



# **Chapter 1**

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## **Introduction**

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## **General Objective of the Chapter:**

Trainee will be able to understand the importance of project management.

## **Detailed Objectives:**

1. The trainee should be familiar with the historical development of the concept of project management.
2. Trainee will be able to understand the fundamental elements of project management such as:
  - Projects
  - The Importance of Project Management
  - Relationships of Project, Program, Portfolio and Operation Management
  - Project and development life cycles
  - Project Phase
  - Phase Gate
  - Project Management Process
  - Project Management Process Groups
  - Project Management Data and Information



## 1.1. History of Project Management

Sometime during the third millennium B.C., workers on the Great Pyramid of Cheops set the last stone in place. Certainly, they must have felt jubilant, for this event represented a milestone of sorts in one of humanity's grandest undertakings. Although much of the ancient Egyptians' technology is still a mystery, the enormity and quality of the finished product remain a marvel. Despite the lack of sophisticated machinery, they were able to raise and fit some 2,300,000 stone blocks, weighing 2 to 70 tons apiece, into a structure the height of a modern 40-story building. Each facing stone was set against the next with an accuracy of 0.04 inch, and the base, which covers 13 acres, deviates less than 1 inch from level (Figure 1.1).



**Figure 1.1.** The Great Pyramid of Cheops, an early (circa 2500 B.C.) large-scale project. Building the Great Pyramid is what we today would call a large-scale project, and stands representative of numerous projects from early recorded history that required massive human works and managerial competency.

With later civilizations, we can cite the Great Wall China which is yet another wonder of the world that was built since the Qin Dynasty (221BC-206BC). Available historical data, shows or indicate that the labor force was organized into three groups consisting of soldiers, the common people and criminals. The overall command was Emperor Qin Shihuang who ordered millions of people



to finish this project. This shows emergence of organization, and command structure in project execution (Figure 1.2).



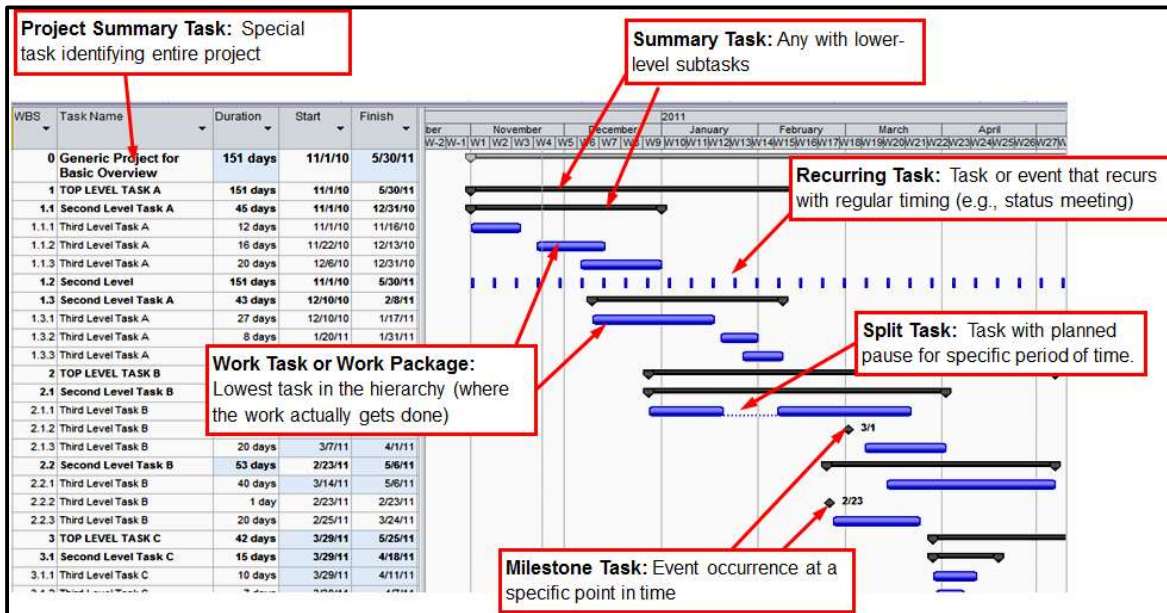
**Figure 1.2.** The Great Wall China, an early (221B.C-206B.C) large-scale project

In late 19th century, in the United States, large-scale government projects were the impetus for making important decisions that became the basis for project management methodology such as the transcontinental railroad, which began construction in the 1860s. Suddenly, business leaders found themselves faced with the daunting task of organizing the manual labor of thousands of workers and the processing and assembly of unprecedented quantities of raw material. Near the turn of the century, Frederick Taylor began his detailed studies of work. He applied scientific reasoning to work by showing that labor can be analyzed and improved by focusing on its elementary parts that introduced the concept of working more efficiently, rather than working harder and longer.

Taylor's associate, Henry Gantt, studied in great detail the order of operations in work and is most famous for developing the Gantt Chart in the 1910s. A Gantt chart is a popular type of bar chart that illustrates a project schedule and have become a common technique for representing the phases and activities of a project work breakdown structure, so they can be understood by a



wide audience (Figure 1.3). Although now considered a common charting technique, Gantt charts were considered quite revolutionary at the time they were introduced. Gantt charts were employed on major infrastructure projects including the Hoover Dam and the Interstate highway system and are still accepted today as an important tool in project.



**Figure 1.3.** An example of a Gantt chart showing the relationship between a series of tasks

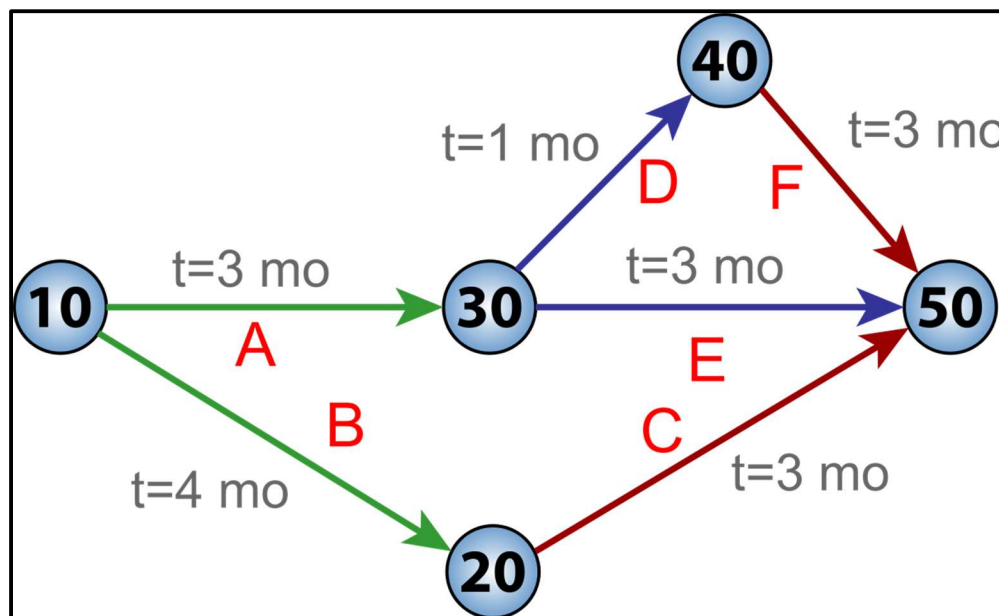
By the mid Twentieth century, projects were managed on an ad hoc basis using mostly Gantt Charts, and informal techniques and tools. During that time, the Manhattan project was initiated and its complexity was only possible because of project management methods. The Manhattan project was the codename given to the Allied effort to develop the first nuclear weapons during World War II. It involved over thirty different project sites in the US and Canada, and thousands of personnel from US, Canada and UK. Born out of a small research program that began in 1939, the Manhattan Project would eventually employ 130,000 people and cost a total of nearly 2 billion USD and result in the creation of multiple production and research sites operated in secret. The project succeeded in developing and detonating three nuclear weapons in 1945.

The 1950s marked the beginning of the modern Project Management era. Two mathematical project scheduling models were developed:





1. The Program Evaluation and Review Technique or PERT, developed by Booz-Allen & Hamilton as part of the United States Navy's (in conjunction with the Lockheed Corporation) Polaris missile submarine program. Pert is basically a method for analyzing the tasks involved for completing a given project, especially the time needed to complete each task, and identifying the minimum time needed to complete the total project (Figure 1.4).
2. The Critical Path Method (CPM) developed in a joint venture by both DuPont Corporation and Remington Rand Corporation for managing plant maintenance projects. The critical path determines the oat, or schedule flexibility, for each activity by calculating the earliest start date, earliest finish date, latest start date, and latest finish date for each activity. The critical path is generally the longest full path on the project. Any activity with a oat time that equals zero is considered a critical path task. CPM can help you figure out how long your complex project will take to complete and which activities are critical; meaning they have to be done on time or else the whole project will take longer. These mathematical techniques quickly spread into many private enterprises.



**Figure 1.4.** An example of a PERT network chart for a seven-month project with five milestones.

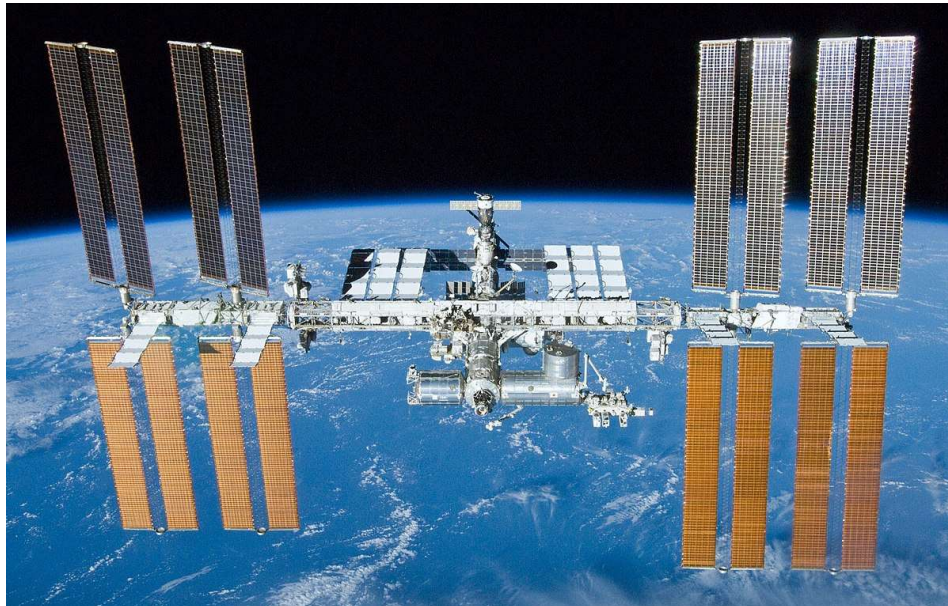


Project management in its present form began to take root a few decades ago. In the early 1960s, industrial and business organizations began to understand the benefits of organizing work around projects. They understood the critical need to communicate and integrate work across multiple departments and professions. The Project Management Institute (PMI) was founded in 1969 by five volunteers. Their initial goal was to establish an organization where members could share their experiences in project management and to discuss issues. Today, PMI is a non-profit project management professional association and the most widely recognized organization in terms of promoting project management best practices. PMI was formed to serve the interests of the project management industry. The premise of PMI is that the tools and techniques of project management are common even among the widespread application of projects from the software to the construction industry. PMI first began offering the PMP certification exam in 1984. Although it took a while for people to take notice, now more than 260,000 individuals around the world hold the PMP designation. To help keep project management terms and concepts clear and consistent, PMI introduced the Project Management Body of Knowledge (PMBOK) Guide in 1987. They updated it in 1996, 2000, 2004, 2009 and most recently in 2017 as the sixth edition. At present, there are more than 1 million copies of the PMBOK Guide in circulation. The highly regarded Institute of Electrical and Electronics Engineers (IEEE) have adopted it as their project management standard. In 1999 PMI was accredited as an American National Standards Institute (ANSI) standards developer and also has the distinction of being the first organization to have its certification program attain International Organization for Standardization (ISO) 9001 recognition. In 2008, the organization reported more than 260,000 members in over 171 countries. PMI also has offices in Washington, D.C., and Beijing, China, as well as Regional Service Centers in Singapore, Brussels (Belgium) and New Delhi (India). Recently, an office was opened in Mumbai (India).

As long as humankind does things, there will be projects. Many projects of the future will be similar to those in the past. Others will be different either in terms of increased scale of effort or more advanced technology. Representative of the latter are three recent projects—the English



Channel tunnel (Chunnel), the international space station, and SpaceShipOne. The Chunnel required tremendous resources and took a decade to complete. The international space station (Figure 1.5) has required development of new technologies and the efforts of the US, Russian, European, Canadian, and Japanese space agencies. SpaceShipOne is the venture of a small California company aimed at developing a vehicle and launch system for future space tourism.



**Figure 1.5.** The international space station, a modern large-scale project.

## 1.2. Fundamental Elements

This section describes fundamental elements necessary for working in and understanding the discipline of project management.

### 1.2.1. PROJECTS

The Project Management Institute (PMI) provides the following definition of a project:

A project is a **temporary endeavor** undertaken to create a **unique product, service, or result**.

- **Unique product, service, or result.** Fulfillment of project objectives may produce one or more of the following deliverables:





- A unique product that can be either a component of another item, an enhancement or correction to an item, or a new end item in itself (e.g., the correction of a defect in an end item);
- A unique service or a capability to perform a service (e.g., a business function that supports production or distribution);
- A unique result, such as an outcome or document (e.g., a research project that develops knowledge that can be used to determine whether a trend exists or a new process will benefit society).

Projects are undertaken at all organizational levels. A project can involve a single individual or a group. A project can involve a single organizational unit or multiple organizational units from multiple organizations.

Examples of projects include but are not limited to:

- Developing a new pharmaceutical compound for market,
  - Expanding a tour guide service,
  - Exploring for oil in a region,
  - Modifying a computer software program used in an organization,
  - Constructing a building.
- **Temporary endeavor.** The temporary nature of projects indicates that a project has a definite beginning and end. Temporary does not necessarily mean a project has a short duration. The end of the project is reached when one or more of the following is true:
- The project's objectives have been achieved;
  - The objectives will not or cannot be met;
  - Funding is exhausted or no longer available for allocation to the project;
  - The need for the project no longer exists (e.g., the customer no longer wants the project completed, a change in strategy or priority ends the project, the organizational management provides direction to end the project);
  - The human or physical resources are no longer available; or



- The project is terminated for legal cause or convenience.

### **1.2.2. THE IMPORTANCE OF PROJECT MANAGEMENT**

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Project management is accomplished through the appropriate application and integration of the project management processes identified for the project. Project management enables organizations to execute projects effectively and efficiently.

Effective project management helps individuals, groups, and public and private organizations to:

- Meet business objectives;
- Satisfy stakeholder expectations;
- Be more predictable;
- Increase chances of success;
- Deliver the right products at the right time;
- Resolve problems and issues;
- Respond to risks in a timely manner;
- Optimize the use of organizational resources;
- Identify, recover, or terminate failing projects;
- Manage constraints (e.g., scope, quality, schedule, costs, resources);
- Balance the influence of constraints on the project (e.g., increased scope may increase cost or schedule); and
- Manage change in a better manner.

Poorly managed projects or the absence of project management may result in:

- Missed deadlines,
- Cost overruns,
- Poor quality,
- Rework,
- Uncontrolled expansion of the project,



- Loss of reputation for the organization,
- Unsatisfied stakeholders, and
- Failure in achieving the objectives for which the project was undertaken.

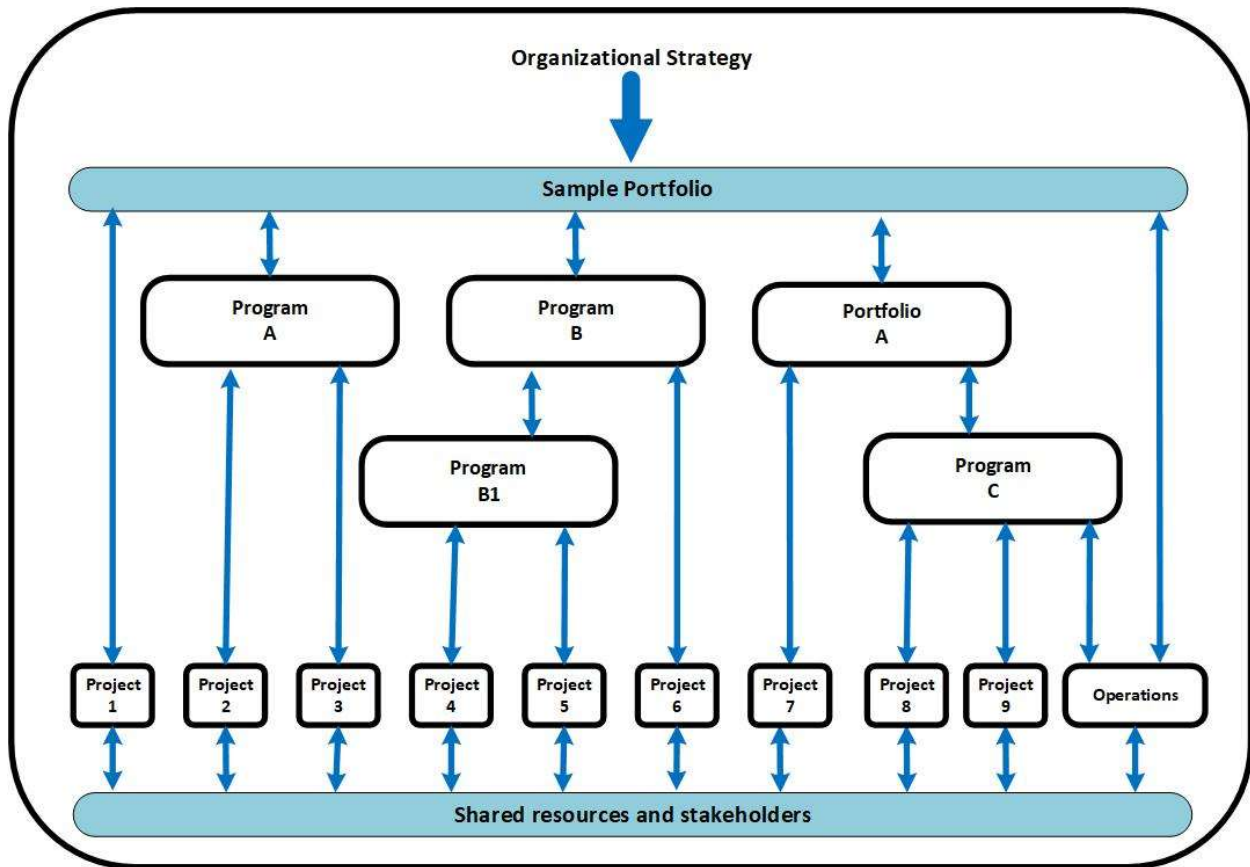
### **I.2.3. RELATIONSHIP OF PROJECT, PROGRAM, PORTFOLIO, AND OPERATIONS MANAGEMENT**

#### **1.2.3.1 OVERVIEW**

Using project management processes, tools, and techniques puts in place a sound foundation for organizations to achieve their goals and objectives. A project may be managed in three separate scenarios: as a stand-alone project (outside of a portfolio or program), within a program, or within a portfolio. Project managers interact with portfolio and program managers when a project is within a program or portfolio. For example, multiple projects may be needed to accomplish a set of goals and objectives for an organization. In those situations, projects may be grouped together into a program. A program is defined as a group of related projects, subsidiary programs, and program activities managed in a coordinated manner to obtain benefits not available from managing them individually. Programs are not large projects. A very large project may be referred to as a megaproject. As a guideline, megaprojects cost US\$1 billion or more, affect 1 million or more people, and run for years.

Some organizations may employ the use of a project portfolio to effectively manage multiple programs and projects that are underway at any given time. A portfolio is defined as projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives. Figure 1.6 illustrates an example of how portfolios, programs, projects, and operations are related in a specific situation.

Program management and portfolio management differ from project management in their life cycles, activities, objectives, focus, and benefits. However, portfolios, programs, projects, and operations often engage with the same stakeholders and may need to use the same resources (see Figure I.6), which may result in a conflict in the organization. This type of a situation increases the need for coordination within the organization through the use of portfolio, program, and project management to achieve a workable balance in the organization.



**Figure 1.6.** Portfolio, Programs, Projects and Operations.

Looking at project, program, and portfolio management from an organizational perspective:

- Program and project management focus on doing programs and projects the “right” way; and
- Portfolio management focuses on doing the “right” programs and projects.

Table 1.1 gives a comparative overview of portfolios, programs, and projects.

**Table 1.1.** comparative overview of portfolios, programs, and projects.

| <b>Organizational Project Management</b> |   |  |   |
|--|---|--|---|
|  | <b>Projects</b>   | <b>Programs</b>  | <b>Portfolios</b>   |
| Scope                                    | Projects have defined objectives. Scope is progressively elaborated throughout the project life cycle.                                    | Programs have a larger scope and provide more significant benefits.  | 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.   | Program managers expect change from both inside and outside the program and are prepared to manage it.   | Portfolio managers continuously monitor changes in the broader internal and external environment.   |
| Planning                                 | Project managers progressively elaborate high-level information into detailed plans throughout the project life cycle.                    | Program managers develop the overall program plan and create high-level plans to guide detailed 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.  | Program managers manage the program staff and the project managers; they provide vision and overall leadership.                                      | Portfolio managers may manage or coordinate portfolio management staff, or program and project staff that may have reporting responsibilities into the aggregate portfolio. |
| Success                                  | Success is measured by product and project quality, timeliness, budget compliance, and degree of customer satisfaction.                   | Success is measured by the degree to which the program satisfies the needs and benefits for which it was undertaken.                                 | Success is measured in terms of the aggregate investment performance and benefit realization of the 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.   |

### 1.2.3.2 PROGRAM MANAGEMENT

Program management is defined as the application of knowledge, skills, and principles to a program to achieve the program objectives and to obtain benefits and control not available by managing program components individually. A program component refers to projects and other programs within a program. Actions related to these program and project-level interdependencies may include:





- Aligning with the organizational or strategic direction that affects program and project goals and objectives;
- Allocating the program scope into program components;
- Managing interdependencies among the components of the program to best serve the program;
- Managing program risks that may impact multiple projects in the program;
- Resolving constraints and conflicts that affect multiple projects within the program;
- Resolving issues between component projects and the program level.

#### 1.2.3.3 PORTFOLIO MANAGEMENT

Portfolio management is defined as the centralized management of one or more portfolios to achieve strategic objectives. The programs or projects of the portfolio may not necessarily be interdependent or directly related. The aim of portfolio management is to:

- Guide organizational investment decisions.
- Select the optimal mix of programs and projects to meet strategic objectives.
- Provide decision-making transparency.
- Prioritize team and physical resource allocation.
- Increase the likelihood of realizing the desired return on investment.
- Centralize the management of the aggregate risk profile of all components.

#### 1.2.3.4 OPERATIONS MANAGEMENT

Operations management is concerned with the ongoing production of goods and/or services. It ensures that business operations continue efficiently by using the optimal resources needed to meet customer demands. It is concerned with managing processes that transform inputs (e.g., materials, components, energy, and labor) into outputs (e.g., products, goods, and/or services).

#### 1.2.3.5 OPERATIONS AND PROJECT MANAGEMENT

Changes in business or organizational operations may be the focus of a project—especially when there are substantial changes to business operations as a result of a new product or service



delivery. Ongoing operations are outside of the scope of a project; however, there are intersecting points where the two areas cross.

Projects can intersect with operations at various points during the product life cycle, such as;

- When developing a new product, upgrading a product, or expanding outputs;
- While improving operations or the product development process;
- At the end of the product life cycle; and
- At each closeout phase.

#### 1.2.3.6 ORGANIZATIONAL PROJECT MANAGEMENT (OPM) AND STRATEGIES

Portfolios, programs, and projects are aligned with or driven by organizational strategies and differ in the way each contributes to the achievement of strategic goals:

- Portfolio management aligns portfolios with organizational strategies by selecting the right programs or projects, prioritizing the work, and providing the needed resources.
- Program management harmonizes its program components and controls interdependencies in order to realize specified benefits.
- Project management enables the achievement of organizational goals and objectives.

Within portfolios or programs, projects are a means of achieving organizational goals and objectives. This is often accomplished in the context of a strategic plan that is the primary factor guiding investments in projects. Alignment with the organization's strategic business goals can be achieved through the systematic management of portfolios, programs, and projects through the application of organizational project management (OPM). OPM is defined as a framework in which portfolio, program, and project management are integrated with organizational enablers in order to achieve strategic objectives. The purpose of OPM is to ensure that the organization undertakes the right projects and allocates critical resources appropriately. OPM also helps to ensure that all levels in the organization understand the strategic vision, the initiatives that support the vision, the objectives, and the deliverables. Figure 1.7 shows the organizational environment where strategy, portfolio, programs, projects, and operations interact.



**Figure 1.7.** Organizational project management (OPM).

#### 1.2.4. PROJECT AND DEVELOPMENT LIFE CYCLES

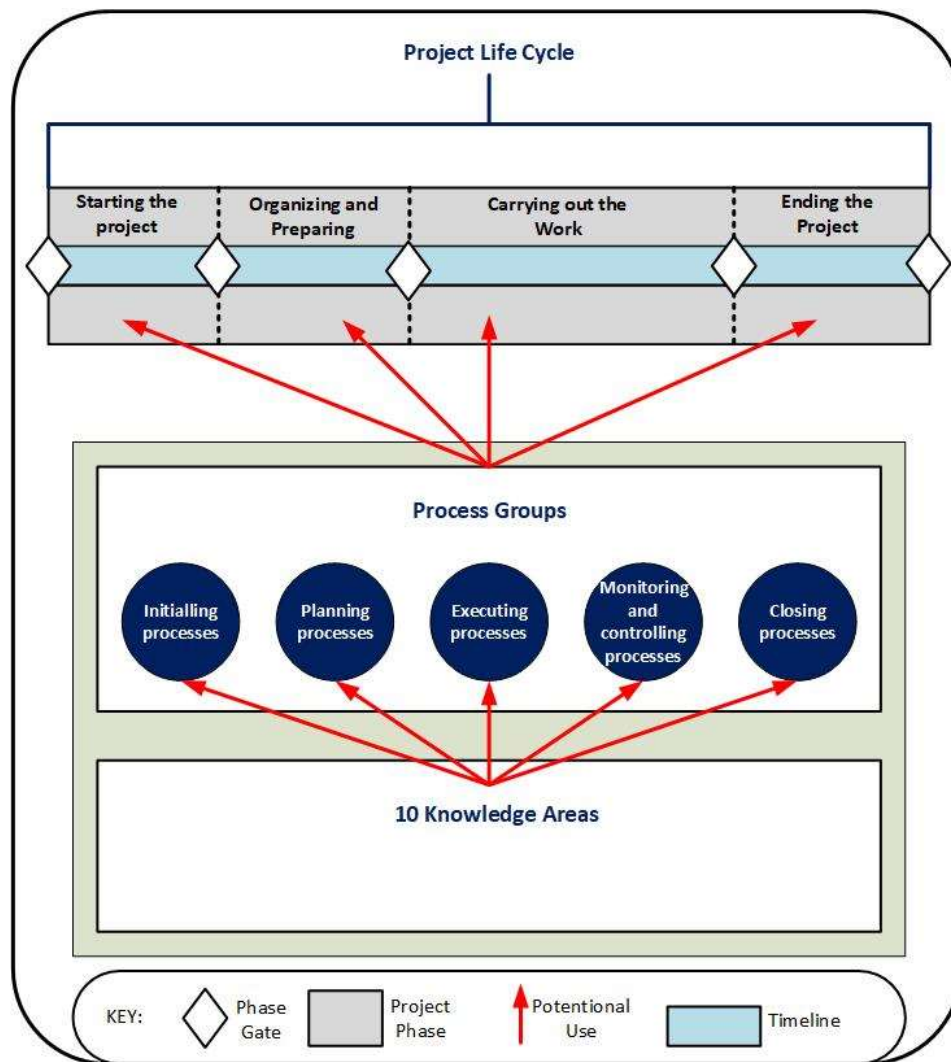
A project life cycle is the series of phases that a project passes through from its start to its completion. It provides the basic framework for managing the project. This basic framework applies regardless of the specific project work involved. The phases may be sequential, iterative, or overlapping. All projects can be mapped to the generic life cycle shown in Figure 1.8.

Project life cycles can be predictive or adaptive. Within a project life cycle, there are generally one or more phases that are associated with the development of the product, service, or result. These are called a development life cycle. Development life cycles can be predictive, iterative, incremental, adaptive, or a hybrid model. It is up to the project management team to determine the best life cycle for each project. The project life cycle needs to be flexible enough to deal with the variety of factors included in the project. Life cycle flexibility may be accomplished by:

- Identifying the process or processes needed to be performed in each phase,
- Performing the process or processes identified in the appropriate phase,



- Adjusting the various attributes of a phase (e.g., name, duration, exit criteria, and entrance criteria).



**Figure 1.8.** Project Generic Life Cycle.

### 1.2.5. PROJECT PHASE

A project phase is a collection of logically related project activities that culminates in the completion of one or more deliverables. The phases in a life cycle can be described by a variety of attributes. Attributes may be measurable and unique to a specific phase. Attributes may include but are not limited to:

- Name (e.g., Phase A, Phase B, Phase 1, Phase 2, proposal phase),



- Number (e.g., three phases in the project, five phases in the project), Duration (e.g., 1 week, 1 month, 1 quarter),
- Resource requirements (e.g., people, buildings, equipment),
- Entrance criteria for a project to move into that phase (e.g., specified approvals documented, specified documents completed), and
- Exit criteria for a project to complete a phase (e.g., documented approvals, completed documents, completed deliverables).

Projects may be separated into distinct phases or subcomponents. These phases or subcomponents are generally given names that indicate the type of work done in that phase.

Examples of phase names include but are not limited to:

- Concept development,
- Feasibility study,
- Customer requirements,
- Solution development,
- Design,
- Prototype,
- Build.

The project phases may be established based on various factors including, but not limited to:

- Management needs;
- Nature of the project;
- Unique characteristics of the organization, industry, or technology.

#### **1.2.6. PHASE GATE**

A phase gate, is held at the end of a phase. The project's performance and progress are compared to project and business documents including but not limited to:

- Project business case,
- Project charter,





- Project management plan, and
- Benefits management plan.

A decision (e.g., go/no-go decision) is made as a result of this comparison to:

- Continue to the next phase,
- Continue to the next phase with modification,
- End the project,
- Remain in the phase, or
- Repeat the phase or elements of it.

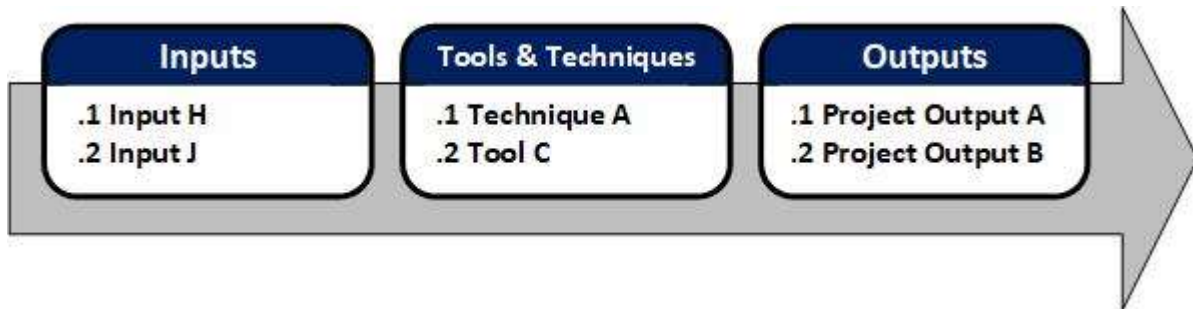
Depending on the organization, industry, or type of work, phase gates may be referred to by other terms such as, phase review, stage gate, kill point, and phase entrance or phase exit.

### **1.2.7. PROJECT MANAGEMENT PROCESSES**

The project life cycle is managed by executing a series of project management activities known as project management processes. Every project management process produces one or more outputs from one or more inputs by using appropriate project management tools and techniques. The output can be a deliverable or an outcome. Outcomes are an end result of a process. Project management processes apply globally across industries. Project management processes are logically linked by the outputs they produce. Processes may contain overlapping activities that occur throughout the project. The output of one process generally results in either:

- An input to another process, or
- A deliverable of the project or project phase.

Figure 1.9 shows an example of how inputs, tools and techniques, and outputs relate to each other within a process, and with other processes.



**Figure 1.9.** Example Process: Inputs, Tools & Techniques and Outputs.

The number of process iterations and interactions between processes varies based on the needs of the project. Processes generally fall into one of three categories:

- **Processes used once or at predefined points in the project.** The processes Develop Project Charter and Close Project or Phase are examples.
- **Processes that are performed periodically as needed.** The process Acquire Resources is performed as resources are needed. The process Conduct Procurements is performed prior to needing the procured item.
- **Processes that are performed continuously throughout the project.** The process Define Activities may occur throughout the project life cycle, especially if the project uses rolling wave planning or an adaptive development approach. Many of the monitoring and control processes are ongoing from the start of the project, until it is closed out.

#### **1.2.8. PROJECT MANAGEMENT PROCESS GROUPS**

A Project Management Process Group is a logical grouping of project management processes to achieve specific project objectives. Process Groups are independent of project phases. Project management processes are grouped into the following five Project Management Process Groups:

- **Initiating Process Group.** Those processes performed to define a new project or a new phase of an existing project by obtaining authorization to start the project or phase.
- **Planning Process Group.** Those processes required to establish the scope of the project, refine the objectives, and define the course of action required to attain the objectives that the project was undertaken to achieve.



- **Executing Process Group.** Those processes performed to complete the work defined in the project management plan to satisfy the project requirements.
- **Monitoring and Controlling Process Group.** Those processes required to track, review, and regulate the progress and performance of the project; identify any areas in which changes to the plan are required; and initiate the corresponding changes.
- **Closing Process Group.** Those processes performed to formally complete or close the project, phase, or contract.

### 1.2.9. PROJECT MANAGEMENT DATA AND INFORMATION

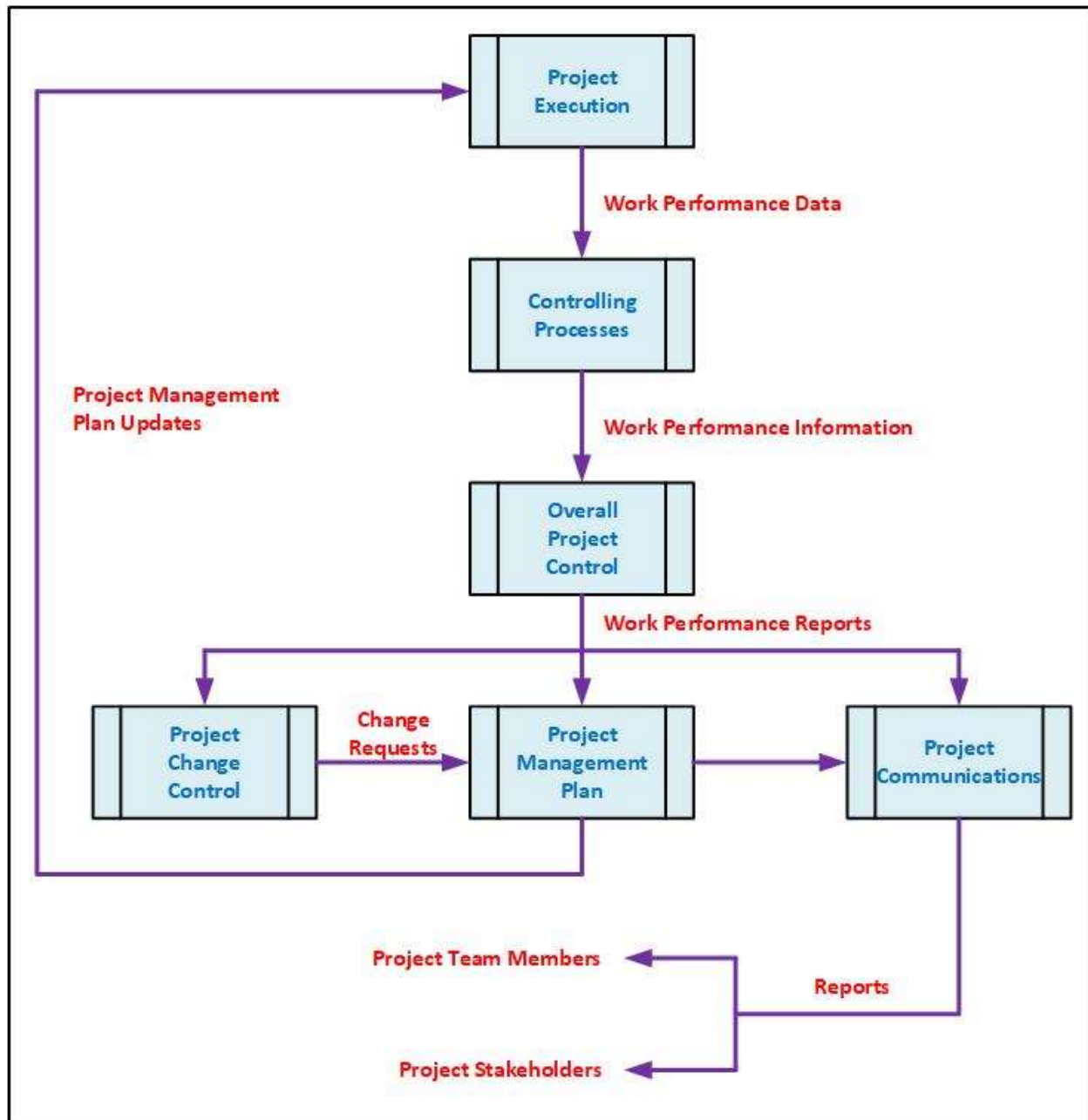
Throughout the life cycle of a project, a significant amount of data is collected, analyzed, and transformed. Project data are collected as a result of various processes and are shared within the project team. The collected data are analyzed in context, aggregated, and transformed to become project information during various processes. Information is communicated verbally or stored and distributed in various formats as reports.

Project data are regularly collected and analyzed throughout the project life cycle. The following definitions identify key terminology regarding project data and information:

- **Work performance data.** The raw observations and measurements identified during activities performed to carry out the project work. Examples include reported percent of work physically completed, quality and technical performance measures, start and finish dates of schedule activities, number of change requests, number of defects, actual costs, actual durations, etc. Project data are usually recorded in a Project Management Information System (PMIS) and in project documents.
- **Work performance information.** The performance data collected from various controlling processes, analyzed in context and integrated based on relationships across areas. Examples of performance information are status of deliverables, implementation status for change requests, and forecast estimates to complete.
- **Work performance reports.** The physical or electronic representation of work performance information compiled in project documents, which is intended to generate



decisions or raise issues, actions, or awareness. Examples include status reports, memos, justifications, information notes, electronic dashboards, recommendations, and updates. Figure 1.10 shows the flow of project information across the various processes used in managing the project.



**Figure 1.10.** Project Data, Information and Report Flow.



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## Questions

1. Cites two monuments which prove that the concept of project management was an early concept.
2. Gives the Two mathematical project scheduling models which have marked the beginning of the modern Project Management era in the 1950s.
3. Project management in its present form began to take root in the early:
  - A. 1940s
  - B. 1950s
  - C. 1960s
  - D. 1970s
4. The Project Management Institute (PMI) was founded in:
  - A. 1959
  - B. 1969
  - C. 1979
  - D. 1989
5. Select the characteristic related to the project from the choices given below.
  - A. project can create a service or capability to perform a service.
  - B. It has a definite beginning and an end.
  - C. A project is a temporary endeavor undertaken to create a unique product.
  - D. All of the above.
6. The following are characteristics of a project, except:
  - A. It is temporary in nature.
  - B. It is continuous.
  - C. It is unique.
  - D. It has a definitive end.





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7. Which of the following is NOT a characteristic of a project?
    - A. Temporary
    - B. Strategic
    - C. Specific result
    - D. Progressively elaborated
  8. All of the following are characteristics of a project EXCEPT:
    - A. It is temporary.
    - B. It has a definite beginning and end.
    - C. It has interrelated activities.
    - D. It repeats itself every month
  9. Which of the following is NOT a type of project management office?
    - A. Directive
    - B. Value-driven
    - C. Supportive
    - D. Controlling
  10. When is a project considered successful?
    - A. All deliverables have been completed.
    - B. The phase completion has been approved.
    - C. Stakeholder expectations have been met.
    - D. The customer has provided final payment.
  11. A project management office (PMO) is responsible for the following activities, except:
    - A. Measuring project performance and suggesting corrective action
    - B. Assuring efficient use of resources toward a specific business goal
    - C. Evaluating completed project for adherence to project plan
    - D. Maintaining and archiving project documentation for future use
  12. Which of the following is NOT a responsibility of a project manager?
    - A. Managing stakeholder expectations



- B. Managing project constraints**
  - C. Gathering product requirements**
  - D. Sponsoring the project**
- 13.** A project management office (PMO) is responsible for the following activities, except:
- A. Measuring project performance and suggesting corrective action**
  - B. Assuring efficient use of resources toward a specific business goal**
  - C. Evaluating completed project for adherence to project plan**
  - D. Maintaining and archiving project documentation for future use**
- 14.** A portfolio is a:
- A. Group of related projects**
  - B. Group of related programs**
  - C. Group of related projects and programs that are managed together**
  - D. Group of projects or programs that may not necessarily be related**
- 15.** An energy company is investing in a series of initiatives to look for alternative energy sources so that the company can be competitive in 10 years. The initiatives are tracked and managed together because this goal is vital to the success of the company. This is an example of:
- A. A portfolio**
  - B. A program**
  - C. A project**
  - D. A enterprise environmental factor**