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STUDY NOTES

PROJECT MANAGEMENT

Unit I — Introduction to Project Management

1.1 Project Definition

Before we understand project management, we must first understand what a project actually is. In simple words, a project is a temporary piece of work that is done to create a unique product, service, or result. It is different from the daily, routine work that happens in an organisation.

Definition (PMBOK Guide)

"A project is a temporary endeavour undertaken to create a unique product, service, or result."

Let us break this definition into small, easy parts so that the meaning becomes very clear.

Key Characteristics of a Project

- **Temporary:** Every project has a clear start date and a clear end date. A project ends when its goal is achieved, or when it is decided that the project is no longer needed and is cancelled. Temporary does not mean the project is short — some projects run for many years — but it always has a defined end point.
- **Unique:** A project always creates something that has not existed before, at least in that exact way. Even if a company has built one hundred similar buildings, the one hundred and first building is still unique because of its location, its client, its date, or its exact design.
- **Definite Objective:** Every project is started with a clear goal in mind, such as building a bridge, launching a new mobile application, or organising a marketing campaign.
- **Defined Resources:** A project always works within a fixed budget, a fixed set of people, and fixed materials. Resources are never unlimited.
- **Progressive Elaboration:** As the project moves forward, the team keeps adding more detail and more clarity to the plan, based on the information they gather along the way.

Project vs Operations

Students often get confused between a project and normal business operations. The table below makes the difference very simple to understand.

Basis	Project	Operations
Nature	Temporary, has a start and an end	Ongoing and continuous
Output	Creates something unique	Produces the same product or service repeatedly
Example	Constructing a new office building	Running the day-to-day office administration

Basis	Project	Operations
Team	Often a temporary, cross-functional team	Permanent, fixed departmental staff
Goal	Achieve a specific, one-time objective	Sustain the business and keep it running smoothly

Simple Examples of Projects

- Constructing a new residential apartment building.
- Developing and launching a brand-new mobile phone application.
- Organising a college cultural festival.
- Installing a new computer network in an office.
- Writing and publishing a new textbook.

What is Project Management?

Once we understand what a project is, project management becomes easy to define. Project management is the use of knowledge, skills, tools, and techniques on project activities in order to meet the project's requirements successfully. In simple words, it is the art and science of planning, organising, and controlling work so that a project is completed on time, within budget, and to the desired quality.

A project manager is the person responsible for leading the team, making key decisions, solving problems, and making sure that the project stays on track from the beginning until the end.

1.2 Project Life Cycle

Just like a living being, every project goes through different stages from its birth to its completion. This series of stages is called the Project Life Cycle. Understanding the life cycle helps a project manager know exactly what should be done at each point in time.

Definition

The Project Life Cycle is the series of phases that a project passes through, from its initiation to its closure.

Although the exact names of the phases may differ slightly from one book to another, most project life cycles follow four broad phases, described below in a simple, step-by-step manner.

Phase 1: Initiation

This is the starting point of the project. In this phase, the idea for the project is studied to check whether it is worth doing. The business need, the goals, and the rough scope of the project are identified. A feasibility study may be carried out to check if the project is practical, and a project charter is prepared, which officially authorises the project to begin.

- Identifying the business need or the problem to be solved.
- Carrying out a feasibility study.
- Identifying key stakeholders.
- Preparing and approving the project charter.

Phase 2: Planning

Planning is often called the most important phase because a well-made plan saves a lot of trouble later. In this phase, the project manager and the team decide exactly how the project's goals will be achieved. Detailed plans are prepared for scope, time, cost, quality, resources, communication, risk, and procurement.

- Defining the detailed scope of work.
- Creating the Work Breakdown Structure (WBS).
- Preparing the schedule, budget, and resource plan.
- Identifying risks and planning how to respond to them.

Phase 3: Execution

This is the phase where the actual work of the project is carried out according to the plan that was made earlier. The project manager coordinates the people and resources, manages stakeholder expectations, and ensures that the tasks are performed as planned.

- Directing and managing the project team.
- Carrying out the planned activities to produce the project deliverables.
- Managing communication with stakeholders.
- Ensuring quality standards are being followed.

Phase 4: Monitoring and Controlling

This phase runs alongside the execution phase. While the work is being performed, the project manager continuously tracks progress and compares it with the plan. If there is any difference between the plan and the actual work, corrective action is taken immediately.

- Tracking cost, schedule, and performance.
- Managing changes to the project through a formal change control process.
- Identifying and managing new risks as they appear.

Phase 5: Closure

This is the final phase, where the project is formally closed. All deliverables are handed over to the client or the end user, contracts are closed, resources are released, and the lessons learned during the project are documented for future use.

- Obtaining formal acceptance of the final deliverable.
- Releasing project resources and closing contracts.
- Documenting lessons learned.
- Celebrating success and archiving project documents.

Characteristics of the Project Life Cycle

- Cost and staffing levels are low at the start, rise during the middle stages, and fall quickly as the project reaches closure.
- The ability of stakeholders to influence the final product is highest at the beginning and decreases as the project moves forward.
- The cost of making changes is low in the early stages and becomes very high in the later stages.
- Risk and uncertainty are highest at the start of the project and reduce gradually as the project progresses.

NOTE

The Project Life Cycle describes the phases of the project itself (initiation to closure), while the Project Management Process Groups (covered next) describe the type of management activity happening within any of these phases. The two ideas work together but are not the same thing.

1.3 Processes and Knowledge Areas in Project Management

The PMBOK Guide, which is the most widely used project management framework in the world, organises project management work into two important structures: Process Groups and Knowledge Areas. Understanding both of these makes it much easier to organise and remember everything a project manager needs to do.

A. The Five Process Groups

A process is simply a set of actions that leads to a result. Project management processes are grouped into five categories, known as Process Groups. These are not the same as the life cycle phases discussed earlier — a Process Group can repeat many times within a single phase.

Process Group	Simple Meaning
Initiating	Defining a new project or a new phase, and getting formal approval to start it.
Planning	Establishing the full scope of the project, refining objectives, and defining the course of action needed to reach the goals.
Executing	Completing the work defined in the plan in order to produce the project's deliverables.
Monitoring & Controlling	Tracking, reviewing, and regulating the progress and performance of the project, and managing any changes.
Closing	Finalising all activities to formally close the project, phase, or contract.

It is important to remember that these five Process Groups are not simply performed once, one after another. In reality, they often overlap and interact with each other repeatedly throughout the project, especially Planning, Executing, and Monitoring & Controlling, which usually happen together in a continuous cycle.

B. The Ten Knowledge Areas

While Process Groups tell us what stage the work belongs to, Knowledge Areas tell us what subject or field of expertise the work belongs to. The PMBOK Guide identifies ten Knowledge Areas, and every project manager needs a working understanding of each one.

Knowledge Area	What It Covers
Integration Management	Coordinating all parts of the project so that they work together as a single, unified whole.

Knowledge Area	What It Covers
Scope Management	Defining and controlling what work is, and is not, included in the project.
Schedule Management	Planning, developing, and controlling the project timeline.
Cost Management	Estimating, budgeting, and controlling project costs.
Quality Management	Ensuring that the project meets the quality standards required by the stakeholders.
Resource Management	Identifying, acquiring, and managing the people and physical resources needed.
Communications Management	Ensuring timely and appropriate creation, sharing, and storage of project information.
Risk Management	Identifying, analysing, and responding to project risks.
Procurement Management	Purchasing or acquiring products, services, or results needed from outside the project team.
Stakeholder Management	Identifying stakeholders and managing their expectations and engagement.

A helpful way to remember the relationship between the two ideas is this: the five Process Groups form the horizontal timeline of the project, while the ten Knowledge Areas form the vertical subjects that must be managed at every point along that timeline. Together, they form a grid that maps out almost everything a project manager must think about.

1.4 Work Breakdown Structure (WBS) and its Types

One of the most useful tools in project planning is the Work Breakdown Structure, commonly known as the WBS. It is a technique that takes the large, sometimes overwhelming, work of a project and breaks it down into small, manageable pieces.

Definition (PMBOK Guide)

A Work Breakdown Structure is a hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables.

In simple words, imagine the entire project as one big task. The WBS breaks that big task down into smaller tasks, and then breaks those smaller tasks down further, until each piece of work becomes small enough that it can be easily planned, assigned, estimated, and controlled. Each smallest piece at the bottom of the WBS is called a work package.

Purpose and Benefits of WBS

- It makes a large and complex project easier to understand and manage.
- It helps in accurately estimating cost, time, and resources for each work package.
- It clearly defines what work is included, and by leaving something out, also defines what is excluded from the project scope.
- It provides a clear basis for assigning responsibility to individual team members.
- It becomes the foundation for developing the project schedule and budget.
- It supports better communication and coordination among team members.

Key Rule of WBS: The 100% Rule**NOTE**

The 100% Rule states that the WBS must include 100 percent of the work defined in the project scope. It must capture all the work — internal, external, and interim — and nothing more, nothing less. The sum of the work at the lower levels must equal 100 percent of the work represented by the level above.

Levels of a WBS

- Level 1 — The Project itself (the very top, representing the entire project).
- Level 2 — Major deliverables or phases of the project.
- Level 3 — Sub-deliverables that make up each major deliverable.
- Lowest Level — The Work Package, which is the smallest unit that can be assigned, scheduled, and monitored.

Types of WBS

A WBS can be created using different approaches, depending on what makes the most sense for the project. The most common types are explained below.

1. Deliverable-Based WBS

In this type, the project is broken down based on the physical or functional deliverables that will be produced. For example, in a house construction project, the top level may be broken into deliverables such as Foundation, Structure, Roofing, Plumbing, Electrical Work, and Interior Finishing. This is the type recommended and preferred by the PMBOK Guide, since it keeps the focus on the actual outputs of the project.

2. Phase-Based WBS

In this type, the project is broken down according to the phases of its life cycle, such as Initiation, Planning, Design, Development, Testing, and Closure. Each phase is then further divided into smaller tasks. This approach is useful when the sequence of work is more important than the individual deliverables.

3. Responsibility-Based WBS (Organisational WBS)

Here, the project is broken down according to the different departments, teams, or individuals responsible for the work, such as the Marketing Team, the Engineering Team, and the Finance Team. This type is helpful when the project manager wants to clearly show who is accountable for which portion of the work.

4. Geographical or Location-Based WBS

In large projects that are spread across different cities, states, or countries, work can be broken down according to location. For example, a national retail chain expansion project may be divided by region, such as North Zone, South Zone, East Zone, and West Zone.

Formats of Representing a WBS

- Tree Structure (Hierarchical Chart): A diagram similar to an organisation chart, showing the project broken down from top to bottom, visually easy to understand.
- Outline Format (Indented List): A simple, numbered, indented list, similar to a table of contents, often easier to create and update in a document.
- Tabular Format: A table listing the WBS codes and their descriptions, useful when integrating the WBS with scheduling and cost software.

Simple Example of an Outline WBS

Project: Organising a College Annual Function

1. Planning and Approvals

- 1.1 Obtain approval from college administration
- 1.2 Finalise budget and date
- 2. Venue and Logistics
 - 2.1 Book auditorium
 - 2.2 Arrange seating, sound, and lighting
- 3. Programme Content
 - 3.1 Finalise list of performances
 - 3.2 Conduct rehearsals
- 4. Marketing and Invitations
 - 4.1 Design and print invitation cards
 - 4.2 Promote the event on social media

1.5 Introduction to PMBOK

PMBOK stands for the Project Management Body of Knowledge. It is one of the most respected and widely followed guides in the field of project management, published by the Project Management Institute, commonly known as PMI, which is based in the United States of America.

Definition

The PMBOK Guide is a document that describes standards, guidelines, and generally accepted good practices for the field of project management.

It is important to understand that the PMBOK Guide is not a rigid, step-by-step manual that must be followed exactly the same way for every project. Rather, it is a widely accepted reference framework that provides globally recognised terminology, processes, and best practices, which project managers can adapt to suit the needs of their own particular project.

Purpose of the PMBOK Guide

- It provides a common vocabulary and standard terminology, so that project managers all over the world can communicate using the same language.
- It documents good practices that are generally agreed to add value and improve the chances of a project's success.
- It forms the basis for professional certification examinations, such as the Project Management Professional, commonly known as the PMP certification.
- It offers a structured and organised approach for managing projects of almost any size or industry.

Structure of the PMBOK Guide

Traditionally, the PMBOK Guide was organised around the five Process Groups and the ten Knowledge Areas that were discussed earlier in this unit. Together, they described forty-nine individual project management processes, showing exactly what inputs, tools and techniques, and outputs were involved in each one.

In its more recent editions, the PMBOK Guide has evolved to also include twelve broad Project Management Principles and eight Performance Domains, moving the framework toward a more flexible, outcome-focused way of thinking, which works well with both traditional and modern, adaptive ways of managing projects. However, for foundational learning, students are still expected to understand and be comfortable with the classic structure of Process Groups and Knowledge Areas.

Benefits of Using PMBOK

- Improves the consistency and predictability of project outcomes.
- Provides a common set of tools and templates that can be reused across projects.
- Helps organisations train new project managers using a proven, standardised approach.

- Increases the credibility of the project manager and the project team.
- Reduces risk by encouraging thorough planning and continuous monitoring.

NOTE

PMBOK is only one of several project management frameworks used around the world. Other well-known approaches include PRINCE2 (widely used in the United Kingdom and Europe) and various Agile frameworks, such as Scrum. However, PMBOK remains the most widely recognised standard globally, especially in North America and India.

1.6 Portfolio Management

As organisations grow larger, they usually work on more than just one project at a time. To manage many projects and programmes together in a way that best supports the overall goals of the organisation, the concept of Portfolio Management is used.

Definition (PMBOK Guide)

A portfolio is a collection of projects, programmes, sub-portfolios, and operations managed as a group to achieve strategic objectives. Portfolio Management is the centralised management of one or more portfolios to achieve strategic objectives.

In simple words, imagine a large company that is working on many different projects at the same time, such as launching a new product, opening a new office, upgrading its computer systems, and running a marketing campaign. Portfolio Management is the discipline of looking at all of these projects together and deciding which ones deserve the most attention, funding, and resources, based on how well they support the company's overall strategy and business goals.

Understanding the Hierarchy: Project, Programme, and Portfolio

It is very important for students to clearly understand the difference between these three related terms, as they are often confused with each other.

Term	Simple Meaning
Project	A single, temporary piece of work with a defined goal, start, and end.
Programme	A group of related projects that are managed together, in a coordinated way, to gain benefits that would not be available if they were managed individually.
Portfolio	A collection of projects, programmes, and other work, grouped together to help an organisation achieve its overall strategic business objectives.

Objectives of Portfolio Management

- To ensure that the organisation is investing its limited resources, such as money and people, in the right set of projects.
- To align every project and programme with the overall vision and strategy of the organisation.
- To balance the mix of projects, for example, balancing high-risk projects against safer, more stable ones.
- To maximise the overall value delivered to the organisation from all its project investments.
- To provide senior management with clear visibility into the performance of all ongoing projects.

Key Activities in Portfolio Management

- Identifying and evaluating potential new projects before they are approved.
- Prioritising projects based on their strategic value, cost, risk, and expected benefit.
- Authorising, or in some cases rejecting, project proposals.
- Continuously monitoring the performance of the entire collection of projects, not just individual ones.
- Reallocating resources from lower-priority projects to higher-priority projects, when necessary.

NOTE

A simple way to remember the difference: a Project Manager focuses on doing the project right (efficiency), while Portfolio Management focuses on doing the right projects (strategic effectiveness) for the organisation as a whole.

1.7 Traditional vs Modern Project Management using the PMBOK Concept

Over the years, the way organisations manage projects has continued to evolve. It is useful to compare the Traditional (or classic, plan-driven) approach to project management with the more Modern (often Agile or adaptive) approach, and to understand how the PMBOK Guide itself has evolved to accommodate both of these ways of working.

The Traditional Approach

The traditional approach to project management, often called the Waterfall approach, is based on detailed, upfront planning. The project moves through its phases — such as Initiation, Planning, Execution, Monitoring, and Closure — largely in a fixed, sequential order. Each phase is generally completed before the next one begins, and changes to the plan later in the project are usually discouraged, since they can be costly and disruptive.

- Best suited for projects where the requirements are clear, stable, and unlikely to change, such as construction or infrastructure projects.
- Relies heavily on detailed documentation, formal approvals, and strict change control processes.
- The full scope of the project is usually defined in detail at the very beginning.
- Success is measured mainly by strict adherence to the original scope, schedule, and budget.

The Modern (Agile / Adaptive) Approach

The modern approach recognises that in many industries today, especially software development and technology, requirements often change quickly and cannot be fully known at the start. Modern project management therefore favours flexibility, frequent collaboration with the customer, and the delivery of work in small, incremental pieces, commonly called iterations or sprints.

- Best suited for projects where requirements are uncertain, evolving, or likely to change, such as new software or new product development.
- Encourages continuous feedback from the customer and frequent, incremental delivery of working results.
- Planning happens continuously throughout the project, rather than being fully finished at the start.
- Success is measured mainly by the value delivered to the customer, and the team's ability to adapt to change.

Comparison Table

Basis of Comparison	Traditional Approach	Modern (Agile) Approach
Planning Style	Detailed, upfront planning before execution begins	Continuous, evolving planning throughout the project
Approach to Change	Change is controlled and generally discouraged	Change is expected and welcomed
Delivery of Work	One large delivery at the end of the project	Small, frequent deliveries throughout the project
Customer Involvement	Mainly at the start and at the end	Continuous and frequent, throughout the project
Documentation	Very detailed and formal	Kept light and only as necessary
Best Suited For	Stable, well-understood, predictable projects	Dynamic, uncertain, fast-changing projects
Team Structure	Often hierarchical, with a strong central project manager	Often self-organising and collaborative

How the PMBOK Guide Bridges Both Approaches

In its earlier editions, the PMBOK Guide was closely associated with the traditional, plan-driven, Process Group and Knowledge Area structure discussed earlier in this unit. However, recognising the growing popularity of Agile and adaptive methods, more recent editions of the PMBOK Guide have expanded to include guidance on adaptive, iterative, and hybrid approaches as well.

- The PMBOK Guide now presents itself as approach-neutral, meaning it can be applied using predictive (traditional), adaptive (Agile), or hybrid methods, depending on what best suits the project.
- It introduces Project Management Principles, which are broad guiding beliefs that apply no matter which specific approach or methodology is chosen.
- It introduces Performance Domains, which are groups of related activities that are critical for the effective delivery of project outcomes, and which apply across both traditional and modern ways of working.
- This evolution allows the PMBOK Guide to remain relevant and useful for project managers, regardless of whether their organisation follows a strictly traditional, a fully Agile, or a blended hybrid approach to managing projects.

NOTE

In practice, many organisations today use a hybrid model, combining the strong planning and governance discipline of the traditional approach with the flexibility and responsiveness of modern Agile methods, in order to get the best of both worlds.

Unit Summary

This unit introduced the foundational ideas of project management. The key points to remember are summarised below.

- A project is a temporary effort undertaken to create a unique product, service, or result, and is different from ongoing operations.
- The Project Life Cycle consists of the phases of Initiation, Planning, Execution, Monitoring & Controlling, and Closure.
- Project management work is organised into five Process Groups and ten Knowledge Areas.
- The Work Breakdown Structure (WBS) breaks the total project scope into small, manageable work packages, and can be deliverable-based, phase-based, responsibility-based, or location-based.
- The PMBOK Guide is a globally recognised framework of standards and good practices published by the Project Management Institute (PMI).
- Portfolio Management involves the centralised management of multiple projects and programmes, in order to achieve the strategic objectives of the organisation.
- Traditional project management relies on detailed upfront planning and sequential execution, while modern (Agile) project management favours flexibility, iteration, and continuous customer collaboration; the PMBOK Guide today supports both approaches.

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