IT Projects Management 1100-ZP0UEN - Winter Semester 2022/2023

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Revision Note

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Project and Project Management

- **A project** is a temporary endeavor undertaken to create a unique product, service, or result.
- Project management is the process of organizing, planning, and controlling resources to achieve specific goals. The goals of a project are typically to deliver a product or service within a certain timeframe, budget, and scope.
- Projects can be small, such as organizing a team-building event, or large, such as building a new hospital. The key characteristic of a project is that it is temporary, meaning it has a defined beginning and end.
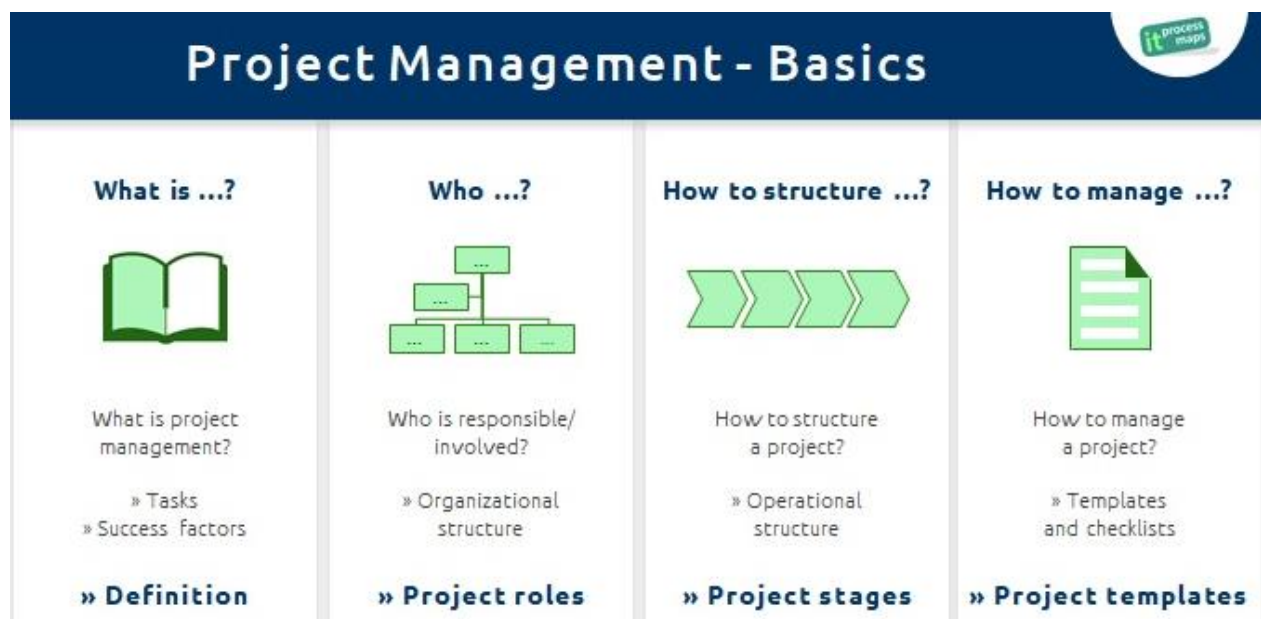
The project management process includes a number of steps, including:

- Defining the project: This involves setting clear goals and objectives for the project, as well as identifying the resources that will be needed to complete it.
- Planning the project: This involves creating a detailed plan that outlines the tasks and activities that need to be completed, as well as the resources that will be required.
- Executing the project: This involves carrying out the tasks and activities identified in the project plan.
- Monitoring and controlling the project: This involves tracking the progress of the project and making any necessary adjustments to ensure that it stays on track and within budget.
- Closing the project: This involves completing all the tasks and activities identified in the project plan and formally closing the project.

Overall, the goal of project management is to deliver a successful project within the defined scope, timeline, and budget.

Project initiation

Project initiation is the process of starting a new project. It involves defining the project's goals and objectives, as well as identifying the resources that will be needed to complete it.

In the context of project management, the project initiation phase typically involves the following steps:

- Define the project: Identify the project's goals and objectives, as well as the benefits it will bring.
- Conduct a feasibility study: Determine whether the project is feasible, both technically and financially.
- Identify the project team: Identify the people who will be responsible for completing the project.
- Develop a project charter: This is a formal document that outlines the project's goals, objectives, and scope.
- Obtain approval: Get approval from the appropriate stakeholders to move forward with the project.

The project initiation phase is critical for setting the foundation for a successful project. It is essential to take the time to define the project's goals and objectives clearly and to ensure that the project has the necessary resources and support to move forward.
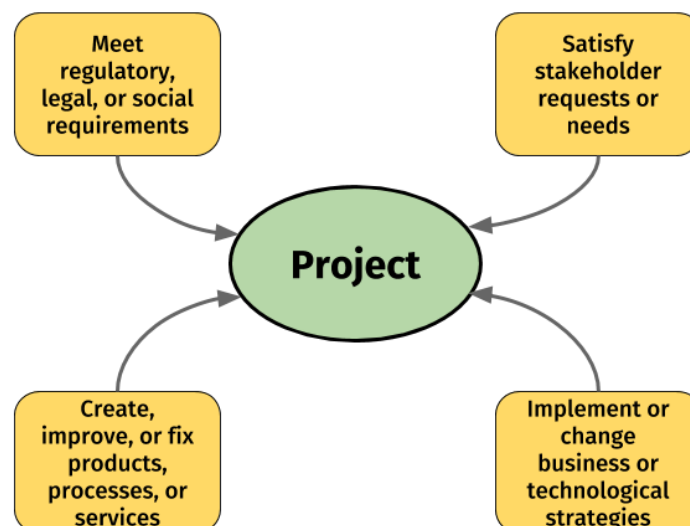
Project Initiation Context

Table 1-1. Examples of Factors that Lead to the Creation of a Project

Specific Factor	Examples of Specific Factors	Meet Regulatory, Legal, or Social Requirements	Satisfy Stakeholder Requests or Needs	Create, Improve, or Fix Products, Processes, or Services	Implement or Change Business or Technological Strategies
New technology	An electronics firm authorizes a new project to develop a faster, cheaper, and smaller laptop based on advances in computer memory and electronics technology			X	X
Competitive forces	Lower pricing on products by a competitor results in the need to lower production costs to remain competitive				X
Material issues	A municipal bridge developed cracks in some support members resulting in a project to fix the problems	X		X	
Political changes	A newly elected official instigating project funding changes to a current project				X
Market demand	A car company authorizes a project to build more fuel-efficient cars in response to gasoline shortages		X	X	X
Economic changes	An economic downturn results in a change in the priorities for a current project				X
Customer request	An electric utility authorizes a project to build a substation to serve a new industrial park		X	X	
Stakeholder demands	A stakeholder requires that a new output be produced by the organization		X		
Legal requirement	A chemical manufacturer authorizes a project to establish guidelines for the proper handling of a new toxic material	X			
Business process improvements	An organization implements a project resulting from a Lean Six Sigma value stream mapping exercise			X	
Strategic opportunity or business need	A training company authorizes a project to create a new course to increase its revenues			X	X
Social need	A nongovernmental organization in a developing country authorizes a project to provide potable water systems, latrines, and sanitation education to communities suffering from high rates of infectious diseases		X		
Environmental considerations	A public company authorizes a project to create a new service for electric car sharing to reduce pollution			X	X

A program

A program is a group of related projects that are managed in a coordinated way to achieve a common goal. A portfolio is a collection of projects and programs that are managed as a whole to achieve the strategic goals of the organization. Operations management is the process of managing the day-to-day activities of an organization to ensure that it is running smoothly and efficiently.

Here are some key differences between these terms:

- Project management: Involves organizing, planning, and controlling resources to achieve specific goals. Projects are temporary endeavors with a defined beginning and end.
- Program management: Involves coordinating and overseeing a group of related projects to achieve a common goal. Programs are ongoing and may not have a defined end date.
- Portfolio management: Involves managing a collection of projects and programs as a whole to achieve the strategic goals of the organization.
- Operations management: Involves managing the day-to-day activities of an organization to ensure that it runs smoothly and efficiently. Operations management is focused on ongoing, regular activities rather than temporary projects.
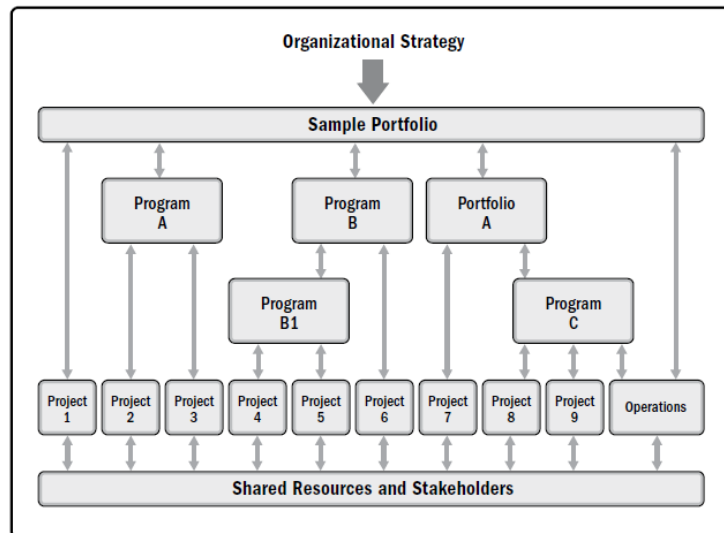
Organizational Strategy

Sample Portfolio

Program A · Program B · Portfolio A

Program B1 · Program C

Project 1 · Project 2 · Project 3 · Project 4 · Project 5 · Project 6 · Project 7 · Project 8 · Project 9 · Operations

Shared Resources and Stakeholders

Table 1-2. Comparative Overview of Portfolios, Programs, and Projects

Organizational Project Management			
	Projects	**Programs**	**Portfolios**
Definition	A project is a temporary endeavor undertaken to create a unique product, service, or result.	A program is a group of related projects, subsidiary programs, and program activities that are managed in a coordinated manner to obtain benefits not available from managing them individually.	A portfolio is a collection of projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives.
Scope	Projects have defined objectives. Scope is progressively elaborated throughout the project life cycle.	Programs have a scope that encompasses the scopes of its program components. Programs produce benefits to an organization by ensuring that the outputs and outcomes of program components are delivered in a coordinated and complementary manner.	Portfolios have an organizational scope that changes with the strategic objectives of the organization.
Change	Project managers expect change and implement processes to keep change managed and controlled.	Programs are managed in a manner that accepts and adapts to change as necessary to optimize the delivery of benefits as the program's components deliver outcomes and/or outputs.	Portfolio managers continuously monitor changes in the broader internal and external environments.
Planning	Project managers progressively elaborate high-level information into detailed plans throughout the project life cycle.	Programs are managed using high-level plans that track the interdependencies and progress of program components. Program plans are also used to guide planning at the component level.	Portfolio managers create and maintain necessary processes and communication relative to the aggregate portfolio.
Management	Project managers manage the project team to meet the project objectives.	Programs are managed by program managers who ensure that program benefits are delivered as expected, by coordinating the activities of a program's components.	Portfolio managers may manage or coordinate portfolio management staff, or program and project staff that may have reporting responsibilities into the aggregate portfolio.
Monitoring	Project managers monitor and control the work of producing the products, services, or results that the project was undertaken to produce.	Program managers monitor the progress of program components to ensure the overall goals, schedules, budget, and benefits of the program will be met.	Portfolio managers monitor strategic changes and aggregate resource allocation, performance results, and risk of the portfolio.
Success	Success is measured by product and project quality, timeliness, budget compliance, and degree of customer satisfaction.	A program's success is measured by the program's ability to deliver its intended benefits to an organization, and by the program's efficiency and effectiveness in delivering those benefits.	Success is measured in terms of the aggregate investment performance and benefit realization of the portfolio.

Organizational project management

Organizational project management refers to the way that an organization approaches and manages projects. It involves the processes, systems, and resources that the organization uses to plan, execute, and deliver projects.

There are several strategies that organizations can use to improve their project management practices. These include:

- Establishing clear project goals and objectives: It is important to define the project's goals and objectives up front, so that everyone involved understands what needs to be achieved.
- Developing a comprehensive project plan: A detailed project plan can help ensure that the project stays on track and that all tasks and activities are completed in a timely manner.
- Identifying and managing project risks: It is important to identify potential risks to the project and develop a plan to mitigate or manage them.
- Communicating effectively: good communication is key to the success of any project. It is important to establish clear lines of communication and to keep all stakeholders informed about the project's progress.
- Using project management software: Project management software can help organizations track progress, allocate resources, and manage communication with team members and stakeholders.

Overall, an effective organizational project management strategy can help ensure that projects are completed successfully, on time, and within budget.
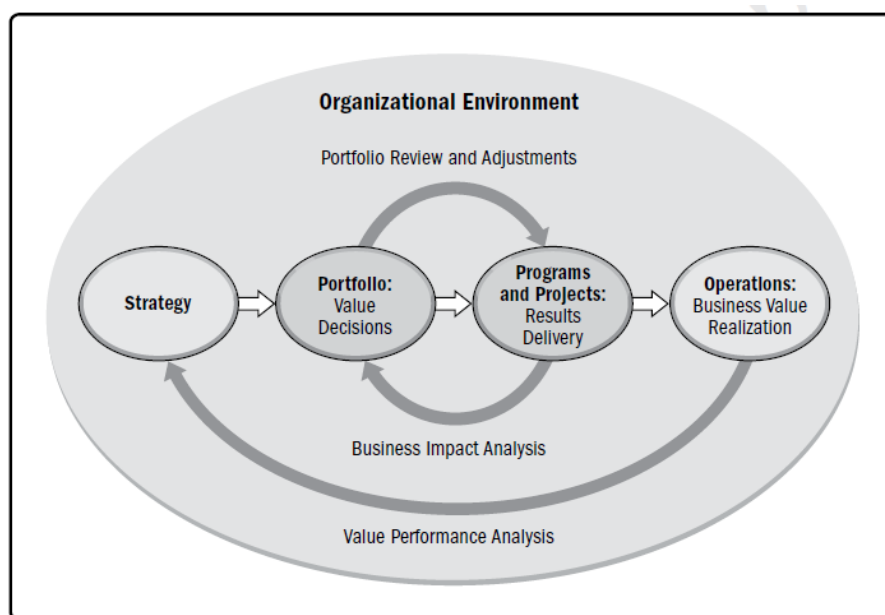

Figure 1-4. Organizational Project Management

The IT project life cycle

IT project life cycle is the series of phases that an IT project goes through from conception to delivery. The specific steps and processes involved in the IT project life cycle can vary depending on the specific needs and goals of the project, but there are generally five main phases:

- Planning: In this phase, the project team defines the goals and objectives of the project, creates a project plan, and identifies the resources that will be needed to complete the project.

- Analysis and design: In this phase, the project team analyzes the business needs that the project is intended to address and designs the technical solution that will meet those needs.
- Implementation: In this phase, the project team builds and tests the technical solution, and prepares it for deployment.
- Deployment: In this phase, the project team installs and integrates the technical solution into the business environment.
- Maintenance: In this phase, the project team provides ongoing support and maintenance for the technical solution and makes any necessary updates or changes.

Overall, the IT project life cycle is designed to ensure that an IT project is completed successfully, and that the technical solution meets the needs of the business.
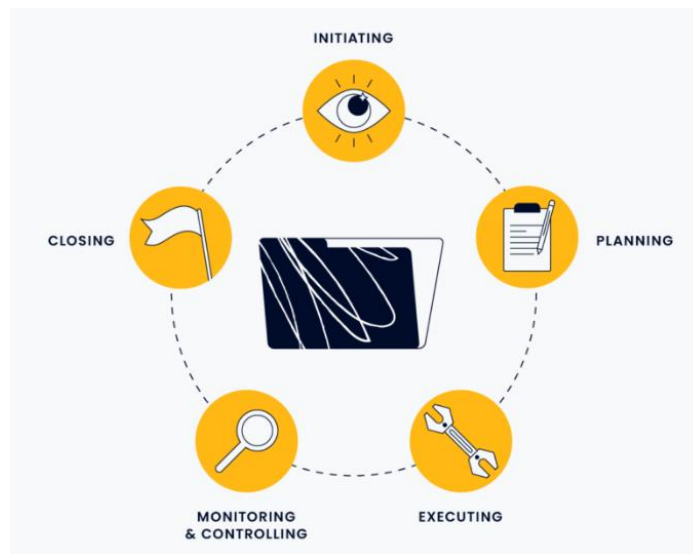
In project management, data, information, and reports flow between various stakeholders, including the project team, the project manager, and the project sponsor.

The project team is responsible for collecting and analyzing data related to the project, and for communicating this information to the project manager. The project manager is responsible for tracking the progress of the project, and for making any necessary adjustments to keep the project on track. The project manager also communicates with the project sponsor and other stakeholders to keep them informed about the project's progress and to seek their input and guidance. Reports are an important part of the flow of information in project management.

These reports can be used to communicate the progress of the project to stakeholders, to highlight any issues or challenges that have arisen, and identify potential solutions. Overall, effective data, information, and report flow is critical to the success of a project. It helps ensure that all stakeholders have the information they need to make informed decisions, and that the project stays on track and meets its goals.

The environment in which the project operates.

Projects operate within a specific environment, which can include internal and external factors that can impact the success of the project. Internal factors refer to elements within the organization that can influence the project. These can include the organization's culture, policies and procedures, resources, and stakeholder expectations. External factors refer to elements outside the organization that can impact the project. These can include market trends, competition, regulatory requirements, and economic conditions.

It is important for project managers to understand the environment in which the project will operate, as this can help them identify potential risks and challenges, and develop strategies to mitigate or manage them. For example, if the project is subject to tight regulatory requirements, the project manager may need to allocate additional resources to ensure compliance.

Overall, the environment in which a project operates can have a significant impact on its success. Project managers need to be aware of both internal and external factors, and be prepared to adapt to changing circumstances as needed.
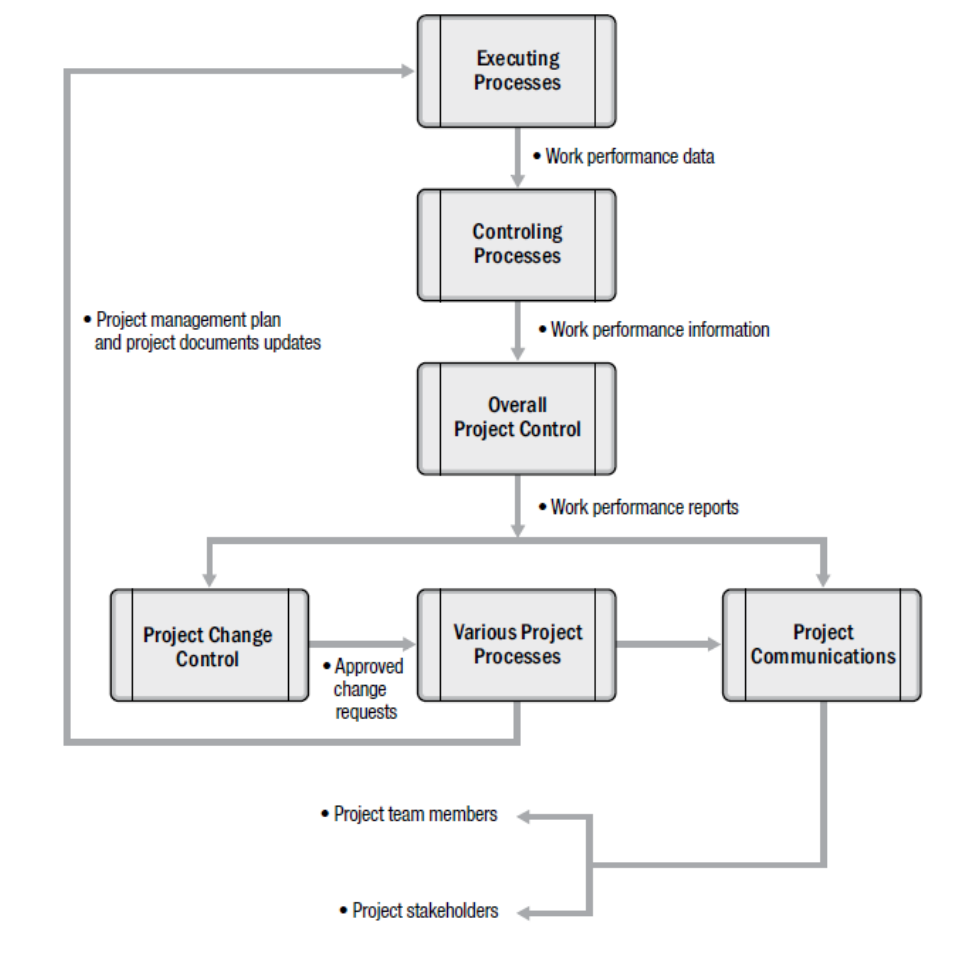
Figure 1-7. Project Data, Information, and Report Flow

Organizational systems

Organizational systems refer to the various elements that make up an organization and how they are structured and managed. These elements can include:

- Management elements: These are the processes, policies, and practices that an organization uses to plan, coordinate, and control its activities. Examples of management elements include budgeting, performance measurement, and decision-making processes.

- Government framework: This refers to the legal and regulatory environment in which an organization operates. This can include laws and regulations that impact the organization, as well as any government agencies or oversight bodies that the organization is subject to.
- Organizational structure: This refers to the way that an organization is structured and the relationships between different parts of the organization. There are several different types of organizational structures, including functional, divisional, matrix, and flat.

Overall, these organizational systems work together to support the goals and objectives of the organization. It is essential for organizations to have clear and effective systems in place to ensure that they are well-managed and operate efficiently.

Table 2-1. Influences of Organizational Structures on Projects

Organizational Structure Type	Project Characteristics					
	Work Groups Arranged by:	Project Manager's Authority	Project Manager's Role	Resource Availability	Who Manages the Project Budget?	Project Management Administrative Staff
Organic or Simple	Flexible; people working side-by-side	Little or none	Part-time; may or may not be a designated job role like coordinator	Little or none	Owner or operator	Little or none
Functional (centralized)	Job being done (e.g., engineering, manufacturing)	Little or none	Part-time; may or may not be a designated job role like coordinator	Little or none	Functional manager	Part-time
Multi-divisional (may replicate functions for each division with little centralization)	One of: product; production processes; portfolio; program; geographic region; customer type	Little or none	Part-time; may or may not be a designated job role like coordinator	Little or none	Functional manager	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
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
Project-oriented (composite, hybrid)	Project	High to almost total	Full-time designated job role	High to almost total	Project manager	Full-time
Virtual	Network structure with nodes at points of contact with other people	Low to moderate	Full-time or part-time	Low to moderate	Mixed	Could be full-time or part-time
Hybrid	Mix of other types	Mixed	Mixed	Mixed	Mixed	Mixed
PMO*	Mix of other types	High to almost total	Full-time designated job role	High to almost total	Project manager	Full-time

*PMO refers to a portfolio, program, or project management office or organization.

A project management office (PMO

A project management office (PMO**)** is a centralized unit within an organization that is responsible for defining and maintaining standards for project management. The PMO plays a key role in ensuring that projects are completed on time, within budget, and to the required quality standards.

- The specific functions and responsibilities of a PMO can vary depending on the organization, but common tasks include:
- Establishing and enforcing project management standards and processes: The PMO defines and maintains project management best practices and ensures that all projects follow these standards.
- Providing resources and support for project managers: The PMO may provide training, tools, and templates to help project managers plan and execute projects effectively.
- Monitoring and reporting on project progress: The PMO tracks the progress of projects and provides regular reports to stakeholders to keep them informed about the status of the project.
- Identifying and mitigating project risks: The PMO works with project managers to identify potential risks to the project and develops strategies to mitigate or manage these risks.

Overall, the PMO plays a critical role in ensuring that projects are delivered successfully, and that the organization is able to achieve its goals.

A project management office (PMO) can operate in one of three modes: supportive, controlling, or directive.

- In a supportive PMO, the role of the PMO is to provide resources and support to project managers, but it does not have decision-making authority. In this model, the PMO acts as an advisory body, helping project managers to plan and execute projects effectively. Still, ultimately the project managers have the final say on how the project is run.
- In a controlling PMO, the PMO has a more hands-on role in the management of projects. It may have the authority to make decisions about the direction of the project and to allocate resources as needed.
- In a directive PMO, the PMO is responsible for driving the direction and strategy of the organization's projects. It has a high level of decision-making authority, and project managers are expected to follow the guidance of the PMO.
- The most appropriate model for a PMO will depend on the needs and goals of the organization. Some organizations may benefit from a more supportive PMO, while others may require a more controlling or directive approach.

The project manager

A project manager is a person who is responsible for planning, coordinating, and controlling the resources and activities needed to complete a project. The project manager is the leader of the project team and is responsible for ensuring that the project is completed on time, within budget, and to the required quality standards.

- The specific responsibilities of a project manager can vary depending on the organization and the nature of the project, but common tasks include:
- Defining the project's goals and objectives: The project manager works with the project team and stakeholders to define the project's goals and objectives, and to develop a plan for achieving them.
- Managing the project budget: The project manager is responsible for tracking the project's budget and ensuring it stays on track.
- Coordinating the project team: The project manager is responsible for assembling and managing the project team, and for ensuring that team members have the resources and support they need to complete their tasks.

- Monitoring and controlling the project: The project manager tracks the progress of the project and makes any necessary adjustments to ensure that the project stays on track and within budget.
- Communicating with stakeholders: The project manager keeps stakeholders informed about the progress of the project, and seeks their input and guidance as needed.

Overall, the project manager is a key figure in the successful delivery of a project.
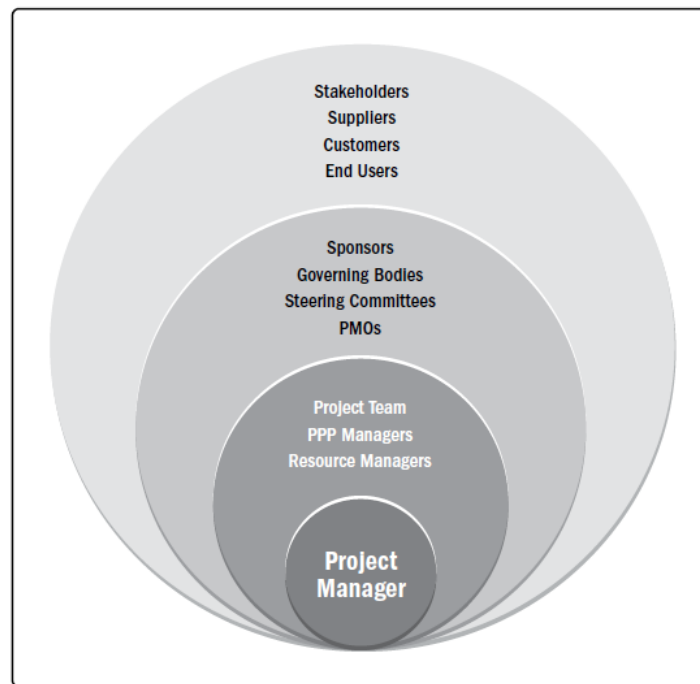

Figure 3-1. Example of Project Manager's Sphere of Influence

A project manager should possess a range of competencies in order to be effective in their role. Some key competencies that are important for project managers include:

- Leadership: Project managers are responsible for leading and motivating the project team. They should be able to inspire and engage team members, and effectively manage conflicts and challenges that may arise.
- Communication: Project managers need to be able to communicate effectively with team members, stakeholders, and other key parties. This includes the ability to listen actively, to present ideas clearly and concisely, and to write effectively.
- Planning and organization: Project managers need to be able to plan and organize the tasks and activities needed to complete a project. This includes developing a project plan, allocating resources, and managing budgets and timelines.
- Problem-solving: Project managers are often faced with complex problems and challenges. They need to be able to analyze problems, develop solutions, and make decisions in a timely and effective manner.
- Risk management: Project managers need to be able to identify potential risks to the project, and develop strategies to mitigate or manage those risks.

Overall, project managers need a wide range of skills and competencies in order to be effective in their roles. It is important for project managers to continually develop and improve their skills in order to meet the changing needs and challenges of their role.
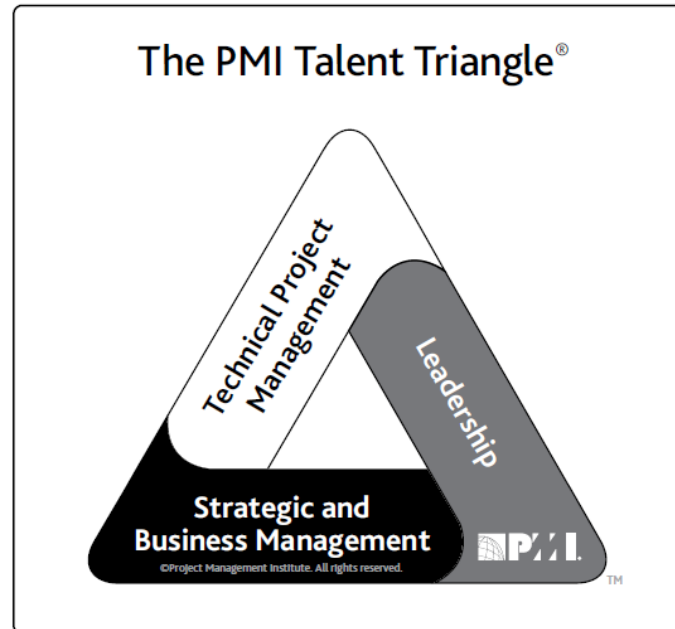

Figure 3-2. The PMI Talent Triangle®

Comparison of leadership and management

Leadership and management are related but distinct concepts. Leadership involves inspiring and guiding people to achieve a common goal, while management involves organizing and coordinating resources to accomplish specific objectives.

Here are some key differences between leadership and management:

- Focus: Leadership focuses on inspiring and guiding people to achieve a shared vision, while management focuses on achieving specific goals and objectives.

- Relationship with followers: Leadership involves building a relationship with followers based on trust and mutual respect, while management involves establishing clear roles and responsibilities and holding people accountable for their work.
- Decision-making: Leadership involves making strategic decisions that shape the direction and vision of the organization, while management involves making operational decisions that help achieve specific goals.
- Style: Leadership style can vary, but it often involves taking a more visionary and transformational approach. Management style tends to be more transactional, with a focus on achieving specific goals and objectives.

Overall, both leadership and management are important for the success of an organization. Effective leaders and managers work together to inspire and guide people to achieve the organization's goals.

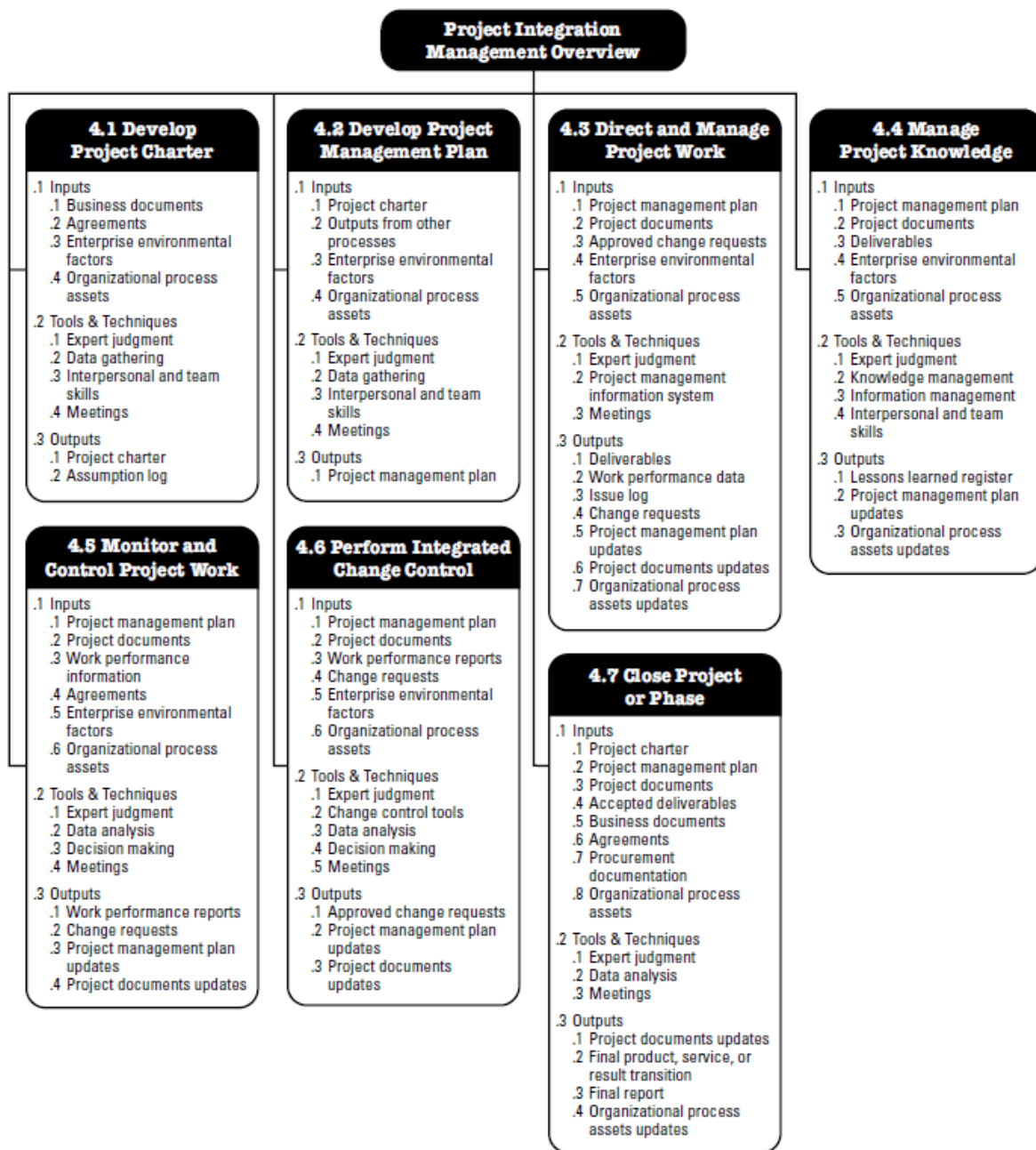**Table 3-1. Team Management and Team Leadership Compared**

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

Program integration refers to the process of combining multiple programs or components into a single, cohesive system. This may involve integrating different software applications, hardware components, or both.

Here is a brief description of each of the elements of project integration management:

- Develop project charter: This involves creating a document that defines the project's goals and objectives, and outlines the roles and responsibilities of the project team. The project charter is an important reference point throughout the project, and helps ensure that all stakeholders are working towards a common goal.
- Develop project management plan: This involves creating a detailed plan that outlines the tasks and activities that need to be completed in order to achieve the project's goals. The project management plan includes a timeline, budget, and resource plan, and is used to guide the execution of the project.
- Direct and manage project execution: This involves coordinating the work of the project team, ensuring that tasks are completed on schedule, and making any necessary adjustments to the project plan as needed.
- Monitor and control project work: This involves tracking the progress of the project and comparing it to the project plan. If any deviations from the plan are identified, the project manager is responsible for taking corrective action to get the project back on track.
- Perform integrated change control: This involves managing and tracking any changes to the project plan, and ensuring that these changes are coordinated with the project team and stakeholders.
- Close project: This involves completing all the tasks and activities identified in the project plan, and formally closing the project. It may also involve conducting a post-project review to identify any lessons learned that can be applied to future projects.

Overall, these elements work together to ensure that a project is completed successfully and that all of its elements are aligned and working towards a common goal.

Project Integration Management Overview

4.1 Develop Project Charter

.1 Inputs
.1 Business documents
.2 Agreements
.3 Enterprise environmental factors
.4 Organizational process assets

.2 Tools & Techniques
.1 Expert judgment
.2 Data gathering
.3 Interpersonal and team skills
.4 Meetings

.3 Outputs
.1 Project charter
.2 Assumption log

4.2 Develop Project Management Plan

.1 Inputs
.1 Project charter
.2 Outputs from other processes
.3 Enterprise environmental factors
.4 Organizational process assets

.2 Tools & Techniques
.1 Expert judgment
.2 Data gathering
.3 Interpersonal and team skills
.4 Meetings

.3 Outputs
.1 Project management plan

4.3 Direct and Manage Project Work

.1 Inputs
.1 Project management plan
.2 Project documents
.3 Approved change requests
.4 Enterprise environmental factors
.5 Organizational process assets

.2 Tools & Techniques
.1 Expert judgment
.2 Project management information system
.3 Meetings

.3 Outputs
.1 Deliverables
.2 Work performance data
.3 Issue log
.4 Change requests
.5 Project management plan updates
.6 Project documents updates
.7 Organizational process assets updates

4.4 Manage Project Knowledge

.1 Inputs
.1 Project management plan
.2 Project documents
.3 Deliverables
.4 Enterprise environmental factors
.5 Organizational process assets

.2 Tools & Techniques
.1 Expert judgment
.2 Knowledge management
.3 Information management
.4 Interpersonal and team skills

.3 Outputs
.1 Lessons learned register
.2 Project management plan updates
.3 Organizational process assets updates

4.5 Monitor and Control Project Work

.1 Inputs
.1 Project management plan
.2 Project documents
.3 Work performance information
.4 Agreements
.5 Enterprise environmental factors
.6 Organizational process assets

.2 Tools & Techniques
.1 Expert judgment
.2 Data analysis
.3 Decision making
.4 Meetings

.3 Outputs
.1 Work performance reports
.2 Change requests
.3 Project management plan updates
.4 Project documents updates

4.6 Perform Integrated Change Control

.1 Inputs
.1 Project management plan
.2 Project documents
.3 Work performance reports
.4 Change requests
.5 Enterprise environmental factors
.6 Organizational process assets

.2 Tools & Techniques
.1 Expert judgment
.2 Change control tools
.3 Data analysis
.4 Decision making
.5 Meetings

.3 Outputs
.1 Approved change requests
.2 Project management plan updates
.3 Project documents updates

4.7 Close Project or Phase

.1 Inputs
.1 Project charter
.2 Project management plan
.3 Project documents
.4 Accepted deliverables
.5 Business documents
.6 Agreements
.7 Procurement documentation
.8 Organizational process assets

.2 Tools & Techniques
.1 Expert judgment
.2 Data analysis
.3 Meetings

.3 Outputs
.1 Project documents updates
.2 Final product, service, or result transition
.3 Final report
.4 Organizational process assets updates

Project scope management

Scope management is the process of defining, documenting, and controlling the scope of a project. It involves identifying what work needs to be done, and what work is outside the scope of the project. In an IT project, scope management can be applied in the following ways:

- Define the scope of the project: Clearly define what work is included in the project and what is not. This can be done through the creation of a project scope statement, which outlines the project's goals, deliverables, and boundaries.
- Create a scope management plan: This plan should outline how scope will be defined, documented, and controlled throughout the project. It should also identify any assumptions or constraints that could impact the scope of the project.

- Use a scope baseline: The scope baseline is a document that captures the agreed-upon scope of the project. It serves as a reference point against which actual progress can be measured.
- Use scope change control: Change control is the process of managing and documenting changes to the scope of the project. Any changes to the scope should be documented, reviewed, and approved before they are implemented.
- Use scope verification: This involves reviewing the completed work to ensure that it aligns with the scope baseline. This can be done through inspections, walk-throughs, or other review processes.

By following these steps, you can effectively manage the scope of your IT project and ensure that it stays on track and within budget.
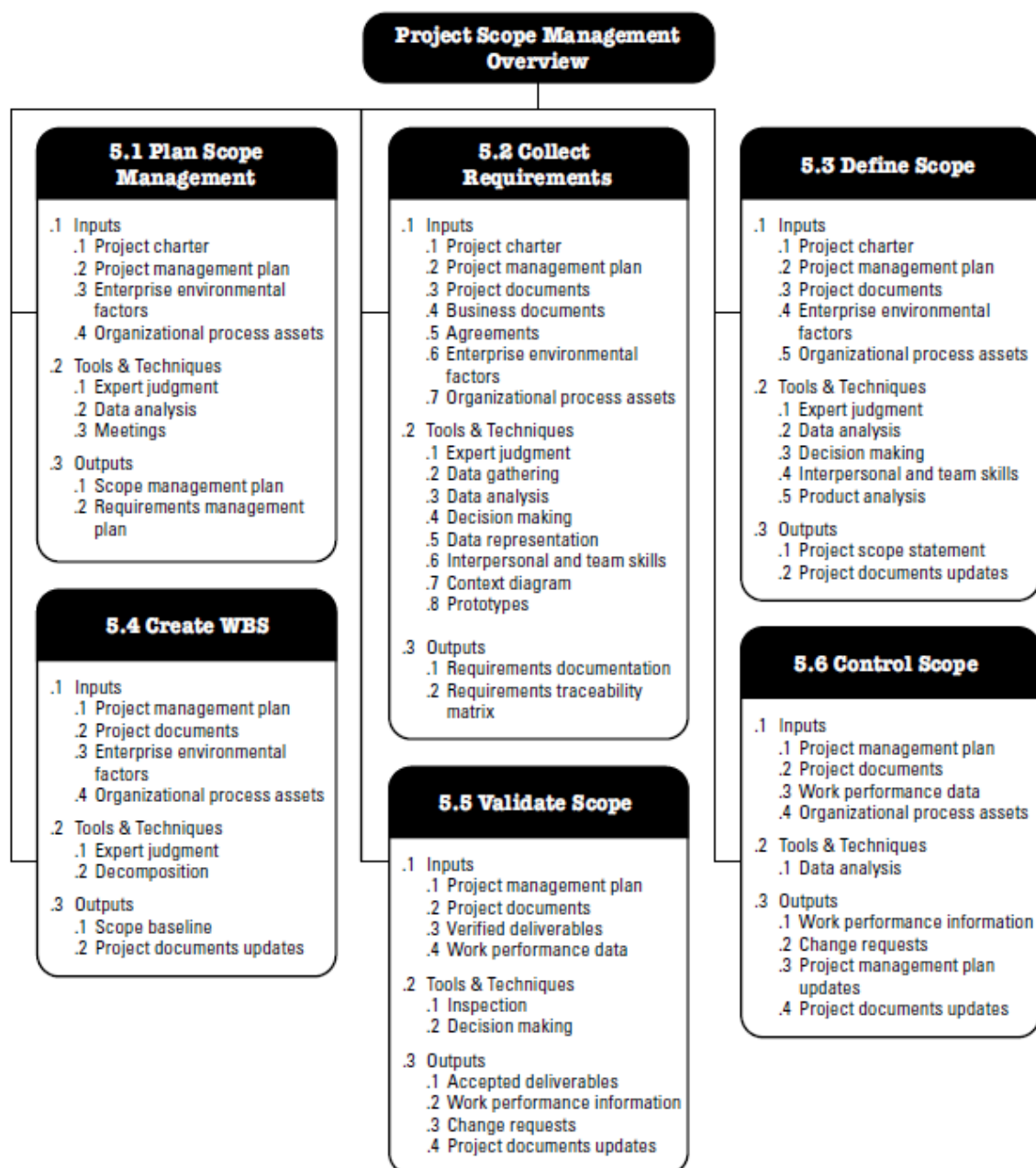
Figure 5-1 Project Scope Management Overview

Project scope Vs. Product scope,

Project scope refers to the boundaries of a project, including the specific goals, objectives, and deliverables that the project is expected to achieve. It defines what is and is not included in the project and helps to ensure that the project stays on track and within budget.

Product scope, on the other hand, refers to the features and characteristics of the product or service that the project is intended to produce. It defines what the product or service should do and what it should look like and helps to ensure that the final product meets the needs and expectations of the customer.

It is essential to distinguish between project scope and product scope, as they serve different purposes and have different implications for the project. Ensuring that the project scope is well-defined and managed helps to ensure that the project is completed successfully while ensuring that the product scope is well-defined and managed helps to ensure that the final product meets the needs of the customer.
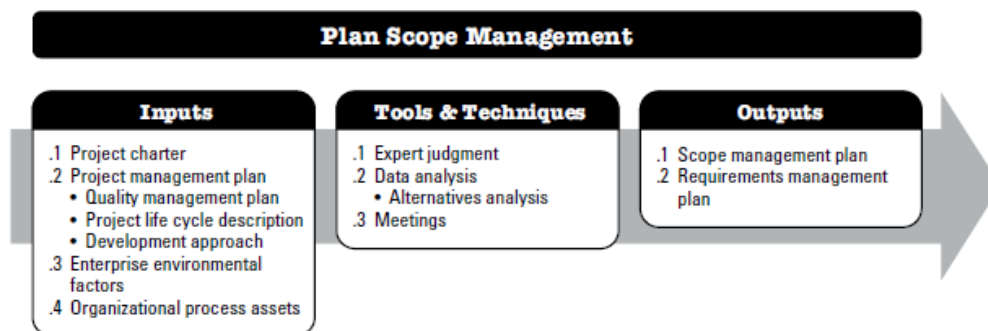
Plan Scope Management

Inputs	Tools & Techniques	Outputs
.1 Project charter	.1 Expert judgment	.1 Scope management plan
.2 Project management plan	.2 Data analysis	.2 Requirements management plan
• Quality management plan	• Alternatives analysis	
• Project life cycle description	.3 Meetings	
• Development approach		
.3 Enterprise environmental factors		
.4 Organizational process assets		

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

4.1 Develop Project Charter
• Project charter

Project Management Plan
• Quality management plan
• Project life cycle description
• Development approach

Enterprise/ Organization
• Enterprise environmental factors
• Organizational process assets

5.1 Plan Scope Management
• Scope management plan
• Requirements management plan
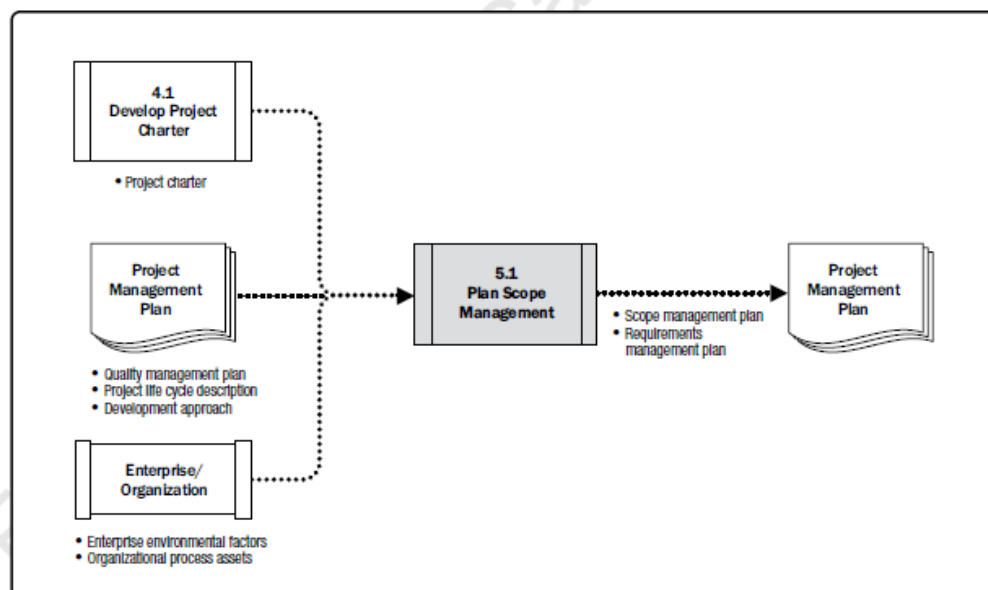
Project Management Plan

Figure 5-3. Plan Scope Management: Data Flow Diagram

There are several tools and techniques that can be used to plan scope management for a project. Some common ones include:

- Work breakdown structure (WBS): A WBS is a graphical representation of the project, showing how the project is divided into smaller, more manageable pieces, or "work packages." It helps the project team understand what tasks need to be completed and how they fit into the overall project.
- Project scope statement: A project scope statement is a document that outlines the scope of the project in detail, including the project's goals, objectives, and deliverables. It helps to ensure that all stakeholders have a clear understanding of what is and is not included in the project.
- Change control process: A change control process is a set of procedures for managing and documenting changes to the project scope. It helps to ensure that changes are coordinated with the project team and stakeholders and that they are within the project's budget and timeline.
- Project charter: A project charter is a document that defines the project's goals and objectives and outlines the roles and responsibilities of the project team. It can be used to help define the scope of the project and ensure that all stakeholders are working towards a common goal.
- Requirements gathering and analysis: Gathering and analyzing project requirements is an essential step in defining the project scope. This can be done through techniques such as interviews, focus groups, and stakeholder workshops.

Overall, these tools and techniques can help project managers plan and manage the scope of a project and ensure that the project stays on track and within budget.
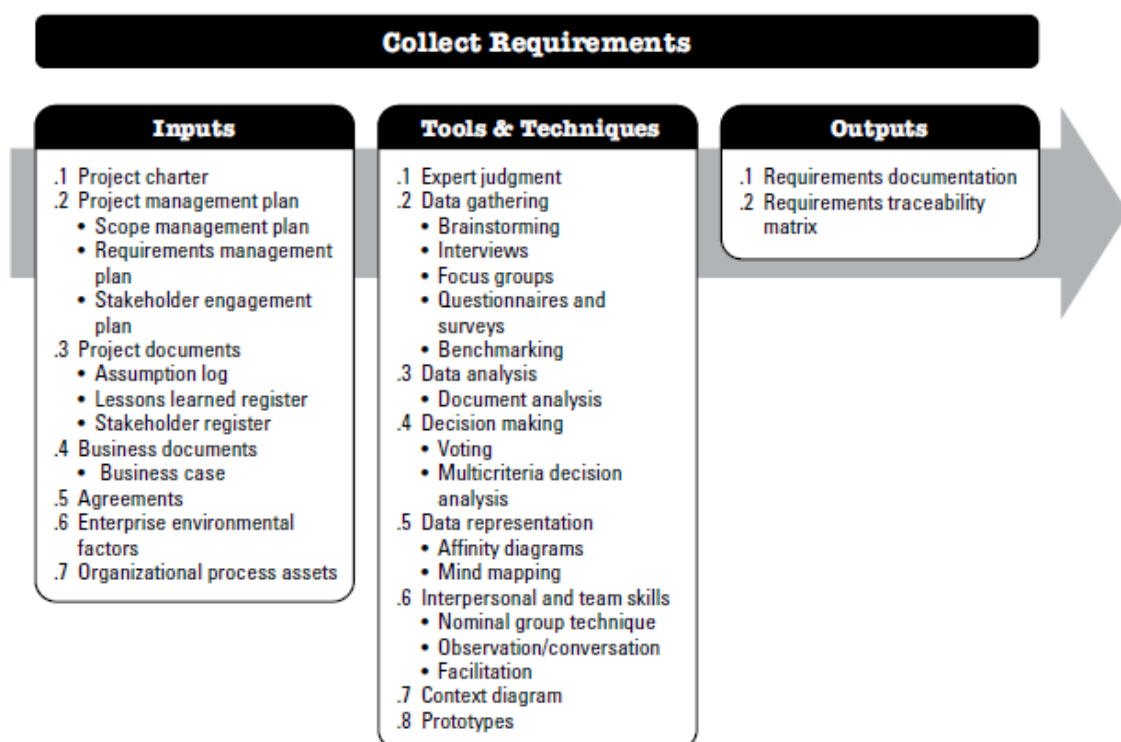

Collect Requirements

Inputs	Tools & Techniques	Outputs
.1 Project charter .2 Project management plan • Scope management plan • Requirements management plan • Stakeholder engagement plan .3 Project documents • Assumption log • Lessons learned register • Stakeholder register .4 Business documents • Business case .5 Agreements .6 Enterprise environmental factors .7 Organizational process assets	.1 Expert judgment .2 Data gathering • Brainstorming • Interviews • Focus groups • Questionnaires and surveys • Benchmarking .3 Data analysis • Document analysis .4 Decision making • Voting • Multicriteria decision analysis .5 Data representation • Affinity diagrams • Mind mapping .6 Interpersonal and team skills • Nominal group technique • Observation/conversation • Facilitation .7 Context diagram .8 Prototypes	.1 Requirements documentation .2 Requirements traceability matrix

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

context diagram

A context diagram is a high-level diagram that provides an overview of a system or process, and how it interacts with its external environment. It is used to identify the boundaries of a system, and to understand the relationships between the system and its external stakeholders.

A context diagram consists of a single box representing the system or process being studied, surrounded by a number of smaller boxes representing the external stakeholders or entities that interact with the system. Arrows connecting the boxes represent the flow of information or other interactions between the system and its external stakeholders. Context diagrams are often used at the beginning of a project to help define the scope of the project and understand the relationships between the system and its external stakeholders. They can also be useful for identifying the inputs and outputs of a system, and for identifying potential risks or challenges that the system may face.

Overall, context diagrams are a useful tool for understanding the high-level context of a system or process, and for identifying the boundaries and relationships that are important to consider when designing or analyzing the system.
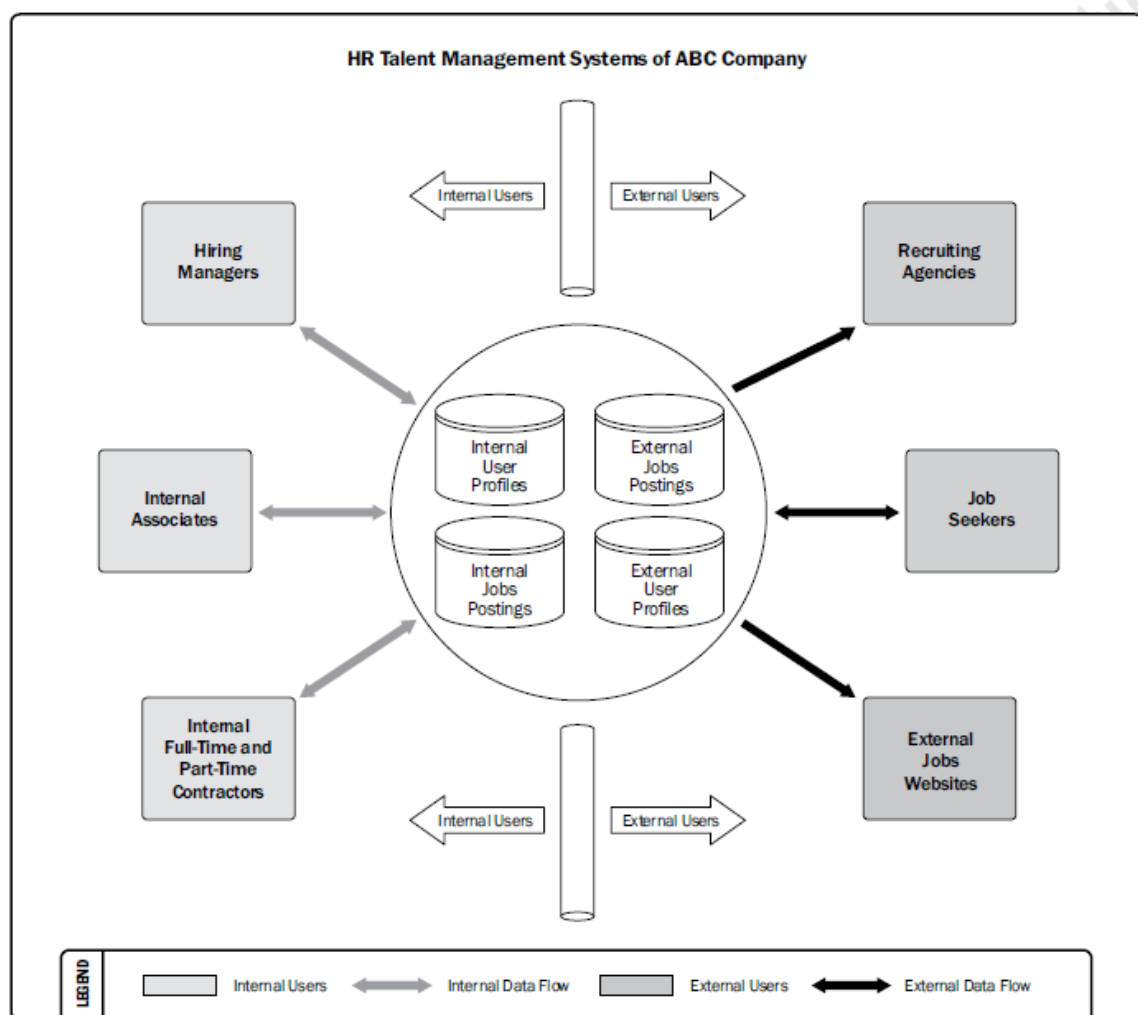
Figure 5-6. Context Diagram

Requirements Traceability Matrix								
Project Name:								
Cost Center:								
Project Description:								
ID	Associate ID	Requirements Description	Business Needs, Opportunities, Goals, Objectives	Project Objectives	WBS Deliverables	Product Design	Product Development	Test Cases
001	1.0							
	1.1							
	1.2							
	1.2.1							
002	2.0							
	2.1							
	2.1.1							
003	3.0							
	3.1							
	3.2							
004	4.0							
005	5.0							

Figure 5-7. Example of a Requirements Traceability Matrix

In project management, a feasibility matrix is a tool used to help determine the feasibility of a project or proposal. It is typically used to assess the potential risks, benefits, and costs associated with a project, and to help decision-makers determine whether or not to pursue the project.

The feasibility matrix typically consists of a grid with the potential risks, benefits, and costs of the project listed on one axis, and the likelihood of each risk, benefit, or cost occurring on the other axis. The cells of the grid are then filled in with a rating of the feasibility of each risk, benefit, or cost, based on its likelihood and impact.

The feasibility matrix can be a helpful tool for helping to identify and prioritize the potential risks, benefits, and costs of a project, and for helping to make informed decisions about whether or not to move forward with the project. It can also be used to help identify potential strategies for mitigating or managing risks, and to help develop contingency plans in case the project encounters unforeseen challenges.

For example, some potential risks might include the difficulty of finding qualified candidates, the potential for high turnover, or the risk of making a bad hiring decision. Some potential benefits might include increased productivity, better skills and expertise, or improved morale. And some potential costs might include the time and resources required to recruit and hire new staff, training and onboarding costs, or salary and benefits expenses.

The matrix can be used to help project managers weigh the potential risks, benefits, and costs of hiring new staff, and to make informed decisions about whether or not to pursue recruitment for a particular project. It can also be used to help identify strategies for minimizing or mitigating the risks associated with recruitment, and to help develop contingency plans in case the project encounters unforeseen challenges related to staffing.
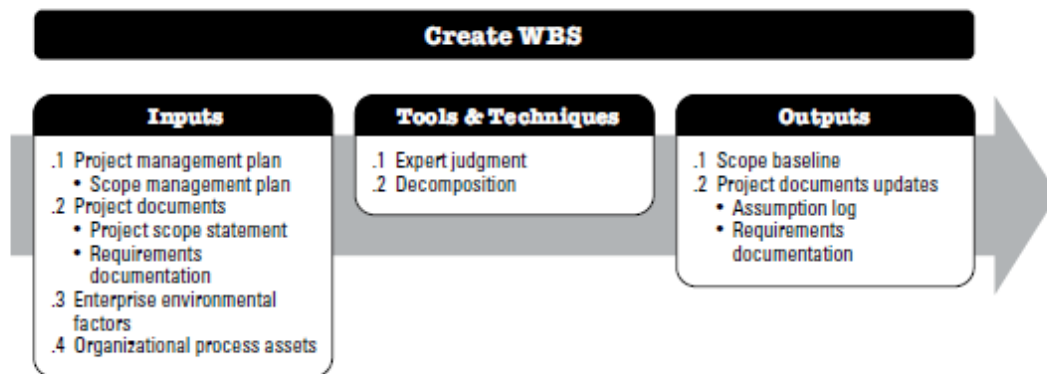
Create WBS

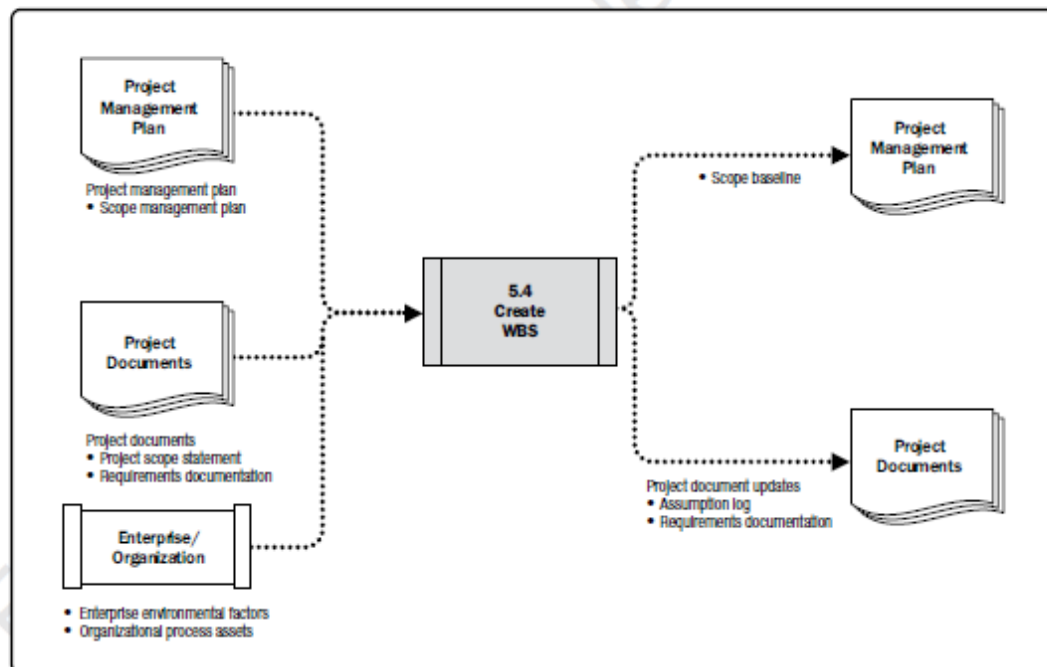Figure 5-10. Create WBS: Inputs, Tools & Techniques, and Outputs

Figure 5-11. Create WBS: Data Flow Diagram

A Work Breakdown Structure (WBS) is a hierarchical representation of the work that needs to be done in a project. It is used to organize and define the total scope of a project and is typically presented in the form of a graphical chart or diagram. The purpose of a WBS is to:

- Define the work that needs to be done in a clear and concise manner.
- Identify the major deliverables and milestones of a project.
- Provide a structure for organizing and managing the work of the project team.
- Facilitate the estimation of effort, duration, and cost.
- Provide a basis for monitoring and controlling the progress of the project.

To create a WBS, follow these steps:

- Identify the project objectives and deliverables.
- Break the project down into smaller, more manageable components.

- Organize the work into a logical structure, using a tree-like diagram.
- Assign each work component a unique identifier (e.g., a code or a name).
- Review and refine the WBS as needed to ensure that it accurately reflects the work of the project.
- It's important to note that the WBS should be developed in consultation with the project team and stakeholders to ensure that it accurately reflects the work that needs to be done.
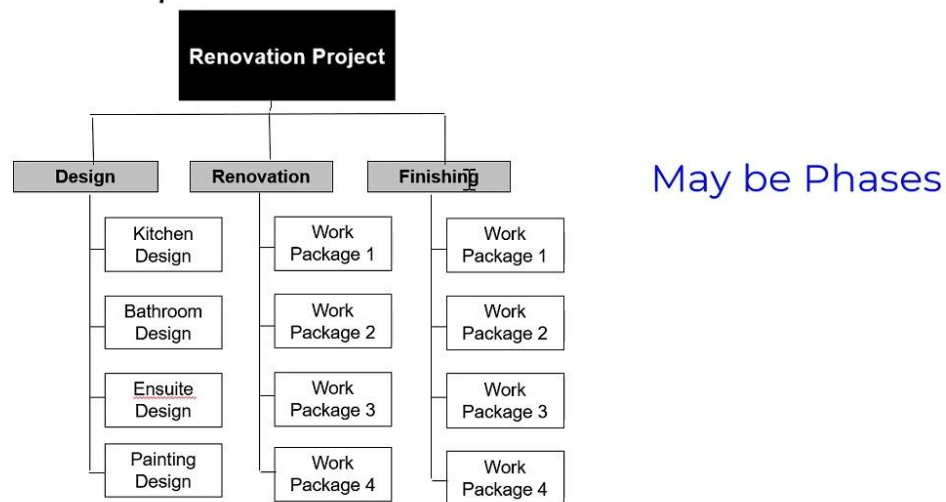
There are several types of WBS that can be used, depending on the nature and needs of the project. Some common types of WBS include:

- Product-oriented WBS: This type of WBS is organized around the deliverables or outputs of the project. It typically includes a list of the major products or deliverables that need to be produced as part of the project, and the tasks required to produce each one.
- Phase-oriented WBS: This type of WBS is organized around the phases or stages of the project. It typically includes a list of the major phases of the project, and the tasks required to complete each phase.
- Deliverable-oriented WBS: This type of WBS is organized around the deliverables or outputs of the project, similar to a product-oriented WBS. However, it typically includes more detailed tasks and sub-tasks, and may also include estimates of the time and resources required for each task.
- Resource-oriented WBS: This type of WBS is organized around the resources required to complete the project. It typically includes a list of the major resources required for the project, such as personnel, equipment, materials, and so on, and the tasks that each resource will be responsible for.
- Functional WBS: This type of WBS is organized around the functions or departments within the organization that will be involved in the project. It typically includes a list of the major functions or departments, and the tasks that each one will be responsible for.

Project schedule management

Project schedule management is the process of planning, coordinating, and managing all the activities that need to be completed to deliver a project on time. It involves creating a schedule, defining the tasks that need to be completed, estimating the resources required to complete those tasks, and then tracking and controlling the progress of the project to ensure that it stays on track.

- Define project activities: This involves identifying all the tasks and activities that must be completed to deliver the project. This helps to ensure that the project scope is well-defined and that all necessary work is included in the schedule.
- Sequence activities: This involves arranging the activities in the correct order based on dependencies and other constraints. For example, some tasks may need to be completed before others can begin, or there may be external factors that affect the sequence of work.
- Identify dependencies: This involves identifying relationships between tasks, such as which tasks need to be completed before others can begin. This is important for accurately sequencing the work and identifying potential bottlenecks or constraints.
- Estimate activity duration: This involves estimating how long each activity will take to complete. This is essential input for developing the project schedule and ensuring that the project can be completed on time.
- Develop project schedule: This involves using the information gathered in the previous steps to create a detailed project schedule. This typically involves using project management software or other tools to create a Gantt chart or other visual representations of the project timeline.
- Monitor and control schedule: This involves regularly tracking the progress of the project and comparing it to the project schedule. If there are any deviations from the plan, corrective action may be needed to get the project back on track.
- Track progress: This involves regularly collecting data on the progress of the project and using that data to update the project schedule and forecast the completion date.
- Identify and address delays: If the project falls behind schedule, it is important to identify the cause of the delay and take corrective action to get the project back on track. This may involve revising the project schedule, reallocating resources, or taking other corrective actions.
- Close project: Once the project is complete, it is important to finalize the project schedule and close out any remaining tasks or activities. This typically involves completing any final documentation and ensuring that all stakeholders are informed of the project's status.
- Finalize schedule: The project schedule is a living document that should be updated and revised as needed throughout the project. Once the project is complete, it is important to finalize the schedule and use it as a reference for future projects.

The critical path

In project management, the critical path is the series of tasks that must be completed on schedule for the project to be completed on time. These tasks have no slack, meaning that any delay in their completion will result in a delay to the overall project.

The critical path can be determined by creating a network diagram, which shows the dependencies between tasks and the duration of each task. The critical path is then identified by the longest path through the network, which represents the minimum amount of time required to complete the project.

It is important to manage the critical path carefully to ensure the project stays on track. This may involve monitoring the progress of tasks on the critical path, identifying and addressing any potential delays, and adjusting the schedule as needed to ensure that the project stays on track.

In addition to managing the critical path, it is also important to manage the overall project schedule to ensure that all tasks are completed on time and that the project is delivered within budget. This may involve regular monitoring and control of the schedule, as well as identifying and addressing any potential risks or issues that could impact the project.

project management approaches that are used to plan and execute projects

There are many different approaches to project management that can be used to plan and execute projects. Some of the most common approaches include:

- Waterfall: This is a traditional, linear approach to project management that follows a sequential process. It involves breaking the project down into distinct phases, with each phase building upon the previous one.
- Agile: This is a flexible, iterative approach to project management that emphasizes adaptability and continuous improvement. It involves breaking the project down into smaller chunks of work, called "sprints," and regularly reviewing and adjusting the project plan as needed.
- Scrum: This is a specific type of Agile project management that involves a team working together to complete a set of goals within a defined time frame, called a "sprint." The team is self-organizing and self-managing and meets daily to discuss progress and identify any challenges or obstacles.
- Lean: This approach to project management focuses on maximizing value and minimizing waste. It involves identifying and eliminating unnecessary steps or activities and streamlining processes to make them as efficient as possible.
- Six Sigma: This approach to project management involves using data and statistical analysis to identify and eliminate defects and improve processes. It involves a structured, data-driven approach to problem-solving and continuous improvement.
- PRINCE2: This is a structured, process-based approach to project management that is widely used in the UK and internationally. It emphasizes the importance of clear roles and responsibilities, and the need to review and adapt the project plan as needed continually.

Waterfall method and agile method

The Waterfall method is a linear approach to project management, in which the project is broken down into a series of sequential phases. Each phase must be completed before the next phase can begin, and there is minimal overlap between phases.

The phases of the Waterfall method typically include:

- Requirements gathering and analysis: This phase involves gathering and documenting the requirements for the project.
- Design: This phase involves creating detailed design documents that outline how the project will be implemented.
- Implementation: This phase involves developing and testing the product or solution.
- Integration and testing: This phase involve integrating all the components of the product or solution and testing them to ensure that they work correctly.
- Deployment: This phase involves installing the product or solution in its final environment and making it available to users.
- Maintenance: This phase involves providing ongoing support and making any necessary updates or changes to the product or solution.

The Waterfall method is best suited for projects with well-defined requirements, where the scope of the project is unlikely to change significantly.

Agile is a project management approach that emphasizes flexibility and collaboration. It is based on the idea of delivering small increments of value frequently, rather than trying to deliver everything at once. Agile projects are typically broken down into short cycles called "sprints," which typically last 1-4 weeks.

In Agile, the project scope is allowed to evolve and change throughout the project, based on feedback from stakeholders and the project team. This is in contrast to the Waterfall method, where the scope is fixed at the beginning of the project.

Agile methodologies include Scrum, Lean, and Extreme Programming (XP). These methodologies have different approaches to project management, but they all share the same basic principles of flexibility, collaboration, and delivering value frequently.

Scrum is an Agile framework for managing and completing complex projects. It was developed in the mid-1990s by a team of software developers in order to improve their process for developing software.

Scrum is based on the idea of small, cross-functional teams working together to deliver small increments of value frequently. These increments are called "sprints," which typically last 1-4 weeks. The team works together to define and prioritize a list of tasks, called the "product backlog," and then selects a subset of these tasks to complete in the current sprint.

The team meets regularly to review progress and adjust the plan as needed. These meetings are called "scrum meetings," and they are an important part of the Scrum process.

Lean is a project management approach that is based on the principles of the Toyota Production System, which is a methodology used in the manufacturing industry to eliminate waste and improve efficiency.

In Lean, the focus is on maximizing value and minimizing waste. This is achieved by identifying and eliminating non-value-adding activities, or "waste," from the process. Lean also emphasizes continuous improvement and the involvement of all team members in the improvement process.

Extreme Programming (XP) is an Agile software development methodology that was developed in the late 1990s. It is based on the idea of delivering small increments of value frequently and making changes to the process based on feedback from stakeholders and the project team.

XP emphasizes the importance of collaboration, communication, and simplicity. It also places a strong emphasis on testing and the use of automated testing tools to ensure the quality of the software.

Here are some steps for applying Agile and waterfall methodologies to a project:

Here is an example of the steps that might be involved in an IT project to develop and deploy a new software application using the **Waterfall method:**

- Define the scope of the project: The first step in the project would be to define the scope of the project clearly. This might involve identifying the specific goals and objectives of the project, as well as the boundaries of what will and will not be included in the project. For example, the scope of the project might include the development of a new software application for managing customer orders, but not the integration of the application with other systems.

- Identify the requirements: The next step would be to identify and document the specific requirements for the project. This might involve gathering input from stakeholders such as the project sponsor, customers, and end users to understand their needs and expectations. The requirements might include functional requirements (e.g. the ability to create and track customer orders), performance requirements (e.g. response times for various actions), and security requirements (e.g. data encryption).

- Design the solution: Based on the identified requirements, the next step would be to design the solution. This might involve creating a detailed design for the software application, including the architecture, database design, user interface design, and so on. The design should specify how the software will meet the identified requirements and should include any necessary diagrams or other documentation.

- Develop the solution: Once the design is complete, the next step would be to develop the solution. This might involve writing code for the application and creating any necessary supporting materials, such as documentation and user manuals.

- Test the solution: Once the solution has been developed, the next step would be to test it to ensure that it meets the specified requirements. This might involve creating and running test cases, as well as making any necessary bug fixes or other changes.

- Deploy the solution: Once the solution has been tested and any necessary changes have been made, the next step would be to deploy it to the production environment. This might involve installing and configuring the software on the necessary servers, as well as training users on how to use the application.

- Maintain and support the solution: The final step in the project would be to provide ongoing support and maintenance for the solution. This might involve providing bug fixes and updates, as well as addressing any issues or requests from users.

Here is an example of the steps that might be involved in an IT project to develop and deploy a new software application using **the Agile method**

- Define the scope of the project: The first step in the project would be to clearly define the scope of the project. This might involve identifying the specific goals and objectives of the project, as well as the boundaries of what will and will not be included in the project. For example, the scope of the project might include the development of a new software application for managing customer orders, but not the integration of the application with other systems.

- Identify and prioritize the requirements: The next step would be to identify and prioritize the requirements for the project. This might involve gathering input from stakeholders such as the project sponsor, customers, and end users to understand their needs and expectations. The requirements should be prioritized based on their value and importance to the business.

- Break the project into smaller chunks of work: The next step would be to break the project down into smaller chunks of work, called "user stories," that can be completed within a short time frame, typically 1-4 weeks. Each user story should describe a specific goal or objective, and should include any necessary acceptance criteria.

- Plan and execute the work in short cycles: The next step would be to plan and execute the work in short cycles, called "sprints." During each sprint, the team would work together to complete a set of user stories, and would regularly review and adjust the project plan as needed. The team might also use agile tools and techniques such as daily stand-up meetings, sprint planning meetings, and sprint review meetings to help coordinate and manage the work.

- Test and validate the solution: At the end of each sprint, the team should test and validate the solution to ensure that it meets the specified requirements. This might involve creating and running test cases, as well as making any necessary bug fixes or other changes.
- Deploy and maintain the solution: Once all of the user stories have been completed and the solution has been fully tested and validated, it can be deployed to the production environment. The team should then provide ongoing support and maintenance for the solution, including bug fixes and updates, as well as addressing any issues or requests from users.
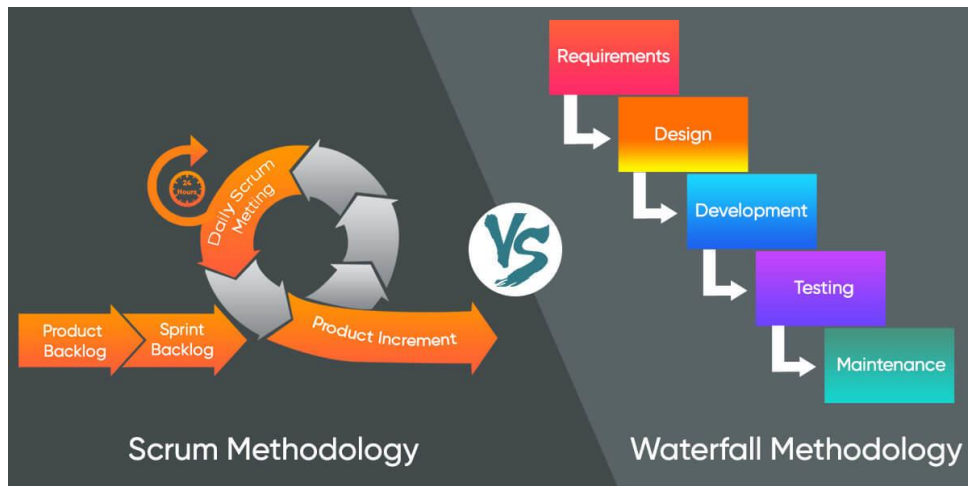
Project cost management

Project cost management is the process of planning, estimating, budgeting, and controlling the costs of a project. It involves identifying all the costs that will be incurred during the project, estimating the amount of each cost, and then tracking and controlling the costs to ensure that the project stays within budget.

There are several key activities involved in project cost management:

- Cost estimation: This involves estimating the costs of all the resources that will be required to complete the project, including labor, materials, equipment, and any other expenses.
- Budgeting: This involves allocating a specific amount of money to each cost item and creating a budget for the project.
- Cost control: This involves monitoring the actual costs of the project as it progresses and comparing them to the budget. Any deviations from the budget need to be identified and addressed in a timely manner to ensure that the project stays on track.
- Cost forecasting: This involves estimating the future costs of the project based on the progress that has been made to date. This helps to identify potential cost overruns and allow for corrective action to be taken.
- Effective project cost management is essential for ensuring that a project is completed on time and within budget. It requires careful planning and monitoring to ensure that the project stays on track and that any issues or risks are identified and managed appropriately.

Here are some common formulas used in project cost management:

→ Total Cost (TC) = Direct Costs (DC) + Indirect Costs (IC)
This formula calculates the total cost of a project by adding the direct costs (e.g., labor, materials) to the indirect costs (e.g., overhead, indirect labor).

→ Cost of Quality (COQ) = Prevention Costs (PC) + Appraisal Costs (AC) + Internal Failure Costs (IFC) + External Failure Costs (EFC)
This formula calculates the total cost of quality for a project by adding up the costs of prevention (e.g., quality planning, training), appraisal (e.g., inspections), and both internal and external failures (e.g., rework, warranty claims).

→ Budget at Completion (BAC) = Planned Value (PV) + Management Reserve (MR)
This formula calculates the total budget for a project by adding the planned value (the budgeted cost of the work that is planned to be completed) to the management reserve (an contingency budget set aside to handle unknown risks or opportunities).

→ Estimate at Completion (EAC) = Actual Cost (AC) + Estimate to Complete (ETC)
This formula calculates the estimated total cost of a project by adding the actual cost of work completed to date to the estimated cost to complete the remaining work.

→ Variance at Completion (VAC) = Budget at Completion (BAC) - Estimate at Completion (EAC)
This formula calculates the difference between the budgeted cost of the project and the estimated total cost of the project.

→ Cost Performance Index (CPI) = Earned Value (EV) / Actual Cost (AC)
This formula calculates the efficiency of a project by dividing the earned value (the budgeted cost of the work that has been completed) by the actual cost of the work completed. A CPI greater than 1 indicates that the project is under budget, while a CPI less than 1 indicates that the project is over budget.

→ Schedule Performance Index (SPI) = Earned Value (EV) / Planned Value (PV)
This formula calculates the schedule efficiency of a project by dividing the earned value (the budgeted cost of the work that has been completed) by the planned value (the budgeted cost of the work that is planned to be completed). An SPI greater than 1 indicates that the project is ahead of schedule, while an SPI less than 1 indicates that the project is behind schedule.

→ Cost Variance (CV) = Earned Value (EV) - Actual Cost (AC)
This formula calculates the difference between the budgeted cost of the work that has been completed and the actual cost of the work completed. A positive CV indicates that the project is under budget, while a negative CV indicates that the project is over budget.

→ Schedule Variance (SV) = Earned Value (EV) - Planned Value (PV)
This formula calculates the difference between the budgeted cost of the work that has been completed and the budgeted cost of the work that was planned to be completed at this point in the project. A positive SV indicates that the project is ahead of schedule, while a negative SV indicates that the project is behind schedule.

→ To Complete Performance Index (TCPI) = (Budget at Completion (BAC) - Earned Value (EV)) / (Budget at Completion (BAC) - Actual Cost (AC))
This formula calculates the cost efficiency needed for the remaining work to meet the project budget. A TCPI greater than 1 indicates that the project is under budget, while a TCPI less than 1 indicates that the project is over budget.

→ Estimate to Complete (ETC) = (Budget at Completion (BAC) - Earned Value (EV)) / Cost Performance Index (CPI)
This formula calculates the estimated cost to complete the remaining work based on the current cost efficiency of the project.

→ Variance at Completion (VAC) = Budget at Completion (BAC) - (Actual Cost (AC) + Estimate to Complete (ETC))
This formula calculates the difference between the budgeted cost of the project and the estimated total cost of the project based on the current cost efficiency. A positive VAC indicates that the project is under budget, while a negative VAC indicates that the project is over budget.

→ Earned Value (EV) = Planned Value (PV) x % Complete
This formula calculates the budgeted cost of the work that has been completed based on the planned value and the percentage of work that has been completed.

→ Planned Value (PV) = Budget at Completion (BAC) x % Complete
This formula calculates the budgeted cost of the work that was planned to be completed at a given point in the project based on the budget at completion and the percentage of work that has been completed.

→ % Complete = Earned Value (EV) / Budget at Completion (BAC)
This formula calculates the percentage of work that has been completed based on the earned value and the budget at completion.

→ Actual Cost (AC) = Total Direct Costs (TDC) + Total Indirect Costs (TIC)
This formula calculates the actual cost of a project by adding the total direct costs (e.g., labor, materials) to the total indirect costs (e.g., overhead, indirect labor).

→ Budget at Completion (BAC) = Total Direct Costs (TDC) + Total Indirect Costs (TIC) + Management Reserve (MR)
This formula calculates the total budget for a project by adding the direct and indirect costs to the management reserve (an contingency budget set aside to handle unknown risks or opportunities).

→ To Complete Cost (TCC) = Budget at Completion (BAC) - Actual Cost (AC)
This formula calculates the remaining budget for a project based on the budget at completion and the actual cost to date.

→ These formulas are just a few examples of the types of calculations that may be used in project cost management. The specific formulas and calculations used will depend on the needs of the project and the tools and techniques being used to manage the project.

Project quality management

Project quality management is the process of ensuring that the project meets the defined quality standards and requirements. It involves planning, executing, and controlling activities throughout the project to ensure that the project delivers a product or service that meets the required level of quality.

There are several key activities involved in project quality management:

- Define quality standards: This involves identifying the quality standards and requirements that the project must meet.
- Plan quality: This involves developing a plan to ensure that the project will meet the defined quality standards. This may involve activities such as creating quality checklists, identifying quality metrics, and selecting quality tools and techniques.
- Perform quality assurance: This involves reviewing and evaluating the project to ensure that it is meeting the defined quality standards. This may involve activities such as inspections, testing, and reviews.
- Perform quality control: This involves monitoring and controlling the project to ensure that it remains on track and meets the defined quality standards. This may involve activities such as identifying and addressing quality issues, tracking quality metrics, and conducting root cause analysis to identify and fix quality problems.

Effective project quality management is essential for ensuring that the project delivers a product or service that meets the needs of the stakeholders and meets the defined quality standards. It requires careful planning and monitoring to ensure that the project stays on track and that any quality issues are identified and addressed promptly.

Once the quality standards have been defined, the next step is to develop a quality plan. This plan should identify any quality risks that may impact the project and outline the steps that will be taken to mitigate these risks. The quality plan should also outline the tools and techniques that will be used to ensure that the project meets the defined quality standards.

Quality assurance involves reviewing and evaluating the project to ensure that it is meeting the defined quality standards. This may involve activities such as inspections, testing, and reviews. Auditing is also an important part of quality assurance, as it involves reviewing the project to ensure that it is in compliance with the defined quality standards and requirements.

Quality control involves monitoring and controlling the project to ensure that it remains on track and meets the defined quality standards. This may involve activities such as identifying and addressing quality issues, tracking quality metrics, and conducting root cause analysis to identify and fix quality problems. Finally, it is important to implement continuous improvement processes to ensure that quality is continuously monitored and improved. This may involve activities such as measuring and tracking quality metrics, and implementing changes based on these metrics to improve overall quality. By following these steps, it is possible to effectively manage quality on a project and deliver a product or service that meets the needs of the stakeholders and the defined quality standards.

Project resource management

Project resource management is the process of planning, acquiring, allocating, and managing the resources (e.g., people, equipment, materials) needed to complete a project. It involves identifying the resources that are required, determining where and how to obtain those resources, and then managing and tracking the use of those resources throughout the project.

There are several key activities involved in project resource management:

- Resource planning: This involves identifying the resources that are required to complete the project and determining where and how to obtain those resources.
- Resource acquisition: This involves acquiring the resources that have been identified as being needed for the project. This may involve purchasing materials, hiring personnel, or renting equipment.
- Resource allocation: This involves assigning the resources to specific tasks and activities within the project.
- Resource management: This involves tracking and managing the use of the resources throughout the project. This may involve activities such as monitoring resource utilization, adjusting the resource plan as needed, and managing resource conflicts.

Effective project resource management is essential for ensuring that the project has the necessary resources to complete the work on time and within budget. It requires careful planning and monitoring to ensure that the project stays on track and that any resource issues are identified and addressed promptly.

Project communication management

Project communication management is the process of planning, organizing, and managing communication within a project. It involves identifying the stakeholders and determining how and when to communicate with them, as well as ensuring that the appropriate communication channels are in place for the project.

There are several key activities involved in project communication management:

- Communication planning: This involves identifying the stakeholders and determining how and when to communicate with them. It also involves developing a communication plan that outlines the specific communication methods, tools, and channels that will be used.
- Communication execution: This involves implementing the communication plan and using the appropriate methods, tools, and channels to communicate with the stakeholders.
- Communication monitoring and control: This involves monitoring the effectiveness of the communication plan and making adjustments as needed. It also involves tracking and managing communication-related risks and issues.

Effective project communication management is essential for ensuring that all stakeholders are kept informed and up-to-date on the progress of the project. It requires careful planning and execution to

ensure that the appropriate communication channels and methods are in place and that all stakeholders are communicated with effectively.
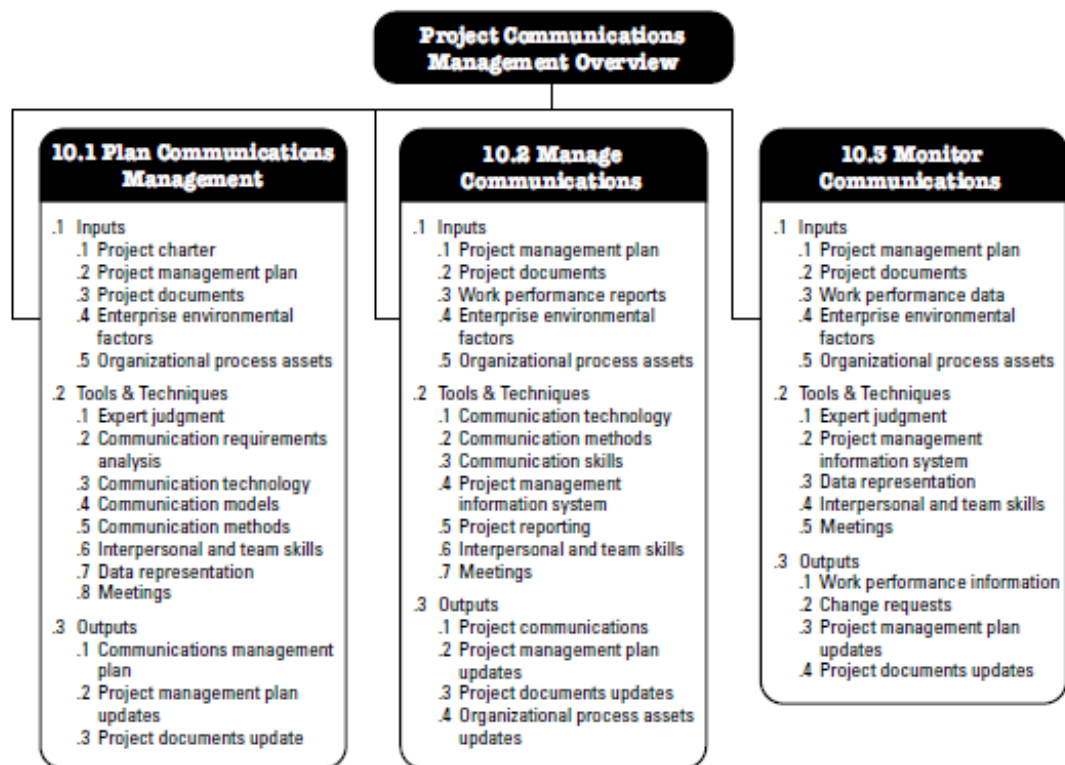

Figure 10-1. Project Communications Overview

Project risk management

Project risk management is the process of identifying, analyzing, and mitigating risks that could potentially impact the project. It involves proactively identifying potential risks, evaluating the likelihood and impact of those risks, and implementing strategies to reduce or eliminate the risks.

There are several key activities involved in project risk management:

- Risk identification: This involves identifying potential risks that could impact the project. This may involve brainstorming sessions, reviewing project documents, and consulting with experts.
- Risk analysis: This involves evaluating the likelihood and impact of each identified risk. This may involve using tools such as probability and impact matrices to quantify the risks.
- Risk response planning: This involves developing strategies to mitigate or eliminate the identified risks. This may involve activities such as creating contingency plans, implementing risk-reducing actions, or transferring the risk to another party.
- Risk monitoring and control: This involves monitoring the identified risks throughout the project and implementing the risk response plans as needed. It also involves identifying and analyzing new risks that may arise during the project.

Effective project risk management is essential for ensuring that the project stays on track and meets its objectives. It requires proactive identification and analysis of potential risks, as well as effective implementation of risk response plans to mitigate or eliminate those risks.

Project procurement management

Project procurement management is the process of planning, acquiring, and managing the goods and services that are needed to complete a project. It involves identifying the procurement needs of the project, developing a procurement plan, and then managing the procurement process to ensure that the needed goods and services are obtained in a timely and cost-effective manner.

There are several key activities involved in project procurement management:

- Procurement planning: This involves identifying the goods and services that are needed for the project and developing a procurement plan that outlines how and when these will be obtained.
- Solicitation planning: This involves developing a plan for soliciting bids or proposals from potential suppliers.
- Source selection: This involves evaluating bids or proposals from potential suppliers and selecting the most suitable one.
- Contract administration: This involves managing the contract with the selected supplier to ensure that the goods and services are delivered as specified.
- Contract closeout: This involves completing all necessary paperwork and finalizing the contract once the goods and services have been delivered.

Effective project procurement management is essential for ensuring that the project has the necessary goods and services to complete the work on time and within budget. It requires careful planning and management to ensure that the procurement process is carried out efficiently and that the necessary goods and services are obtained in a cost-effective manner.

Summary

- Project integration management is crucial for coordinating and aligning the various components of a project. It involves bringing together the various elements of the project and ensuring that they work together effectively.
- Project scope management is crucial for defining and controlling the work that needs to be completed in order to deliver the project. It involves defining the project boundaries and ensuring that only work that is within those boundaries is completed.
- Project schedule management is crucial for ensuring that the project is completed on time. It involves defining the project activities, sequencing them, and developing a project schedule that outlines when each activity will be completed.
- Project cost management is crucial for ensuring that the project is completed within budget. It involves estimating the costs of the project, monitoring and controlling those costs, and taking steps to minimize costs wherever possible.
- Project quality management is crucial for ensuring that the project delivers a product or service that meets the required level of quality. It involves planning, executing, and controlling activities throughout the project to ensure that the project meets the defined quality standards.
- Project resource management is crucial for ensuring that the project has the necessary resources to complete the work on time and within budget. It involves identifying the resources that are required, determining where and how to obtain those resources, and then managing and tracking the use of those resources throughout the project.
- Project communication management is crucial for ensuring that all stakeholders are kept informed and up-to-date on the progress of the project. It involves planning, organizing, and managing communication within the project to ensure that the appropriate communication channels and methods are in place.

- Project risk management is crucial for ensuring that the project stays on track and meets its objectives. It involves proactively identifying potential risks, evaluating the likelihood and impact of those risks, and implementing strategies to reduce or eliminate the risks.
- Project procurement management is crucial for ensuring that the project has the necessary goods and services to complete the work on time and within budget. It involves identifying the procurement needs of the project, developing a procurement plan, and then managing the procurement process to ensure that the needed goods and services are obtained in a timely and cost-effective manner.

All of these components of project management are interconnected and rely on each other to ensure the success of the project. For example, effective project scope management is necessary to ensure that the project stays on track and does not exceed its budget or timeline. This, in turn, requires effective project schedules and cost management to ensure that the project is completed on time and within budget. Good communication and risk management are also crucial for ensuring that the project stays on track and that any issues are identified and addressed promptly. Overall, the success of a project relies on the effective management of all of these components and their integration with each other. By ensuring that each component is managed effectively and that they work together seamlessly, it is possible to deliver a successful project that meets the needs of the stakeholders and achieves the desired outcomes.

Project Management Success Factors

Factor	Value
Clear Business Objectives	88.41%
User Involvement	87.99%
PM Expertise	87.24%
Execution	86.88%
Emotional Maturity	86.35%
Skilled Resources	85.18%
Agile Process	84.93%
Project Optimization	82.00%
Executive Management Support	80.30%
Tools & Infrastructure	78.12%

---END OF THE REVISON NOTE----