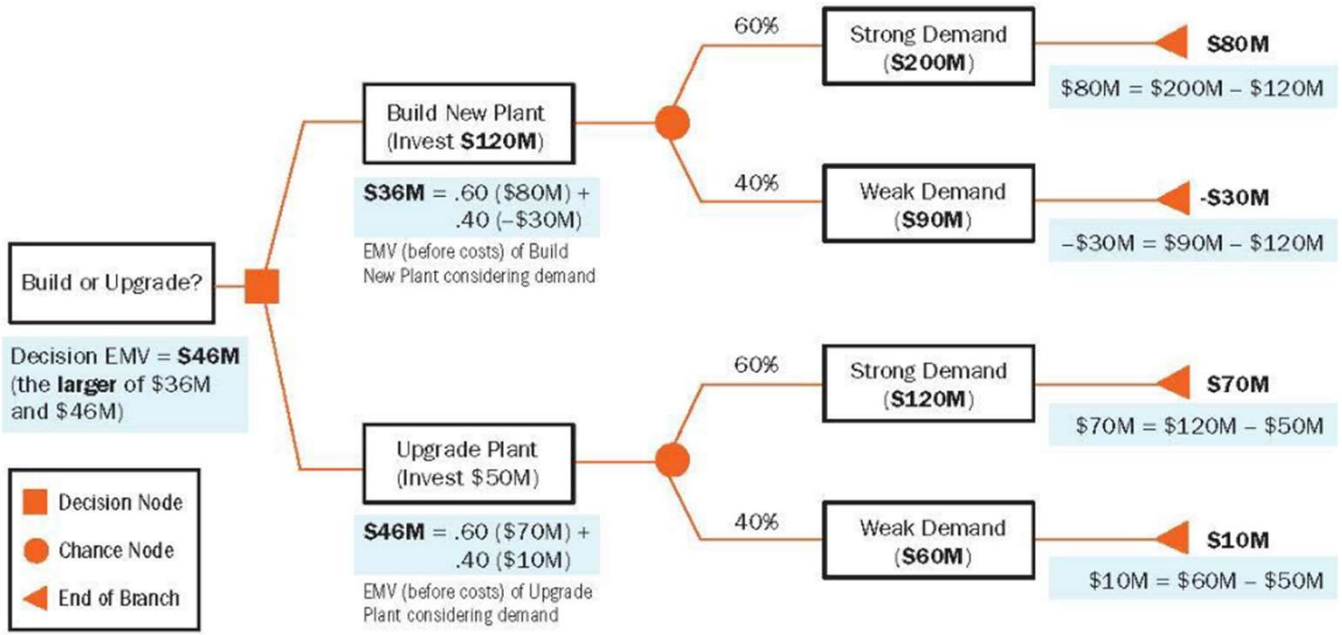
Decision Tree

- It helps you answer questions like:
- What is the potential loss / return due to a particular negative / positive risk occurring, in $ terms? (Expected Monetary Value – EMV)



Risk	Probability	İmpact	EMV = Probability x Impact
1	25%	-$100.000	-$25.000
2	15%	-$200.000	-$30.000
3	10%	-$90.000	-$9.000
4	30%	$50.000	$15.000
EMV of The Project			**-$49.000**

Decision Tree - Example



Perform Quantitative Risk Analysis – Outputs

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- **Assessment of overall project risk exposure**
  - Chances of project success
  - Degree of inherent variability remaining within project
- **Detailed probabilistic analysis of the project :**
  - Amount of contingency reserves needed to provide specific confidence
  - Identifying individual risks having high impact on critical path
  - Major drivers of overall project risk impacting project objectives
  - Prioritized list of individual project risks
  - Trends in quantitative risk analysis results
  - Recommended risk responses

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Plan Risk Responses

Plan Risk Responses – Process

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Definition

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.

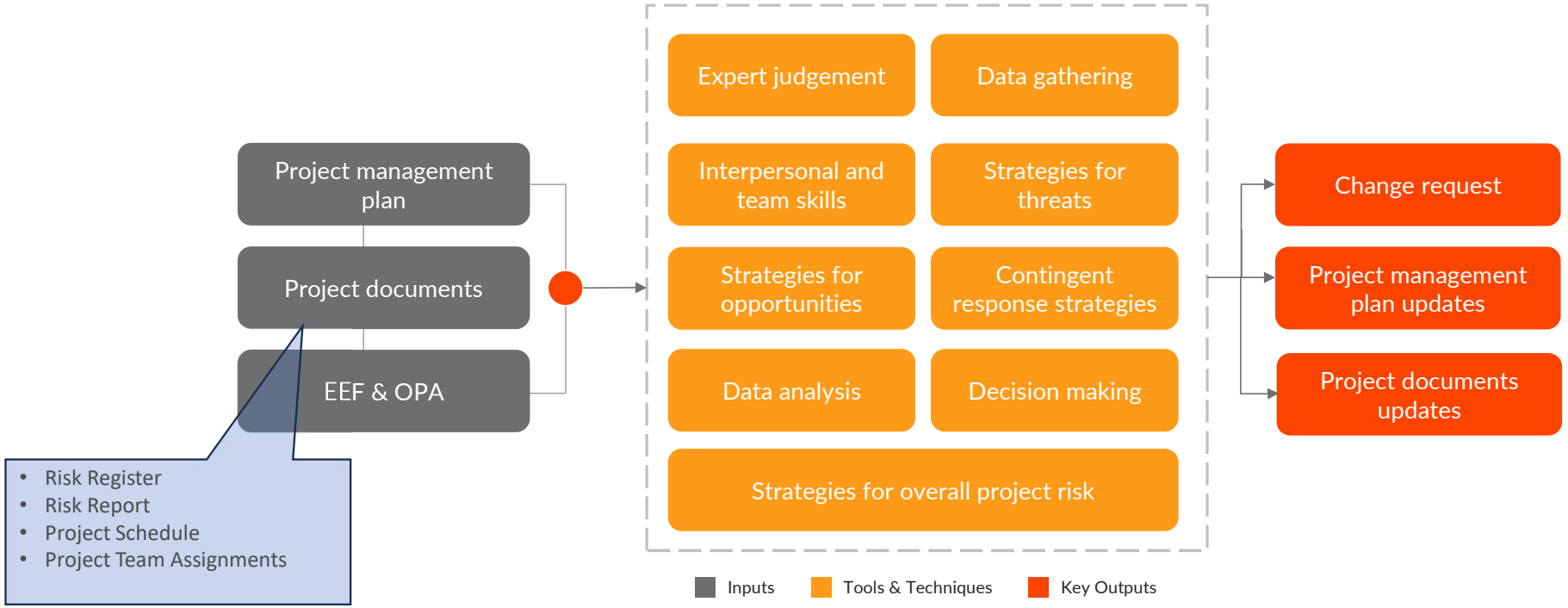
Benefit

Identifies appropriate ways to address overall project risk and individual project risks.

Notes

- This process is performed throughout the project.
- Effective and appropriate risk responses can minimize individual threats, maximize individual opportunities, and reduce overall project risk exposure.
- Unsuitable risk responses can have the converse effect.
- A contingency plan (or fall-back plan) can be developed for implementation if the selected strategy turns out not to be fully effective or if an accepted risk occurs. Secondary risks should also be identified.
- Secondary risks are risks that arise as a direct result of implementing a risk response.
- A contingency reserve is often allocated for time or cost. If developed, it may include identification of the conditions that trigger its use.

Plan Risk Responses – Process



Initiating | Planning | Executing | Monitoring & Controllin | Closing

Plan Risk Responses – Tools & Techniques

- **Expert Judgment:** Leveraging expertise from individuals or groups with specialized knowledge in risk management to develop appropriate risk responses.
- **Data Gathering:**
  - **Interviews**: Collecting information from stakeholders and experts to identify potential risk responses.
- **Interpersonal and Team Skills:**
  - **Facilitation**: Using facilitation techniques to guide discussions and reach consensus on risk responses.
- **Strategies for Threats**: Developing specific strategies to address negative risks or threats, such as:
  - **Avoid**: Changing the project plan to eliminate the risk or protect the project objectives from its impact.
  - **Transfer**: Shifting the impact of a risk to a third party, such as through insurance or outsourcing.
  - **Mitigate**: Reducing the probability or impact of a risk to an acceptable threshold.
  - **Accept**: Acknowledging the risk and not taking any action unless the risk occurs.
- **Strategies for Opportunities:** Developing specific strategies to address positive risks or opportunities, such as:
  - **Exploit**: Ensuring that the opportunity is realized by taking specific actions.
  - **Enhance**: Increasing the probability or impact of the opportunity.
  - **Share**: Allocating ownership of the opportunity to a third party who is best able to capture the benefit.
  - **Accept**: Acknowledging the opportunity and being willing to take advantage of it if it occurs.

Plan Risk Responses – Tools & Techniques cont.

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- **Contingent Response Strategies:** Developing responses that will only be executed under certain predefined conditions, often referred to as "trigger conditions."
- **Strategies for Overall Project Risk:** Developing strategies to address the overall risk exposure of the project, which may include a combination of the above strategies.
- **Data Analysis:**
  - **Alternatives Analysis**: Evaluating different options for risk responses.
  - **Cost-Benefit Analysis**: Comparing the costs and benefits of risk response options to determine the best approach.
- **Decision Making:**
  - **Multicriteria Decision Analysis**: Using a systematic approach to evaluate and prioritize risk response options based on multiple criteria.

Risk Response Strategies

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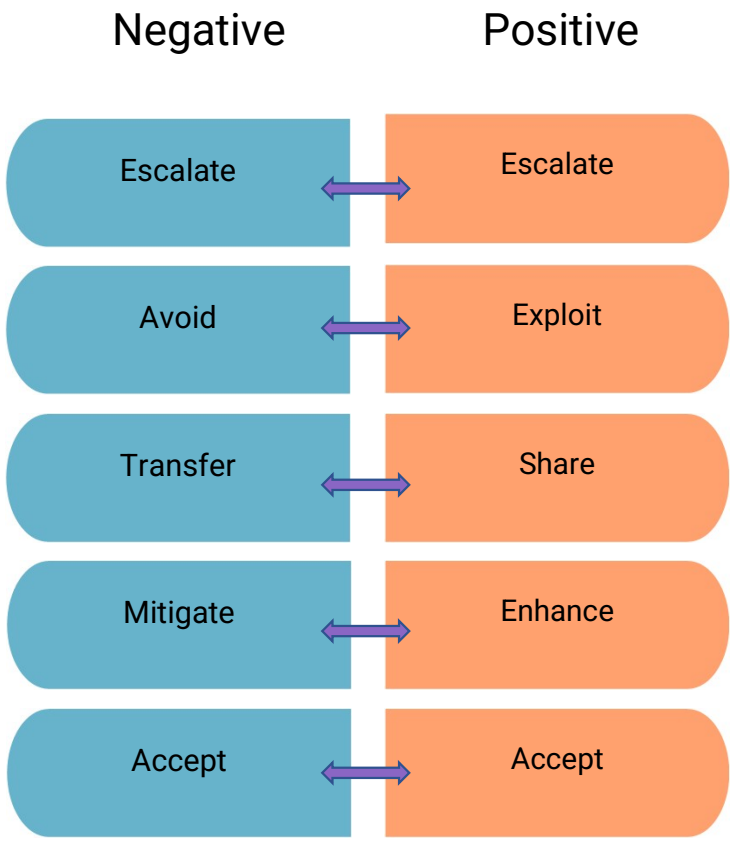
- ✓ Prepare strategies for threats (negative) as well as opportunities (positive).
- ✓ Plan and implement strategies for individual project risks and overall project risk.



Plan Risk Responses

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Strategies for threats

1. **Escalate:** appropriate when the threat is outside the scope of the project or that the proposed response would exceed the project manager's authority. Escalated risks are managed not on the project level. Threats are usually escalated to the level that matches the objectives that would be affected if the threat occurred. Escalated threats are not monitored further by the project team after escalation, although they may be recorded in the risk register for information.
2. **Avoid**: appropriate when the project team acts to eliminate the threat or protect the project from its impact. It may be appropriate for high-priority threats with a high probability of occurrence and a large negative impact. Avoidance may involve changing some aspect of the project management plan or changing the objective that is in jeopardy in order to **eliminate** the threat entirely, **reducing its probability of occurrence to zero**.
3. **Transfer**: transfer involves **shifting ownership of a threat to a third party** to manage the risk and to bear the impact if the threat occurs.
4. **Mitigate**: **reduce the probability of occurrence and/or impact of a threat**. Early mitigation action is often more effective than trying to repair the damage after the threat has occurred.
5. **Accept**: **acknowledges the existence of a threat, but no proactive action is taken**. Appropriate for low-priority threats, and it may also be adopted where it is not possible or cost-effective to address a threat in any other way. Acceptance can be either **active** or **passive**. The most common active acceptance strategy is to establish a **contingency reserve**, including amounts of time, money, or resources to handle the threat if it occurs. Passive acceptance involves no proactive action apart from periodic review of the threat to ensure that it does not change significantly.

Plan Risk Responses

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Strategies for opportunities

1. **Escalate:** appropriate when the opportunity is outside the scope of the project or that the proposed response would exceed the project manager's authority. Escalated risks are managed not on the project level. opportunities are usually escalated to the level that matches the objectives that would be affected if the opportunity occurred. Escalated opportunities are not monitored further by the project team after escalation, although they may be recorded in the risk register for information.
2. **Exploit**: selected for high-priority opportunities where the organization wants to ensure that the opportunity is realized. This strategy seeks to capture the benefit associated with a particular opportunity by **ensuring that it definitely happens**, **increasing the probability of occurrence to 100%.**
3. **Share**: sharing involves **transferring ownership of an opportunity to a third party** so that it **shares some of the benefit** if the opportunity occurs.
4. **Enhance**: **increase the probability and/or impact of an opportunity**. Early enhancement action is often more effective than trying to improve the benefit after the opportunity has occurred. **The probability of occurrence of an opportunity may be increased** by focusing attention on its causes. Where it is not possible to increase probability, an enhancement response might increase **the impact** by targeting factors that drive the size of the potential benefit.
5. **Accept**: acknowledges the existence of an opportunity, but no proactive action is taken. Appropriate for low-priority opportunities, and it may also be adopted where it is not possible or cost-effective to address a threat in any other way. Acceptance can be either active or passive. The most common active acceptance strategy is to establish a contingency reserve, including amounts of time, money, or resources to handle the opportunity if it occurs. Passive acceptance involves no proactive action apart from periodic review of the threat to ensure that it does not change significantly.


Risk

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Escalate

You use the escalate risk response strategy when you cannot manage risk because you lack authority, resources, or knowledge.
You contact your PMO or management to take responsibility for the risk. Once the higher authority accepts, you won't take further action other than updating the risk register

For example, say your local government announces a regulation that could impact your project negatively. You have no resources to manage this risk, so you approach management. You can use this risk response strategy for positive and negative risks.

Source: pmstudycircle.com

Mitigate

This risk response strategy helps you lessen the impact or probability of the risk. This strategy decreases the severity.

For example, a team member may leave during the peak of your project. To reduce the impact of their absence, you find another employee with similar qualifications in your organization.
The new employee may not be as capable, but they can cover.
This is a purely negative risk response strategy.

Source: pmstudycircle.com

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Transfer

You use this strategy when you lack the skills or resources to manage the risk or are too busy to manage it.
You simply transfer the responsibility to a third party. If the risk occurs, the third party will manage it, and you will be safe from the impact. Note that transferring does not eliminate the risk; it only shifts the responsibility.

For example, you have to install equipment but don't have much experience. The task is complex, and very few contractors have done it successfully. You find an expert and hire them to do the task for you, signing a fixed price contract.
In this way, you have transferred the risk responsibility to a third party, and now they will complete the task at the agreed time and cost.
Transferring risk can cause a secondary risk. For example, although you have given it to a third party, you are responsible for the project from the client's point of view.
This is again a purely negative risk response strategy.

Source: pmstudycircle.com

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Avoid

Here, you try to eliminate the risk or its impact. You do this by changing your project management plan, scope, or schedule.
You use this strategy with critical risks. This is the best technique, so use it when you can.
It becomes easier if you identify the risk in an early stage, as changing the scope or plan in later stages is difficult and costly.
You will have to convince the client or your management to change the scope or schedule to use this strategy.
Avoid risk response strategies require after their approval.

For example, you find that there is a chance of rain during certain periods, and you have work planned outdoors at that time. Therefore, you move these activities to a few days later to avoid the risk.
This is a negative risk response strategy.

Source: pmstudycircle.com

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Accept

You can use this risk response strategy with positive and negative risks. Here you take no action to manage the risk other than acknowledging it.
You use this strategy with non-critical risks when it is not possible or practical to respond using other strategies or if it is of little importance and does not call for a response.
You can accept the risk either by actively or passively acknowledging it. In an active acceptance strategy, you keep a separate contingency reserve to manage the risk, and in passive acceptance, you do nothing except record it to the risk register.

For example, you are digging for a building foundation, and there is a risk of finding artifacts, though the chances are low. So you record this in the risk register and take no action because a response plan is costly, with no guarantee it will occur.
This risk response strategy can be used with negative and positive risks.

Source: pmstudycircle.com

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Escalate

You use this strategy when you cannot realize an opportunity because you lack the authority to make it happen. You approach top management and ask them to manage the risk. Once they review and accept the responsibility, you are no longer accountable for it; however, you will record it in your risk register for further monitoring.
In the escalate risk response strategy, you entrust top management to handle the risk, and your job is limited to monitoring.

For example, let's say you see an opportunity to buy a consumable in bulk and get a 20% discount. However, buying consumables in a large quantity will not benefit you as most of it will be wasted. So, you ask your PMO to consult with other project managers to see if anyone requires the same consumable. If yes, you can combine the requirements and place the bulk order to realize the opportunity.
The escalate risk response strategy was introduced in the 6th edition of the PMBOK Guide.
It can be used with positive and negative risks.

Source: pmstudycircle.com

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Enhance

In the enhance risk response strategy, you try to increase the chance of a risk happening so you can realize it. In this case, you try to seize the opportunity. The enhance risk response is the opposite of the mitigate strategy.

For example, let's say you will complete your project in three months, and the government is about to float a similar project in two months. You can bid for a new project if you complete your current one. This is an opportunity for you.

Therefore, you try to compress your schedule with fast-tracking.
Here, you are using the enhance risk response strategy because you are trying to realize the opportunity.

This is a purely positive risk response strategy.

Source: pmstudycircle.com

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Exploit

In the exploit risk response strategy, you ensure that the opportunity is realized. You do not try, you make certain to seize it

For example, let's consider that your project will be completed in three months. You learn that the government is about to float a similar one in two months, and you can bid for it if you can complete your work before.
You have an opportunity here if you complete your project ahead of time: you will get a chance to bid.
Now you have to ensure that you realize this opportunity. You take every possible measure to finish ahead of time so you can bid for the new project. You bring in new resources, compress the schedule, allow overtime, etc.
Exploit is the opposite of the avoid risk response strategy.
This is a purely positive risk response strategy.

Source: pmstudycircle.com

Share

You use the share risk response strategy when you cannot realize the opportunity on your own. So, you team up with another company and work together.

For example, suppose that because of a lack of technical capabilities, you cannot bid for a project your company wants. Therefore, you team up with another company capable of doing this task and jointly bid for the project. A teaming agreement is an example of the share risk response strategy.

Source: pmstudycircle.com

Accept

In the accept risk response strategy, you take no action to realize the opportunity. You leave it as is, and if it happens, you will benefit from it. You use this strategy when the cost of the response is high, there is a low chance of it occurring, or the benefit does not outweigh the effort.

For example, suppose you may get skilled workers from another project if you convince them to join you. However, you do not pursue this matter and instead let them decide whether or not they are interested in your project.
You can use this strategy for both types of risks.

Source: pmstudycircle.com

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Elements for a healthy project

Term	Definition	Purpose	When to Use
Mitigation Plan	A strategy designed to reduce the probability and/or impact of a risk event.	To proactively address and minimize the potential negative effects of a risk.	Before the risk occurs, as part of the initial risk response planning.
Contingency Plan	A predefined action plan to be implemented if a risk event occurs.	To provide a ready-to-implement response to manage the risk if it materializes.	When the risk event occurs, as a reactive measure.
Fallback Plan	An alternative plan to be executed if the primary risk response (mitigation or contingency) fails or is not fully effective.	To ensure there is a backup strategy in place if the initial response does not work as intended.	If the primary risk response is unsuccessful or insufficient.
Management Reserve	A budget set aside to cover unforeseen risks or uncertainties that are not identified in the risk register.	To provide financial resources for unexpected issues that arise during the project.	For unknown-unknown risks that cannot be anticipated or planned for in advance.

The Mitigation Plan is a proactive strategy to reduce risk impact or probability, while the Contingency Plan is a reactive measure to be implemented if the risk occurs. The Fallback Plan serves as a backup if the primary response fails, and the Management Reserve is a financial buffer for unforeseen risks.

These elements collectively ensure comprehensive risk management throughout the project lifecycle.

Plan Risk Responses – Agile Considerations

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Pairing

Pairing involves two team members working together on the same task, typically sharing one computer. This technique is often used in software development, known as pair programming.

- **Knowledge Sharing**: Both team members share their knowledge and expertise, leading to better solutions and learning opportunities.
- **Immediate Feedback**: Continuous feedback between the pair helps catch errors early and improve code quality.
- **Enhanced Collaboration**: Encourages communication and collaboration, fostering a team-oriented environment.

Swarming

Swarming occurs when most or all team members focus on a single task or issue to complete it quickly. This technique is useful for addressing critical tasks or resolving blockers.

- **Rapid Problem Solving:** By concentrating the team's efforts, swarming can quickly resolve issues that might otherwise delay the project.
- **Increased Focus:** The team's collective focus on one task ensures that it is completed efficiently and effectively.
- **Dynamic Team Formation:** Teams can dynamically form based on the needs of the task, bringing together the necessary expertise.

Mobbing

Mobbing, or mob programming, involves the entire team working together on the same task, using a single computer. This technique extends the concept of pairing to the whole team.

- **Collective Ownership:** The entire team takes ownership of the task, leading to a shared understanding and responsibility.
- **Diverse Perspectives:** Multiple viewpoints contribute to better problem-solving and innovative solutions.
- **Continuous Learning:** Team members learn from each other in real-time, enhancing their skills and knowledge.

Processes and Key Outputs – cont.

PG	Process Name	Key Outputs
Project Planning	Plan Procurement Management	• Procurement management plan • Procurement strategy • Bid documents • Procurement statement of work • Source selection criteria • Make-or-buy decisions • Independent cost estimates
	Plan Stakeholder Engagement	• Stakeholder engagement plan
Project Executing	Direct and Manage Project Work	• Deliverables • Change requests
	Manage Project Knowledge	• Lessons learned register
	Manage Quality	• Quality reports • Test and evaluation documents
	Acquire Resources	• Physical resource assignments • Project team assignments • Resource calendars
	Develop Team	• Team performance assessments
	Manage Team	• Change requests
	Manage Communications	• Project communications
	Implement Risk Responses	• Change requests
	Conduct Procurements	• Selected sellers • Agreements
	Manage Stakeholder Engagement	• Stakeholder engagement plan

PG	Process Name	Key Outputs
Project Monitoring & Controlling	Monitor and Control Project Work	• Work performance reports • Change requests
	Perform Integrated Change Control	• Approved change requests
	Validate Scope	• Accepted deliverables
	Control Scope	• Change requests
	Control Schedule	• Schedule forecasts • Change requests
	Control Costs	• Cost forecasts • Change requests
	Control Quality	• Quality control measurements • Verified deliverables
	Control Resources	• Change requests
	Monitor Communications	• Change requests
	Monitor Risks	• Work performance information • Change requests
	Control Procurements	• Closed procurements
	Monitor Stakeholder Engagement	• Work performance information • Change requests
Project Closing	Close Project or Phase	• Final product, service, or result transition • Final report

Plan Procurement Management

Plan Procurement Management – Concepts

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- Project procurement processes involve agreements that describe the relationship between two parties – a buyer & seller
- Agreements can be as simple as the purchase of a defined quantity of labor hours at a specified labor rate or they can be as complex as multi year international construction contracts.
- The contracting approach or the contract itself should reflect the simplicity or complexity of the deliverables or required effort and should be written, complies with local, national, and international laws as applicable regarding contracts

Plan Procurement Management – Concepts

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- A contract should clearly state the deliverables and results expected including any knowledge transfer from seller to the buyer
- Anything not in contract cannot be legally enforced
- Working internationally need to understand the effect that culture and local law have upon contracts and their enforceability
- Depending on the application area , an agreement can be a contract, an SLA, an understanding, an MOA (Memorandum of association), or a purchase order
- Most organizations document policies and procedures specifically defining procurement rules and specifying who has authority to sign and administer such agreements on behalf of organization

Plan Procurement Management – Concepts

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- For smaller organizations or startup companies and those without a purchasing, contracting or procurement department , the project manager may assume the purchasing authority role to negotiate and sign contracts directly (decentralized purchasing)
- For more mature organizations the actual procurement and contracting functions will be carried out by a separate department with specific role to purchase, negotiate and sign contracts (Centralized purchasing)
- In international contracting , the legal jurisdictions under which the contracts will be administered are clearly spelled out in the contract.
- In most cases the seller is an external contractor who is bound by a formal contractual relationship

Plan Procurement Management – Trends

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There are a number of major trends in software tools , risk, processes, logistics and technology with different industries that can affect the success rate of projects.

- Advances in tool
- More advanced risk management
- Changing contracting processes
- Logistics and supply chain management
- Technology & stakeholder relations
- Trial engagements

Plan Procurement Management – Terms

- Advertising
- Agreements
- Bid documents
- Bidder conferences
- Closed procurements
- Independent cost estimates
- Make-or-buy analysis
- Make-or-buy decisions
- Market research
- Performance reviews
- Procurement documentation
- Procurement management plan
- Procurement statement of work
- Procurement strategy
- Proposal evaluation
- Selected sellers
- Seller proposals
- Source selection analysis
- Source selection criteria

Plan Procurement Management – Process

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Definition

Plan Procurement Management is the process of documenting project procurement decisions, specifying the **approach** and identifying potential seller.

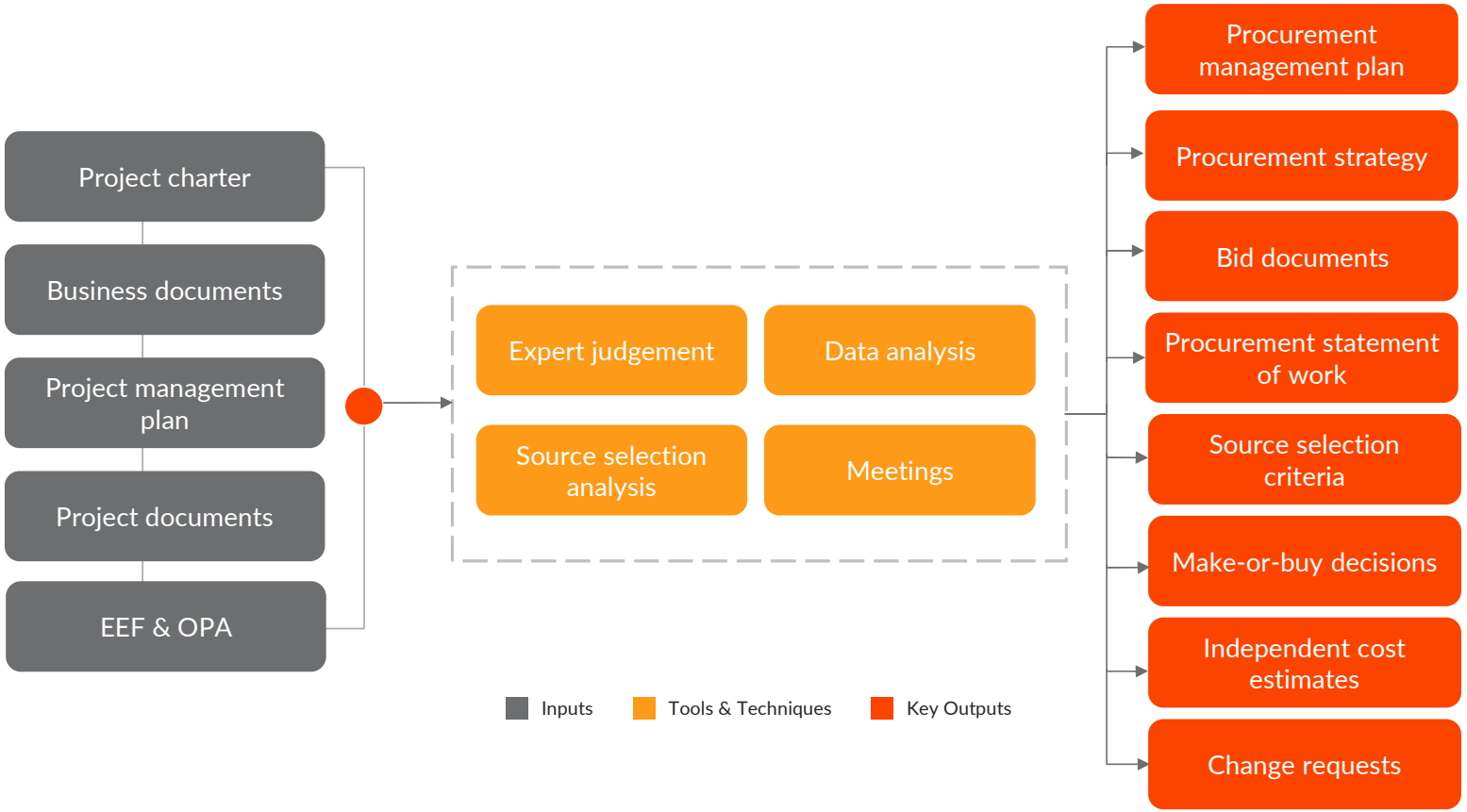
Benefit

Determines whether to acquire goods and services from outside the project, what to acquire as well as how and when to acquire it.

Notes

- This process is performed once or at predefined points in the project.
- Defining roles and responsibilities related to procurement should be done early in the Plan Procurement Management process. Typical procurement steps might be:
- Prepare the procurement statement of work (SOW) or terms of reference (TOR).
- Prepare a high-level cost estimate to determine the budget.
- Advertise the opportunity.
- Identify a short list of qualified sellers.
- Prepare and issue bid documents.
- Prepare and submit proposals by the seller.
- Conduct a technical & financial evaluation of the proposals including quality.
- Prepare the final combined quality and cost evaluation to select the winning proposal.
- Finalize negotiations and sign contract between the buyer and the seller.

Plan Procurement Management – Process



Initiating | Planning | Executing | Monitoring & Controlli | Closing

Plan Procurement Management – Contract Types

All legal contractual relationships generally fall into one of two broad families: **either fixed-price** or **cost reimbursable**. Also, there is a **third hybrid type** commonly in use called the **time and materials contract**. The more popular contract types in use are discussed below as discrete types, but in practice it is not unusual to combine one or more types into a single procurement:

1. **Fixed-price contracts:** this category of contracts involves setting a fixed total price for a defined product, service, or result to be provided. Sellers under fixed-price contracts are legally obligated to complete such contracts, with possible financial damages if they do not. Under the fixed-price arrangement, buyers need to precisely specify the product or services being procured. Changes in scope may be accommodated, but generally with an increase in contract price.
2. **Cost-reimbursable contracts:** this category of contract involves payments (cost reimbursements) to the seller for all legitimate actual costs incurred for completed work, plus a fee representing seller profit. A cost-reimbursable contract provides the project flexibility to redirect a seller whenever the scope of work cannot be precisely defined at the start and needs to be altered, or when high risks may exist in the effort.
3. **Time and Material Contracts (T&M):** are a hybrid type of contractual arrangement that contain aspects of both cost-reimbursable (open ended) and fixed-price (fixed price per unit) contracts.

Plan Procurement Management – Contract Types

Contract Type	Description	Risk Exposure	When to Use
Firm Fixed Price (FFP)	A contract where the buyer pays the seller a set amount regardless of the seller's costs. Suitable for well-defined projects with clear requirements.	Low for Buyer, High for Seller	When the scope is well-defined and unlikely to change.
Fixed Price Incentive Fee (FPIF)	A contract where the buyer pays a fixed price plus an additional fee if the seller meets certain performance criteria. Encourages the seller to control costs and meet performance targets.	Moderate for Buyer, Moderate for Seller	When performance incentives are needed to motivate the seller.
Fixed Price with Economic Price Adjustment (FP-EPA)	A contract with a fixed price that includes provisions for adjustments based on changes in economic conditions, such as inflation or cost indices. Useful for long-term projects where economic conditions may change.	Low to Moderate for Buyer, Moderate for Seller	For long-term projects where economic conditions may change.
Cost Plus Fixed Fee (CPFF)	A contract where the buyer reimburses the seller for all allowable costs plus a fixed fee. Suitable for projects with uncertain scope or high risk, as it provides flexibility for the seller.	High for Buyer, Low for Seller	When the scope is uncertain or high risk, and flexibility is needed.
Cost Plus Incentive Fee (CPIF)	A contract where the buyer reimburses the seller for all allowable costs plus an incentive fee based on achieving certain performance objectives. Encourages the seller to control costs and meet performance targets.	Moderate for Buyer, Moderate for Seller	When performance incentives are needed to control costs and meet objectives.
Cost Plus Award Fee (CPAF)	A contract where the buyer reimburses the seller for all allowable costs plus an award fee based on the buyer's subjective evaluation of the seller's performance. Provides flexibility and rewards the seller for excellent performance.	High for Buyer, Low for Seller	When subjective performance evaluation and flexibility are required.
Time and Material (T&M)	A contract where the buyer pays the seller based on the time spent and materials used. Suitable for projects with an uncertain scope or where the work is expected to evolve over time.	High for Buyer, Low for Seller	When the scope is uncertain or expected to evolve over time.

Plan Procurement Management – Outputs

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- **Procurement Management Plan**: This document describes how the procurement processes will be managed, from developing procurement documentation to contract closure. It includes guidelines on procurement strategy, types of contracts to be used, risk management, and procurement metrics.
- **Procurement Strategy:** Defines the approach for managing procurements, including delivery methods, contract types, and procurement phases.
- **Bid Documents:** These documents are used to solicit proposals from potential sellers. They include Request for Information (RFI), Request for Proposal (RFP), and Request for Quotation (RFQ).
- **Procurement Statement of Work (SOW):** A detailed description of the products, services, or results to be procured. It includes specifications, performance requirements, and deliverables.
- **Source Selection Criteria:** The criteria used to evaluate and select potential sellers. This may include factors such as cost, technical capability, past performance, and compliance with requirements.
- **Make-or-Buy Decisions:** Documentation of the analysis and decisions regarding whether certain work should be performed internally or procured from external sources.
- **Independent Cost Estimates:** Estimates prepared to validate the cost of procurement items and ensure budget accuracy.
- **Change Requests:** Any changes to the project management plan or other project documents that result from the procurement planning process.
- **Project Documents Updates:** Updates to project documents such as the risk register, requirements documentation, and stakeholder register based on procurement planning activities.

Plan Procurement Management – Agile Consideration

- In agile environments, specific sellers may be used to extend the team
- This collaborative working relationship can lead to a shared risk procurement model where both the buyer and the seller share the risk threats and rewards associated with a project
- Larger projects may use an adaptive approach for some deliverables and a more stable approach for other parts
- Governing agreement such as Master services agreement (MSA) may be used for the overall Engagement with adaptive work being placed in an appendix
- This allows changes to occur on the adaptive scope without impacting the overall contract

"Agile" Contract Types

Multi-tiered structure	• Describe different agreements (waterfall/agile) in separate documents e.g. Appendix
Emphasize value delivered	• Milestones and payment terms can be structured based on value-driven deliverables in order to enhance the project's agility. Can be equivalent to FPIF contract in traditional approach
Fixed-price increments	• Decompose scope into smaller, fixed-price micro-deliverables (user stories), giving customer more control over how the money is spent and limiting the supplier's financial risk.
Not-to-exceed time and materials	• Limit budget to fixed amount, allowing customer to add ideas by removing existing ones and prioritize.
Graduated time and materials	• Connect quality and timely delivery of work (use DoD) to financial award – reward for early and penalty for late delivery.
Early cancellation option	• Enable flexible delivery of scope, using DoD — e.g., if partial scope delivery satisfies customer, contract can be cancelled for a fee or free.
Dynamic scope option	• Gives the customer the option to vary scope and fund innovation at specific points while limiting supplier risk. • Vary scope at specific points to adjust features and innovate
Team augmentation	• Embed supplier's services directly into the customer organization; fund team instead of scope

It is possible to create Agile contracts. Agile is built on a synergy of collaboration and trust. The supplier can help by delivering value early and often. The customer can help by providing timely feedback

Plan Procurement Management – Key Output

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Procurement management plan content:

- How procurement will be coordinated with other project aspects, such as project schedule development and control processes;
- Timetable of key procurement activities;
- Procurement metrics to be used to manage contracts;
- Stakeholder roles and responsibilities related to procurement, including authority and constraints of the project team when the performing organization has a procurement department;
- Constraints and assumptions that could affect planned procurements;
- The legal authority and the currency in which payments will be made;
- Determination of whether independent estimates will be used and whether they are needed as evaluation criteria.
- Risk management issues including identifying requirements for performance bonds or insurance contracts to mitigate some forms of project risk.
- Prequalified sellers, if any, to be used.

Plan Procurement Management – Content of Documents

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

Executing the Project

Processes and Key Outputs – cont.

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	Manage Team	• Change requests
	Manage Communications	• Project communications
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	Validate Scope	• Accepted deliverables
	Control Scope	• Change requests
	Control Schedule	• Schedule forecasts • Change requests
	Control Costs	• Cost forecasts • Change requests
	Control Quality	• Quality control measurements • Verified deliverables
	Control Resources	• Change requests
	Monitor Communications	• Change requests
	Monitor Risks	• Work performance information • Change requests
	Control Procurements	• Closed procurements
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Project Closing	**Close Project or Phase**	• Final product, service, or result transition • Final report

Direct and Manage Project Work

Direct & Manage Project Work – Process

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Definition

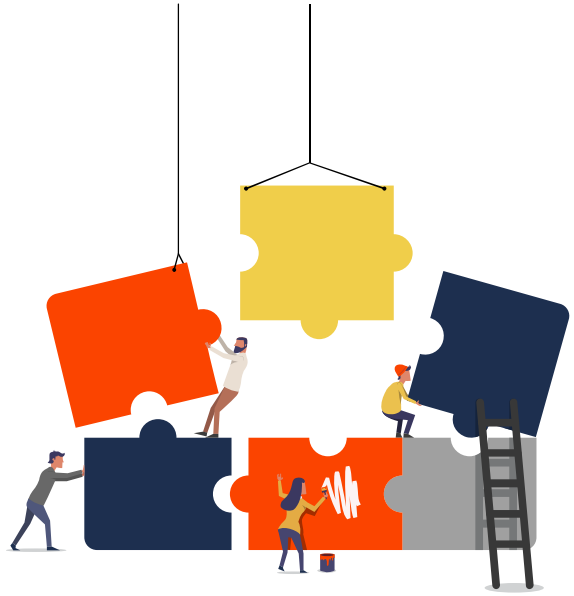
Direct and Manage Project Work is the process of **leading** and performing the work defined in the project management plan and **implementing** approved changes to achieve the project's objectives.

Benefit

It provides overall management of the project work and deliverables, thus improving the probability of project success.

Notes

- This process is performed throughout the project.
- Producing the project deliverables by executing the project management plan.
- Instigating the approved changes, defect repairs, corrective and preventive actions.
- Implementing the planned methods, processes, and standards.
- Producing and distributing status information.



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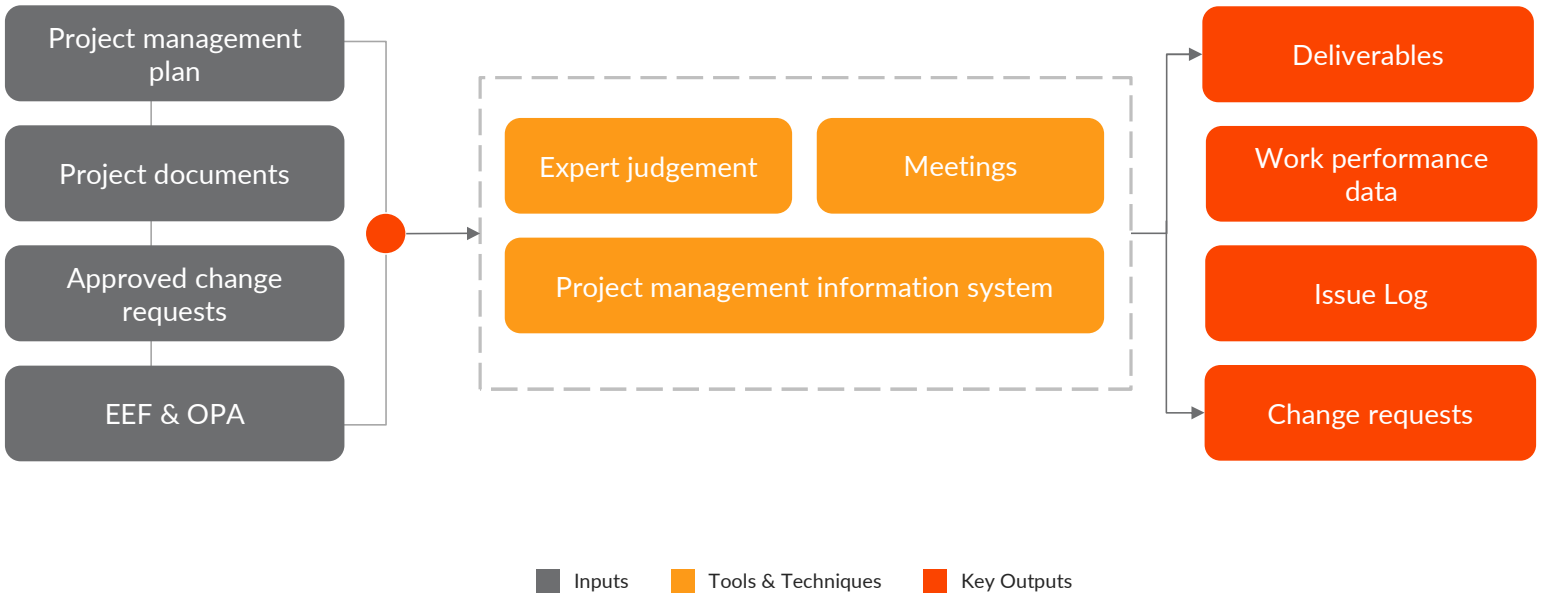

Initiating | Planning | **Executing** | Monitoring & Controlling | Closing

Direct & Manage Project Work – Key Activities

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1. Perform activities to accomplish project requirements
2. Create project deliverables
3. Staff, train and manage the team members
4. Obtain , manage use resources (man-machine-material) , tool equipments
5. Implement planned methods and standards
6. Establish and manage communication channels, external and internal
7. Generate project data (schedule-Cost-technical-quality etc)
8. Manage change requests
9. Manage risks and implement risk responses
10. Manage sellers and suppliers
11. Collect and document lessons learned , implement approved process improvements

Direct & Manage Project Work – Process

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1. This process is part of executing process group. Being a part of Integration ,here project manager synchronizes all the executing processes into a common effort so as to execute the Project Management Plan & meet project requirements.
2. Being a executing process, it has to take care of standard planned activities along with all types of approved changes , actions for appropriate implementation.
3. All the implemented actions are audited / checked through **"Perform Quality Assurance"** process

Direct & Manage Project Work – Process

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- **Deliverables:** any unique product, result, or capability to perform a service that must be produced to complete a process, phase, or project.

- **Change Requests:**
  - **Corrective action**: direction of the implementation of project work to reach the expected future performance that corresponds to project management plan
  - **Preventive action**: direction of one implementation of activities that will influence the probability of negative results related to project risks.
  - **Defect repair**: formally documented identifying defect in a project component and recommendation to either repair the defect or completely replace the component.
  - **Updates**: changes to formally controlled documents, plans to o reflect additional ideas or content.

- **Knowledge management:** is concerned with managing both tacit and explicit knowledge for two purposes:
  - Reusing existing knowledge.
  - Creating new knowledge.

Direct & Manage Project Work – Agile Consideration

- **Iterative Work Execution**: Agile projects are executed in iterations or sprints, with work being planned, executed, and reviewed in short cycles.
  - Allows for regular feedback and continuous improvement.
  - Enhances flexibility to adapt to changes in requirements.
- **Collaboration and Communication:** Agile emphasizes close collaboration among team members and stakeholders.
  - Daily stand-up meetings (Scrum) to discuss progress, impediments, and plans.
  - Use of collaborative tools and techniques to ensure transparency and effective communication.
- **Incremental Deliverables:** Deliverables are produced incrementally, providing value to the customer at the end of each iteration.
  - Focus on delivering small, usable pieces of the product.
  - Regular reviews and demonstrations to gather feedback and make necessary adjustments.
- **Empowered Teams:** Agile teams are self-organizing and empowered to make decisions.
  - Encourages team ownership and accountability.
  - Facilitates faster decision-making and problem-solving.
- **Continuous Improvement:** Agile practices include regular retrospectives to reflect on the process and identify areas for improvement.
  - Promotes a culture of continuous learning and adaptation.
  - Helps in refining processes and practices for better efficiency and effectiveness.

Processes and Key Outputs – cont.

PG	Process Name	Key Outputs
Project Planning	**Plan Procurement Management**	• Procurement management plan • Procurement strategy • Bid documents • Procurement statement of work • Source selection criteria • Make-or-buy decisions • Independent cost estimates
	Plan Stakeholder Engagement	• Stakeholder engagement plan
Project Executing	**Direct and Manage Project Work**	• Deliverables • Change requests
	Manage Project Knowledge	• Lessons learned register
	Manage Quality	• Quality reports • Test and evaluation documents
	Acquire Resources	• Physical resource assignments • Project team assignments • Resource calendars
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	Manage Team	• Change requests
	Manage Communications	• Project communications
	Implement Risk Responses	• Change requests
	Conduct Procurements	• Selected sellers • Agreements
	Manage Stakeholder Engagement	• Stakeholder engagement plan

PG	Process Name	Key Outputs
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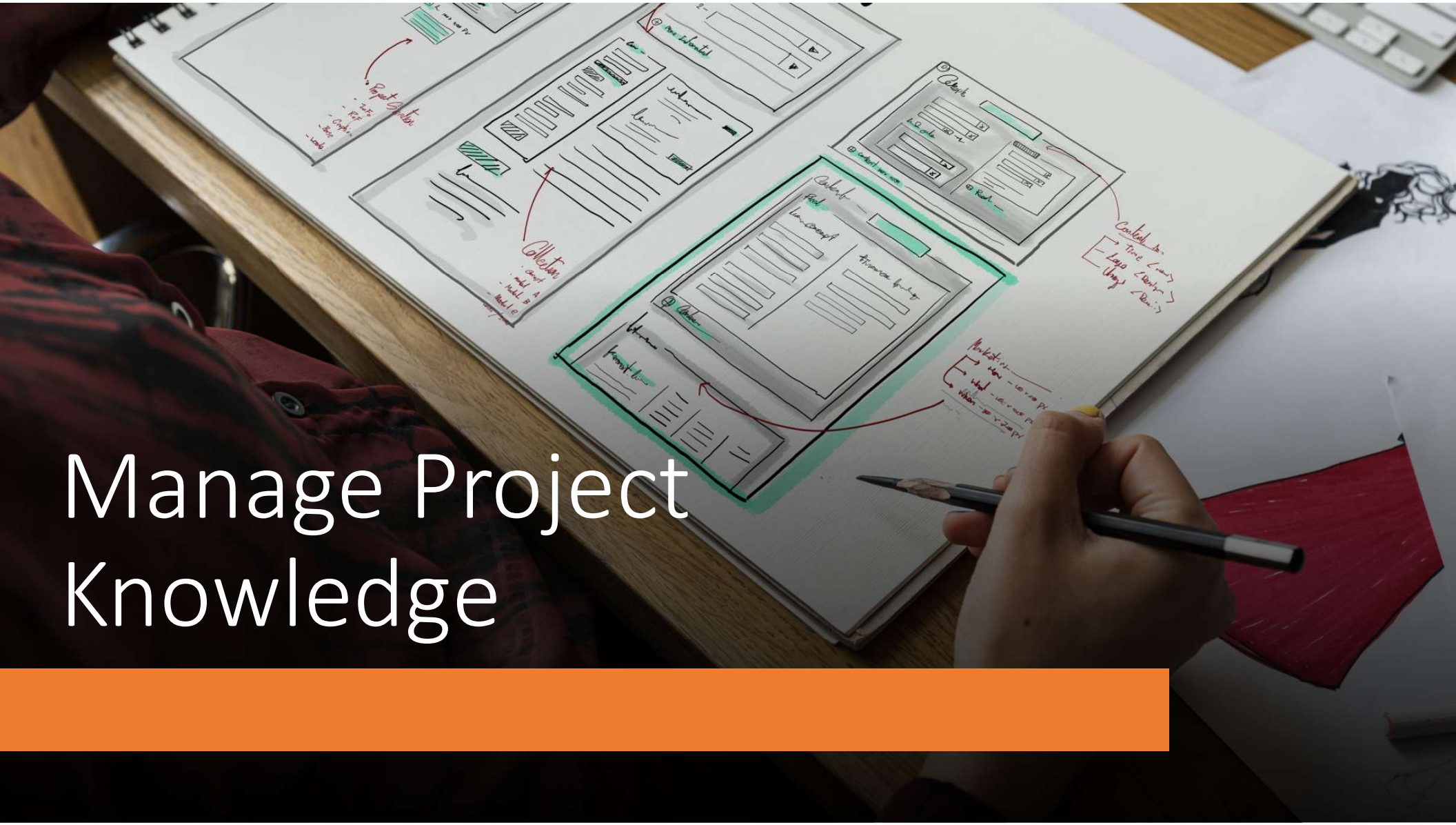
Project Closing	**Close Project or Phase**	• Final product, service, or result transition • Final report



Manage Project Knowledge

Manage Project Knowledge – Process

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Definition

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

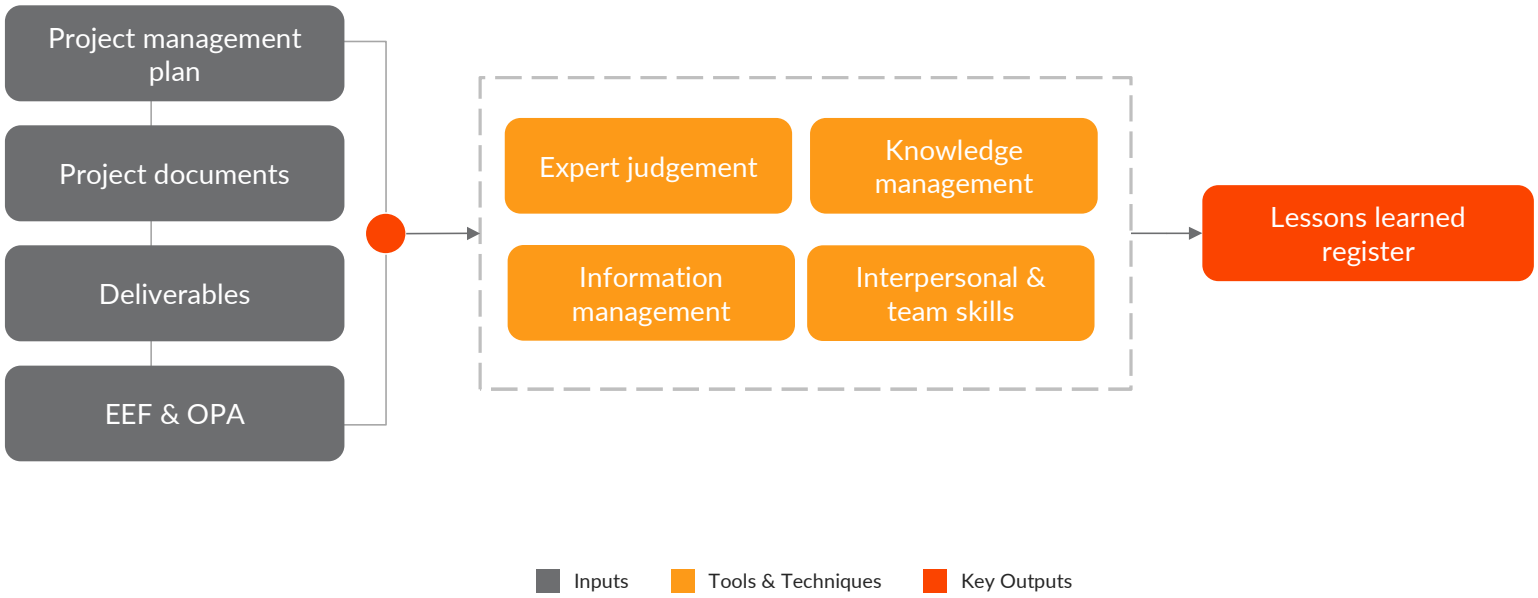
Benefit

Prior organizational knowledge is leveraged to produce or improve the project outcomes, and knowledge created by the project is available to support organizational operations and future projects or phases.

Notes

- This process is performed throughout the project.
- Just documenting it so it can be shared.
- Just obtaining lessons learned at the end of the project.

Manage Project Knowledge – Process



Initiating | Planning | **Executing** | Monitoring & Controlling | Closing

Knowledge Management System – Cycle

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The key benefits of this process are that prior organizational knowledge is leveraged to produce or improve the project outcomes, and knowledge created by the project is available to support organizational operations and future projects or phases.

Some specific results from Lessons Learned:

- Update knowledge base, Process in OPA
- Update Skill sets of project resources
- Overall efficiency improvement
- Strengthening organizational project Risk management

Manage Project Knowledge – Agile Consideration

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- **Knowledge Sharing and Collaboration**: Agile emphasizes open communication and collaboration among team members.
  - Use of collaborative tools and platforms to share knowledge.
  - Regular meetings (e.g., daily stand-ups, sprint reviews) to discuss progress and share insights.
- **Continuous Learning and Improvement:** Agile practices include regular retrospectives to reflect on the process and identify areas for improvement.
  - Encourages a culture of continuous learning and adaptation.
  - Teams regularly review what worked well and what didn't, and make adjustments accordingly.
- **Documentation Practices:** Agile values working software over comprehensive documentation, but still recognizes the importance of essential documentation.
  - Focus on creating "just enough" documentation to support the team and stakeholders.
  - Use of lightweight documentation methods, such as user stories and acceptance criteria.
- **Tacit Knowledge Capture:** Agile teams often rely on tacit knowledge, which is knowledge gained through experience and shared informally.
  - Pair programming, mob programming, and collaborative workspaces help in capturing and sharing tacit knowledge.
  - Encourages mentoring and knowledge transfer within the team.
- **Knowledge Repositories:** Agile teams use knowledge repositories to store and manage project knowledge.
  - Use of wikis, shared drives, and other digital tools to maintain and access knowledge.
  - Ensures that knowledge is easily accessible and can be reused in future projects.

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Manage Stakeholder Engagement

Manage Stakeholder Engagement – Concepts

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- Engaging stakeholders at appropriate project stages to obtain, confirm, or maintain their continued commitment to the success of the project
- Managing stakeholder's expectations through negotiation & communication
- Addressing any risk or potential concerns related to stakeholder management & anticipating future issues that may be raised by stakeholders
- Clarifying & resolving issues that have been identified

Manage Stakeholder Engagement – Concepts cont.

- Stakeholder's **needs must be understood** in order to resolve their issues throughout the project.
- Anticipating the concerns of stakeholders and taking **some proactive measures to make the stakeholders feel that their needs** and concerns are taken care positively.
- This process also plays the valuable role of keeping open communication channels with the stakeholders **for them to communicate project team about added risks, potential changes etc.**

Manage Stakeholder Engagement – Process

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Definition

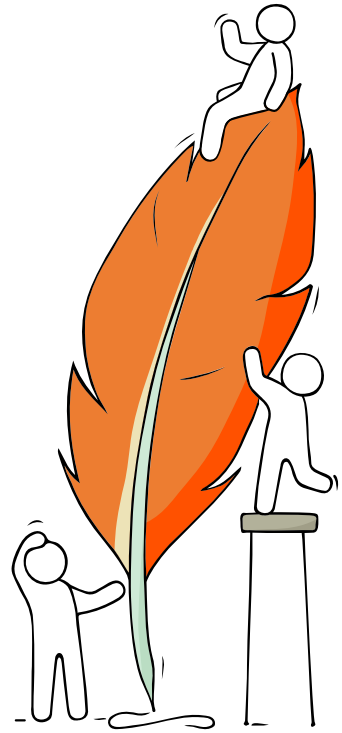
Manage Stakeholder Engagement is the process of communicating and **working with stakeholders to meet their needs and expectations**, address issues, and foster appropriate stakeholder involvement.

Benefit

Allows the project manager to increase support and minimize resistance from stakeholders.

Notes

- This process is performed throughout the project.
- Engaging stakeholders at appropriate project stages to obtain, confirm, or maintain their continued commitment to the success of the project.
- Managing stakeholder expectations through negotiation and communication.
- Addressing any risks or potential concerns related to stakeholder management and anticipating future issues that may be raised by stakeholders.
- Clarifying and resolving issues that have been identified.
- Helps to ensure that stakeholders clearly understand the project goals, objectives, benefits, and risks for the project, as well as how their contribution will enhance project success.



Manage Stakeholder Engagement – Process

Initiating | Planning | **Executing** | Monitoring & Controlling | Closing

Manage Stakeholder Engagement – Tools & Techniques

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Communication Skills:

- Conversations: Formal – Informal
- Issue identification & discussions
- Meetings, progress reporting
- Surveys

Interpersonal and Team Skills:

- Conflict management
- Cultural awareness
- Negotiation
- Conversation
- Political awareness

Processes and Key Outputs – cont.

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Manage Quality

Manage Quality Process

Definition

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.

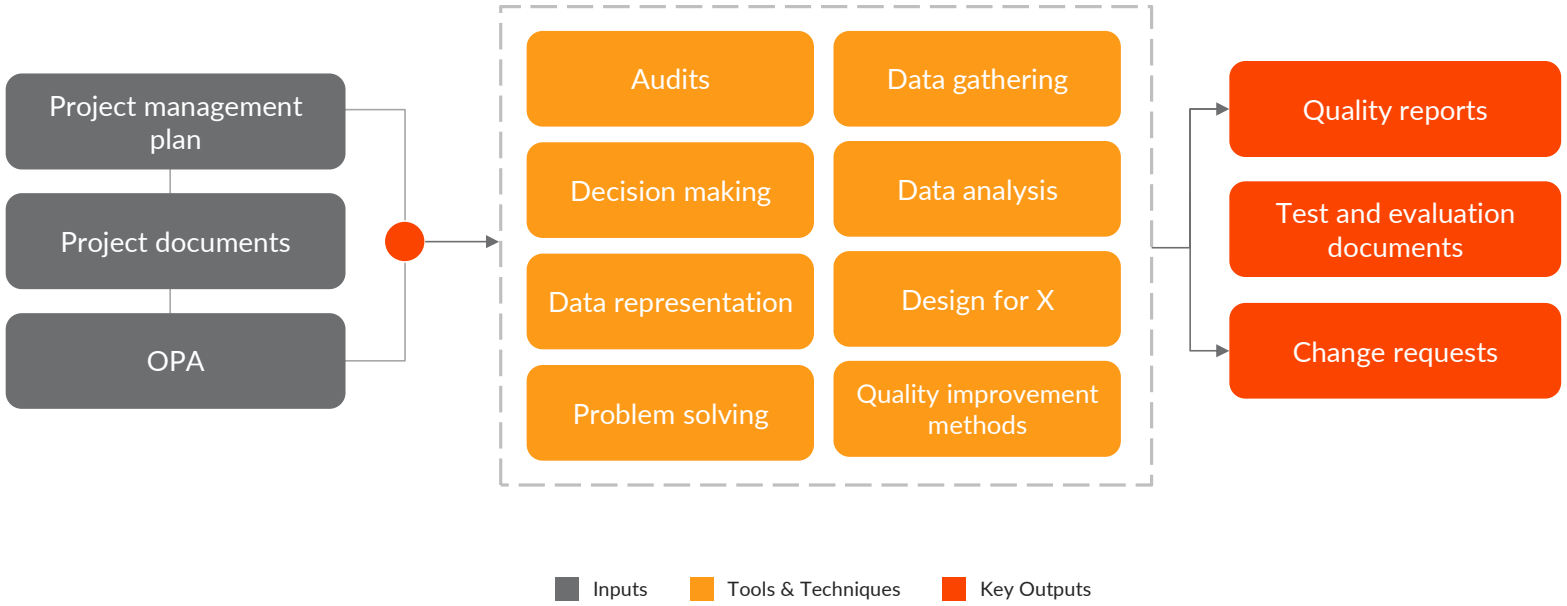
Benefit

It increases the probability of meeting the quality objectives as well as identifying ineffective processes and causes of poor quality.

Notes

- This process is performed throughout the project.
- Manage Quality is sometimes called quality assurance, although Manage Quality has a broader definition than quality assurance as it is used in non-project work.
- In project management, the focus of quality assurance is on the processes used in the project.

Manage Quality – Process



Initiation | Planning | **Executing** | Monitoring & Controlling | Closing

Manage Quality – Concepts

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- **Manage quality is sometimes called as 'Quality assurance'** although manage Quality has a broader definition than quality assurance as it is used in Non-project work.
- In Project Management focus , Quality assurance is of the processes used in project for effective use of project processes
- Following and meeting standards to assure stakeholders that the final product will meet their needs, expectations and requirements.
- Manage Quality includes all the quality assurance activities and is also concerned with product design aspects & process improvements
- Efforts under manage quality falls under **'conformance work'** category in the cost of quality framework

Manage Quality – Tools & Techniques

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Data gathering:

- **Checklist** is a structured tool usually component specific used To Verify that a set of required steps has been performed or to check if a list of Requirements has been satisfied. Many organizations have standardized checklists available to ensure consistency in frequently performed tasks.
- In some application areas , **checklists** are also available from professional associations or commercial Service providers.
- **Quality checklist** should incorporate the acceptance criteria included in scope baseline

Manage Quality – Tools & Techniques cont.

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Unleashing Capabilities

Data analysis:

- **Alternative Analysis:** It is used to evaluate identified options in order to select the options or approaches to use to execute and perform the work of the project. Many activities have multiple options for accomplishment. They include various resource capabilities, skills , types of machines, different tools, make-rent-buy decisions. Alternative analysis assists in providing the best solution to perform he project activities within the defined constraints.
- **Root Cause Analysis:** (RCA) It is an analytical technique used to determine the basic underlying reason that causes a variance, defect or risk. A root cause may underline more than one variance, defect or risk. Also used as a technique for identifying root causes root causes of a problem and solving them.

Manage Quality – Tools & Techniques cont.

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Data Analysis:

- **Document Analysis:** Analysis of different documents produced as part of the output of project control processes such as “quality reports , test reports, performance reports, and variance analysis” can point to and focus on processes that may be out of control and may jeopardize meeting the specified requirements or stakeholder’s expectations.
- **Process Analysis:** Process analysis identifies opportunities for process improvements. This analysis also examines problems, constraints and non-value added activities that occur during a process.

Manage Quality – Tools & Techniques cont.

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- **Audits:**
- It is a structured, independent review to determine whether project activities comply with organizational and project policies, processes and procedures.
  - A quality audit is usually conducted by a team external to the project.
  - Identify all good and best practices being implemented
  - Identify all non conformity , gaps, and shortcomings
  - Sharing good practices introduced or implemented in similar projects
  - Proactively offering assistance in a positive manner to improve the implementation of processes
  - Highlighting contributions of each audit in the lessons learned repository
- **Quality Audits** can confirm the implementation of approved change requests, corrective actions, defect repairs and preventive actions.

Manage Quality – Tools & Techniques cont.

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Design for X:

- (DfX) It is a set of technical guidelines that may be applied during the design of the product for the optimization of a specific aspect of the design.
- The 'X' in DfX can be different aspects of product development, such as reliability , deployment, assembly, manufacturing, cost, service, usability, safety, and quality.
- **Using "DfX" may result in "cost reduction, quality improvement, better performance & customer satisfaction".**

Manage Quality – Tools & Techniques cont.

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Problem Solving:

- Finding solutions for issues and challenges. Includes gathering additional information , critical thinking, creative, quantitative and / or logical approaches.
- **Effective & systematic problem solving is a fundamental element in quality assurance and quality improvement.** Generally include following:

- Defining problem & identifying the root cause
- Generating possible solutions, choosing the best solution
- Implementing the solution, verifying the effectiveness of solution

Manage Quality – Output - Quality Report Content

- **Quality Management Issues**: Identifies any issues or non-conformances related to quality that were discovered during the project.
  - Description of the issues.
  - Impact on the project.
  - Root cause analysis.
- **Recommendations for Corrective Actions:** Provides suggestions for actions to address the identified quality issues.
  - Specific corrective actions to be taken.
  - Responsible parties for implementing the actions.
  - Timeline for completion.
- **Summary of Findings from Quality Control Activities:** Summarizes the results of quality control activities conducted during the project.
  - Results of inspections, tests, and audits.
  - Compliance with quality standards and requirements.
  - Trends and patterns observed in quality data.
- **Process Improvements:** Includes recommendations for improving processes based on the findings.
  - Suggestions for process changes.
  - Potential benefits of the improvements.
  - Implementation plan for process changes.
- **Product Improvements:** Provides recommendations for enhancing the product based on quality findings.
  - Specific product enhancements.
  - Expected impact on product quality.
  - Plan for implementing product improvements.

Manage Quality – Agile Consideration

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- **Continuous Improvement**: Agile emphasizes continuous improvement through regular retrospectives and feedback loops.
  - Teams reflect on their processes and outcomes at the end of each iteration.
  - Identifies areas for improvement and implements changes in subsequent iterations.
- **Built-In Quality:** Agile practices integrate quality into the development process rather than inspecting for quality at the end.
  - Emphasizes test-driven development (TDD), continuous integration, and automated testing.
  - Ensures that quality is maintained throughout the development cycle.
- **Customer Collaboration:** Agile projects involve continuous collaboration with customers and stakeholders.
  - Regular reviews and demonstrations to gather feedback.
  - Ensures that the product meets customer expectations and quality standards.
- **Definition of Done:** Agile teams use a clear and agreed-upon definition of done to ensure that all work meets quality standards.
  - Includes criteria such as code reviews, testing, and documentation.
  - Ensures consistency and completeness of deliverables.
- **Quality Metrics:** Agile teams use metrics to monitor and improve quality.
  - Metrics such as defect rates, velocity, and customer satisfaction.
  - Helps in identifying trends and making data-driven decisions.
- **Empowered Teams:** Agile teams are self-organizing and empowered to make decisions about quality.
  - Encourages team ownership and accountability for quality.
  - Facilitates faster resolution of quality issues.

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Acquire Resources

Acquire Resources – Process

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Unleashing Capabilities

Definition

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

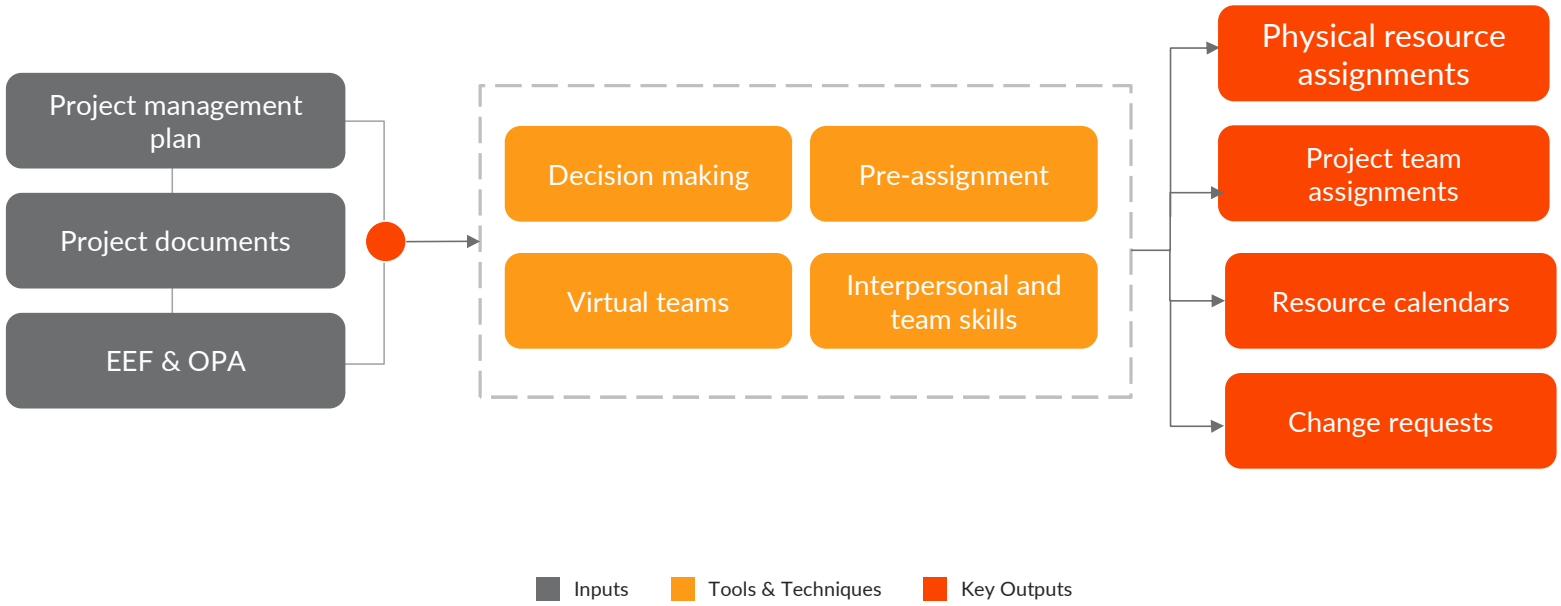
Benefit

Outlines and guide the selection of resources and assigns them to their respective activities.

Notes

- This process is performed periodically.
- The resources needed for the project can be internal or external.
- The project manager or project team should effectively negotiate and influence others who are in a position to provide the required team and physical resources for the project.
- Failure to acquire the necessary resources for the project may affect project constraints.
- Insufficient resources or capabilities decrease the probability of success.

Acquire Resources – Process



Initiating | Planning | Executing | Monitoring & Controlling | Closing

Acquire Resources – Considerations

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- The Resources needed for the project can be internal or external to Project – Performing Organization.
- Internal Resources are acquired (assigned) from Functional Managers
- External Resources are acquired through the Procurement Processes

Factors to be considered while acquiring:

- Effectively negotiate & influence others who are in a position to provide required team and physical resources for the project
- Failure to acquire the necessary resources for the project may affect project schedules, Budgets, customer satisfaction, quality and risks
- If the team resources are not available due to constraints such as economic factors or assignment to other projects , the project manager may be required to assign alternative resources perhaps with different competencies or costs.

Acquire Resources – Tools & Techniques

- **Pre-Assignment**: Resources are pre-assigned if they are specified in the project charter or other early project documents.
  - Ensures key resources are available from the start.
  - Reduces the time needed to acquire resources during the project.
- **Negotiation:** Project managers may need to negotiate with functional managers, other project teams, or external organizations to secure the necessary resources.
  - Helps in obtaining the best possible resources.
  - Requires strong communication and negotiation skills.
- **Acquisition:** Resources can be acquired from outside the organization if internal resources are insufficient.
  - Involves procurement processes to hire contractors or purchase materials.
  - Ensures that all necessary resources are available for project execution.
- **Virtual Teams:** Use of virtual teams allows for the inclusion of team members from different geographic locations.
  - Facilitates access to a broader pool of talent.
  - Requires effective communication tools and techniques to manage remote collaboration.
- **Multi-Criteria Decision Analysis:** This technique uses a set of criteria to evaluate and select resources.
  - Criteria may include availability, cost, experience, and skills.
  - Helps in making informed decisions about resource selection.
- **Interpersonal and Team Skills:** Skills such as negotiation, influencing, and conflict resolution are crucial in acquiring resources.
  - Enhances the ability to secure the best resources.
  - Improves team dynamics and collaboration.

Acquire Resources – Agile Considerations

- **Cross-Functional Teams**: Agile projects typically require cross-functional teams that have all the skills necessary to complete the work within the team.
  - Ensures that the team can handle various tasks without relying on external resources.
  - Promotes collaboration and knowledge sharing among team members.
- **Team Empowerment:** Agile teams are self-organizing and empowered to make decisions about how to accomplish their work.
  - Encourages team ownership and accountability.
  - Facilitates faster decision-making and problem-solving.
- **Resource Flexibility:** Agile projects often require flexibility in resource allocation to adapt to changing project needs and priorities.
  - Allows for quick reallocation of resources based on the current iteration's requirements.
  - Supports the iterative and incremental nature of agile projects.
- **Collaboration Tools:** Effective communication and collaboration tools are essential for agile teams, especially if they are distributed or working remotely.
  - Tools like Slack, Jira, and Trello help in managing tasks and facilitating communication.
  - Ensures that all team members are aligned and informed.

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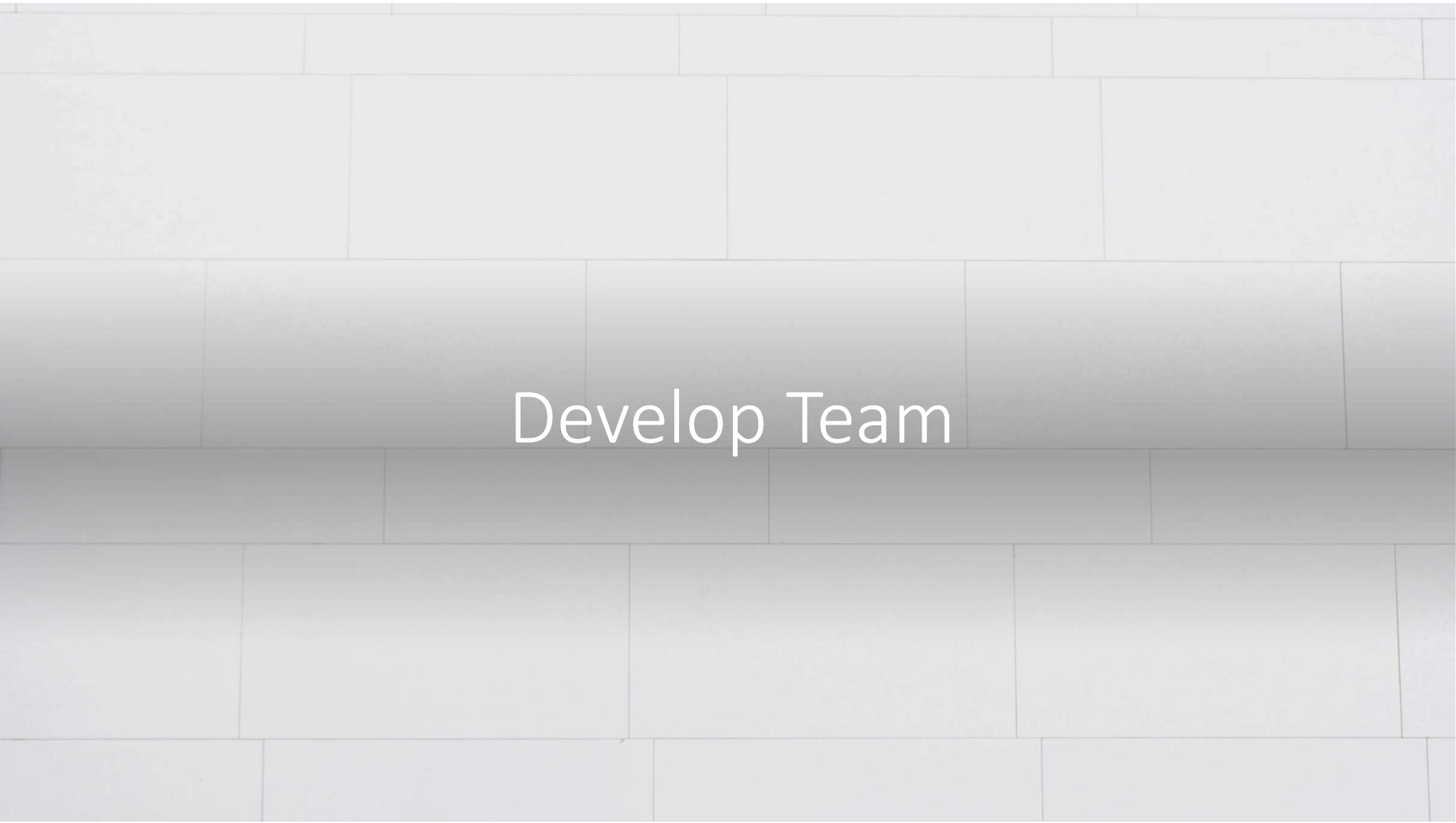
Develop Team

Develop Team – Process

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Definition

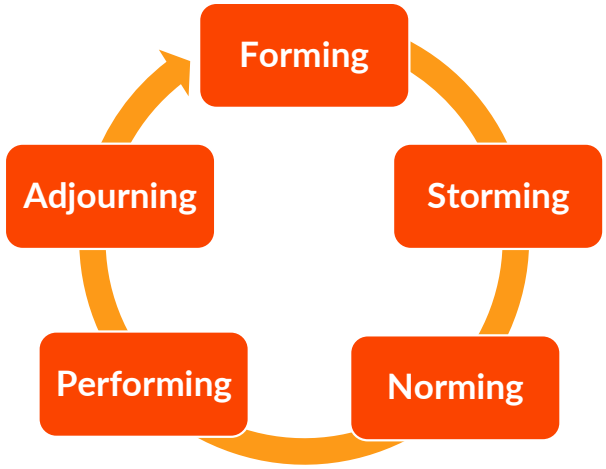
The process of **improving competencies**, team member interaction, and the overall team environment to enhance project performance.

Benefit

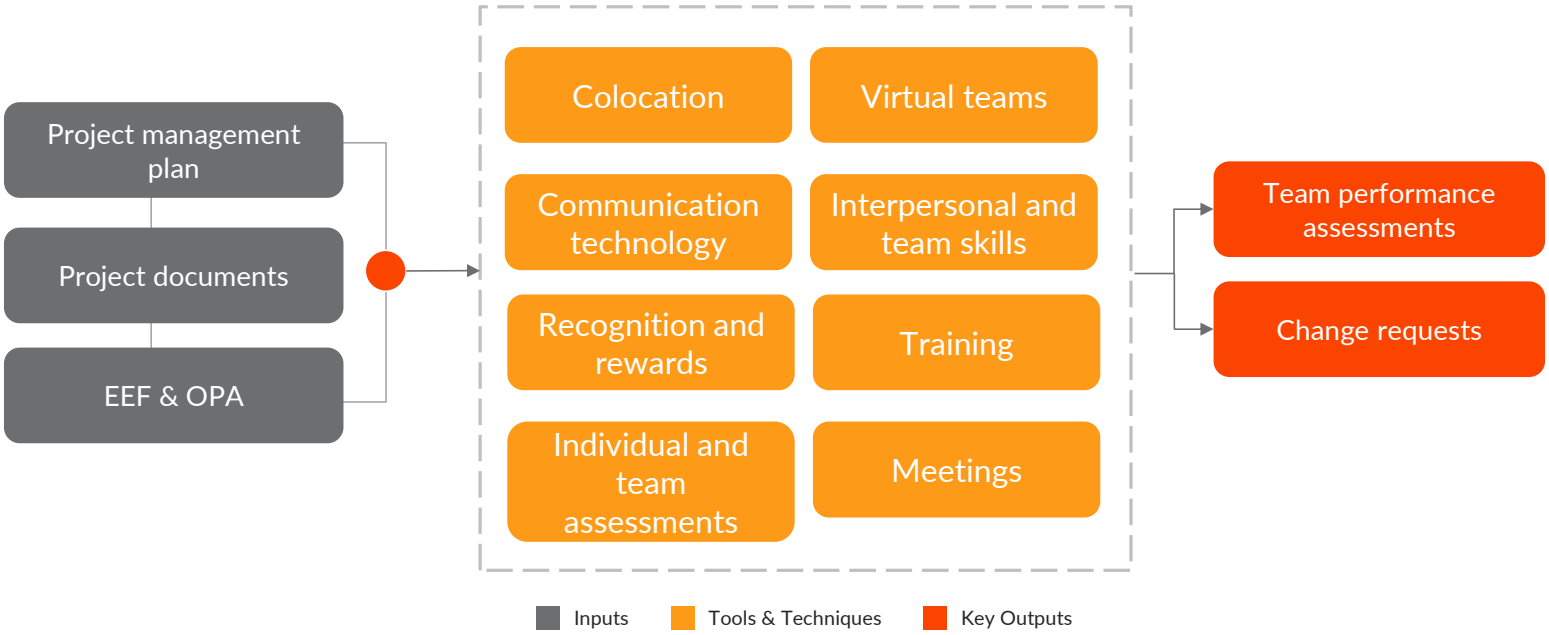
Results in improved teamwork, enhanced interpersonal skills and competencies, motivated employees, reduced attrition, and improved overall project performance.

Notes

- This process is performed throughout the project.
- Project managers should create an environment that facilitates teamwork and continually motivates the team.
- High team performance can be achieved by:
- Using open and effective communication
- Creating team-building opportunities.
- Developing trust among team members.
- Managing conflicts in a constructive manner.
- Encouraging collaboration.



Develop Team – Process



Initiating | Planning | **Executing** | Monitoring & Controlling | Closing

Develop Team – Key Concepts

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- Project Managers require the skills to **identify**, **build maintain**, **motivate**, **lead**, & **inspire** project teams to achieve high team performance & to meet the project's objectives

Project manager should:

- Create environment that facilitates teamwork and continually motivates the team by providing challenges & opportunities, Provide timely feedback and support as needed
- Create the appreciation, recognition culture , environment with respective system for rewarding good performance
- Have clear, timely, effective and efficient communication between team members throughout the project life cycle
- Team development model: **Tuckman's ladder** which includes five development stages:

  Forming – Storming – Norming – Performing – Adjourning

Teamwork is critical for project success.

Develop Team – Tuckman Ladder

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Tuckman ladder: is one of the models used to describe team development which includes five stages of development that teams may go through. Although it is common for these stages to occur in order, it is not uncommon for a team to get stuck in a particular stage or regress to an earlier stage. Projects with team members who worked together in the past might skip a stage. The duration of a particular stage depends upon team dynamics, team size, and team leadership.

1. **Forming:** team members meet and learn about the project and their formal roles and responsibilities. Team members tend to be independent and not as open in this phase.
2. **Storming:** the team begins to address the project work, technical decisions, and the project management approach. If team members are not collaborative or open to differing ideas and perspectives, the environment can become counterproductive.
3. **Norming:** team members begin to work together and adjust their work habits and behaviours to support the team. The team members learn to trust each other.
4. **Performing:** teams that reach the performing stage function as a well-organized unit. They are interdependent and work through issues smoothly and effectively.
5. **Adjourning:** the team completes the work and moves on from the project. This typically occurs when staff is released from the project as deliverables are completed or as part of the Close Project or Phase process.

Develop Team – Virtual Team

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What is Virtual Team?

- Groups of people with a shared goal who fulfill their roles with little or no time spent meeting face to face.

Why virtual teams are used ?

- Common organizational team but located geographical wide
- Special expertise from remote / distant geographical area
- Team members working from home, different timing or shifts
- It Includes Mobility of handicapped people
- Controlling heavy travel expenses & schedules as needs interactions at different geographical locations.

Importance of Interaction: Communications planning is most essential as resources are at distant locations

Typical Mode of interactions are E-mail, Video conferencing etc.

Develop Team – Activities

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Interpersonal and Team Skills:

- Conflict management
- Influencing
- Motivation
- Negotiation
- Team building

Recognition – Rewards: People are motivated when they feel they are valued in the organization and their value is demonstrated by the rewards given to them. Monetary rewards as tangible & opportunity to grow, accomplish, be appreciated are most common motivational things

Develop Team – Agile Consideration

- **Adopt an Agile Mindset**:
  - Encourage team members to embrace Agile principles and values, such as collaboration, customer focus, and adaptability.
  - Promote a culture of continuous learning and improvement.
- **Form Cross-Functional Teams:**
  - Ensure the team has all the necessary skills to complete tasks independently.
  - Include members with diverse expertise to enhance problem-solving and innovation.
- **Foster Collaboration and Communication:**
  - Implement regular meetings such as daily stand-ups, sprint planning, and retrospectives to facilitate communication.
  - Use collaborative tools and techniques to enhance teamwork and information sharing.
- **Encourage Self-Organization:**
  - Empower team members to make decisions and take ownership of their work.
  - Allow the team to manage their tasks and workflows, promoting accountability and responsibility.
- **Provide Training and Support:**
  - Offer training on Agile methodologies, such as Scrum or Kanban, to ensure team members understand the framework.
  - Provide ongoing support and resources to help the team develop their skills and knowledge.
- **Promote a Safe and Trusting Environment:**
  - Create a culture where team members feel safe to express their ideas and concerns.
  - Encourage open and honest communication, and address conflicts constructively.
- **Focus on Continuous Improvement:**
  - Use retrospectives to reflect on the team's performance and identify areas for improvement.

Processes and Key Outputs – cont.

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	Plan Stakeholder Engagement	• Stakeholder engagement plan
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	Manage Quality	• Quality reports • Test and evaluation documents
	Acquire Resources	• Physical resource assignments • Project team assignments • Resource calendars
	Develop Team	• Team performance assessments
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	Manage Stakeholder Engagement	• Stakeholder engagement plan

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Manage Team

Manage Team – Process

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Definition

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

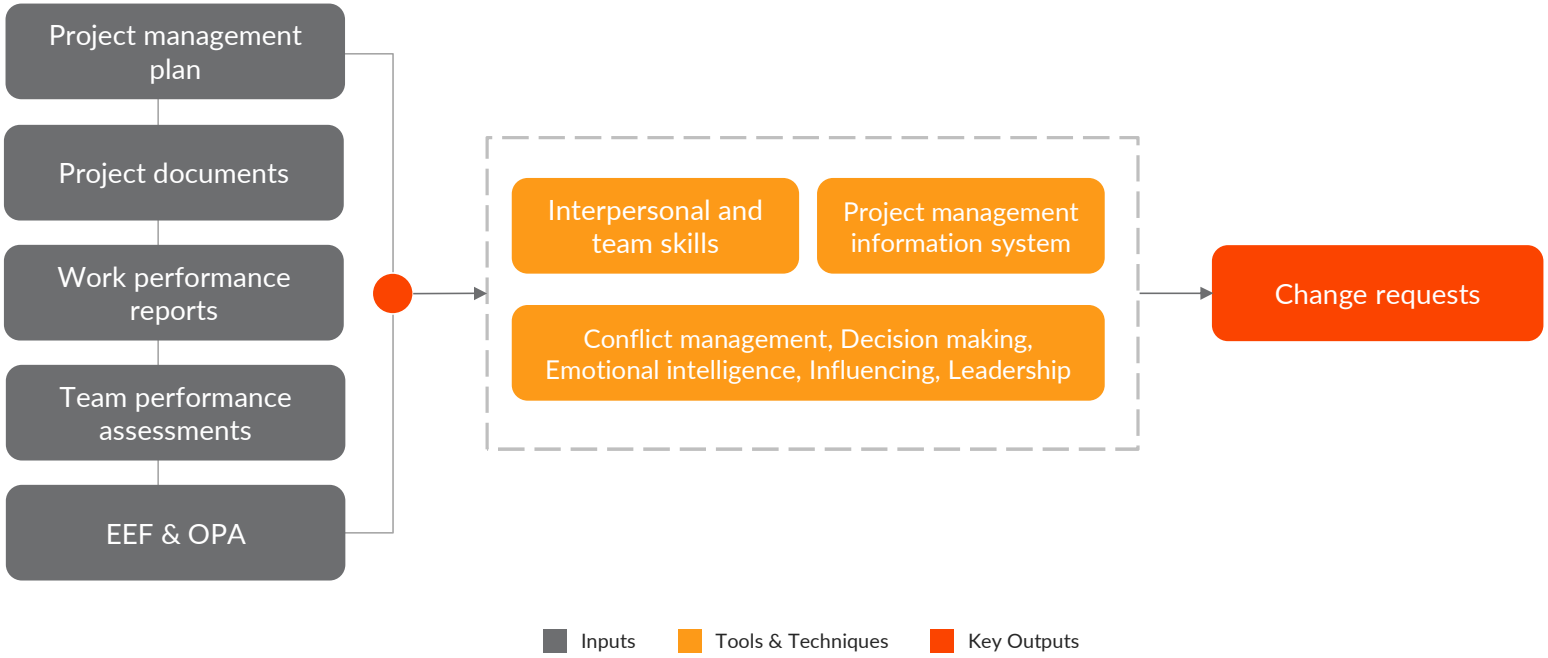
Benefit

Influences team behavior, manages conflict, and resolves issues.

Notes

- This process is performed throughout the project.
- Managing the project team requires a variety of management and leadership skills for fostering teamwork and integrating the efforts of team members to create high-performance teams.
- Team management involves a combination of skills with special emphasis on communication, conflict management, negotiation, and leadership.
- The project manager needs to be sensitive to both the willingness and the ability of team members to perform their work.

Manage Team – Process



Initiating | Planning | **Executing** | Monitoring & Controlling | Closing

Manage Team – Conflict Management

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Conflict Management:

- Conflict is inevitable in a project environment. **Common sources of conflict include "Limited resources, scheduling priorities and individual work style".** Team ground rules, group norms and solid project management practices about communication planning-role definition can help reduce conflicts.
- Successful conflict management results in greater productivity and positive working relationships.
- Can lead to increased creativity and better decision making
- If conflict gets escalated, project manager should help facilitate a satisfactory solution
- Should be addressed early and privately

Different popular Solutions:

- **Withdraw** (Avoid), **Smooth** (Accommodate), **Compromise** (Reconcile), **Force** (Direct), **Collaborate** (problem solve).

Manage Team – Resolution Techniques

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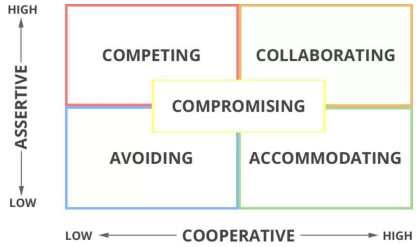
Conflict resolution techniques: there are five general techniques for resolving conflict:

1. **Withdraw/avoid:** retreating from an actual or potential conflict situation; postponing the issue to be better prepared or to be resolved by others. (Lose-Lose)
2. **Smooth/accommodate**: emphasizing areas of agreement rather than areas of difference; conceding(giving away) one's position to the needs of others to maintain harmony and relationships.(Lose-Lose)
3. **Compromise/reconcile**: searching for solutions that bring some degree of satisfaction to all parties in order to temporarily or partially resolve the conflict. This approach occasionally results in a (Lose-Lose) situation.
4. **Force/direct/competing**: pushing one's viewpoint at the expense of others; offering only win-lose solutions, usually enforced through a power position to resolve an emergency. This approach often results to a (Win-Lose) situation.
5. **Collaborate/problem solving**: incorporating multiple viewpoints and insights from differing perspectives; requires a cooperative attitude and open dialogue that typically leads to consensus and commitment. This approach can result in a (Win-Win) situation



"Project Manager Must Carefully Select the Appropriate Mode"

Manage Team – Key Activities

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- Tracking team member's performance. providing feedback, resolving issues and coordinating changes to enhance project performance
- Observing team behavior, managing conflicts, resolving issues & appraising team member's performance
- It is complicated when team members are accountable to both a functional manager as well as project manager within a Matrix type of organization
- In Matrix organization one of critical success factor of the project is effective management of the dual reporting relationship (this becomes the responsibility of the Project Manager)

Manage Team – Project Manager Power

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- **Project Manager should exert different types of POWER:**
  - **Expert:** Power received out of EXPERTISE
  - **Reward:** Power of ability to REWARD project resources
  - **Formal:** Power acquired out of Position (Chair power)
  - **Penalty:** Power of able to penalize project resources

Manage Team – Agile Consideration

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- **Facilitate Communication and Collaboration**:
  - Conduct regular meetings such as daily stand-ups, sprint planning, and retrospectives to ensure continuous communication.
  - Use collaborative tools to enhance teamwork and information sharing.
- **Support Self-Organization**:
  - Empower team members to make decisions and take ownership of their tasks.
  - Encourage the team to manage their workflows and resolve issues independently.
- **Remove Impediments**:
  - Identify and eliminate obstacles that hinder the team's progress.
  - Escalate issues that the team cannot resolve on their own to higher management.
- **Foster a Positive Team Culture**:
  - Create a safe and trusting environment where team members feel comfortable sharing ideas and concerns.
  - Promote a culture of respect, openness, and mutual support.
- **Provide Continuous Feedback and Coaching**:
  - Offer regular feedback to team members to help them improve their performance.
  - Act as a coach and mentor, guiding the team in Agile practices and principles.
- **Encourage Continuous Improvement**:
  - Use retrospectives to reflect on the team's performance and identify areas for improvement.
  - Implement changes based on feedback and lessons learned to enhance team effectiveness.
- **Align Team Goals with Business Objectives**:
  - Ensure that the team's work aligns with the overall business goals and objectives.
  - Communicate the vision and goals clearly to the team to keep them focused and motivated.

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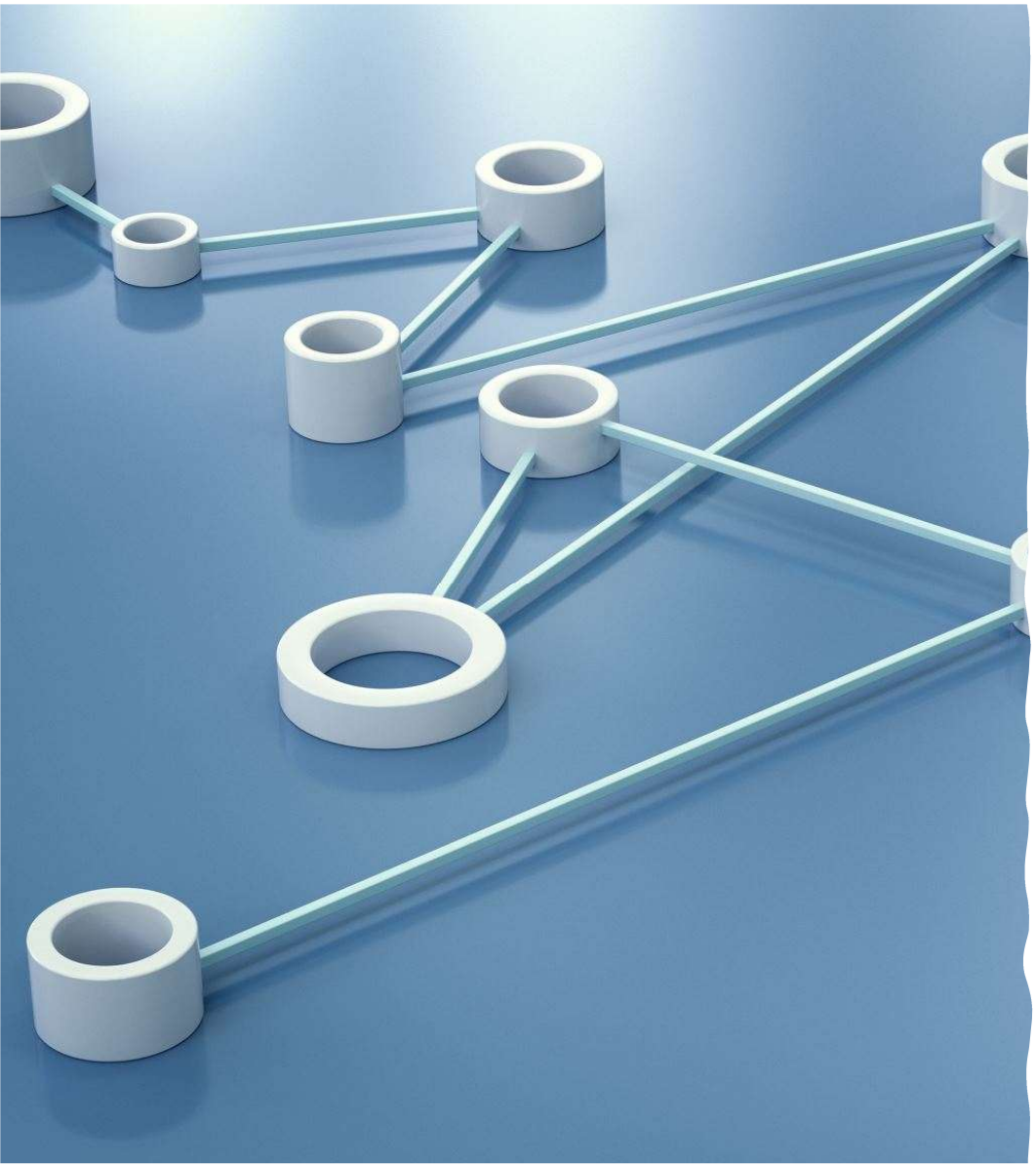

Manage Communications

Manage Communication – Process

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Definition

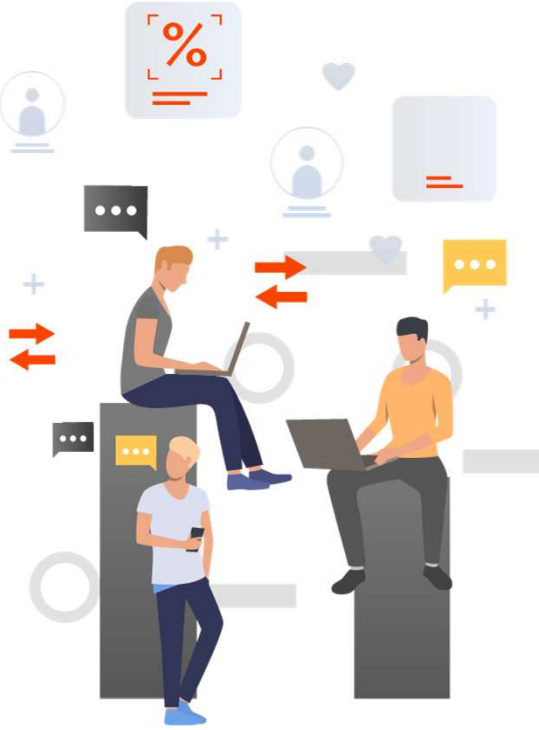
Manage Communications is the process of **ensuring timely** and appropriate collection, creation, distribution, storage, retrieval, management, monitoring, and the ultimate disposition of **project information**.

Benefit

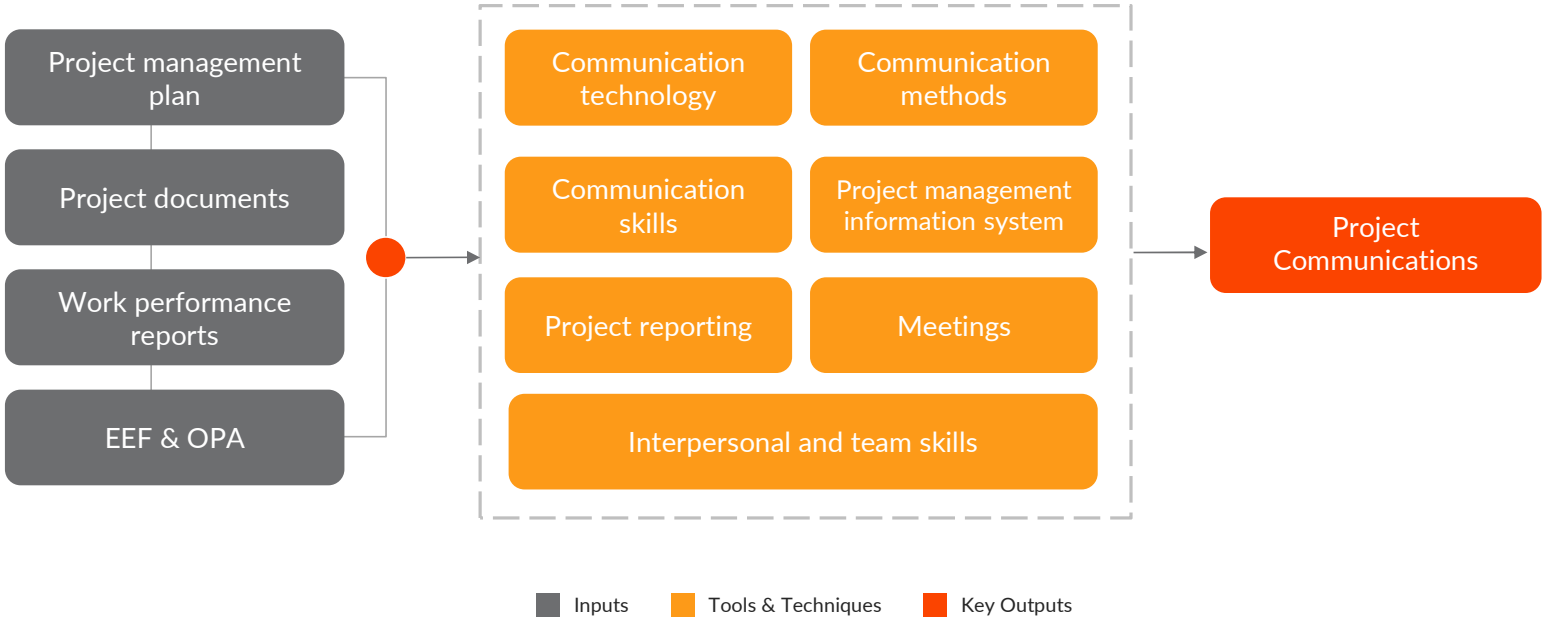
Enables an efficient and effective information flow between the project team and the stakeholders.

Notes

- This process is performed throughout the project.
- This process identifies all aspects of effective communication, including choice of appropriate technologies, methods, and techniques.
- This process goes beyond the distribution of relevant information and seeks to ensure that the information being communicated to project stakeholders has been appropriately generated and formatted, and received by the intended audience. It also provides opportunities for stakeholders to make requests for further information, clarification, and discussion.



Manage Communication – Process



Initiating | Planning | **Executing** | Monitoring & Controlling | Closing

Manage Communication – Skills

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- **Communication Skills**
  - **Communication competence**: a combination of tailored communication skills that considers factors such as clarity of purpose in key messages, effective relationships and information sharing, and leadership behaviours.
  - **Feedback**: information about reactions to communications, a deliverable, or a situation. Feedback supports interactive communication between the project manager, team and all other project stakeholders.
  - **Nonverbal**: body language , tone of voice, facial expressions and Mirroring and eye contact.

Type	Written	Verbal
Formal	Reports, letter, and meeting minutes	Presentations and meetings
Informal	Emails and notes	Ad-hoc meetings

- **Project reporting:** collecting and distributing project information. Project information is distributed to many groups of stakeholders and should be adapted to provide information at an appropriate level, format, and detail for each type of stakeholder. The format may range from a simple communication to more elaborate custom reports and presentations.
- **Project communications:** Project communications artefacts may include but are not limited to: performance reports, deliverable status, schedule progress, cost incurred, presentations, and other information required by stakeholders.
- **Work performance reports:** circulated to the project stakeholders through this process as defined in the communications management plan. Examples of work performance reports include status reports and progress reports.

Manage Communication – Agile Consideration

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- **Regular Meetings**:
  - **Daily Stand-Ups**: Short, daily meetings where team members share updates on their progress, plans for the day, and any impediments they are facing.
  - **Sprint Planning**: Meetings at the beginning of each sprint to plan the work to be completed and discuss resource needs.
  - **Sprint Reviews**: Meetings at the end of each sprint to demonstrate completed work to stakeholders and gather feedback.
  - **Retrospectives**: Meetings to reflect on the sprint and identify areas for improvement.
- **Transparent Communication:**
  - Use visual management tools like Kanban boards or Scrum boards to make the status of tasks visible to everyone.
  - Maintain an accessible and up-to-date product backlog that stakeholders can review.
- **Collaborative Tools:**
  - Utilize collaboration tools such as Slack, Microsoft Teams, or Jira to facilitate real-time communication and information sharing.
  - Use version control systems and shared repositories to ensure that all team members have access to the latest project documents and code.
- **Stakeholder Engagement:**
  - Regularly communicate with stakeholders to keep them informed about project progress, changes, and any issues that arise.
  - Involve stakeholders in sprint reviews and gather their feedback to ensure the project meets their expectations.
- **Feedback Loops:**
  - Establish continuous feedback loops through regular reviews and retrospectives.
  - Encourage open and honest feedback from all team members and stakeholders to improve processes and outcomes.
- **Adaptability:**
  - Be prepared to adjust communication strategies based on the needs of the project and the preferences of the team and stakeholders.
  - Use different communication methods (e.g., face-to-face meetings, emails, instant messaging) to suit different situations and audiences.

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Implement Risk Responses

Implement Risk Responses – Process

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Definition

The process of **implementing** agreed-upon risk response plans.

Benefit

Ensures that agreed-upon risk responses are executed as planned in order to address overall project risk exposure, minimize individual project threats, and maximize individual project opportunities.

Notes

- Ensure that agreed-upon risk responses are actually executed.
- A common problem with Project Risk Management is that project teams spend effort in identifying and analyzing risks and developing risk responses, then risk responses are agreed upon and documented in the risk register and risk report, but no action is taken to manage the risk.

Implement Risk Responses – Concept

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- Proper attention to the implement risk responses process will ensure that agreed –upon risk responses are actually executed.
- A common problem is that project teams spend effort in identifying and analyzing risks and developing risk responses, then risk responses are agreed upon and documented in the risk register and risk report, but no action is taken to manage the risk
- Only if risk owners give the required level of effort to implementing the agreed upon responses, will the overall risk exposures of the project and individual threats and opportunities be managed proactively

Implement Risk Responses – Key Steps

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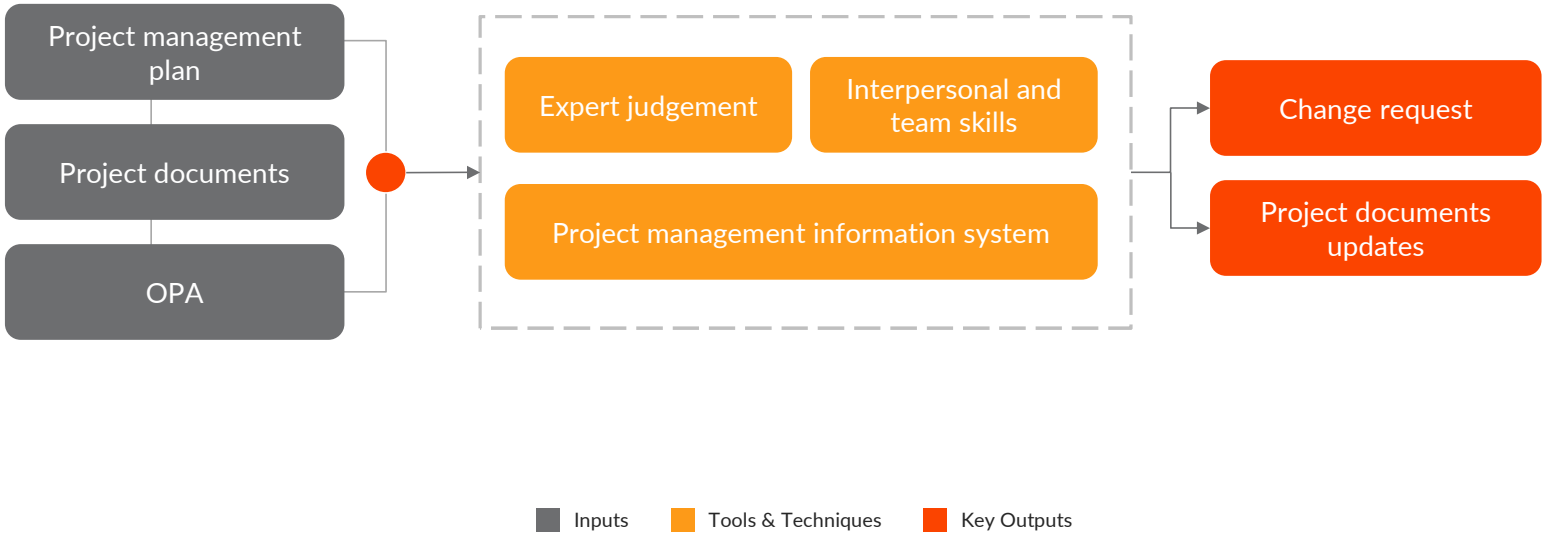
- **Assign Risk Owners**:
  - Designate individuals responsible for managing specific risks.
  - Ensure risk owners are accountable for executing the risk response plans.
- **Execute Risk Response Plans:**
  - Carry out the actions defined in the risk response plans.
  - Implement strategies such as avoiding, transferring, mitigating, or accepting risks.
- **Monitor and Track Progress:**
  - Continuously monitor the effectiveness of the risk responses.
  - Track the progress of risk response actions and update the risk register accordingly.
- **Communicate with Stakeholders:**
  - Maintain open and honest communication with stakeholders about the status of risk responses.
  - Ensure stakeholders are aware of any changes that may affect their responsibilities.
- **Review and Adjust Plans:**
  - Regularly review the risk response plans to ensure they remain effective.
  - Adjust the plans as necessary based on new information or changes in the project environment.
- **Document Lessons Learned:**
  - Capture lessons learned from the implementation of risk responses.
  - Use this information to improve future risk management processes.

Implement Risk Responses – Process



Initiating | Planning | Executing | Monitoring & Controllin | Closing

Implement Risk Responses – Agile Considerations

- **Iterative Risk Management**:
  - Risks are identified, assessed, and managed iteratively throughout the project lifecycle.
  - Risk responses are reviewed and adjusted at the end of each sprint or iteration.
- **Collaborative Approach:**
  - Risk management is a team effort, with all members contributing to identifying and addressing risks.
  - Regular meetings, such as daily stand-ups and sprint retrospectives, provide opportunities to discuss and manage risks.
- **Flexibility and Adaptability:**
  - Agile teams are prepared to adapt their risk responses based on new information or changes in the project environment.
  - The iterative nature of Agile allows for quick adjustments to risk response plans.
- **Continuous Monitoring:**
  - Risks are continuously monitored throughout the project, with regular updates to the risk register.
  - Agile teams use tools like burndown charts and Kanban boards to track the status of risk responses.
- **Empowered Teams:**
  - Teams are empowered to make decisions and take action on risk responses without waiting for higher-level approval.
  - This autonomy allows for faster and more effective risk management.
- **Frequent Communication:**
  - Open and frequent communication within the team and with stakeholders ensures that everyone is aware of the current risk status and response plans.
  - Agile ceremonies, such as sprint reviews and retrospectives, facilitate this communication.
- **Focus on Value Delivery:**
  - Risk responses are aligned with the goal of delivering value to the customer.
  - Agile teams prioritize risk responses that protect or enhance the delivery of valuable features.

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Conduct Procurement

Conduct Procurements – Process

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Definition

Conduct Procurements is the process of **obtaining** seller responses, **selecting** a seller, and **awarding** a contract

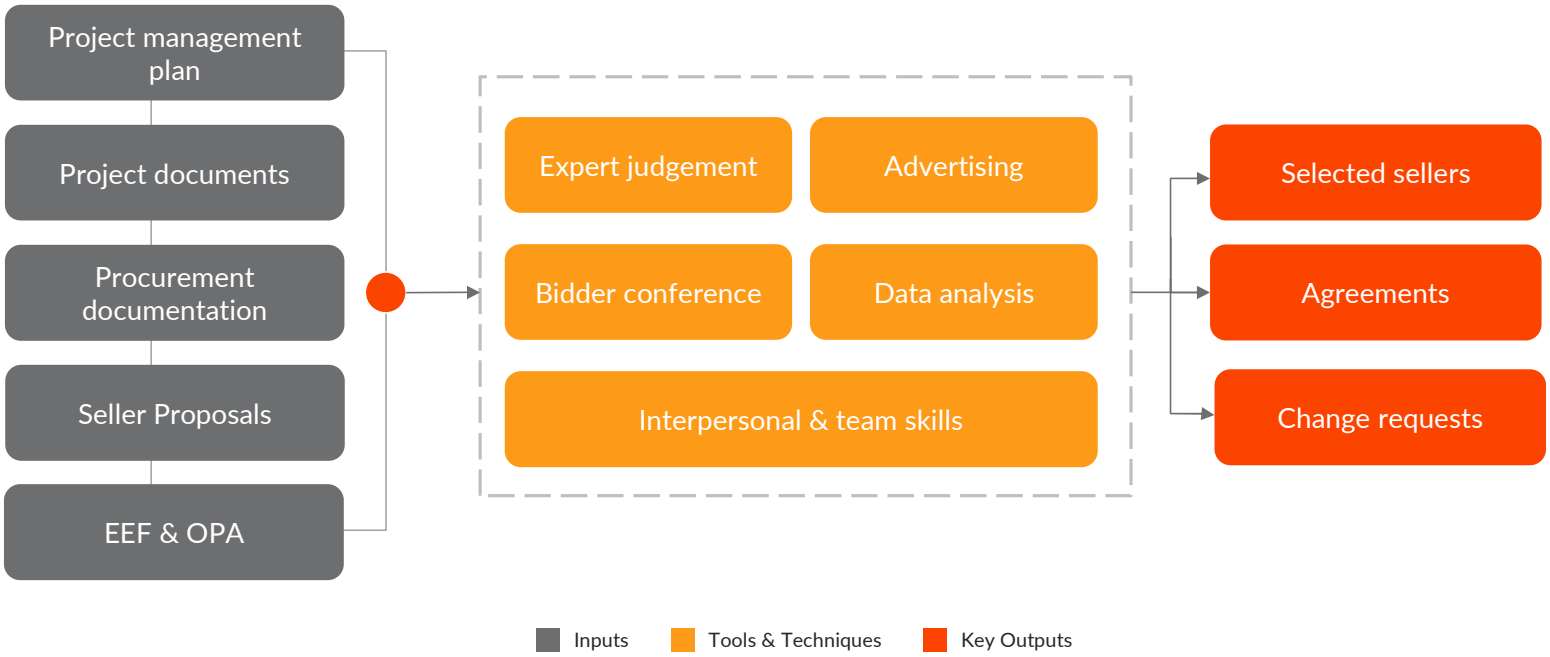
Benefit

Selects a qualified seller and implements the legal agreement for delivery.

Notes

- This process is performed periodically throughout the project as needed.
- The end results of the process are the established agreements including formal contracts. This process is performed periodically throughout the project as needed.
- Both the buyer and the seller administer the procurement contract for similar purposes.

Conduct Procurements – Process



Initiating | Planning | **Executing** | Monitoring & Controlling | Closing

Conduct Procurements – Key Steps

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- **Prepare Procurement Documents:**
  - Develop and issue procurement documents such as Requests for Proposals (RFPs), Invitations for Bid (IFBs), and Requests for Quotations (RFQs).
  - Ensure that the documents clearly define the project requirements, evaluation criteria, and submission guidelines.
- **Obtain Seller Responses:**
  - Distribute the procurement documents to potential sellers.
  - Facilitate a process for sellers to submit their proposals, bids, or quotations.
- **Evaluate Seller Proposals:**
  - Review and assess the received proposals against the predefined evaluation criteria.
  - Conduct technical and financial evaluations to determine the best fit for the project needs.
- **Select a Seller:**
  - Choose the seller that best meets the project requirements and offers the best value.
  - Conduct negotiations if necessary to finalize terms and conditions.
- **Award the Contract:**
  - Formally award the contract to the selected seller.
  - Ensure that all contractual agreements are documented and signed by both parties.
- **Establish Agreements:**
  - Develop and finalize the legal agreements, including terms and conditions, scope of work, and payment schedules.
  - Ensure that all parties understand and agree to the contract terms.
- **Communicate with Stakeholders:**
  - Inform relevant stakeholders about the procurement decisions and contract awards.
  - Ensure that stakeholders are aware of their roles and responsibilities in the procurement process.

Conduct Procurements – Agile Considerations

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- **Iterative Procurement Planning:**
  - Procurement activities are planned iteratively, often aligning with the sprint cycles.
  - Requirements and procurement needs are revisited and adjusted at the end of each sprint or iteration.
- **Collaborative Vendor Relationships:**
  - Foster a collaborative relationship with vendors, treating them as partners rather than just suppliers.
  - Engage vendors early in the process to ensure they understand the Agile approach and can adapt accordingly.
- **Flexible Contracts:**
  - Use flexible contract types that allow for changes and adjustments as the project evolves.
  - Consider contracts that support iterative delivery, such as time and materials or incremental delivery contracts.
- **Continuous Feedback and Improvement:**
  - Establish mechanisms for continuous feedback from vendors to ensure alignment with project goals.
  - Use retrospectives to review procurement processes and identify areas for improvement.
- **Frequent Communication:**
  - Maintain open and frequent communication with vendors to ensure they are aware of project changes and updates.
  - Use Agile ceremonies, such as sprint reviews, to involve vendors and gather their input.
- **Value-Driven Procurement:**
  - Focus on procuring goods and services that deliver the most value to the project and stakeholders.
  - Prioritize procurement activities based on the value they bring to the project.
- **Risk Management:**
  - Continuously assess and manage risks associated with procurements.
  - Collaborate with vendors to identify and mitigate risks early in the process.

Monitoring & Controlling the Project

Processes and Key Outputs – cont.

PG	Process Name	Key Outputs
Project Planning	**Plan Procurement Management**	• Procurement management plan • Procurement strategy • Bid documents • Procurement statement of work • Source selection criteria • Make-or-buy decisions • Independent cost estimates
	Plan Stakeholder Engagement	• Stakeholder engagement plan
Project Executing	**Direct and Manage Project Work**	• Deliverables • Change requests
	Manage Project Knowledge	• Lessons learned register
	Manage Quality	• Quality reports • Test and evaluation documents
	Acquire Resources	• Physical resource assignments • Project team assignments • Resource calendars
	Develop Team	• Team performance assessments
	Manage Team	• Change requests
	Manage Communications	• Project communications
	Implement Risk Responses	• Change requests
	Conduct Procurements	• Selected sellers • Agreements
	Manage Stakeholder Engagement	• Stakeholder engagement plan

PG	Process Name	Key Outputs
Project Monitoring & Controlling	**Monitor and Control Project Work**	• Work performance reports • Change requests
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	Control Scope	• Change requests
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	Monitor Stakeholder Engagement	• Work performance information • Change requests
Project Closing	**Close Project or Phase**	• Final product, service, or result transition • Final report

Monitor & Control Project Work – Process

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Definition

Monitor and Control Project Work is the process of tracking, reviewing, and reporting the **overall progress to meet the performance objectives** defined in the project management plan.

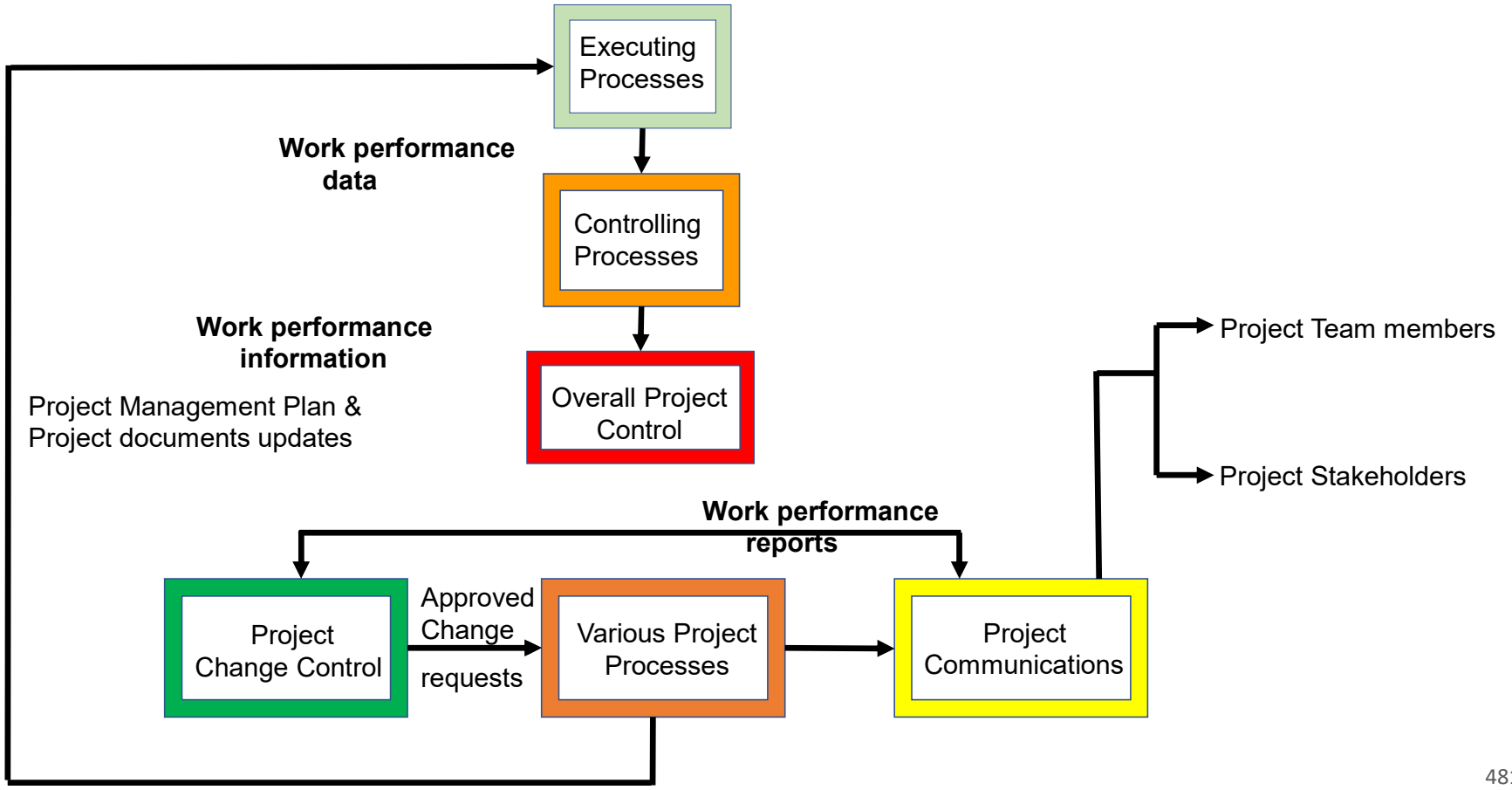
Benefit

- It allows stakeholders to understand the current state of the project.
- Recognize the actions taken to address any performance issues.
- To have visibility into the future project status with cost and schedule forecasts.

Notes

- This process is performed throughout the project.
- Comparing actual performance against the project management plan.
- Checking the status of individual project risks.
- Assessing performance periodically to determine whether any corrective or preventive actions are needed.
- Providing information to support status reporting, progress measurement, and forecasting.

Project Management: Data, Information & Report flow



Project Performance Data & Information

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- **Work Performance Data:** The raw observations and measurements Identified during activities performed to carry out the project work
- **Example:** Percent of work physically completed, Quality, technical performance measures
- **Work Performance Information:** The performance data collected from Various controlling processes analyzed in context and integrated based on Relationships across areas
- **Example:** Status of deliverables, status of change requests, forecasts
- **Work Performance Reports:** The physical or electronic representation of Work performance information compiled in project documents, which is Intended to generate decisions or raise issues, actions or awareness
- **Example:** Status reports, memos, dashboard, justifications, recommendations

Monitor & Control Project Work – Process

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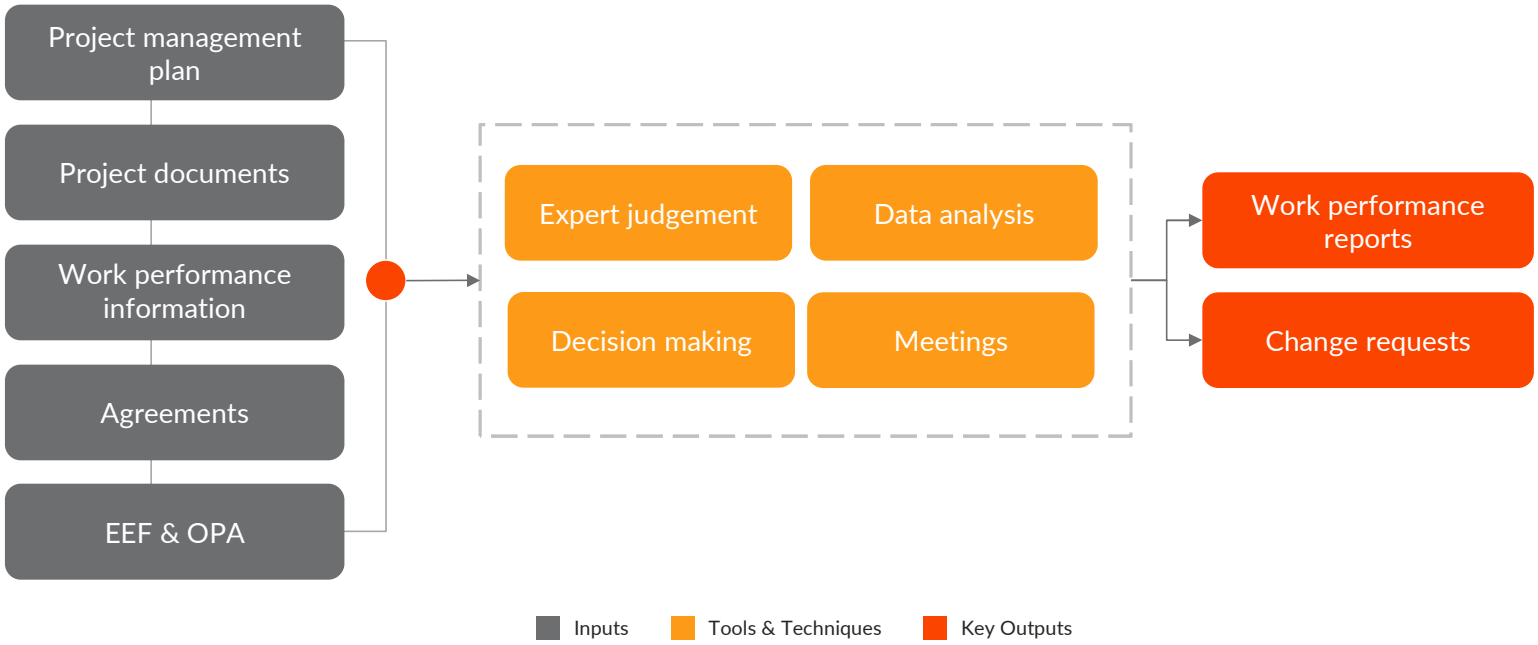

Initiating | Planning | Executing | Monitoring & Controlling | Closing

Monitor & Control Project Work – Key Concepts

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1. Comparing actual project performance against the project management plan
2. Determine whether ‘corrective and preventive’ actions are indicated and recommending necessary actions
3. Identifying new risks and analyzing , tracking and monitoring existing project risks, status is reported, and risk response plans are being executed
4. Maintaining accurate, timely information base concerning the project’s product
5. Providing information to support status reporting, progress measurement & forecasting
6. Providing forecasts to update current ‘Cost-Schedule’ information
7. Monitoring implementation of approved changes

Monitor & Control Project Work – Agile Considerations

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Sprint Retrospective is an opportunity for the Scrum Team to inspect itself and create a plan for improvements to be enacted during the next **Sprint**.

The **Sprint Retrospective** occurs after the **Sprint** Review and prior to the next **Sprint** Planning.

Development team, Scrum Master, and Product owner should attend retrospective

The purpose of the **sprint retrospective meeting** is for the development team to discuss what went well during the just completed **sprint** and what did not.

Sprint retrospective meeting takes place immediately after the **sprint review.**

Sprint review is a discussion about what the team is building, **Sprint retrospective** is focused on how they're building it.

The goal of **sprint retrospective** is improving the development process

Sprint review meeting is at the end of the sprint where the Scrum team and all the stakeholders get together and discuss what has been accomplished during the sprint and whether the sprint goal has been met

Processes and Key Outputs – cont.

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Perform Integrated Change Control – Process

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Definition

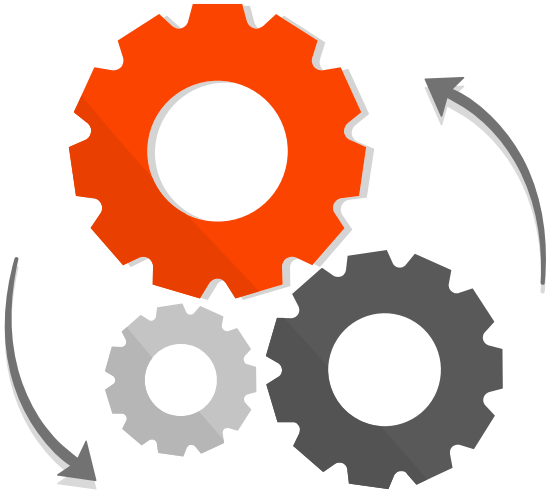
The process of **reviewing** all change requests; **approving** changes and managing changes to deliverables, project documents, and the project management plan; and communicating the decisions.

Benefit

It allows for documented changes of the overall project objectives or plans.

Notes

- This process is performed throughout the project.
- Changes are not required to be formally controlled by the Perform Integrated Change Control process.
- This process is conducted from project start through completion.
- Before the baselines are established, changes are not required to be formally controlled by the Perform Integrated Change Control process. Once the project is baselined, change requests go through this process.

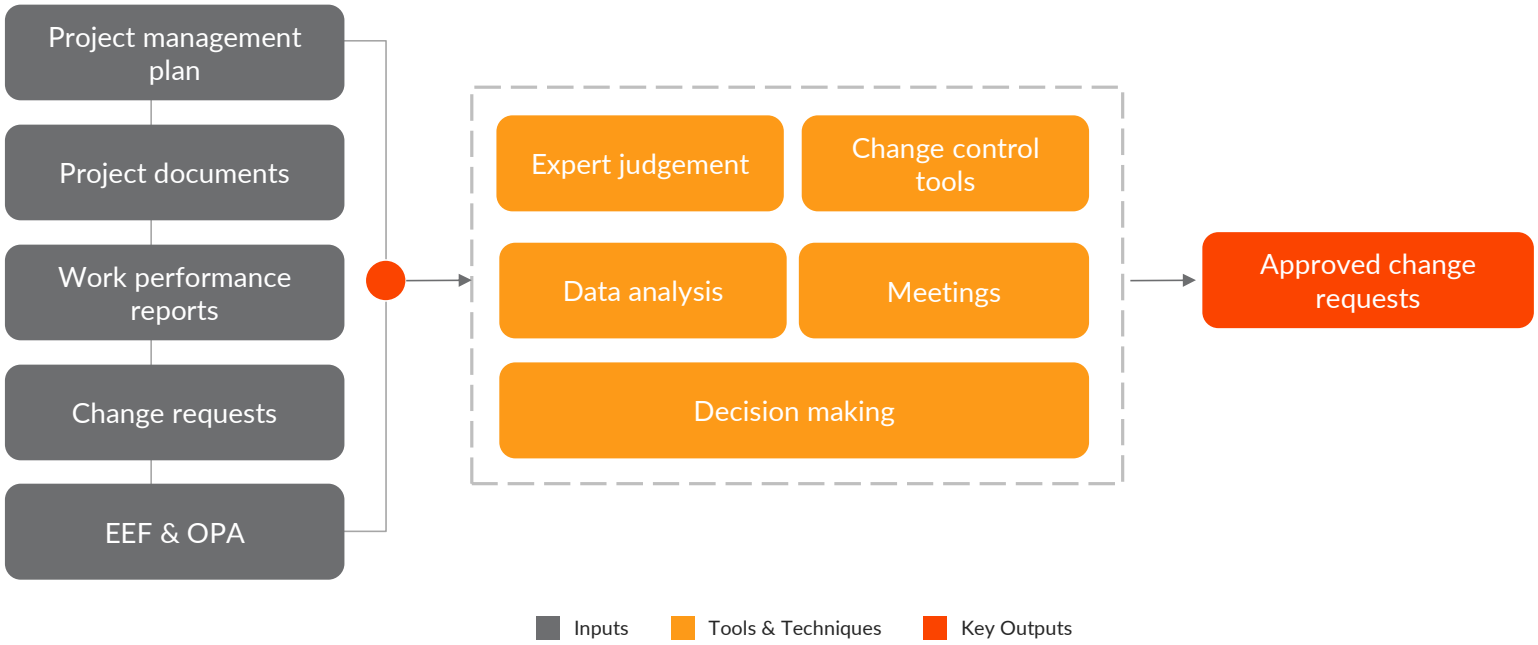


Perform Integrated Change Control – Change Management

The Perform Integrated Change Control process includes following Change Management Activities in differing levels of detail based on completion of project execution

1. Identifying the change needs, influencing the factors circumventing the change
2. Reviewing, approving and managing the approved changes
3. Maintaining the integrity of baselines by releasing only approved changes
4. Maintaining configuration and planning documentations
5. Reviewing and approving all recommended corrective, preventive actions
6. Controlling the effects of changes on all fronts (cost, schedule, scope, risk etc)
7. Documenting the complete impact of requested changes
8. Controlling project quality to standards and validating defect repair

Perform Integrated Change Control – Process



Initiating | Planning | Executing | Monitoring & Controlling | Closing

Processes and Key Outputs – cont.

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Monitor Stakeholder Engagement – Process

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Definition

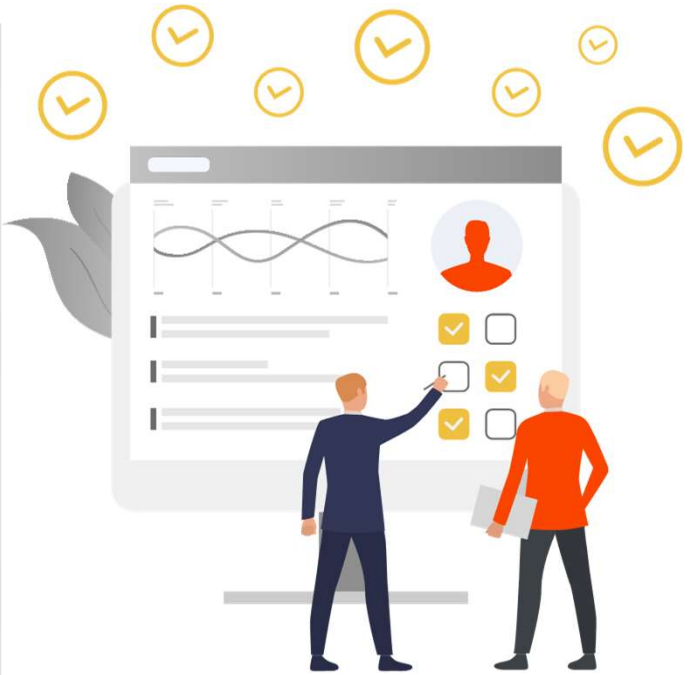
Monitor Stakeholder Engagement is the process of monitoring project stakeholder **relationships** and tailoring strategies for **engaging stakeholders** through modification of engagement strategies and plans.

Benefit

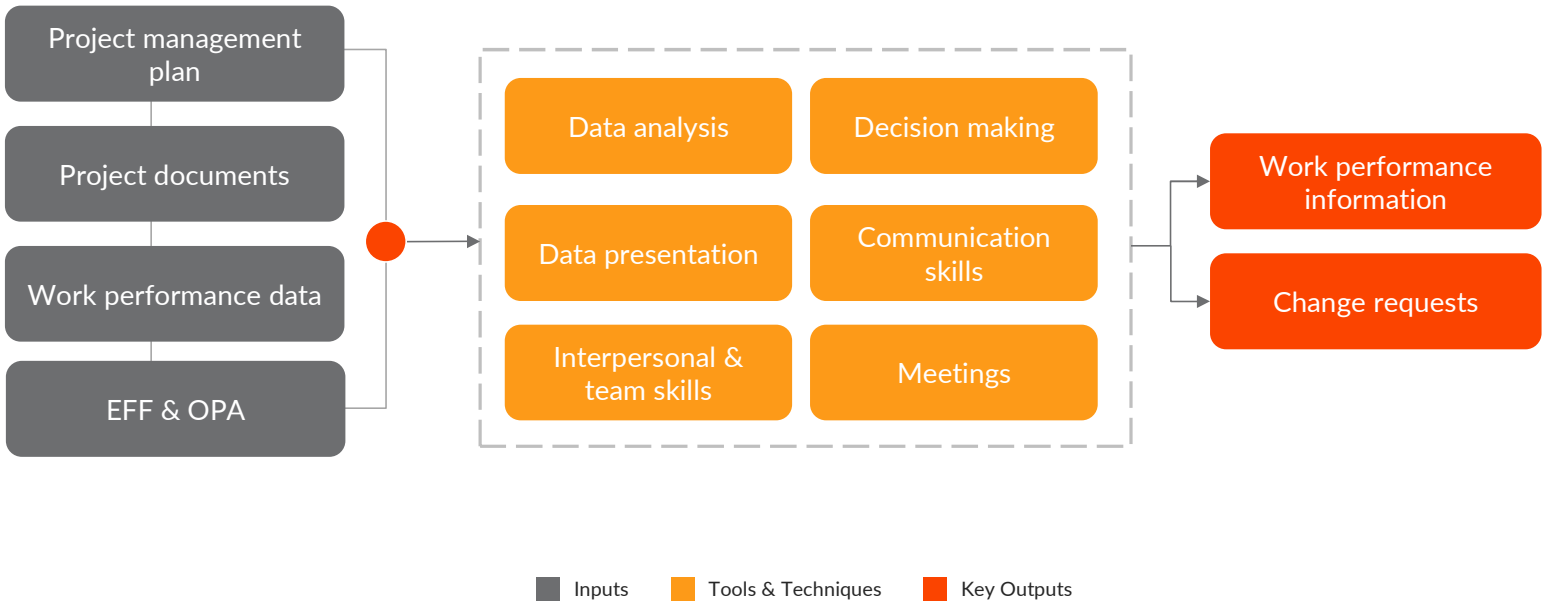
Maintains or increases the efficiency and effectiveness of stakeholder engagement activities as the project evolves and its environment changes

Notes

This process is performed throughout the project.



Monitor Stakeholder Engagement – Process



Initiating | Planning | Executing | Monitoring & Controllin | Closing

Monitor Stakeholder Engagement – Tools & Techniques

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Data Analysis:

- Alternative analysis, Root cause analysis, Stakeholder analysis

Decision Making:

- Multi-criteria decision analysis, Voting

Communication Skills:

- Feedback , Presentations

Interpersonal & Team Skills:

- Active listening, Cultural awareness , Leadership, Networking, Political awareness

Processes and Key Outputs – cont.

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Validate Scope – Process

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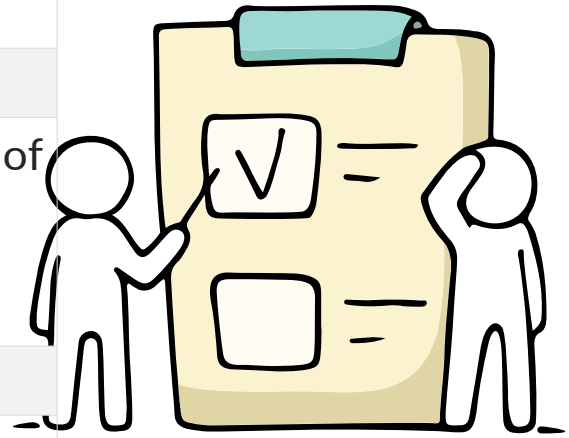
Definition

Validate Scope is the process of **formalizing acceptance** of the completed project deliverables.

Benefit

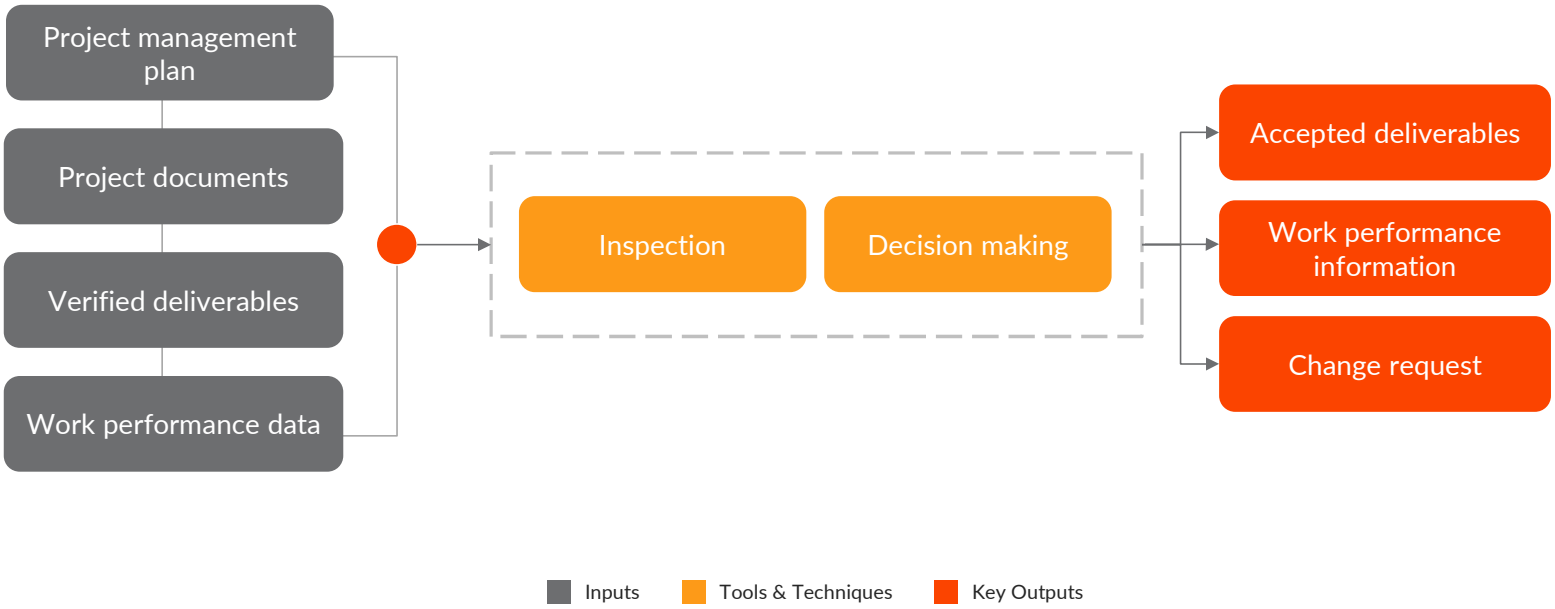
Brings objectivity to the acceptance process and increases the probability of final product, service, or result acceptance by validating each deliverable



Notes

- This process is performed periodically throughout the project as needed.
- The Validate Scope process is primarily concerned with acceptance of the deliverables.
- **Inspection**: sometimes called reviews, product reviews, audits, and walkthroughs.

Validate Scope – Process



Initiating | Planning | Executing | Monitoring & Controlling | Closing

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Control Scope – Process

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Unleashing Capabilities

Definition

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

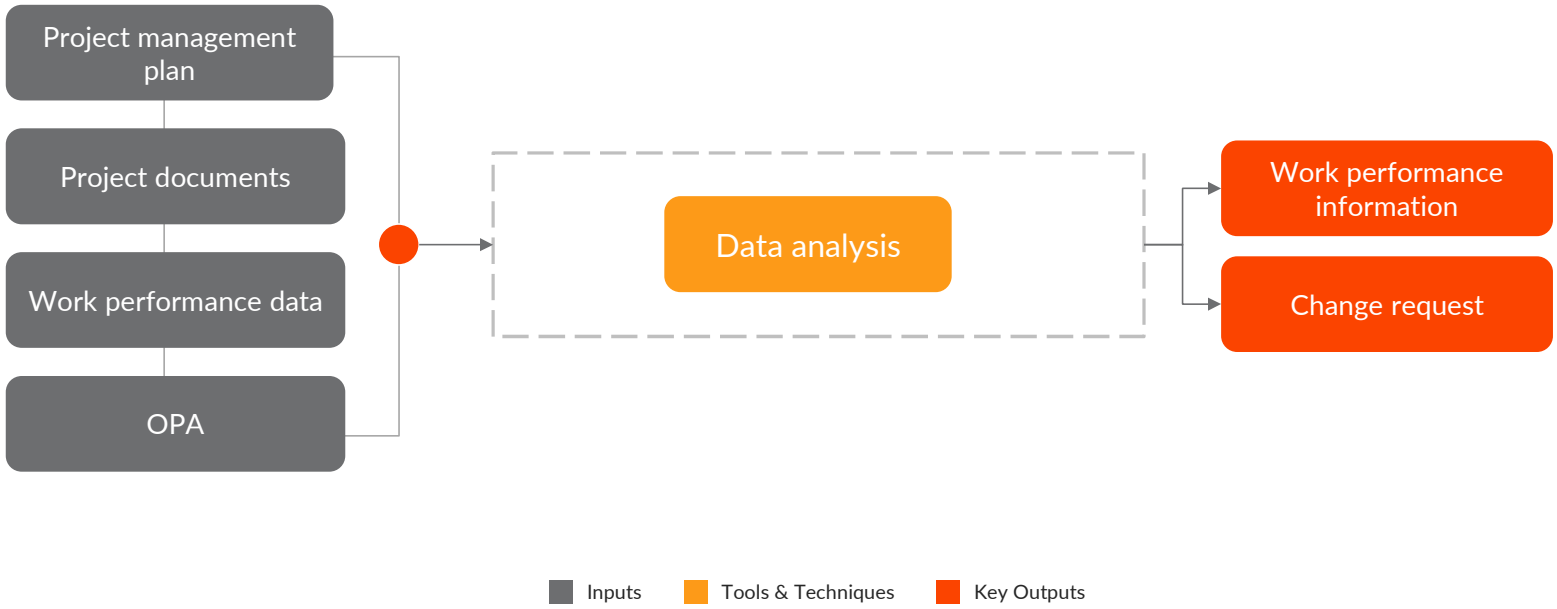
Benefit

- The scope baseline is maintained throughout the project.

Notes

- This process is performed throughout the project.
- Control Scope is used to manage the actual changes when they occur and is integrated with the other control processes
- The uncontrolled expansion to product or project scope without adjustments to time, cost, and resources is referred to as **scope creep.**

Control Scope – Process



Initiating | Planning | Executing | Monitoring & Controlling | Closing

Control Scope – Key Concepts

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- Change is inevitable, therefore some type of change control process is mandatory for every project
- Control Scope is the process of monitoring the status of the project and product scope and managing the changes to the scope baseline
- The key benefit of this process is that the scope baseline is maintained throughout the project
- The process is performed throughout the project
- Controlling the project scope ensures all requested changes and recommended corrective or preventive action are processed through the integrated change control process

Control Scope – Key Concepts

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- Control Scope involves considering ' from where changes are originated and how better can we limit its effects'.
- Understand Project Scope Statement and WBS thoroughly before analyzing the control scope requirements.
- Control Scope: Assures all approved change requests, change request log and recommended corrective actions are processed through the project integrated change control process.
- The uncontrolled expansion to product or project scope without adjustment to time, cost & resources is termed as Scope creep

Control Scope – Key Concepts

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- The key benefit of this process is that it brings objectivity to the acceptance process and increase the probability of the of the final product, service or result acceptance by validating each deliverable
- This process is performed periodically throughout the project as needed
- **Accepted deliverables:** Deliverables that meet the acceptance criteria are formally signed off and approved by the customer or sponsor acknowledging formal stakeholder acceptance of the project's deliverables is forwarded to the close project or phase process

Control Scope – Key Concepts

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Unleashing Capabilities

Process	Definition	Who Does It	On the Process or Product	Output(s)	Proactive or Reactive	Technique Used (Audit or Inspection)
Manage Quality	Translating the quality management plan into executable quality activities that incorporate the organization's quality policies into the project.	Project Manager, Quality Team	Process	Quality reports, test and evaluation documents, change requests, project management plan updates, project documents updates	Proactive	Audit
Control Scope	Monitoring the status of the project and product scope and managing changes to the scope baseline.	Project Manager	Process	Work performance information, change requests, project management plan updates, project documents updates	Proactive	Audit
Control Quality	Monitoring and recording results of executing the quality management activities to assess performance and recommend necessary changes.	Project Manager, Quality Team	Product	Quality control measurements, verified deliverables, work performance information, change requests, project management plan updates, project documents updates	Proactive	Inspection
Validate Scope	Formalizing acceptance of the completed project deliverables.	Project Manager, Customer/Sponsor	Product	Accepted deliverables, work performance information, change requests, project documents updates	Reactive	Inspection

Processes and Key Outputs – cont.

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Control Schedule – Process

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Definition

Control Schedule is the process of **monitoring the status** of the project to update the project schedule and managing changes to the **schedule baseline**.

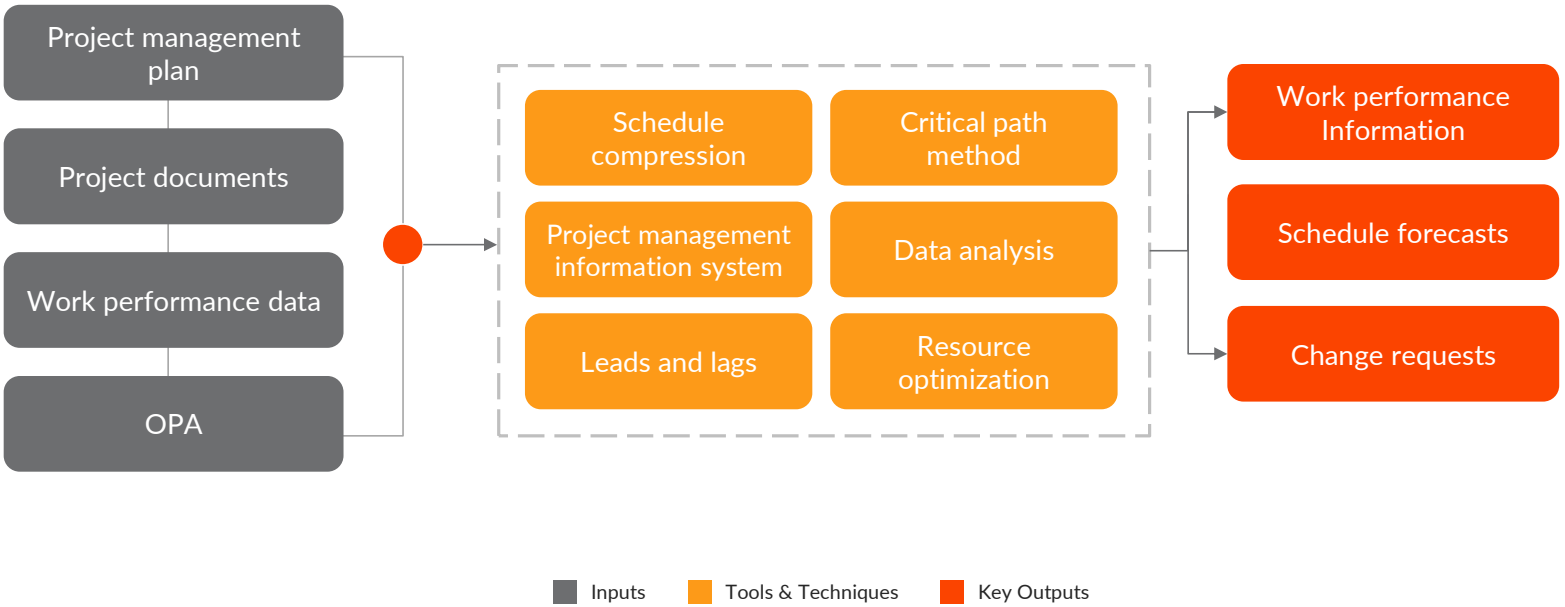
Benefit

The schedule baseline is maintained throughout the project.

Notes

- This process is performed throughout the project.
- Determining the current status of the project schedule.
- Influencing the factors that create schedule changes.
- Determining if the project schedule has changed.
- Managing the actual changes as they occur.

Control Schedule – Process



Initiating | Planning | Executing | Monitoring & Controlling | Closing

Control Schedule – Agile Considerations

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If any **agile approach is utilized**, control schedule is concerned with:

- Determining the current status of the project schedule by comparing the total amount of work delivered and accepted against the estimates of work completed for the elapsed time cycle.
- Conducting retrospective reviews (scheduled reviews to record lessons learned) for correcting processes and improving, if required.
- Reprioritizing the remaining work plan (backlog).
- Determining the rate at which the deliverables are produced, validated, and accepted (velocity) in given time per iteration (agreed work cycle duration, typically two weeks or one month).
- Determining that the project schedule has changed.
- Managing the actual changes as they occur.

Control Schedule – Agile Considerations

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- **Iterative scheduling with backlog:** Form of rolling wave planning based on adaptive life cycles, such as the agile approach for product development.
- Requirements are documented in user stories that are then prioritized and refined just before construction with features developed using time boxed periods of work
- This approach is often used to deliver incremental value to the customer or when multiple teams can concurrently develop a large number of features that have few interconnected dependencies
- The benefit of this approach is that it welcomes changes throughout the development life cycle

Control Schedule – Agile Considerations

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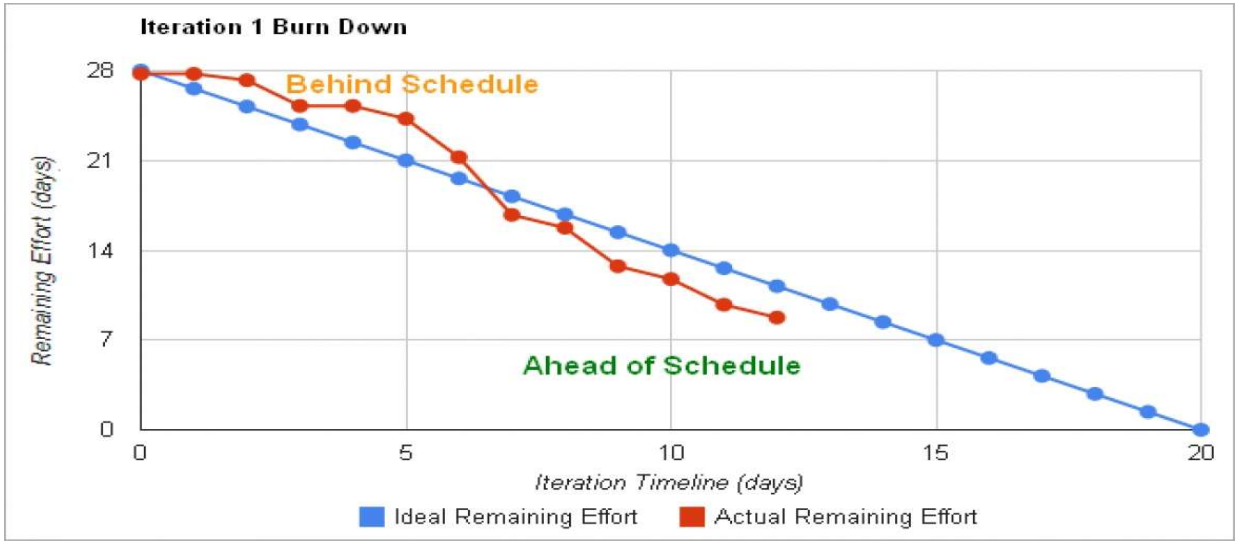
- **Iteration Burndown Chart:** This chart tracks the work that remains to be completed in the iteration backlog, It is used to analyze the variance with respect to an ideal burndown based on the work committed from iteration planning. A diagonal line representing the ideal burndown and daily actual remaining work is then plotted.



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Control Cost – Process

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Unleashing Capabilities

Definition

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

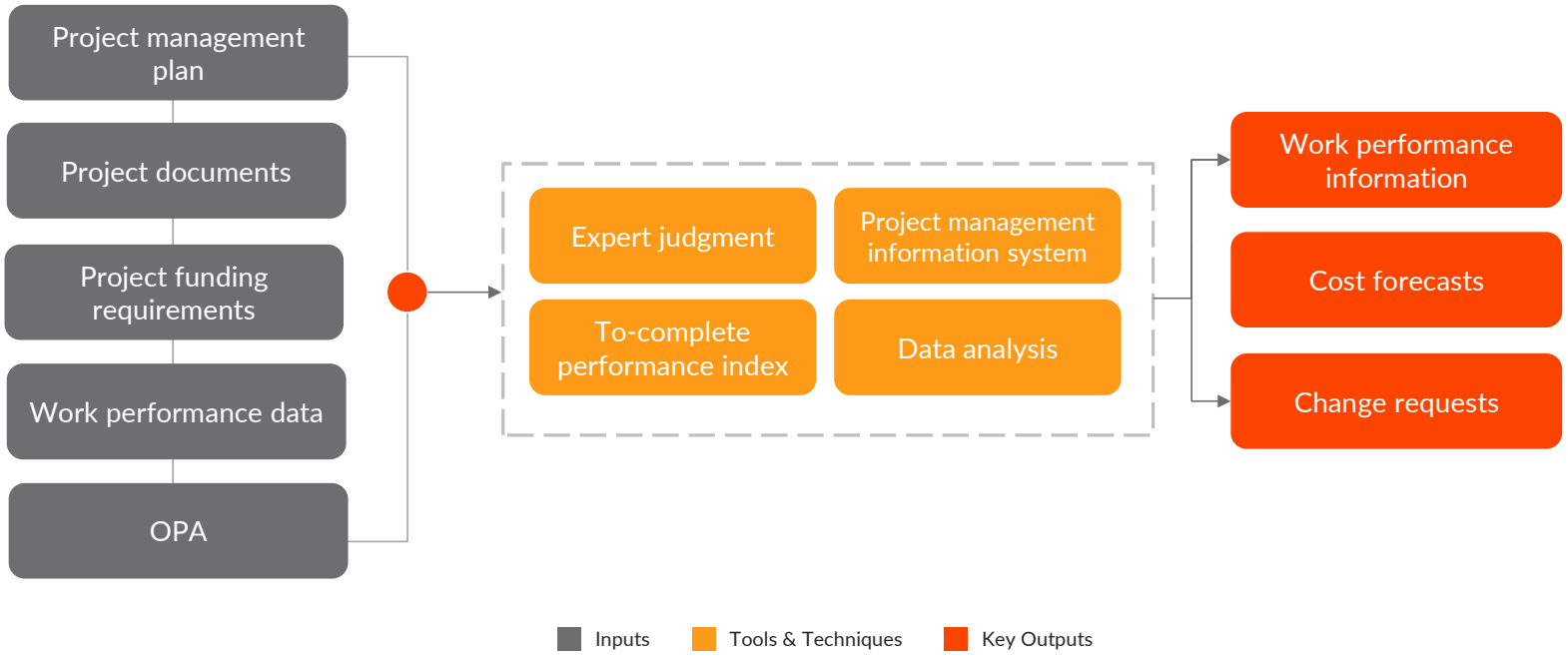
Benefit

The cost baseline is maintained throughout the project.

Notes

- This process is performed throughout the project.
- Ensuring that all change requests are acted on in a timely manner.
- Managing the actual changes when and as they occur.
- Ensuring that cost expenditures do not exceed the authorized funding by period, by WBS component, by activity, and in total for the project.
- Monitoring work performance against funds expended.

Control Cost – Process



Initiation | Planning | Executing | **Monitoring & Controlling** | Closing

Control Cost – Key Concepts

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- Assuring that potential cost overruns do not exceed the authorized funding periodically and in total for the project
- Monitoring cost performance to detect and understand variances from the cost baseline
- Recording all appropriate changes accurately against the cost baseline
- Preventing incorrect, inappropriate or unapproved changes from being included in the reported cost or resource usage

Control Cost – Earned Value Analysis

Earned Value Analysis: Performance Analysis

- The technique of Earned Value integrates cost and schedule performance in one report unlike traditional reports in which cost and schedule are reported separately.
- EVA compares the performance measurement baseline to the actual schedule & cost performance. It integrates the scope baseline with the cost baseline and schedule baseline to form he performance measurement baseline.
- Planned value (PV): Authorized budget assigned to scheduled work. It is the authorized budget planned for the work to be accomplished for an activity or WBS component not including management reserves. The total of PV is sometimes referred to as performance measurement baseline (PMB) & also known as (BAC) Budget At Completion

Control Cost – Earned Value Analysis

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- **Earned value analysis:** Earned value analysis compares the performance measurement baseline to the actual schedule and cost performance. It integrates the **scope baseline** with the **cost baseline** and **schedule baseline** to form the performance measurement baseline. EVM develops and monitors three key dimensions for each work package and control account:
- **Planned Value (PV):** the authorized budget assigned to scheduled work. The total of the PV is sometimes referred to as the performance measurement baseline (PMB). The total planned value for the project is also known as **budget at completion (BAC).**
- **Earned Value (EV):** measure of work performed expressed in terms of the budget authorized for that work.
- **Actual Cost (AC):** the realized cost incurred for the work performed on an activity during a specific time period.

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Earned Value Analysis - Formulae

- Budgeted cost of work scheduled (BCWS) ……..Planed Value (PV)
- Budgeted cost of work performed (BCWP) ……..Earned Value (EV)
- Actual cost of work performed (ACWP) ……Actual Cost (AC)
- Cost variance (CV) = EV – AC
- Schedule variance (SV) = EV – PV
- Cost Performance Index (CPI) = EV / AC ……..Cost efficiency
- Schedule Performance Index (SPI) = EV / PV ……..Schedule efficiency
- **BAC = Budgeted At Completion**

Forecasting

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- EAC = An Estimate At Completion, is a forecast of most likely total project costs based on project performance & risk quantification.
- IF it becomes obvious that the BAC is no longer viable, Project manager should develop a forecasted EAC. It involves making estimates or predictions of conditions and events in the project's future based on information and knowledge available at the time of the forecast.
- In general THREE types of forecasting methods are used:

1. EAC based on the actual costs incurred for work completed PLUS an Estimate To Complete (ETC) the remaining work.
   EAC = AC + ETC
   Actual to date plus remaining budget (BAC – EV)
   EAC = AC + (BAC – EV)
   Assumption is remaining work will be completed at Budgeted rate. i.e. CPI & SPI = 100%

2. EAC = BAC / CPI (cumulative till data date)

Assumption here is what the project has experienced to date regarding Cost is expected to continue in future.
(Same CPI will continue through out project) but overall project SPI will be as planed i.e. 100%

3. EAC = AC + { (BAC – EV) / (cumulative CPI X cumulative SPI) }

In this forecast, the ETC work will be performed at the efficiency rate that considers both 'the cost and schedule performance indices'.
Assumption here is "cost performance & schedule performance to date, will continue in future till completion of the project".
Each of the above three approaches can be correct for any given project and will provide the project management team with an "early warning" signal if the EAC forecasts are not within acceptable limits.

To Complete Perform Index (TCPI)

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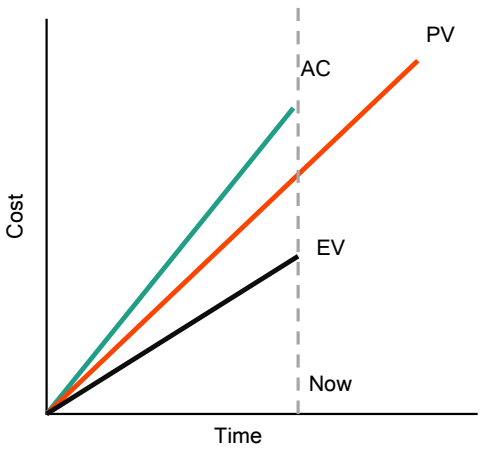
- TCPI is the calculated projection of cost performance that must be achieved on the remaining work to meet a specified management goal, such as BAC or the EAC
- TCPI (BAC)= BAC – EV / BAC – AC
- Assumption here is management specified goal is " complete project in BAC" only.

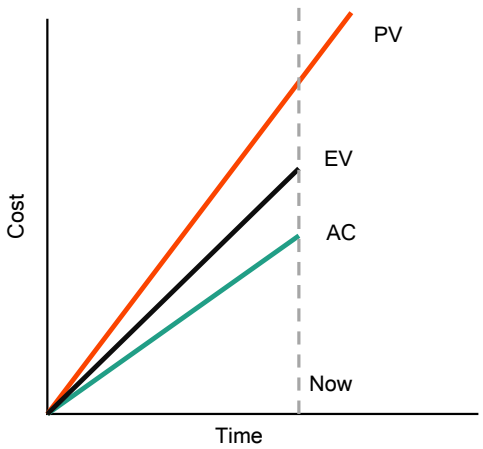
- If the cumulative CPI on data date is less than basic assumption at the time of estimating , all future work of the project will need to be performed in the range of TCPI to stay within the authorized budget of BAC.
- The practical application of this will depend on ' risks, schedule and other technical performance' etc. Once management acknowledges that BAC is no longer achievable, project manager will prepare new estimate (EAC) and get it approved from management. In this scenario calculations of TCPI will be as follows:

- TCPI (EAC)= BAC – EV / EAC – AC

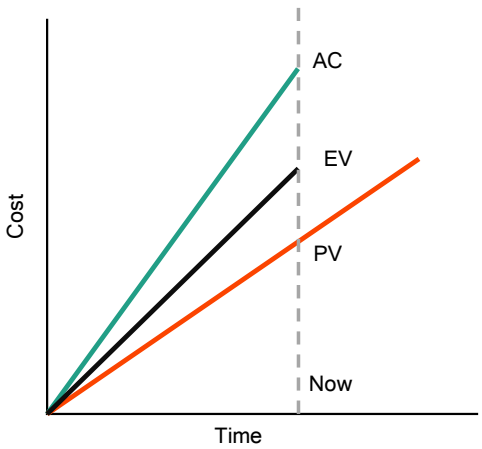
Control Costs



Behind Schedule And Over Budget



Behind Schedule And Under Budget



Ahead Of Schedule And Over Budget

Control Cost – Earned Value Analysis – S-Curve

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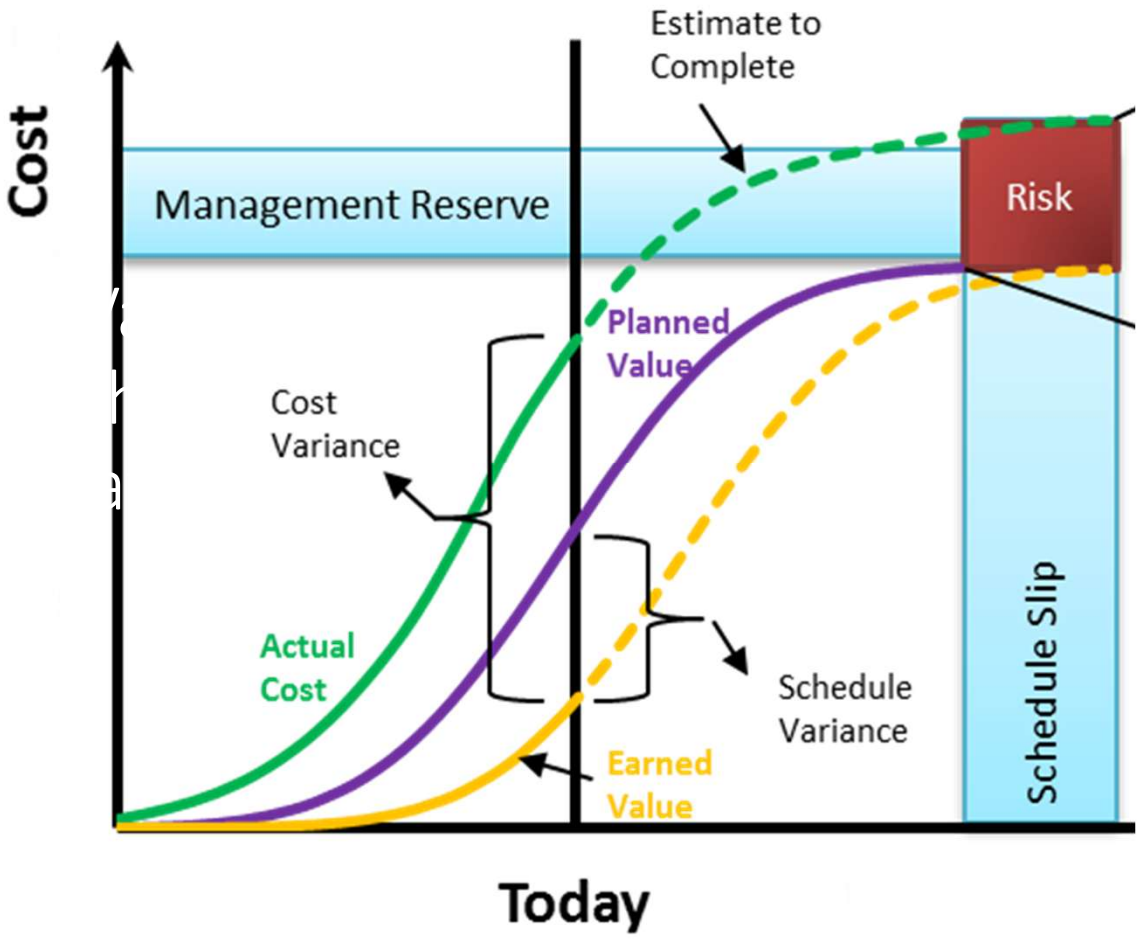

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EVM - Example

A $10,000 software project is scheduled for 4 weeks. At the end of the third week, the project is 50% complete and the actual costs to date is $9,000

BAC = 10,000
PV = 7,500
EV = 5,000
AC = 9,000

CPI = EV/AC
CPI= 0.55
SPI = EV/PV
SPI = 0.66

EAC = BAC/CPI
EAC = 18,182
ETC = EAC-AC
ETC = 9,182

Use BAC when the project is expected to be completed within the original budget

TCPI = BAC-EV / BAC-AC
TCPI = 5,000 / 1,000
TCPI = 5.0

Use EAC when the project is expected to exceed the original budget, and a new estimate has been approved.

TCPI = BAC-EV / EAC-AC
TCPI = 5,000 / 9,182
TCPI = 0.54

Significantly negative VAC indicates that the project is expected to exceed the budget by a large margin, suggesting financial difficulties

VAC = BAC-EAC
VAC = 10,000-18,182
VAC = - 8,182

Estimated Duration (ED) = (BAC/SPI)/(BAC/DUR)
Estimated Duration (ED) = (10,000/0.66)/(10,000/4)
Estimated Duration (ED) = 6 weeks

Earned Value Exercise

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- Following are details of a project that is to be completed in 12 months at a total cost of $100000. The project is being reviewed at the end of month 4.

Month	PV $ (BCWS) Cumulative	EV % Complete Cumulative	AC $ (ACWP) Cumulative
1	6000		5800
2	13000		12900
3	21000		22200
4	30000	80%	32000

1. Calculate the schedule variance at end of month 4.
2. Calculate the cost variance at the end of month 4.
3. Calculate the CPI & Cost efficiency at the end of month 4.
4. Report the project status at the end of month 4.
5. Forecast the expected cost of the project if current CPI is expected to remain same throughout project but project schedule will be achieved as planned
6. Calculate 'To Complete Performance Index' in order to complete the project in BAC (TCPI for BAC) as well as at a negotiated EAC of 105000 (TCPI for EAC)
7. Forecast the expected cost of the project if cumulative SPI & CPI (at the end of month 4) will continue throughout the project.

Earned Value Analysis - Calculation

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Ans.1 Schedule Variance = EV(BCWP) – PV(BCWS) = 24000 – 30000= - 6000 (behind schedule)

Ans.2 Cost Variance = EV(BCWP) – AC(ACWP) = 24000 – 32000 = - 8000 (Cost over run)

Ans.3 CPI & Cost efficiency = EV (BCWP) / AC(ACWP) = 24000 / 32000 = 0.75 X 100 = 75%

Ans.4 Status of the project = The project is behind schedule by 20% (schedule variance is –6000 out of planned 30000) & over budget by $8000 (24000 – 32000 = - 8000)

Ans.5 Forecast expected cost of the project (with same CPI & SPI = 100%)

EAC = BAC / CPI = 100000 / 0.75 = $ 133333

Earned Value Analysis - Calculation

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Ans.6 To complete performance Index within BAC

TCPI = (BAC – EV) / (BAC – AC)
= 100000 - 24000 / 100000 – 32000
TCPI = 76000 / 68000 = 1.117 (111.7%)

TCPI = (BAC – EV) / (EAC – AC)
= 100000 - 24000 / 105000 – 32000
TCPI = 76000 / 73000 = 1.041 (104.1%)

Ans.7 Forecast expected cost of the project : (with cumulative SPI & CPI at the end of month 4)

EAC = AC + { (BAC –EV) / CPI cumulative X SPI cumulative }
= 32000 + { (100000 – 24000) / 0.75 X 0.8 } = $ 158666

Control Cost – Trends

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- Trends include the expansion of earned value management (EVM) to include the concept of Earned Schedule (ES)
- Earned schedule theory replaces the schedule variance measures used in traditional EVM with ES & actual time AT. Calculating schedule variance as ES – AT .
- ES greater than zero (0) project is considered ahead of schedule
- SPI using earned schedule is ES/AT
- Earned schedule theory also provides formulas for forecasting the project completion date using earned schedule , actual time & estimated duration

Control Cost – Agile Considerations

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Guidelines

- Focus on short-term budgeting and metrics versus long-term
- Set time periods for work and prioritize work within those time periods.
- Base cost on the resources used for that time period

Examples

- Estimate budget based on current data, plus a forecast algorithm that is based on historic data or expert guidance — e.g., lean or Kanban
- Use a "top-down" approach, using gross-level estimation techniques such as planning poker and affinity grouping on feature sets, then employing progressive elaboration and rolling-wave planning methods to drill down to the task level on a just-in-time basis (iteratively)
- Revise budget at sprint planning intervals

Control Cost – Agile Considerations

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- In agile projects, time periods are set and then the work is prioritized within those time periods.
- The cost for each time period is based on the resources and the time consumed – not based on story points delivered.

- Hybrid approaches won't follow prescriptive(rigid) guidance, rather a learned or adapted approach tailored by teams in a project.

- As a benefit, in hybrid approaches, stories and their value can be determined ahead of time.

Agile Practice Guide and Michelle Sliger "Agile estimation techniques." Paper presented at PMI® Global Congress 2012
https://www.pmi.org/learning/library/agile-project-estimation-techniques-6110

Control Cost – Agile Considerations

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Example

- If the team planned to complete 30 story points in an iteration, but only completed 25 then the SPI = 25/30 or 0.83
- Likewise, CPI is the 'earned value' (completed features value) to date divided by the actual cost to date. Ex. AED 1,500/AED 2,000 or 0.75. This means a result of only 75 Fils on the Dirham compared to plan

Agile Cost Management in a Software Development Project

- **Objective:** Develop a new customer relationship management (CRM) software.
- **Duration:** 12 months
- **Initial Budget:** AED 500,000

Agile Cost Management Approach:

1. **Iterative Budgeting:**
   - Allocate an initial budget for the first quarter.
   - Review and adjust the budget at the end of each quarter based on progress and new requirements.
2. **Value-Based Prioritization:**
   1. Prioritize features that deliver the highest value to the customer, such as core CRM functionalities.
   2. Defer less critical features to later iterations.
3. **Frequent Reviews and Adjustments:**
   1. Conduct financial reviews at the end of each sprint (every two weeks).
   2. Adjust the budget and reallocate funds based on actual costs and progress.
4. **Collaboration with Stakeholders:**
   1. Hold regular meetings with stakeholders to discuss budget status and financial performance.
   2. Make collaborative decisions on scope adjustments and additional funding if necessary.
5. **Simple Estimation Techniques:**
   1. Use story points to estimate the effort required for each feature.
   2. Convert story points to cost estimates based on the team's velocity and cost per sprint.
6. **Focus on Transparency:**
   1. Maintain a shared financial dashboard that tracks budget, actual costs, and remaining funds.
   2. Ensure all team members and stakeholders have access to the dashboard.

Processes and Key Outputs – cont.

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Project Planning	**Plan Procurement Management**	• Procurement management plan • Procurement strategy • Bid documents • Procurement statement of work • Source selection criteria • Make-or-buy decisions • Independent cost estimates
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	Implement Risk Responses	• Change requests
	Conduct Procurements	• Selected sellers • Agreements
	Manage Stakeholder Engagement	• Stakeholder engagement plan

PG	Process Name	Key Outputs
Project Monitoring & Controlling	**Monitor and Control Project Work**	• Work performance reports • Change requests
	Perform Integrated Change Control	• Approved change requests
	Validate Scope	• Accepted deliverables
	Control Scope	• Change requests
	Control Schedule	• Schedule forecasts • Change requests
	Control Costs	• Cost forecasts • Change requests
	Control Quality	• Quality control measurements • Verified deliverables
	Control Resources	• Change requests
	Monitor Communications	• Change requests
	Monitor Risks	• Work performance information • Change requests
	Control Procurements	• Closed procurements
	Monitor Stakeholder Engagement	• Work performance information • Change requests
Project Closing	**Close Project or Phase**	• Final product, service, or result transition • Final report

Control Quality – Process

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Definition

Control Quality is the process of **monitoring and recording results** of executing the quality management activities in order to assess performance and ensure the project outputs are **complete, correct, and meet customer expectations.**

Benefit

Verifying that project deliverables and work meet the requirements specified by key stakeholders for final acceptance.

Notes

Control Quality process is performed to measure the completeness, compliance, and fitness for use of a product or service prior to user acceptance and final delivery.

Control Quality – Key Concepts

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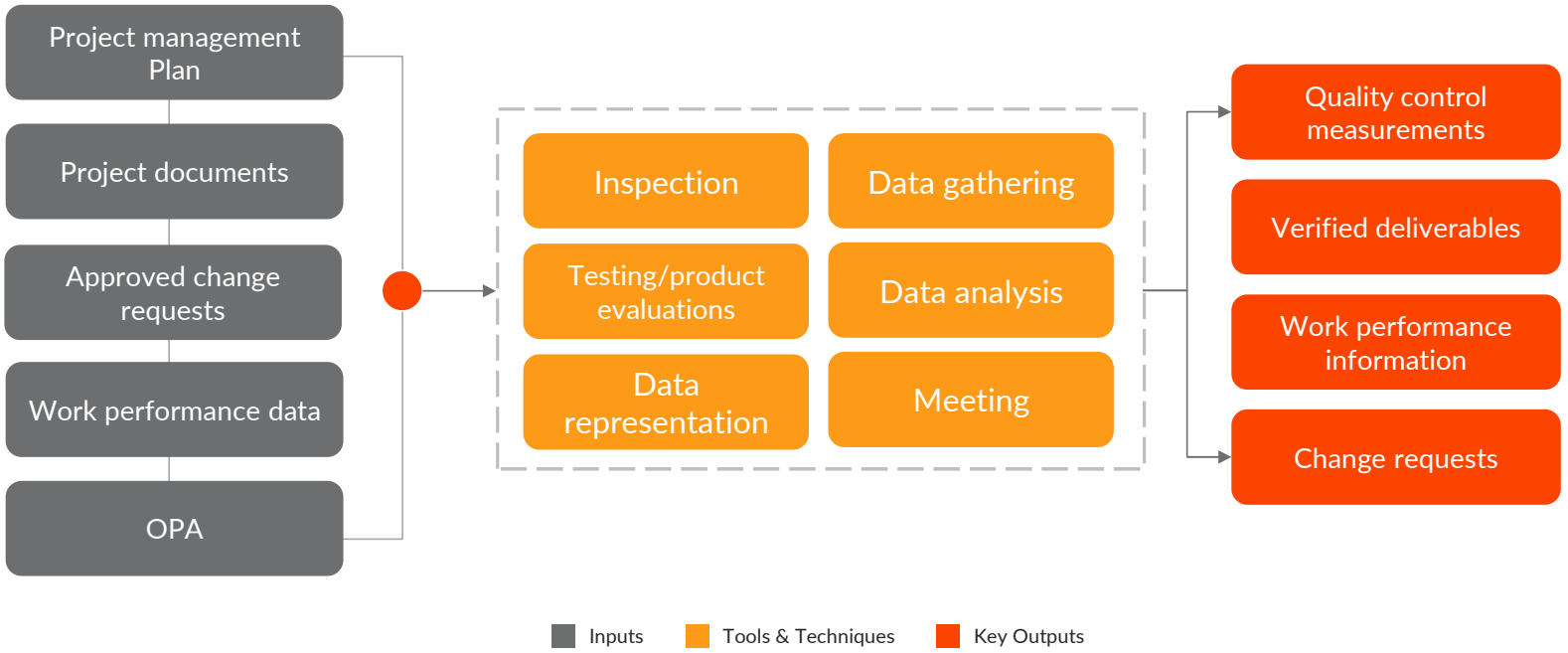
- Control Quality is the process of monitoring and recording results of executing the quality management activities in order to assess performance and ensure the project outputs are complete, correct, and meet customer expectations.
- The key benefit of this process is verifying that project deliverables and work meet the requirements specified by key stakeholders for final acceptance.
- The Control Quality process determines if the project outputs do what they were intended to do. Those outputs need to comply with all applicable standards, requirements, regulations, and specifications.
- This process is performed throughout the project.
- In Agile projects, control quality activities may be performed by all team members throughout the project life cycle

Control Quality – Process



Initiation | Planning | Executing | **Monitoring & Controlling** | Closing

Control Quality – Key Terms

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- **Gold plating:** intentionally adding extras (e.g., extra functionality, higher-quality components, and extra scope or better performance). This practice is not recommended, as gold plating adds no value to the project.
- **Scope creep**: refers to the uncontrolled changes in the project's or product's scope
- **Responsibility for quality**: the entire organization has responsibilities relating to quality.
- **Just in time (JIT):** decreasing inventory to close to zero
- **Continuous improvement process (CIP) (Kaizen):** small improvements in products or processes to reduce costs and ensure consistency of performance of products or services.
- A sustained, gradual change to improve the situation.
- Differs from innovation -- does not make a sudden jump to a plateau where it matures over time
- **6 Sigma**:
  - +/- 1 sigma is equal to 68.26% which is the percentage of occurrences to fall between the two control limits
  - +/- 2 sigma equals 95.46%
  - +/- 3 sigma equals 99.73%
  - +/- 6 sigma equals 99.99985%
- **Zero Defects**
  - Implies that there is no tolerance for errors within the system.
  - The goal of all processes is to avoid defects in the product or service.

Control Quality – Tools & Techniques

- **Data Gathering**:
  - **Checklists**: Used to ensure that all steps or requirements have been addressed.
  - **Check Sheets**: Used to collect data in real-time at the location where the data is generated.
  - **Statistical Sampling**: Involves selecting a random sample from a larger population to make inferences about the population.
  - **Questionnaires and Surveys**: Used to gather information from stakeholders about their satisfaction with the project deliverables.
- **Data Analysis:**
  - **Performance Reviews**: Assessing the performance of the project to determine if it meets the quality standards.
  - **Root Cause Analysis**: Identifying the root causes of defects or problems to prevent recurrence.
- **Inspection:**
  - Examining or measuring deliverables to verify that they meet the specified requirements.
- **Testing/Product Evaluations:**
  - Conducting tests to ensure that the product meets the required standards and specifications.
- **Data Representation:**
  - **Cause-and-Effect Diagrams**: Also known as fishbone diagrams, used to identify potential causes of defects.
  - **Control Charts**: Used to determine if a process is stable and within control limits.
  - **Histogram**: A graphical representation of data distribution.
  - **Scatter Diagrams**: Used to identify relationships between two variables.
- **Meetings:**
  - Regular meetings to discuss quality issues, review progress, and make decisions on quality improvements.

Control Quality – Data Gathering

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Check sheets are used as reference sheets that help in ensuring that the relevant data or steps occurring during a process are recorded or performed.

Check sheets, also known as tally sheets, are checklists used for collecting data.

- It ensures that the relevant data or relevant 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

Check Sheet

Control Quality – Data Gathering

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- **Check-Sheets:** Check Sheets are used to organize facts in a manner that facilitate the effective collection of useful data about a potential quality problem. They are especially useful for gathering attributes data while performing inspections to identify defects
- **Statistical Sampling:** Choosing part of a population of interest for inspection. The sample is taken to measure controls and verify quality
- **Questionnaire & Surveys:** Surveys may be used to gather data about customer satisfaction after the deployment of product or service
- **Inspection:** Examination of the work product to determine if it conforms to documented standards. Inspections may be called “reviews, peer reviews, audits or walkthroughs”. Inspections are also used to verify defect repairs

Control Quality – Suggested Methods

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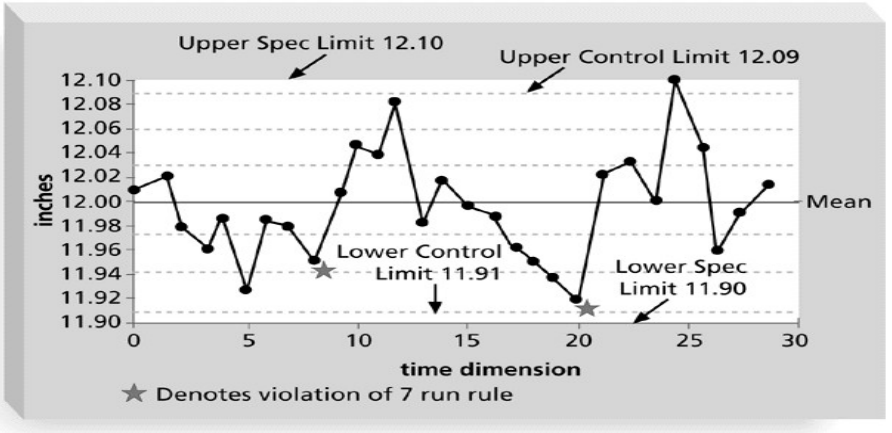
- **Testing / Product Evaluations:** Organized and constructed investigation conducted with the intent to find errors, defects , bugs, or non conformance problems
  - Software testing **: U**nit testing , Integration testing , Black box , White box, Interface testing, Regression testing , Alpha testing etc.
  - Engr. / Construction projects**:** Cement tests, concrete workability test, nondestructive test , soil tests, stress screening, burn-in tests, system test, various acceptance tests
- **Data Representation: Control Charts**

Determine whether or not a process is stable or has predictable performance.



Quality Assurance v/s Quality Control

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Quality Assurance

- Process related
- Proactive
- Audit
- Prevention
- Project Managerial function

Quality Control

- Product related
- Reactive
- Check
- Inspection
- Independent Organizational function

Seven Basic Quality Control Tools

Control Quality – 7 Basic Quality Tools

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For Quality Assurance and Quality Control, following are seven basic tools of quality:

1. Control Charts
2. Cause and effect diagrams
3. Pareto Charts
4. Flowcharts
5. Histograms
6. Run charts
7. Scatter diagrams

Control Charts

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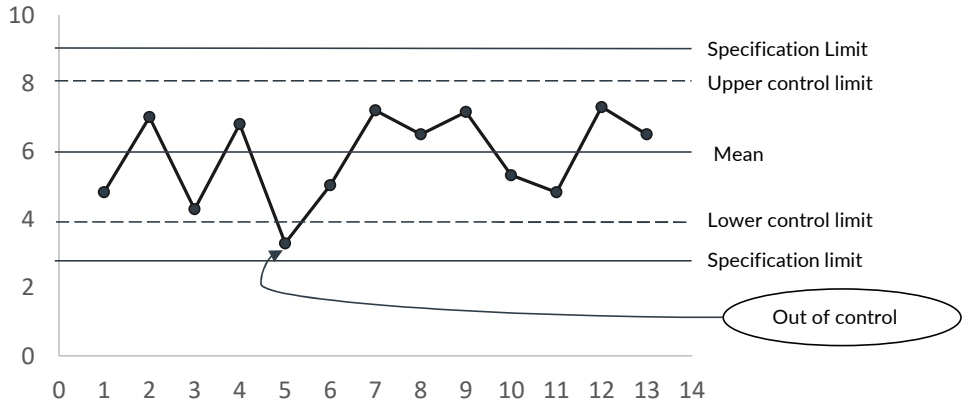
It helps in determining if a process is within acceptable limits. It has;

- Specification limits: customer expectation of performance
- Upper and lower control limits: acceptable range of variation
- Mean: middle of the range of acceptable variation
- Out of control
  - Data point outside of upper or lower control limits
  - Non-random data points like rule of seven



Control Charts – Cont.

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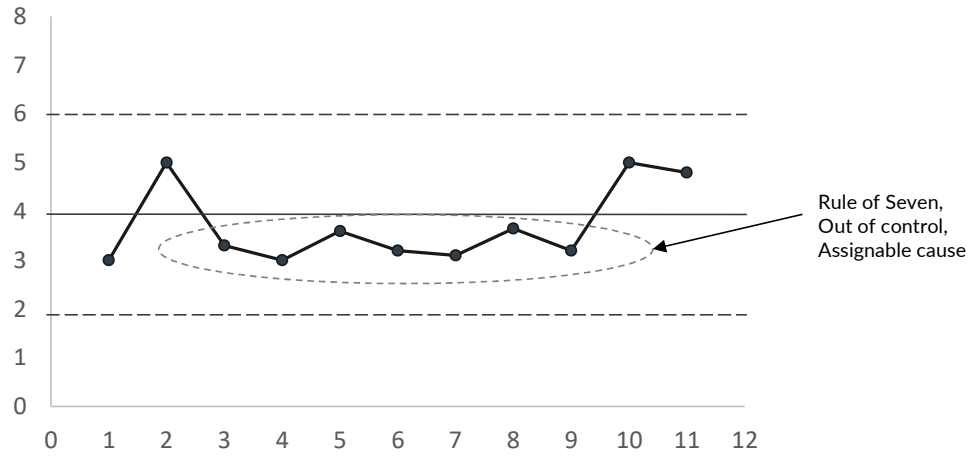
- **Rule of seven**
  - Seven data point on one side of the mean.
  - Process may be out of control.
  - Situation should be investigated, and a cause found.
- Assignable Cause/Special Cause Variation
  - Data point or rule of seven which requires investigation to determine the cause of the variation.



Cause and effect diagrams

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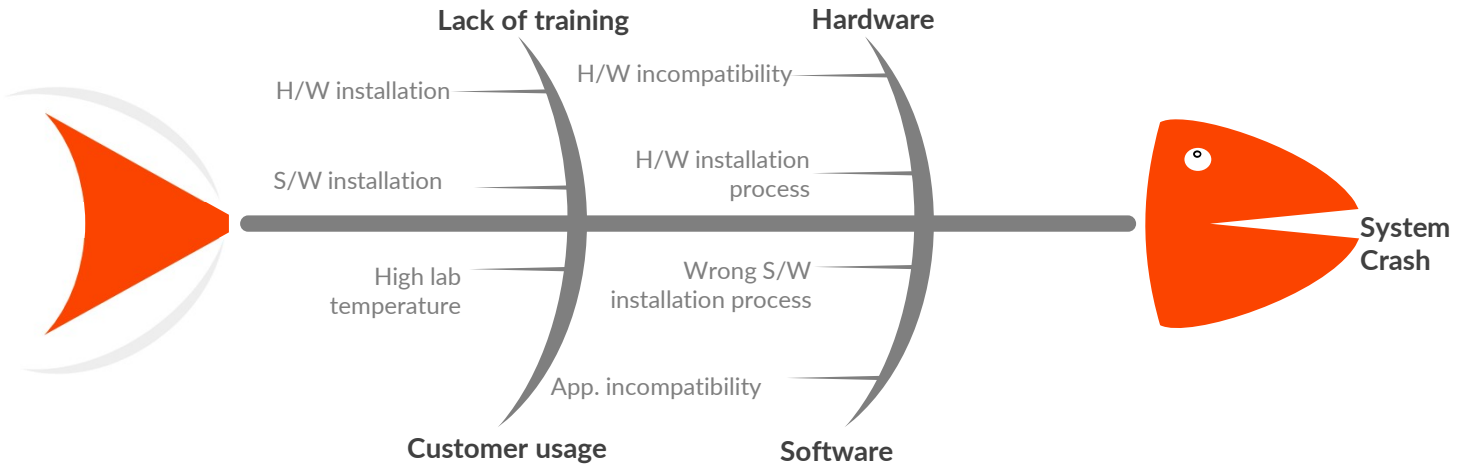
- Also called **Fishbone** and **Ishikawa** diagrams.
- Used to figure out what caused a defect.
- It list all the categories of the defects and the possible causes of the defect.
- Helps to see all the possible causes in one place.



Pareto Charts

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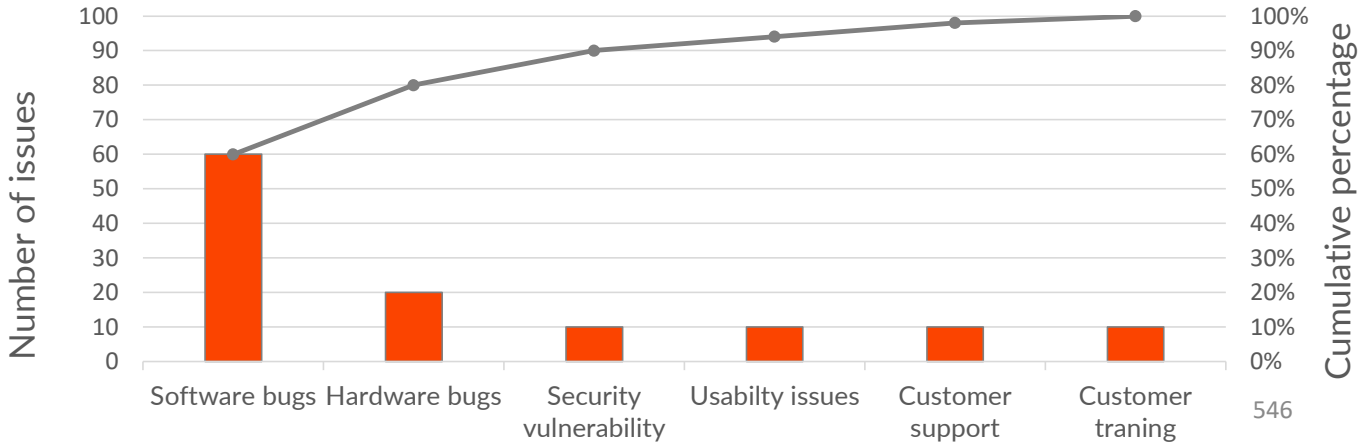
- Helps in finding most critical issues.
- It plots frequency of issues in descending order
- Separates critical few from uncritical.
- Based on **80/20** rule – for many events, roughly 80% of the effects come from 20% of the causes
  - 80% of traffic on 20% of roads
  - 80% of wealth with 20% of people
  - 80% of sales from 20% of customers



Flowcharts

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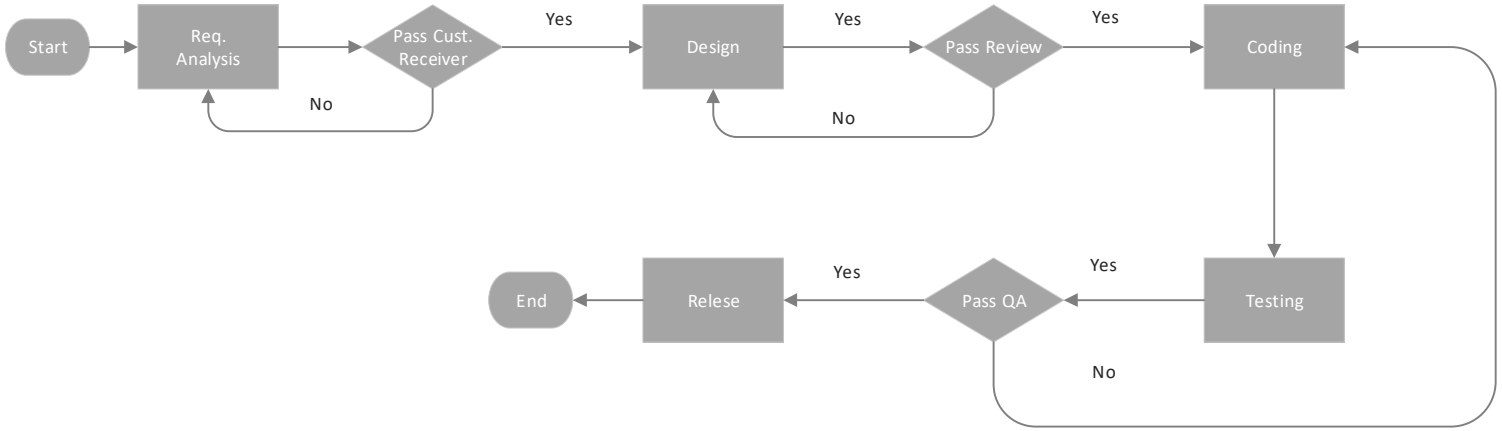
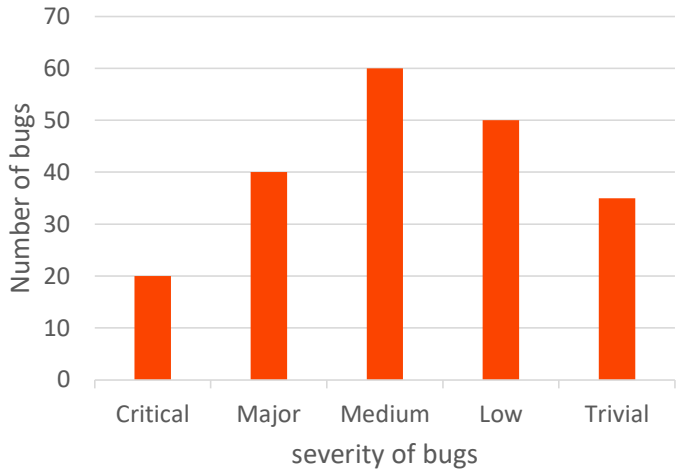
- Shows flow of processes from beginning to end and how they interrelate.
- It help you get a handle on the way you are working by showing you a picture of whole process.
- It graphically represent the process to help analyze how problem occur.



A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition, Project Management Institute Inc., 2013.

Histograms

- Give clear picture of how data breaks down.
- It helps you to compare characteristic of data and make more informed decisions.
- Also known as **vertical bar chart.**



Run Charts

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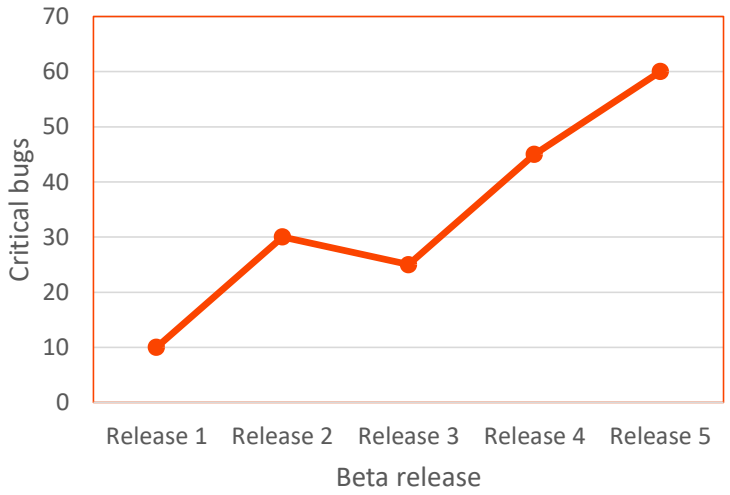
- It shows trends in your project by showing how your data looks as line chart.
- It shows **trends** in data over time? Project progress going up or down over time?



Scatter Diagrams

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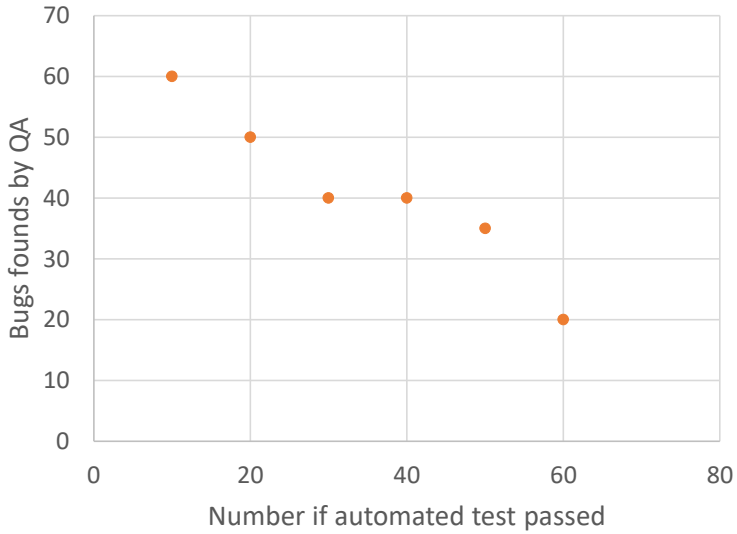
- It shows **relationship** between two different data types.
- Scatter diagram might be used to see if two different data types are **related**.



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Project Closing	**Close Project or Phase**	• Final product, service, or result transition • Final report

Control Resources – Process

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Definition

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

Benefit

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

Notes

- This process is performed throughout the project.
- The resources needed for the project should be assigned and released at the right time, right place, and right amount for the project to continue without delays.
- This process is concerned with monitoring resource expenditures, identifying and dealing with resource shortage/ surplus in a timely manner, ensuring that resources are used and released according to the plan and project needs, informing appropriate stakeholders if any issues arise with relevant resources, influencing the factors that can create resources utilization change, and managing the actual changes as they occur.

Control Resources – Overview

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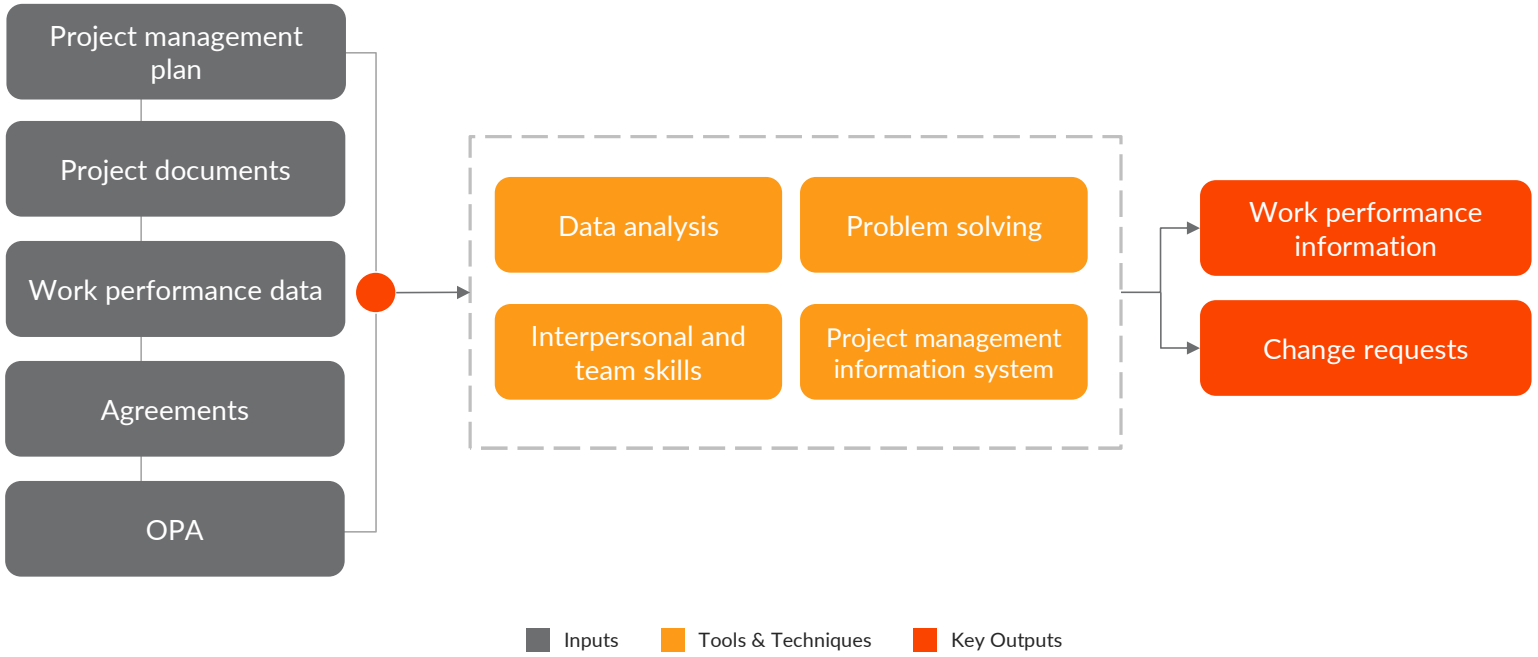
Unleashing Capabilities

- The resources needed for the project should be assigned and released at the right time, right place and right amount
- This process is concerned with resources such as, equipment, materials, facilities, and infrastructure.

- Monitoring resource expenditures
- Identifying, dealing with resource shortage / surplus
- Ensuring resource utilization , release on timely manner
- Informing stakeholders about issues with relevant resources
- Managing actual changes as they occur

Control Resources – Process



Initiating | Planning | Executing | Monitoring & Controlling | Closing

Control Resources – Tools & Techniques

- **Problem Solving:** The project manager should use methodical steps to deal with problem solving :
    1. **Identify the problem:** Specify the problem
    2. **Define the problem:** Break it into smaller , manageable problems
    3. **Investigate:** Collect data
    4. **Analyze:** Find the root cause of the problem
    5. **Solve:** Choose the suitable solution from a variety of available ones
    6. **Check the solution:** Determine if the problem has been fixed

Processes and Key Outputs – cont.

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Monitor Communications – Process

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Unleashing Capabilities

Definition

The process of ensuring the **information needs of the project and its stakeholders are met.**

Benefit

The optimal information flow as defined in the communications management plan and the stakeholder engagement plan.

Notes

- This process is performed throughout the project.
- This process determines if the planned communications artefacts and activities have had the desired effect of increasing or maintaining stakeholders' support for the project's deliverables and expected outcomes.
- This process can trigger an iteration of the Plan Communications Management and/or Manage Communications processes to improve effectiveness of communication through additional and possibly amended communications plans and activities.

Monitor Communications – Overview

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- Determine whether planned communications artifacts and activities have had the desired effect of increasing or maintaining stakeholder's support for the project's deliverables and expected outcomes
- Impact and consequences should be carefully evaluated & monitored to ensure that the right message , right content is delivered to right audience, through right channel at right time
- Issues, key performance indicators, risks or conflicts may trigger an immediate revision

Various Performance Reports

- Status Report : Snapshot of project generally on Scope - Schedule - Cost - Quality parameters
- Progress Report : Description of what is accomplished
- Variance Report : Comparing Plan v/s Actual
- Trend Report : Analysis of project results over time to examine performance.
- Forecasting Report : Predictions of expected project status & performance

Monitor Communications – Process

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Monitor Communications – Lessons Learned

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- Timely updating for Organizational process assets (OPA) based on **"What Went Wrong & What Went Right" Analysis.**
- "Project managers have a professional obligation to conduct lessons learned sessions for all projects with key internal and external stakeholders".

- **Timely Documentation, Reporting throughout the Project Life Cycle** are the major activities of information distribution

- It also involves providing information that is not planned or chalked down in communication plan but required during course of project.

Monitor Communications – Performance Reporting

- **Performance Reporting** is the act of collecting and distributing **Performance Information**. It includes status reports, progress measurements and forecasts. It a periodic collection and analysis of baseline versus actual data to understand and communicate the project progress and performance as well as to forecast the project results.

- **Elaborate Reports may include:**
- Analysis of past performance – Analysis of project forecasts – Current status of risks – Work completed during period – Work to be completed in next period – Summary of changes approved in the period --- other relevant information reviewed and discussed.

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Monitor Risks – Process

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Definition

The process of monitoring the implementation of agreed-upon risk response plans, **tracking** identified risks, identifying and analyzing **new** risks, and evaluating risk process effectiveness throughout the project.

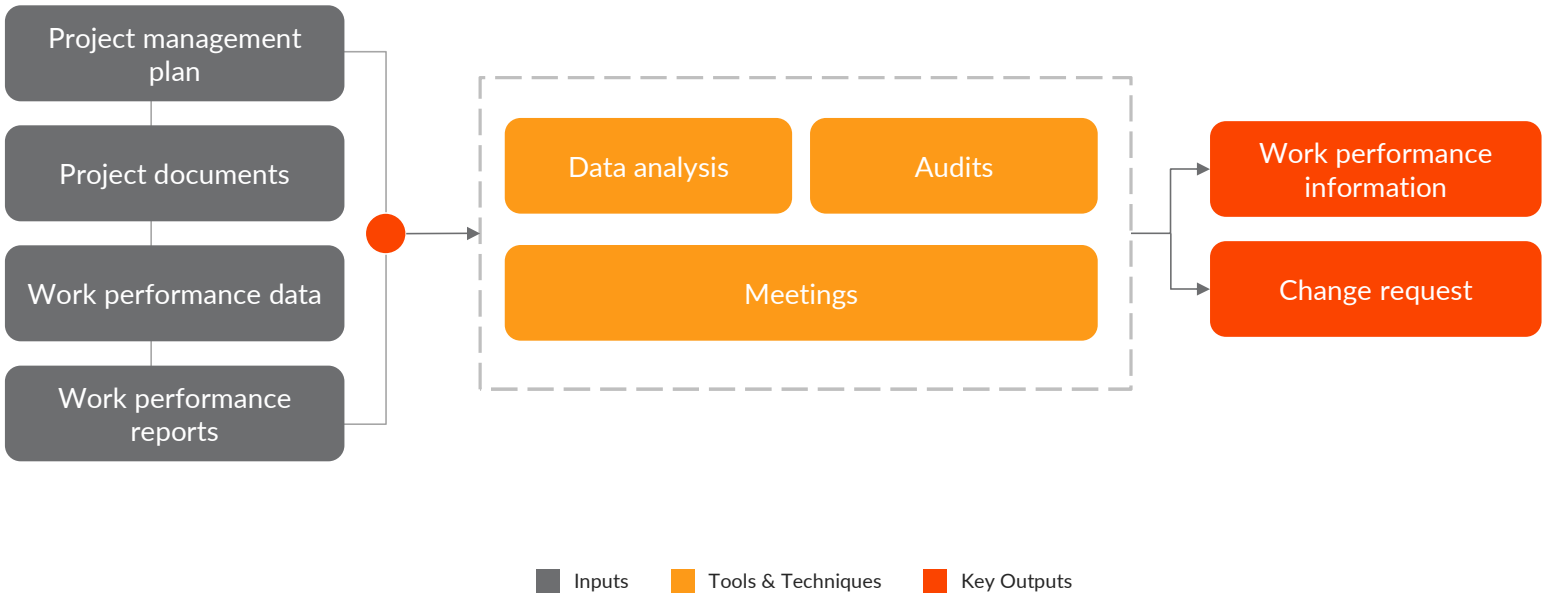
Benefit

Enables project decisions to be based on current information about overall project risk exposure and individual project risks.

Notes

- This process is performed throughout the project.
- In order to ensure that the project team and key stakeholders are aware of the current level of risk exposure, project work should be continuously monitored for new, changing, and outdated individual project risks and for changes in the level of overall project risk.

Monitor Risks – Process



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Monitor Risks – Overview

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- In order to ensure that the project team and key stakeholders are aware of the current level of risk exposure , project work should be continuously monitored for new , changing and outdated individual project risks and for changes in the level project risk by applying the monitor risks process.

It is primarily a process of determining:

- ✓ Implemented risk responses are effective
- ✓ Level of overall project risk has changed
- ✓ Status of identified individual project risk has changed
- ✓ New individual project risk have arisen
- ✓ Risk management approach is still appropriate
- ✓ Project assumptions are still valid
- ✓ Risk management policies and procedures are being followed
- ✓ Contingency reserves for cost and schedule require modification
- ✓ Project strategy is still valid

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Project Procurement Management - Key Concepts

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- Project Procurement Processes are more significantly tied with legal Obligations and penalties as compared to other processes.
- Project Manager may not be expert but should be familiar enough with the procurement process to make intelligent decisions regarding contracts and contractual relationships
- Project Manager is typically not authorized to sign legal agreements binding the organization

Control Procurement – Process

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Definition

Control Procurements includes application of the appropriate project management processes to the **contractual relationship(s**) and integration of the outputs from these processes into the overall management of the project.

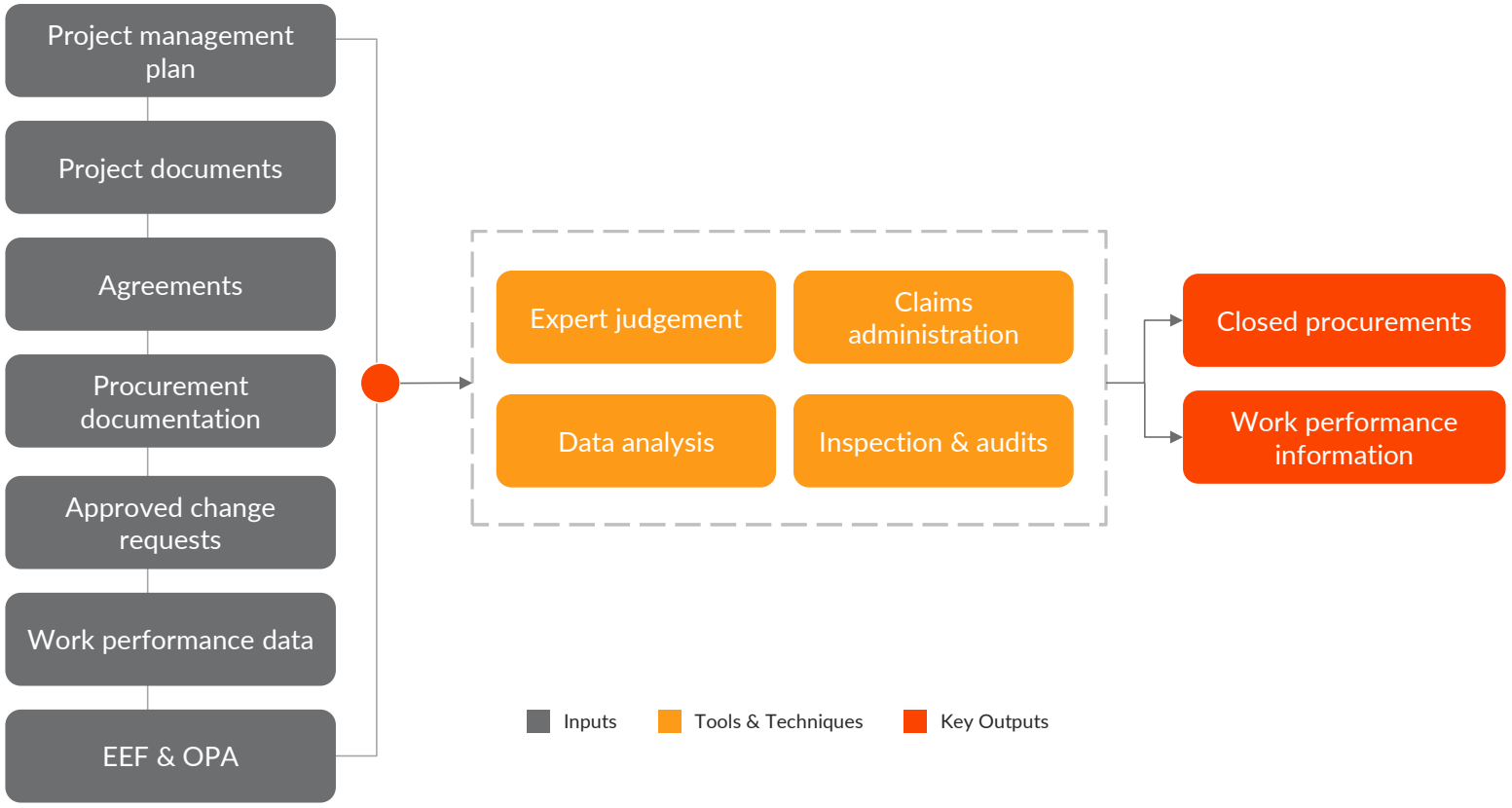
Benefit

Ensures that both the seller's and buyer's performance meet the project's requirements according to the terms of the legal agreement.

Notes

- This process is performed throughout the project as needed.
- This process reviews and documents how well a seller is performing or has performed based on the contract and establishes corrective actions when needed.
- This process includes capturing the necessary details for managing any early terminations of the contracted work.
- Agreements can be amended at any time prior to contract closure by mutual consent, in accordance with the change control terms of the agreement.

Control Procurement – Process



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Control Procurement – Tools & Techniques

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- **Claims administration:** contested changes and potential constructive changes are those requested changes where the buyer and seller cannot reach an agreement on compensation for the change or cannot agree that a change has occurred. These contested changes are called claims. When they cannot be resolved, they become disputes and finally appeals. Claims are documented, processed, monitored, and managed throughout the contract life cycle, usually in accordance with the terms of the contract. Settlement of all claims and disputes through negotiation is the preferred method.
- **Inspection:** structured review of the work being performed by the contractor. This may involve a simple review of the deliverables or an actual physical review of the work itself.
- **Audits:** structured review of the procurement process. Rights and obligations related to audits should be described in the procurement contract.
- **Closed procurements:** the buyer, usually through its authorized procurement administrator, provides the seller with formal written notice that the contract has been completed. Requirements for formal procurement closure are usually defined in the terms and conditions of the contract and are included in the procurement management plan. Typically, all deliverables should have been provided on time and meet technical and quality requirements, there should be no outstanding claims or invoices, and all final payments should have been made. The project management team should have approved all deliverables prior to closure.

Control Procurement – Type of Contract Changes

Component	Description	Example
Administrative changes	Minor changes that do not affect the scope, cost, or schedule of the contract.	Correcting a misspelled company name or updating the project manager's contact details.
Contract modification	An essential change to the contract requirements such as a new deadline or a change to the product requirements.	Extending the project deadline by three months due to unforeseen delays.
Supplemental agreement	An additional agreement related to the contract but negotiated separately.	Adding a new phase to the project that includes additional deliverables and associated costs.
Constructive changes	Changes that the buyer may have caused through action or inaction (e.g. procrastination)	A project manager verbally instructs a contractor to use higher-quality materials, resulting in increased costs
Termination of contract	A contract may be terminated due to vendor default or for customer convenience. Defaults are due to nonperformance, such as late deliveries and poor quality, or nonperformance of some or all project requirements.	Terminating a contract due to the contractor's failure to meet critical deadlines

Legal Concepts when Managing Disputes

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- Seek legal advice if the terms of a contract have not been met.
- Negotiate settlements to arrive at a final equitable settlement of all outstanding issues, claims, and disputes by negotiation.

Legal Issue	Description
Warranty	A promise or guarantee made by a seller regarding the condition, quality, or performance of the goods or services provided.
Waiver	When a party intentionally decides not to enforce a specific term or condition of the contract
Breach of contract	When one party fails to fulfill their obligations as specified in the contract.
Cease and desist (C&D) letter	A legal document that requires an individual or entity to stop an alleged illegal activity and refrain from doing it in the future

Control Procurement – Documents

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Procurement Documents

- The contract
- All supporting schedules
- Requested unapproved contract changes
- Approved change requests
- Seller-developed technical documentation
- Seller work performance information like
  a) Deliverables and results of contract-related inspections
  b) Financial documents including invoices and payment records
  c) Seller performance reports

Control Procurement – Seller Performance Evaluation

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Seller Performance Evaluation Documentation

- It documents the seller's ability to continue to perform work on the current contract.
- It indicates if the seller can be allowed to perform work on future projects.
- It rates how well the seller is performing the project work.
- It can form the basis for early termination of the seller's contract.
- It can determine how contract penalties, fees or incentives are administered.

Closing the Project

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Close Project / Phase

Close Project or Phase – Process

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Definition

Close Project or Phase is the process of **finalizing all activities** for the project, phase, or contract.

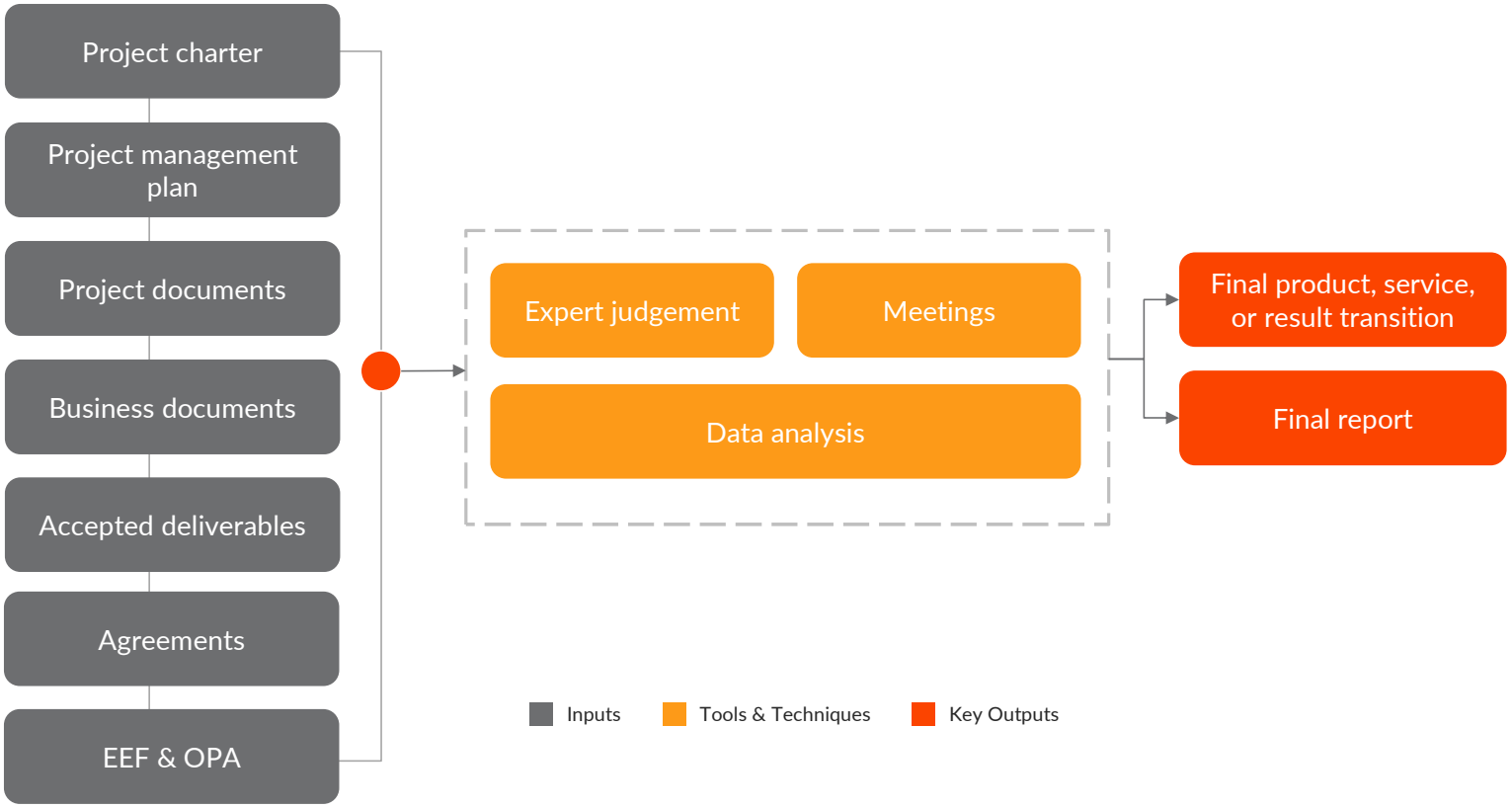
Benefit

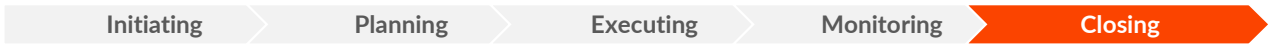
- The project or phase information is archived, the planned work is completed.
- Organizational team resources are released to pursue new endeavors.

Notes

- This process is performed once or at predefined points in the project.
- The project manager reviews the project management plan to ensure that all project work is completed and that the project has met its objectives.
- Collecting any suggestions for enhancements.
- Measuring stakeholder satisfaction.

Close Project or Phase – Process





Close Project or Phase – Project Manager role

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- Obtain final acceptance of the project deliverables by working with the sponsor and/or customer in order to confirm that Project scope & deliverable were met
- Obtain financial, legal & administrative closure using generally accepted practices in order to communicate formal project closure and ensure no further liability
- Collate lessons learned through comprehensive project review in order to create or update the organization's knowledge base
- Distribute the final project report including all project closure related information , project variances, any issues in order to provide the final project status to all stakeholders
- Actions and activities necessary to satisfy completion or exit criteria for the phase or project
- Activities related to the completion of the contractual agreements
- Activities needed to collect project or phase records, Audit project success or failure, Manage knowledge sharing and transfer, Identify lessons learned, and Archive project information for future use by the organization
- Actions and activities necessary to transfer the project's products, services, or results to the next phase or to production and/or operations.
- Collecting any suggestions for enhancements
- Measuring stakeholder satisfaction

Close Project or Phase – Agile Considerations

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- **Iterative Completion**:
  - Projects are often closed at the end of each iteration or sprint, ensuring that deliverables are completed and reviewed regularly.
  - Each iteration provides an opportunity to close out a phase of work, gather feedback, and make necessary adjustments.
- **Customer Acceptance:**
  - Ensure that deliverables are formally accepted by the customer or stakeholders at the end of each iteration.
  - Regular reviews and demonstrations help in gaining continuous acceptance and feedback.
- **Documentation and Knowledge Transfer:**
  - Document lessons learned, best practices, and any issues encountered during the project.
  - Share knowledge and insights with the team and the organization to improve future projects.
- **Team Transition:**
  - Reassign team members to new projects or roles as the current project or phase is completed.
  - Ensure a smooth transition by providing necessary training and support.
- **Retrospectives:**
  - Conduct a final retrospective to reflect on the overall project performance, identify successes, and areas for improvement.
  - Use the insights gained to enhance processes and practices in future projects.
- **Resource Reallocation:**
  - Reallocate resources such as equipment, facilities, and budget to other projects or organizational needs.
  - Ensure that all project accounts are closed and financials are reconciled.
- **Contract Closure:**
  - Complete any remaining contractual obligations and ensure that all agreements are fulfilled.
  - Confirm the formal acceptance of the seller's work and close out any procurement activities.

Thank You