Chapter 1: Project Management Foundation

1.1 Definition of a project

Question: Define Project. State some attributes that characterize projects

Answer:

The Project Management Institute (PMI) has defined a project as "A temporary endeavor undertaken to create a unique product or service"

Importance: The most crucial attribute of a project is that it must be important enough in the eyes of senior management to justify setting up a special organizational unit outside the routine structure of the organization.

Performance: A project is usually a one-time activity with a well-defined set of desired end results. It can be divided into subtasks that must be accomplished in order to achieve the project goals.

Life Cycle with a Finite Due Date: Like organic entities, projects have life cycles. From a slow beginning they progress to a buildup of size, then peak, begin a decline, and finally must be terminated by some due date.

Interdependencies: Projects often interact with other projects being carried out simultaneously by their parent organization.

Uniqueness: Though the desired end results may have been achieved elsewhere, they are at least unique to this organization. Moreover, every project has some elements that are unique.

Resources: Projects have limited budgets, both for personnel as well as other resources. Often the budget is implied rather than detailed, particularly concerning personnel, but it is strictly limited.

Conflict: The members of the project team are in almost constant conflict for the project's resources and for leadership roles in solving project problems. The PM must be expert in conflict resolution, but we will see later that there are helpful types of conflict.

1.2 Project Vs Operations

There are many differences between projects and operations. Some differences are as follows:

- Projects are unique and temporary, while operations are ongoing and permanent with a repetitive output.
- Projects have a fixed budget, while operations have to earn a profit to run the business.
- Projects are executed to start a new business objective and terminated when it is achieved, while operational work does not produce anything new and is ongoing.
- Projects create a unique product, service, or result, while operations produce the same product, aim to earn a profit and keep the system running.
- There are more risks in projects as they are usually done for the first time, while in operations there are fewer risks as they are repeated many times.
- Projects are performance intensive while operations are efficiency intensive.
- Projects are managed through project management and operations require business process management.

Projects	**Operations**
Projects are **temporary**, and have a beginning and an end.	Operations are **ongoing** and sustains the organization over time
Projects produce **unique** products, services, or results.	Operations produce **repetitive** products, services, or results.
When current objectives are met Projects are **closed**. Any New directions may result in initiation of new projects.	When current objectives are met Operations do not terminate, but follow new directions to support the organization's strategic plans.
It is new (new product). A project is undertaken to create a new kind of product.	It is has nothing new. This is because it is just process of making product in more numbers so as to be distributed among users.
Unique product is created. The project is undertaken for creation of a unique product.	Same product is produced to keep system running. More numbers of the existing product are made for end-users.

It has more risk as it is done for first time. There is a risk of failure attached because specified thing has never been made before.	It has less risk as such products have already been made before and it is only process of creating them in greater numbers.
Management of project is called Project Management	Management of operation is called Business Process Management

1.3 Necessity of project management

Question: Why Is Project Management Important?

Answer:

1. Strategic Alignment: Project management is important because it ensures what is being delivered, is right, and will deliver real value against the business opportunity.
2. Leadership: Project management is important because it brings leadership and direction to projects.
3. Clear Focus & Objectives: Project management is important because it ensures there's a proper plan for executing on strategic goals.
4. Realistic Project Planning: Project management is important because it ensures proper expectations are set around what can be delivered, by when, and for how much.
5. Quality Control: Projects management is important because it ensures the quality of whatever is being delivered, consistently hits the mark.
6. Risk Management: Project management is important because it ensures risks are properly managed and mitigated against to avoid becoming issues.
7. Orderly Process: Project management is important because it ensures the right people do the right things, at the right time – it ensures proper project process is followed throughout the project lifecycle.
8. Subject Matter Expertise: Project management is important because someone needs to be able to understand if everyone's doing what they should.
9. Managing and Learning from Success and Failure: Project management is important because it learns from the successes and failures of the past.

1.4 Triple constraints

Question: What is triple constraint in Project Management?

Answer:

- The Triple Constraints in Project Management are Time, Scope & Cost. It is also called as the Project Management Triangle, Iron Triangle and Project Triangle.

  1. **Cost:** The financial constraints of a project, also known as the project budget
  2. **Scope:** The tasks required to fulfill the project's goals
  3. **Time:** The schedule for the project to reach completion

- Triple Constraint states that the success of the project is impacted by its budget, deadlines and features.

1. **Cost**

   The financial commitment of the project is dependent on several variables.
   There are the resources involved, from materials to people, which include labor costs.

2. **Scope**
    - Project scope deals with the specific requirements or tasks necessary to complete the project.
    - When managing scope its critical that you prioritize your tasks, enabling you to plan and assign resources effectively
3. **Time**
    - At its basic, the schedule is the estimated amount of time allotted to complete the project, or producing the deliverable.
    - Usually, this is figured out by first noting all the tasks necessary to move from the start to the finish of the project.
    - A Work Breakdown Structure (WBS) is used to take the large project goal and break it down into a series of more manageable tasks.
    - These tasks are then prioritized, dependencies are linked, and then placed on a timeline.
    - A Gantt chart is one way to visualize the project schedule, with each task a point on that timeline, with task dependencies linked, and durations determined.
    - According to the Project Management Body of Knowledge (PMBOK), the schedule can be managed through a process of time management. Those steps are as follows.

    a) **Plan Schedule Management:** Creating policies, procedures and documentation for planning, executing and monitoring the project schedule
    b) **Define Activities:** Identifying and documenting what actions must be done to produce the project deliverables
    c) **Sequence Activities:** Identifying and documenting the logical order of work to be most efficient
    d) **Estimate Activity Resources:** What type and how many materials, people, equipment, supplies, etc. are needed to perform each activity
    e) **Estimate Activity Durations:** How long will it take to complete each activity with the resources estimated
    f) **Develop Schedule:** Analyze activity, duration, resources and timeline to develop a schedule
    g) **Control Schedule:** Comparing planned schedule to actual progress to determine if your project is on track

1.3 Project life cycles (typical & atypical)

Question: Explain the phases of the project life cycle

Answer:

- The project manager and project team have one shared goal: to carry out the work of the project for the purpose of meeting the project's objectives.
- Every project has a beginning, a middle period during which activities move the project toward completion, and an ending (either successful or unsuccessful).
- A standard project typically has the following four major phases (each with its own agenda of tasks and issues): initiation, planning, implementation, and closure.
- Taken together, these phases represent the path a project takes from the beginning to its end and are generally referred to as the project "life cycle."

A Project cycle can be of two types:

1) **Typical(Standard)** :- It is also called as standard Project life cycle because it follows a set of steps that are predictable and prove successful in most of cases.

2) **Atypical(Adaptive)** :- It is also called as Adaptive project life cycle. It deviates from the set of steps and it used mostly for Projects where rapid changes are expected and scope is not possible to define upfront.

Typical Project Management Phases

- **Initiation Phase**
  - In the initiation phase, the project objective or need is identified; this can be a business problem or opportunity
  - A feasibility study is conducted to investigate whether each option addresses the project objective and a final recommended solution is determined

- **Planning Phase**
  - In this step, the team identifies all of the work to be done.
  - The project's tasks and resource requirements are identified, along with the strategy for producing them.
  - This is also referred to as "scope management." A project plan is created outlining the activities, tasks, dependencies, and timeframes.

- **Implementation (Execution) Phase**
  - During this phase, the implementation phase, the project plan is put into motion and the work of the project is performed.
  - It is important to maintain control and communicate as needed during implementation.
  - People are carrying out the tasks, and progress information is being reported through regular team meetings

- **Closing Phase**

- During the final closure, or completion phase, the emphasis is on releasing the final deliverables to the customer, handing over project documentation to the business, terminating supplier contracts, releasing project resources, and communicating the closure of the project to all stakeholders.

Atypical (Adaptive) Project Life Cycle

This is change driven. It is an agile way of doing things. It needs on going stakeholder's involvement. Here iterations are rapid usually with a duration of 2 to 4 weeks and are fixed in time and cost. This is used for projects where rapid changes are expected and scope is not possible to define upfront. Also, the end result is delivered at the end of 2 to 4 weeks' iteration. A yearlong project will have multiple 2-4 week iteration and each iteration will execute Planning, Analysis, Design, Code, testing phases and deliver the result at the end of the iteration.

Advantages: It id appropriate for projects that involve higher levels of complexity and uncertainties. The risk is minimized.

Atypical Project Life cycle exists within 5 stages.

1. Constant Change
   The will always be change on the project. It has constant change after change and decision after decision.
2. Urgency
   When we work in adaptive, there is a sense of urgency. We have to move quickly.
3. Need to Learn
   There is need to learn because you don't know the goal because it's unclear.
4. Small Team Ability
   Small teams set out to work to figure out where to go.
5. Deliver in Small Increments
   Delivered in small parts as we are learning. The ability to deliver in small increments is the requirement of the project following this life cycle.

1.3 Project phases and stage gate process

Question: What is the Phase Gate Process? Explain stages of the Phase gate process.
Answer:

- The phase-gate process is a linear project management concept punctuated by stages of development followed by benchmarks for assessment.
- Developed in the 1940s for large-scale engineering projects, this process has been used by many organizations driven by a need for quick, product-to-market launches.
- The phase-gate process is ideal for projects that involve large teams across multiple

departments, as it is designed to handle many spinning plates in a short amount of time

Stages of the Phase-Gate Process

The **Stage Gate Process**, also known as the **Phase Gate Process**, guides the product development process through six main phases. The stages in the Stage-Gate are **Discover, Scoping, Define Business Case, Development, Testing and Validation and Launch**.

Gates

Gates in a state gate process are decision points in a project.

They help to take decision whether to continue the next stage or not.

The decision is based on the availability of information on the project progress till that moment.

The decision is taken by a manager or committee.

After each gate, one of the following decisions can be made:

- **Go**

The project is good enough to move on to the next stage.

- **Kill**

The project is not good enough to develop further and is shut down right away.

- **Hold**

The project is not good enough to continue to develop it at this moment, but not so bad that it needs to be shut down immediately. It is put on hold to possibly be resumed at a later date.

- **Recycle**

The project is good enough to develop further, provided some changes are made.

There is a gate between every two stages where the process can be tested and validated to determine whether the team should move to the next step or an iteration should be applied in the current step to improve before moving to the next one.

Stage 0: **Discover**: Before we define the five phases, every project is started with a preliminary ideation phase. It's during this phase that the project actually starts to take shape. Stakeholders will gather into breakout sessions and participate in group brainstorming meetings.

Stage 1- 1: **Scoping**

a) Identifying strengths and weaknesses of the product
b) determine risk factors
c) At the end of every phase is the opportunity to have leadership decide on whether or not to kill the project or continue forward

Stage 2: **Build Business Case**

Once the idea is formed and there is a clear vision of the solution, the team works to build a product definition and analysis, a business case, a project plan, and a feasibility review. This business case aims to convince the different teams involved in the product development and its viability. They can use tools such as the Business Model Canvas which provides a clear vision of the product's market value.

Stage 3: **Development**

The team applies the plan formulated during the above stages and puts it into action by building a prototype for the product. This Stage's timeline is critical to achieving six factors: specific, measurable, actionable, realistic, and time (SMART). The timeline is constantly updated based on the production

status.

Stage 4: **Testing and Validation**

In this Stage, the prototype is tested, and feedback is collected to improve the prototype. The testing includes team testing for problems and issues in the product. Then, it goes for the field test, where consumers test the product in a beta version and a marketing test to identify market feasibility for the product.

Stage 5: **Launch**

Once the product passes all the stages, it moves directly to the launch stage, where the product is introduced to the market based on a marketing strategy. In this Stage, the marketing team plays an essential role in creating the market need and increasing market exposure for the product.

1.4 Role of project manager

- The project manager can be chosen and installed as soon as the project is selected for funding
- This simplifies several start up activities
- The project manager can be chosen later but this makes things difficult
- Senior management briefs the project manager
- Project manager begins with a budget and schedule and as people are added these are refined
- Department heads are usually functional specialists
- They have the required technical skills to evaluate all members of their organization
- Functional managers:
- Decide who performs each task
- Decide how the task is performed
- Exercise a great deal of control over every aspect of the work that gets performed within their area

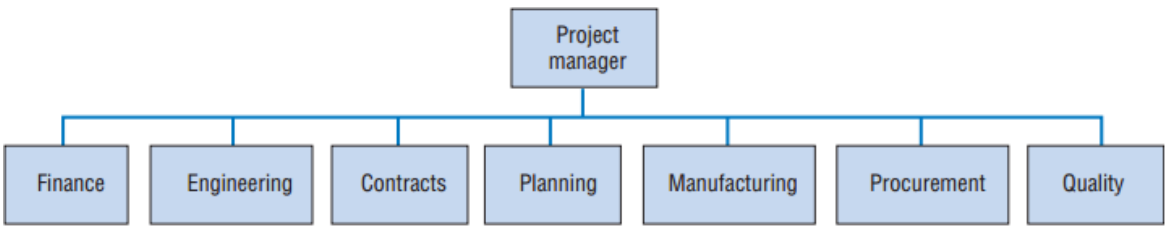

Figure 3-1 Project management organization showing typical responsibilities of a project manager.

- Project managers are usually generalists
- It would be very unusual for a project manager to have all the technical skills that are used on their projects
- Project managers:
    - Rarely decide who performs each task
    - Lack the technical skills to evaluate much of the work performed on a particular project
    - Exercise control very little over most aspects of the work that gets performed on the project

- A project manager is responsible for overseeing a project from start to finish. The responsibilities of a project manager include:

✓ Planning the project
✓ Creating a schedule and timeline
✓ Executing each phase
✓ Managing the budget
✓ Serving as the liaison among all stakeholders

Troubleshooting and maintenance

Comparing Functional & Project Managers

Functional Managers	Project Managers
need technical skills	need negotiation skills
should be more skilled at analysis	should be more skilled at synthesis
use the analytic approach	use systems approach
responsible for a small area	responsible for the big picture
act as managers	act as facilitators
act as direct, technical supervisors	act as facilitators and generalists

1.5 Negotiations and resolving conflicts

- One of several causes is that conflict arises when people working on the same project have somewhat different ideas about how to achieve project objectives.
- Most conflicts have their roots in uncertainty, and negotiation is a way of managing the resultant risk.
- There are many ways to resolve conflict.
- Brute force is a time-honored method, as is the absolute rule of the monarch, but the rule of law is the method of choice for modern societies in spite of occasional lapses.
- Conflict resolution is the ultimate purpose of law.

A **competitive negotiation** is a type of negotiation that is like a winner-takes-all battle royal. One side tries to get all of the resources and not share. This is a dangerous type of negotiation as bridges can be burned and feelings hurt.

A **collaborative negotiation** is the opposite of a competitive negotiation. This type tries to make both parties winners, also known as win-win negotiations. Most project managers look to use collaborative negotiations, as it will build long term alliances and decrease the chance of conflict later.

- **THE NATURE OF NEGOTIATION**
    - The favored technique for resolving conflict is *negotiation*
    - The process through which two or more parties seek an accept- able rate of exchange for items they own or control
    - During the negotiation process, an ethical situation often arises that is worth mentioning.
    - Consider the situation where a firm requests an outside contractor to develop a software package to achieve some function.
    - When the firm asks for a specific objective to be accomplished, it frequently does not know if that is a major job or a trivial task because it lacks technical competence in that area.
    - Thus, the contractor has the opportunity to misrepresent the task to its customer, either inflating the cost for a trivial task or minimizing the impact of a significant task in order to acquire the contract and then boosting the cost later.
    - The ethics of the situation require that each party in the negotiation be honest with the other, even in situations where it is clear there will not be further work between the two.

Conflicts

Conflicts occur daily in our lives. Some can vary from a minor disagreement between individuals or groups to a major extreme situation with life-threatening elements.

Being a project manager or team leader these conflicts are especially rampant and relevant in the

project environment.

Conflicts are natural but they become serious when they lead to quarrels, fights and even a breakup of the project team.

According to the PMBOK (project management body of knowledge) Guide, "Conflict is inevitable in a project environment."

Ways to resolve Conflicts

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

1.6 Project management in various organization structure

Three Types of Project Management Structures

An organizational structure could be described as the official line of authority and control within an organization. Project management structures tell us how reporting relationships work in a particular organization.

Depending on the environment the organization finds itself operating in, the goals they set for themselves and the nature of work being done, you would find that organizations are structured in 3 ways:

- Functional Organizational Structure
- Matrix Organizational Structure – This can be further broken down into – Balanced matrix, Strong Matrix, and Weak Matrix
- Projectized Organization Structure

Now that we know how organizational structures are categorized, let's take a closer look at each one of them to see what makes them unique.

Functional Organizational Structure

- In a functional organizational structure, you would find the components of a hierarchy systems where authority-driven decisions on budget, schedule, and

equipment rest on the shoulders of the functional manager who possesses a significant level of expertise in the same field.

- The project manager, in this type of organization has little to no authority here; in some functional organizations, that position does not even exist.
- In simple terms, it can be likened to that of a more traditional company where staff is presided over by a supervisor, based on their functions within the organization and communication is most often done through the department heads to senior management.

Projectized Organizational Structure

- The projectized organizational structure is the complete opposite of the functional organizational structure even though the organization may still group staff according to their work functions.
- In this case, the project management team structure is organized in such a way that the project manager has project authority.
- He has jurisdiction over the project's budget, schedule, and the project team.
- You would find him at the top of the hierarchical structure, calling all the shots; with employees playing supporting roles for the project.
- At the end of the project, the project team members are released and resources directed towards more relevant areas.

Matrix Organizational Structure

- The matrix organizational structure can be found lying somewhere between the functional organizational structure and the projectized organizational structure depending on what type of matrix structure is being run.
- For instance, the strong matrix organizational structure has some similarities with that of a projectized organizational structure in the sense that the project manager is responsible for a project.
- If the organization is running a weak matrix structure, then the project authority would fall to the hands of a functional manager – as it is in a functional organization. Interestingly enough, in a balanced matrix organization, both the project manager and the functional manager shares equal authority for the project.

1.7PM knowledge areas as per Project Management Institute (PMI)

- PMI has divided the large field of project management into 10 more digestible parts, which it calls the **10 project management knowledge areas** in its *A Guide to the Project Management Body of Knowledge (PMBOK).*
- Project management knowledge areas coincide with the process groups, which are project initiation, project planning, project execution, monitoring and controlling, and project closing.
- These are the chronological phases that every project goes through.
- The knowledge areas take place during anyone of these process groups.
- You can think of the process groups as horizontal, while the knowledge areas are vertical.
- The knowledge areas are the core technical subject matter, which are necessary for effective project management.

1. **Project Integration management**
   Includes such fundamental plans as developing a project charter that is created during the initiation phase. This is the document that sets up the project and assigns the project manager.
2. **Project Scope Management**
   Scope relates to the work of the project. So, that includes plan scope management, which is part of the project management plan. It also is when a detailed requirement for the final product or service is collected
3. **Project Time Management**
   The project is divided into tasks, which are scheduled with start dates and deadlines, as well as budgets for each task. And things are constantly changing over the phases of any project, which means revising these things often.
4. **Project Cost Management**
   This area involves the project budget, which means having good estimating tools to make sure that the funds cover the extent of the project and are being monitored regularly to keep stakeholders or sponsors informed.
5. **Project Quality Management**
   A project can come in on time and within budget, but if the quality is not up to the standard set, then the project is a failure. Plan quality management is part of the overall project management plan, though it can be a standalone document if it contains the quality specs for the product or service.
6. **Project Human Resource Management**
   The project team is your most important resource, so it's crucial to assemble the best team and to make sure they're happy. But also you need to track their performance to ensure that the project is progressing as planned. A human resource management plan will identify their roles and their requirements for those positions, as well as how they fit in the overall project structure.
7. **Project Communications Management**
   All areas of project management are important; communications management might be paramount as it informs every aspect of the project. Communications inform the team and stakeholders, therefore the need to plan communications management is a critical step in any project.
8. **Project Risk Management**
   Risk management plans will identify how the risks will be itemized, categorized and prioritized. This involves identifying risks that might occur during the execution of the project by making a risk register
9. **Project Procurement Management**
   This deals with outside procurement, which is part of most projects, such as hiring subcontractors. This will obviously have an impact on the budget and schedule. Planning procurement management starts by identifying the outside needs of the project and how those contractors will be involved.
10. **Project Stakeholder Management**
    The stakeholders must be happy, as the project has been created for their needs. Therefore, they must be actively managed like any other part of the project. To start one must identify the stakeholders. It's not always easy, but it's a crucial part of starting any project, so find out who they are and what concerns they have.