Chapter 01

Introduction to Project Management

erga

Project Management

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Erga Academy

PM17 – PMP6 Certification

EPDM & ESM tracks

20 credits

Plan


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2. Environment in which projects operate
3. The role of the Project Manager
4. Project Integration Management
5. Project Scope Management
6. Project Schedule Management
7. Project Cost Management
8. Project Quality Management
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Plan

- Chapter 01- Introduction to Project Management

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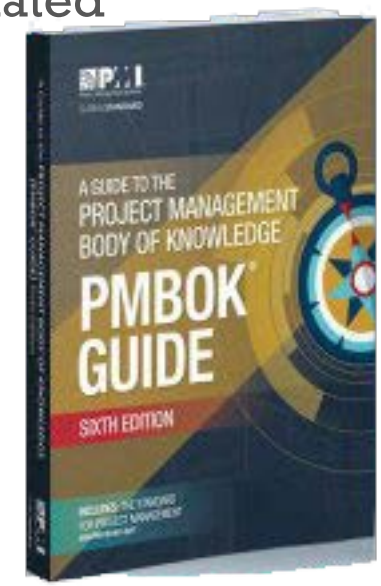
1.1 Overview and purpose of this guide

About PMBOK ® Guide

- PMI developed and published ***A Guide to the Project Management Body of Knowledge (PMBOK® Guide)***
- It defines concepts, environment and project life cycle and provides guidelines for managing projects.
- It describes the project management lifecycle and related processes.
- It contains the standard for the PM Profession that is **generally recognized as good practices**.
- It is applicable to most projects most of the time
- It enhances the chances of success
- It defines a common vocabulary.



1.1 Overview and purpose of this guide

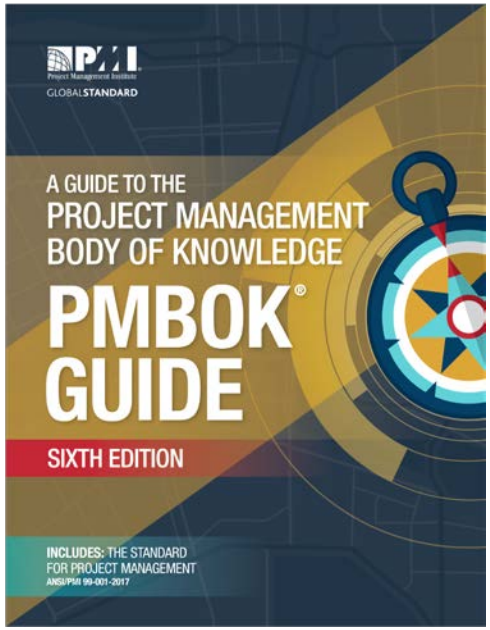
About PMBOK ® Guide

It doesn't mean that

this knowledge is to be applied systematically on all projects

But…

the project management team of the organization is responsible for selecting the adequate part for a given project



1.1 Overview and purpose of this guide

1.1.1 The standard for project management

A **standard** is a guide on "What to do…"

While

A **methodology** is "How to do it…"

- A **standard** is a *"Document approved by a recognized body, that provides, for common repeated use, rules, guidelines, or characteristics for products, processes or services with which compliance are not mandatory"* (ISO/IEC 2:2004 standardization and Related Activities – General Vocabulary)
- This guide is based on the *Standard for Project Management*. (an American National Standards Institute (ANSI) standard). Because project management needs to be tailored to fit the needs of the project, the standard and the guide are both based on descriptive practices, rather than prescriptive practices.

1.1 Overview and purpose of this guide

1.1.1 The standard for project management

A **standard** is a guide on "What to do…"

While

A **methodology** is "How to do it…"

- This PMBOK® Guide is different from a methodology.
- A **methodology** is a 'system of practices, techniques, procedures, and rules used by those who work in a discipline'.
- This PMBOK® Guide is a foundation upon which organizations can build methodologies, policies, procedures, rules, tools and techniques, and life cycle phases needed to practice project management.

1.1 Overview and purpose of this guide

1.1.2 Common Vocabulary

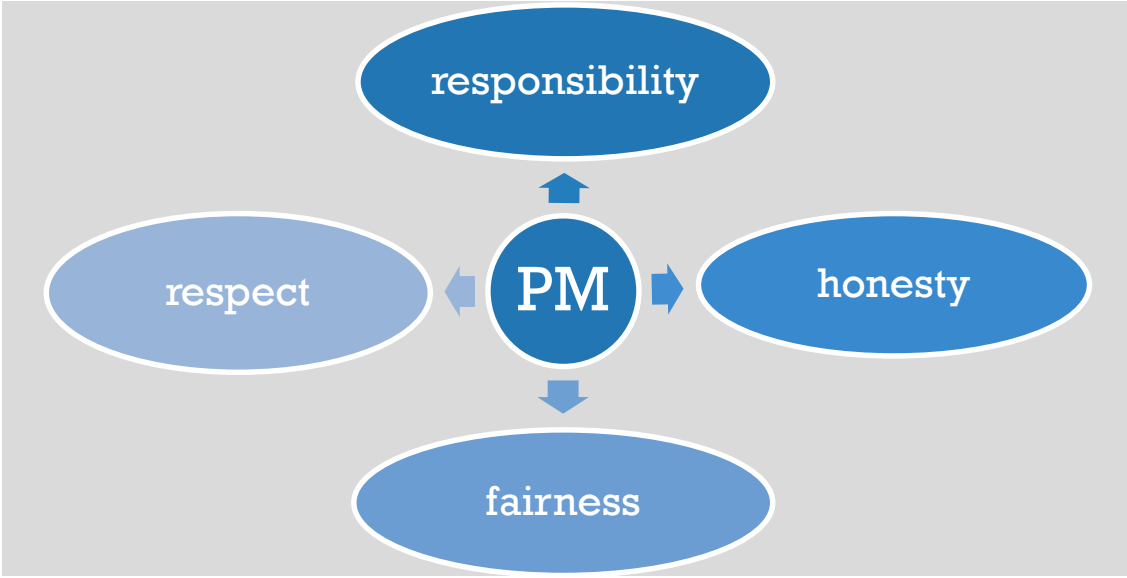
- A common vocabulary is an essential element of a professional discipline. The ***PMI Lexicon of Project Management Terms*** provides the foundational professional vocabulary that can be consistently used by organizations, portfolio, program, and PMs and other project stakeholders.
- The Lexicon will continue to evolve over time.
- There may be other industry-specific terms used in projects that are defined by that industry's literature..

1.1 Overview and purpose of this guide

1.1.3 Code of Ethics and Professional Conduct

- PMI publishes the ***Code of Ethics and Professional Conduct*** to instill confidence in the project management profession and to help an individual in making wise decisions, particularly when faced with difficult situations where the individual may be asked to compromise his or her integrity or values.

The values that the global project management community defined as most important were:

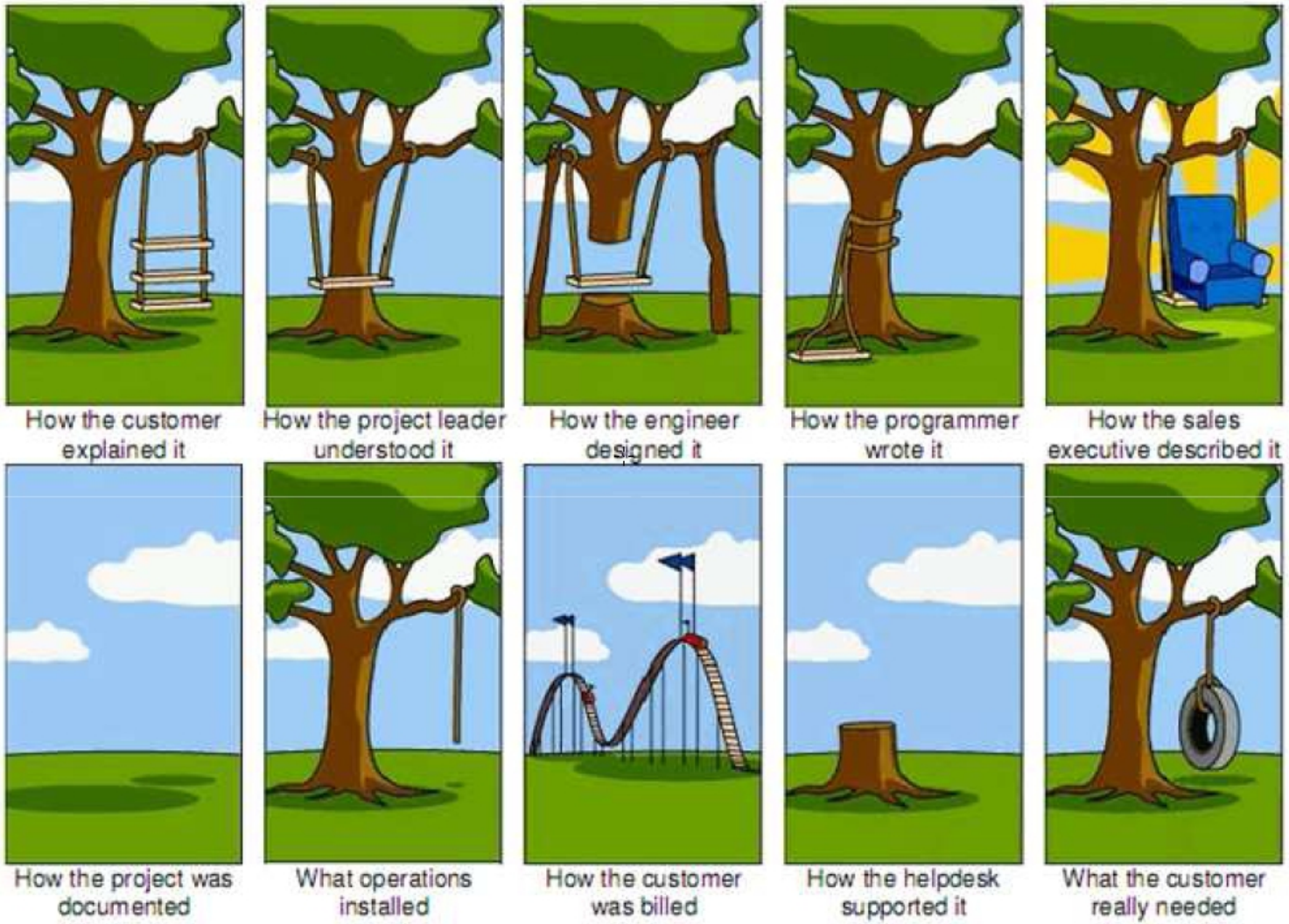


1.1 Overview and purpose of this guide

1.1.3 Code of Ethics and Professional Conduct

- The *Code of Ethics and Professional Conduct* includes both aspirational standards and mandatory standards:
  - The **aspirational standards** describe the conduct that practitioners, who are also PMI members, certification holders, or volunteers, strive to uphold. Although adherence to the aspirational standards is not easily measured, conduct in accordance with these is an expectation for those who consider themselves to be professionals—it is not optional.
  - The **mandatory standards** establish firm requirements and, in some cases, limit or prohibit practitioner behavior. Practitioners who are also PMI members, certification holders, or volunteers and who do not conduct themselves in accordance with these standards will be subject to disciplinary procedures before PMI's Ethics Review Committee.

1.2 Foundational elements



1.2 Foundational elements

1.2.1 Projects

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

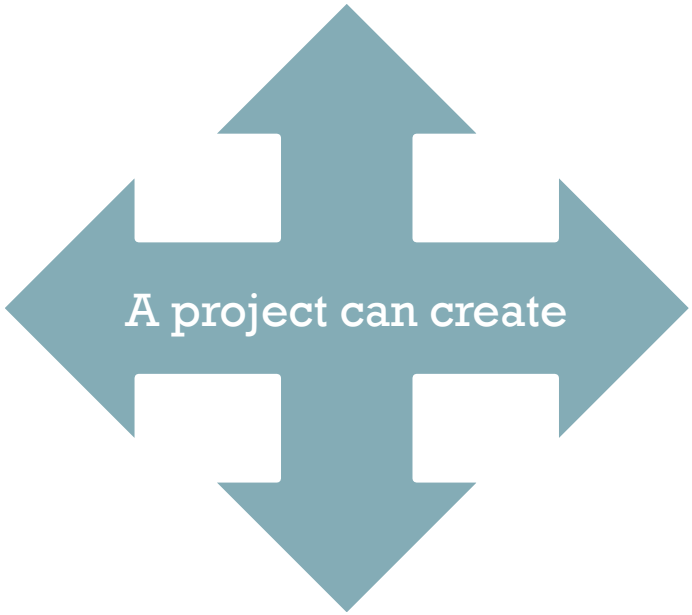
- **Unique product, service, or result**. *Projects are undertaken to fulfill objectives by producing deliverables.*
  - An **objective** is defined as *an outcome toward which work is to be directed*, a strategic position to be attained, a purpose to be achieved, a result to be obtained, a product to be produced, or a service to be performed.
  - A **deliverable** is defined as *any unique and verifiable product*, result, or capability to perform a service that is required to be produced to complete a process, phase, or project. Deliverables may be tangible or intangible.

1.2 Foundational elements

1.2.1 Projects

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

A **unique service** or a capability to perform a service (a business function that supports production or distribution)



A **unique result**, such as an outcome or document

A **unique combination of one or more products, services, or results** (a software application, its associated documentation, and help desk services)

1.2 Foundational elements

1.2.1 Projects

- **Repetitive elements** may be present in some project deliverables and activities. This repetition does not change the fundamental and unique characteristics of the project work. However, each building project remains unique in key characteristics (location, design, environment, situation, people involved).

- **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.

1.2 Foundational elements

1.2.1 Projects

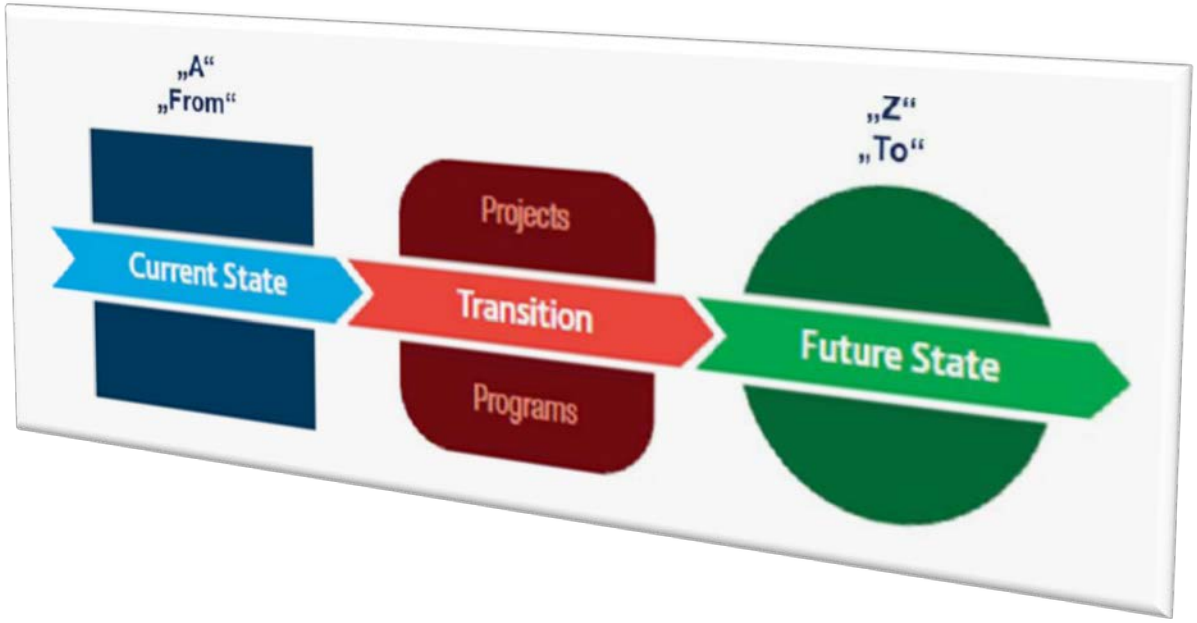
- **Temporary endeavor**. The temporary nature of projects indicates that a project has a **definite beginning and end**. Temporary does not necessarily mean a project has a short duration. The end of the project is reached when one or more of the following is true:
  - The project's objectives have 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 (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.

Projects are temporary, but their deliverables may exist beyond the end of the project. Projects may produce deliverables of a social, economic, material, or environmental nature. For example, a project to build a national monument will create a deliverable expected to last for centuries.

1.2 Foundational elements

1.2.1 Projects

- **Projects drive change**. Projects drive change in organizations. From a business perspective, a *project is aimed at moving an organization from one state to another state in order to achieve a specific objective.* Before the project begins, the organization is commonly referred to as being in the current state. The desired result of the change driven by the project is described as *the future state.*

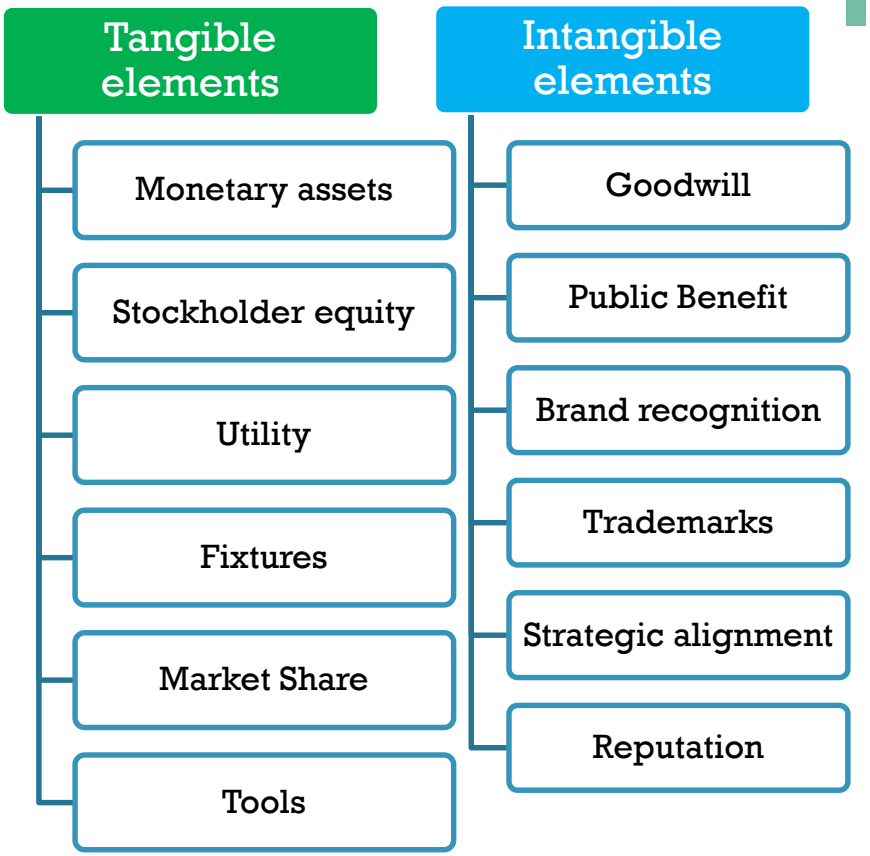


1.2 Foundational elements

1.2.1 Projects

- **Projects enable business value creation.** PMI defines **business value** as the net quantifiable benefit derived from a business endeavor.

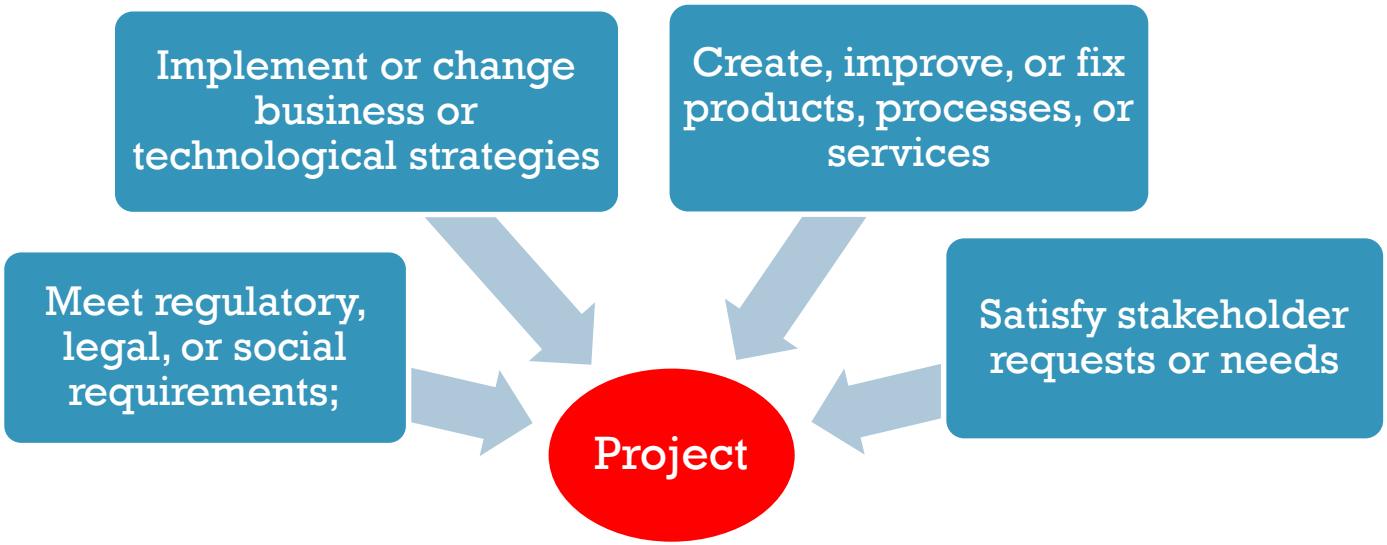
Business value is a unique concept in each organization. It is defined as the entire value of the business; the total sum of all tangible + intangible elements.



1.2 Foundational elements

1.2.1 Projects

- **Project Initiation Context**. Organizational leaders initiate projects in response to factors acting upon their organizations. There are four fundamental categories for these factors:



  - Projects provide the means for organizations to successfully make the changes necessary to deal with these factors which ultimately should link to the strategic objectives of the organization and the business value of each project.

1.2 Foundational elements

1.2.1 Projects

Sub Projects

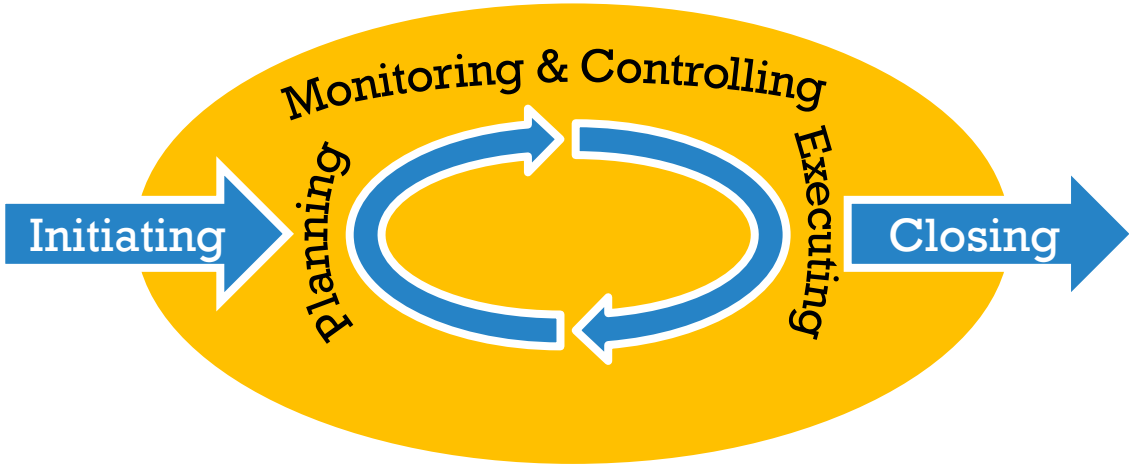
- Projects are frequently divided into more manageable components or subprojects.
- Subprojects are often contracted to an external enterprise or to another functional unit in the performing organization.
- Sub projects can be referred to as projects and managed as such.

1.2 Foundational elements

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 (PMGT) is accomplished through the appropriate application and integration of the project management processes identified for the project grouped within **5 process groups.**



1.2 Foundational elements

1.2.2 The importance of Project Management

Effective and efficient project management should be considered a strategic competency within organizations. It enables organizations to:

1.2 Foundational elements

1.2.2 The importance of Project Management

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

1.2 Foundational elements

1.2.2 The importance of Project Management

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

- Missed deadlines
- Cost Overruns
- Poor Quality
- Rework
- Uncontrolled expansion of the project
- Failure in achieving the objectives
- Unsatisfied stakeholders
- Loss of reputation for the organization

1.2 Foundational elements

1.2.2 The importance of Project Management

Project Management typically includes:

- Identification of the requirements.
- Managing the stakeholders: during the life of the project, addressing their needs & expectations and ensure adequate communication & management.
- Balancing the competing project constraints:

Triple Constraints
(outdated)

1.2 Foundational elements

1.2.2 The importance of Project Management

- Constraints may include the date of milestone or maximum allowable risk in a project.
- Management directly or indirectly sets the priority of each defined constraint.
- The PM uses this prioritization throughout the project to properly plan the project, evaluate the impact of changes, and prove successful project completion.

It is important to realize that a change to one constraint should be evaluated for its effect on the other constraints. i.e. shortening the schedule is unlikely without causing a negative impact on cost, risk, …

1.2 Foundational elements

1.2.2 The importance of Project Management

Know the following list of unique things about objectives:

- Project *objectives* are contained in the project charter.
- Projects are considered complete when the *objectives* have been met.
- The reasons for terminating a project before completion is that the project *objectives* can not be met.
- A more complete understanding of the *objectives* is achieved over the length of the project.
- It is the PM's role to accomplish the project *objectives*.
- The reason for quality activities is to make sure the project meets its *objectives*.
- Risk management enhances the opportunities and reduces threats to the project *objectives*.
- ...

1.2 Foundational elements

1.2.2 The importance of Project Management

Know the following list of unique things about objectives (cont'd):

- …
- Things that could negatively impact the project *objectives* such as risk and stakeholders influences should be watched out and tracked.
- Project *objectives* are determined in the initiating process group and more elaborated in the planning process group.
- One of the purposes of the *Develop project management plan* process is to determine how the works will be accomplished to meet the project *objectives*.

1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

1. Overview

- **A program is a group of related projects** managed in a coordinated way to obtain benefits and control not available from managing them individually.

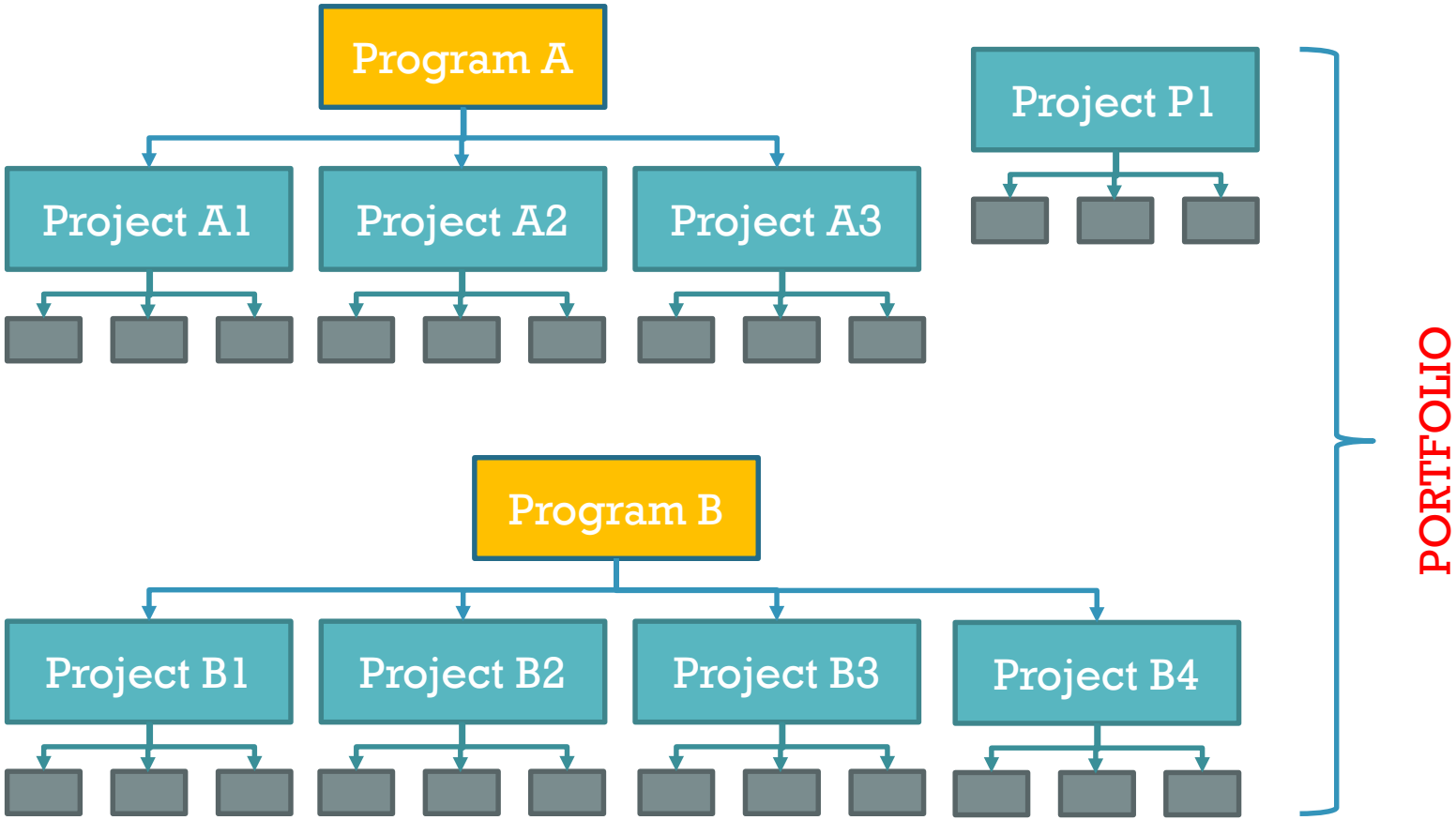
  The projects in the program are directly related to each other by a common outcome or result.

- **A portfolio is a collection of projects or programs** and other work that are grouped together to facilitate effective management of that work to meet common strategic business objectives.

  The projects or programs in the portfolio may not necessarily be interdependent or directly related

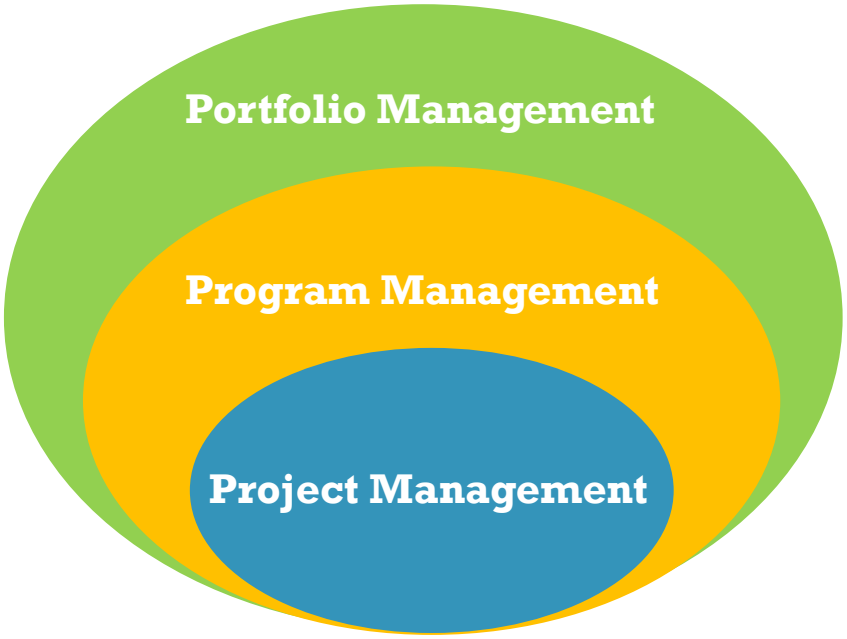
1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management



1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management



Portfolio: A suite of Programs & Projects managed to optimize Enterprise Value

Program: A structured grouping of related projects designed to produce clearly identified business value

Project: A structured set of activities undertaken to deliver a defined capability based on an agreed schedule & budget

1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

1. Overview

	Projects	Programs	Portfolios
Scope	Have defined objectives. Scope is progressively elaborated.	Programs have larger scope and provide more significant benefits	Have business scope that changes with strategic goals of Organization.
Change	PMs expect change and implement processes to keep change managed and controlled.	Program Manager must expect change from both inside and outside the program and be prepared to manage it.	Portfolio managers continually monitor changes in the broad Environment.
Planning	PMs 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.

1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

1. Overview (cont'd)

	Projects	Programs	Portfolios
Management	PMs manage the project team (PT) to meet the project objectives.	Program Managers manage the program staff and the PMs; they provide vision and overall leadership.	Portfolio managers may manage or coordinate portfolio management Staff.
Success	Success is measured by product and project quality, timeliness, cost effectiveness and degree of customer Satisfaction.	Success is measured by degree to which program satisfies the needs and benefits for which it was undertaken.	Success is measured in terms of aggregate performance of portfolio components.
Monitoring	Monitoring and Controlling of the work for producing the project's products, services or results.	Program Managers monitor progress of program components to ensure overall goals, schedules, budget and benefits of the program will be met.	Portfolio Managers monitor aggregate performance and value indicators.

1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

- **Program management is:**
  - Centralized management that helps in achieving the program's strategic objectives
  - Focusing on projects interdependencies to resolve resource constraints, issues & conflicts, and to align with organizational/ strategic direction.

- **Portfolio management is:**
  - Centralized management that helps in achieving the organizational strategic objectives.
  - Focusing on prioritizing resource allocation that ensures alignment with organizational strategies

1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

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.

- 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 program components 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;
  - Managing change requests within a shared governance framework;
  - Allocating budgets across multiple projects within the program;
  - Assuring benefits realization from the program and component projects.

1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

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 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

4. Operations Management

- Operations management is an area that is *outside the scope of formal project management* as described in this guide.
- 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 (materials, components, energy, and labor) into outputs (products, goods, and/or services).

1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

5. Operations and Project Management

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 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

5. Operations and Project Management (cont'd)

- Similarities between projects and operations:
  - Both are constrained by resources.
  - Both are planned, executed, and controlled.
  - Both are done for a purpose and have interrelated activities.
- Difference between projects and operations:
  - Operations are On-going and repetitive.
  - Projects are temporary endeavor undertaken to create unique products or services that are progressively elaborated.

1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

5. Operations and Project Management (cont'd)

- Projects and Operations INTERSECT to exchange deliverables & knowledge at various points during the "Product life cycle".

Projects	Operations
Created at Business initiative, operations changes,..	**Exist** : Manufacturing tasks, accounting, production,
Performed during **limited** time of the project, "temporary"	**Repetitive** services, on going activities, "permanent"
Specific start/end date	No specific start/end date
Create " Product/ Service"	**Use** " Product/Service"

1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

5. Operations and Project Management (cont'd)

Similarities	Differences
Performed by individuals	The project is limited in time, whereas operations continue for the lifetime of the product
Subject to constraints including resources, schedule, risk and others	The project may contain a number of unknown and unpredictable elements, whereas operational elements are always predictable and repeatable
Can be planned, executed and controlled	Projects continually evaluate risk, whereas operational processes are usually designed to minimize or eliminate risk.
Designed to meet organizational and/or strategic objectives	

1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

6. Organizational Project Management (OPM) and strategies

Portfolios, programs, and projects are aligned with or driven by organizational strategies. Alignment with the organization's strategic business goals can be achieved 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.

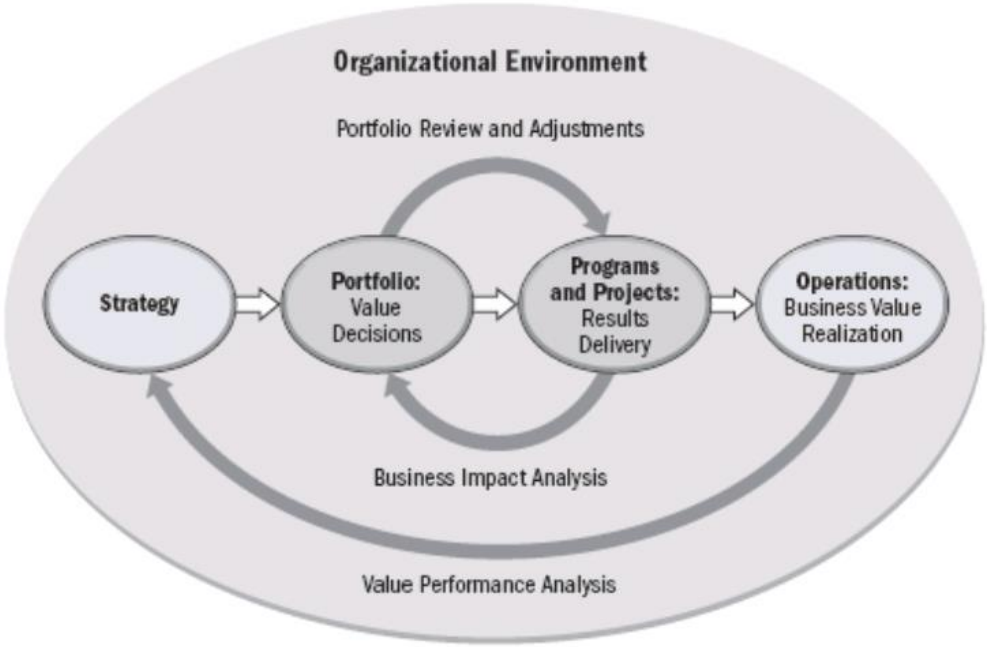
1.2 Foundational elements

1.2.3 Relationship of Project, Program, Portfolio and Operations Management

6. Organizational Project Management (OPM) and strategies (Cont'd)

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.



1.2 Foundational elements

1.2.4 Components of the Guide

PMBOK® Guide Key Component	Brief Description
Project life cycle (Sec 1.2.4.1)	The series of phases that a project passes through from its start to its completion.
Project phase (Sec 1.2.4.2)	A collection of logically related project activities that culminates in the completion of one or more deliverables.
Phase gate (Sec 1.2.4.3)	A review at the end of a phase in which a decision is made to continue to the next phase, to continue with modification, or to end a program or project.
Project management processes (Sec 1.2.4.4)	A systematic series of activities directed toward causing an end result where inputs will be acted upon to create one or more outputs.
Project Management Process Group (Sec 1.2.4.5)	A logical grouping of project management inputs, tools and techniques, and outputs. Project Management Process Groups include Initiating, Planning, Executing, Monitoring and Controlling, and Closing. They are not project phases.
Project Management Knowledge Area (Sec 1.2.4.6)	An identified area of project management defined by its knowledge requirements and described in terms of its component processes, practices, inputs, outputs, tools, and techniques.

1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles

- ***A project life cycle is a collection of project phases*** that defines:
  - What work will be performed in each phase.
  - What deliverables will be produced and when.
  - Who is involved in each phase.
  - What management will do to control and approve work produced in each phase.

- 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.

1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

- Differs from Project to Project based on the type of the project, type of industry etc.
- Projects are divided into phases, and all projects of same type, large or small have a similar life cycle.
- At a minimum, a project will have a beginning or initiation phase, an intermediate phase or phases, and an ending phase.

Construction: Feasibility => Planning => Design => Production => Turnover
IT Project: Requirement => Design => Program => Test => Implement

1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

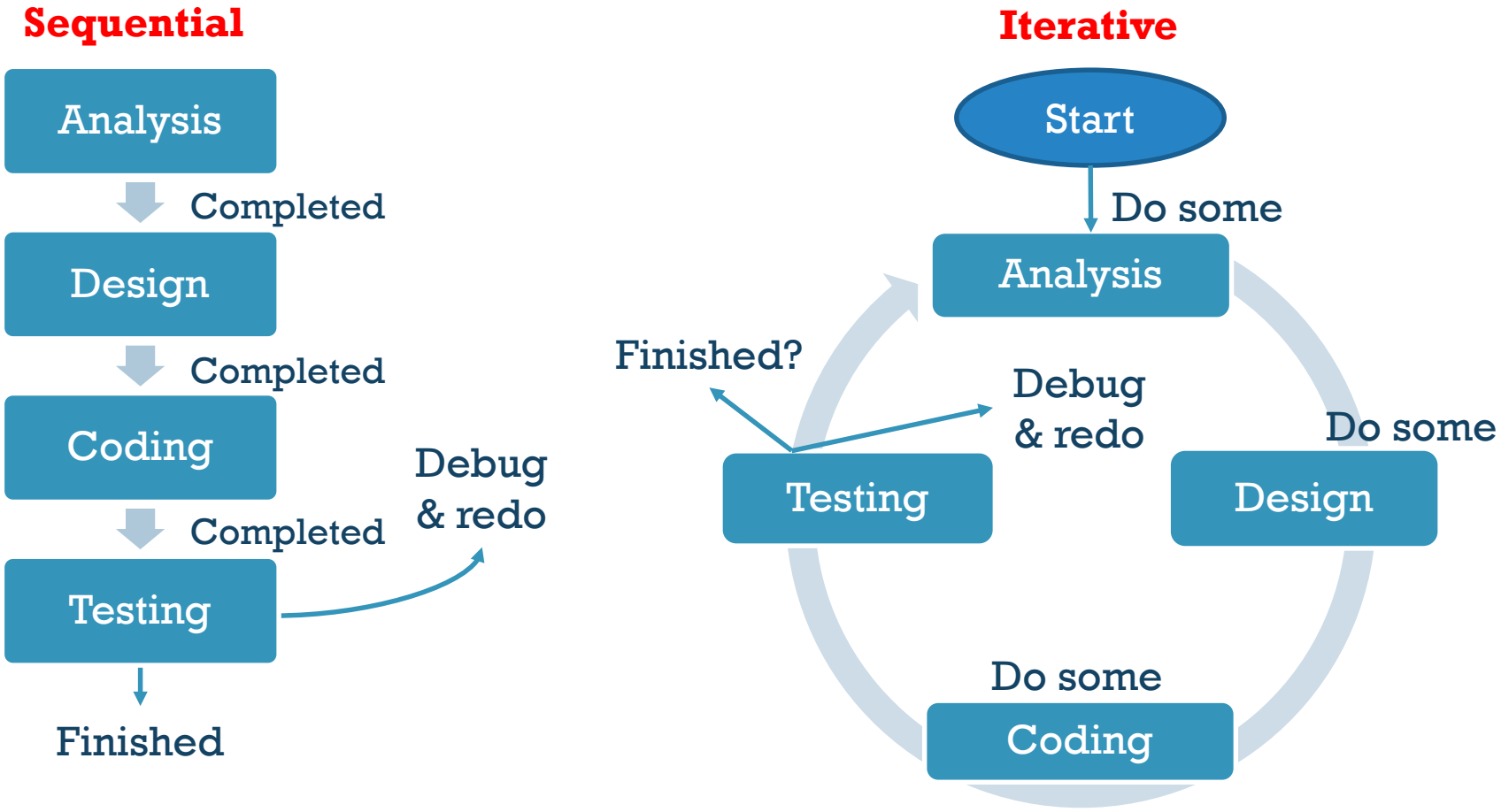
There are three basic types of [phase to phase] relationships:

- **Sequential relationship**: where a phase can only start once the previous phase is complete.
- **An Iterative relationship**: where only one phase is planned at any given time and the planning for the next is carried out, as work progresses on the current phase and deliverables.
- **An overlapping relationship**

1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

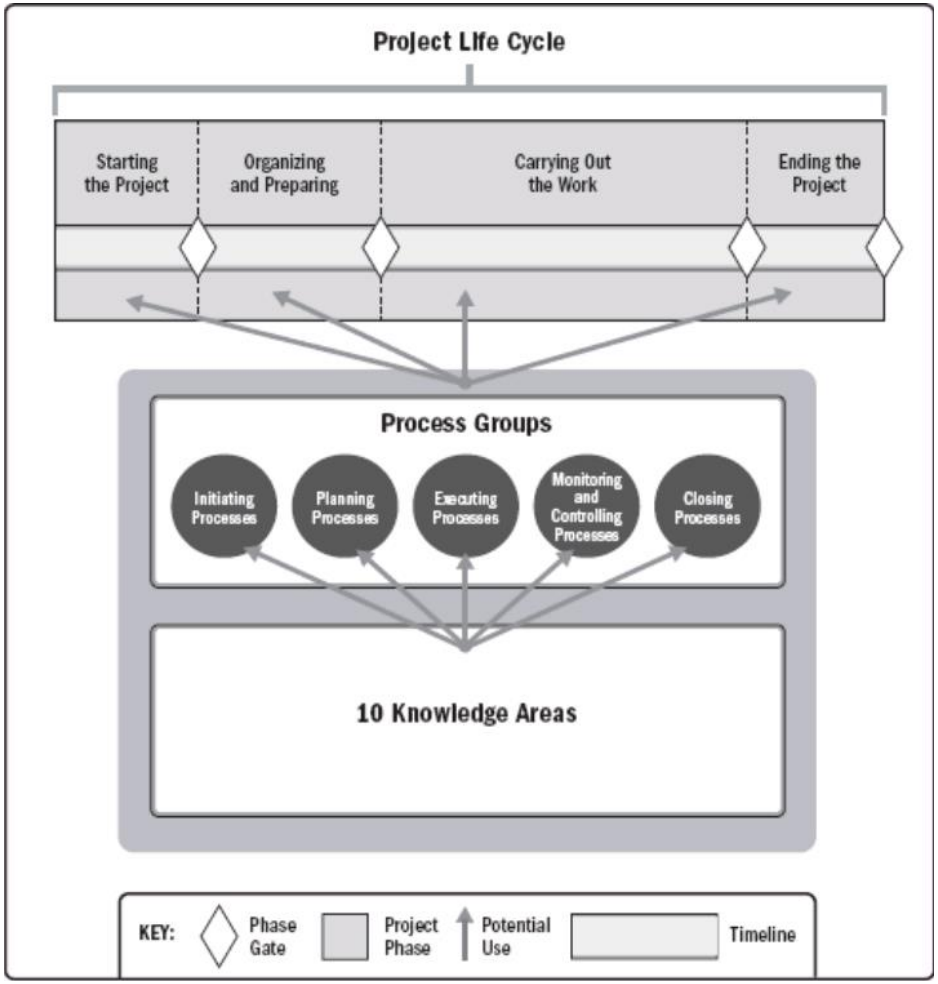


1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

All projects can be mapped to this generic life cycle



1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

There are five basic types of Project life cycles:

A. **Predictive** (fully plan-driven)

B. **Iterative** life cycles

C. **Incremental** life cycles

D. **Adaptive** life cycles

E. **Hybrid** life cycles

1.2 Foundational elements

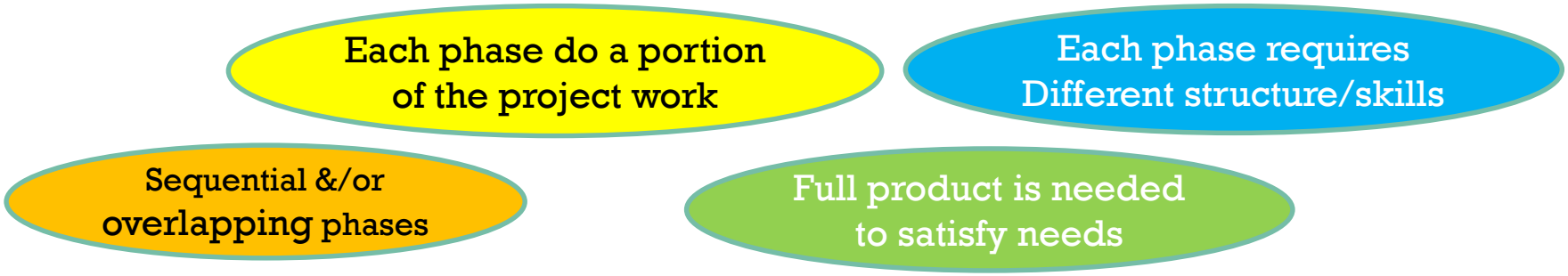
1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

- **A. Predictive (fully plan-driven) life cycles**

The project scope, time, and cost are determined in the early phases of the life cycle. Any changes to the scope are carefully managed. Predictive life cycles may also be referred to as waterfall life cycles. In this case:

- The overall project/product scope is defined at the project starting.
- Any change in the scope is carefully controlled and needs formal acceptance.



1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

- **B. Iterative life cycles**

The project scope is generally determined early in the project life cycle, but time and cost *estimates are routinely modified* as the project team's understanding of the product increases. Iterations develop the product through a series of repeated cycles, while increments successively add to the functionality of the product.

In this case:
- A high-level vision of the project is defined at the project starting.
- Detailed scope for next iteration is elaborated during the current one.
- Each iteration builds its deliverable until the phase exit criteria are met.
- Any change in the iteration scope is carefully controlled after the work starts.

The phase work required may change in effort/time

Each phase may enhance or create a deliverable

Sequential &/or overlapping phases

Partial delivery of a phase satisfy needs

1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

- **C. Incremental life cycles**

In an incremental life cycle, the deliverable is produced through a series of *iterations that successively add functionality* within a predetermined time frame. The deliverable contains the necessary and sufficient capability to be considered complete only after the final iteration.

In this case:
- A high-level vision of the project is defined at the project starting.
- Detailed scope for next iteration is elaborated during the current one.
- Each iteration builds its deliverable until the phase exit criteria are met.
- Any change in the iteration scope is carefully controlled after the work starts.

The phase work required may change in effort/time

Each phase may enhance or create a deliverable

Sequential &/or overlapping phases

Partial delivery of a phase satisfy needs

1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

- **D. Adaptive life cycles**

Adaptive life cycles are agile, iterative, or incremental. The detailed scope is defined and approved before the start of an iteration. Adaptive life cycles are also referred to as agile or change-driven life cycles. In this case:

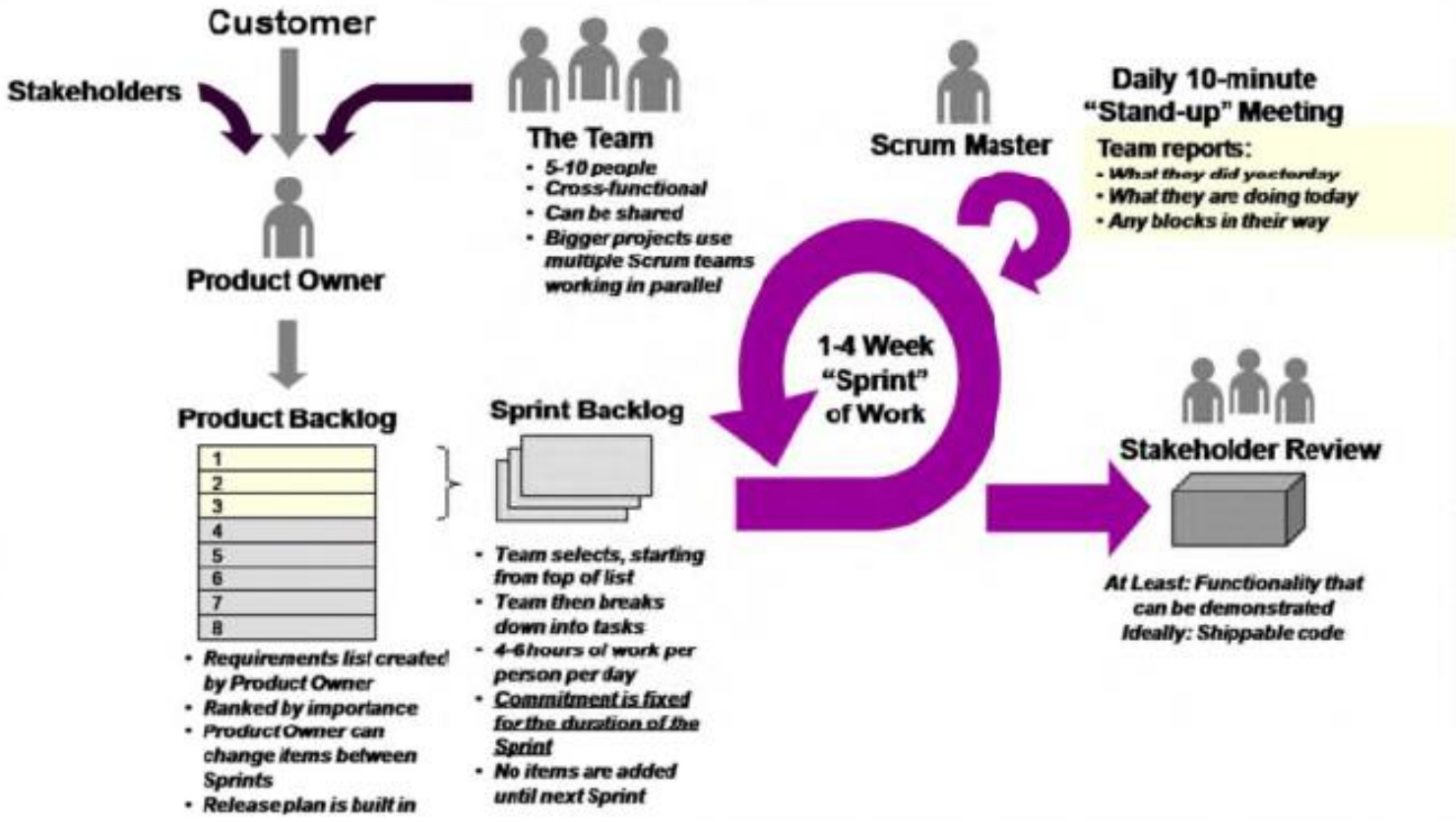
- Early Iterations concentrate on planning activities.
- Overall project scope is decomposed into "requirements" = **Product backlog.**
- At the start of an Iteration, the project team decides what to be implemented from the " backlog".
- At the end of an Iteration, the product is reviewed by the customer.

1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

- **D. Adaptive life cycles (cont'd)**



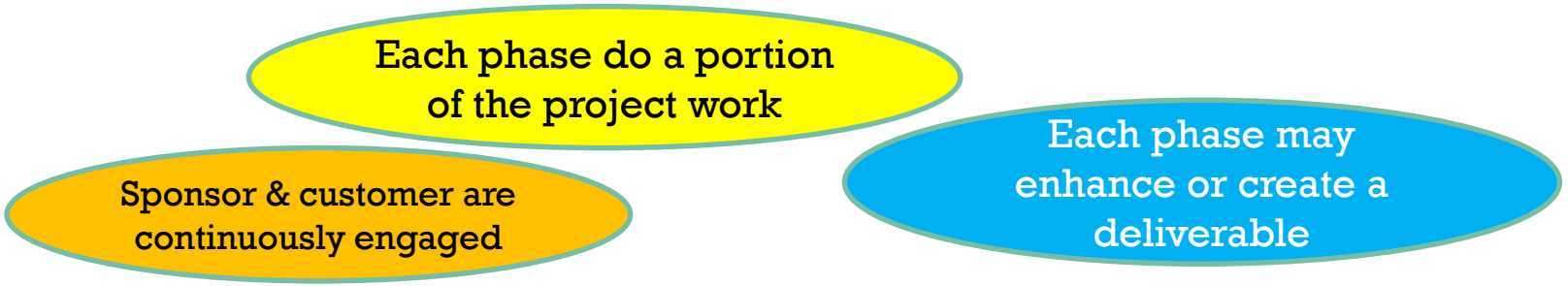
1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

- **E. Hybrid life cycles**

A hybrid life cycle is a combination of a predictive and an adaptive life cycle. Those elements of the project that are well known or have fixed requirements follow a predictive development life cycle, and those elements that are still evolving follow an adaptive development life cycle.



1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

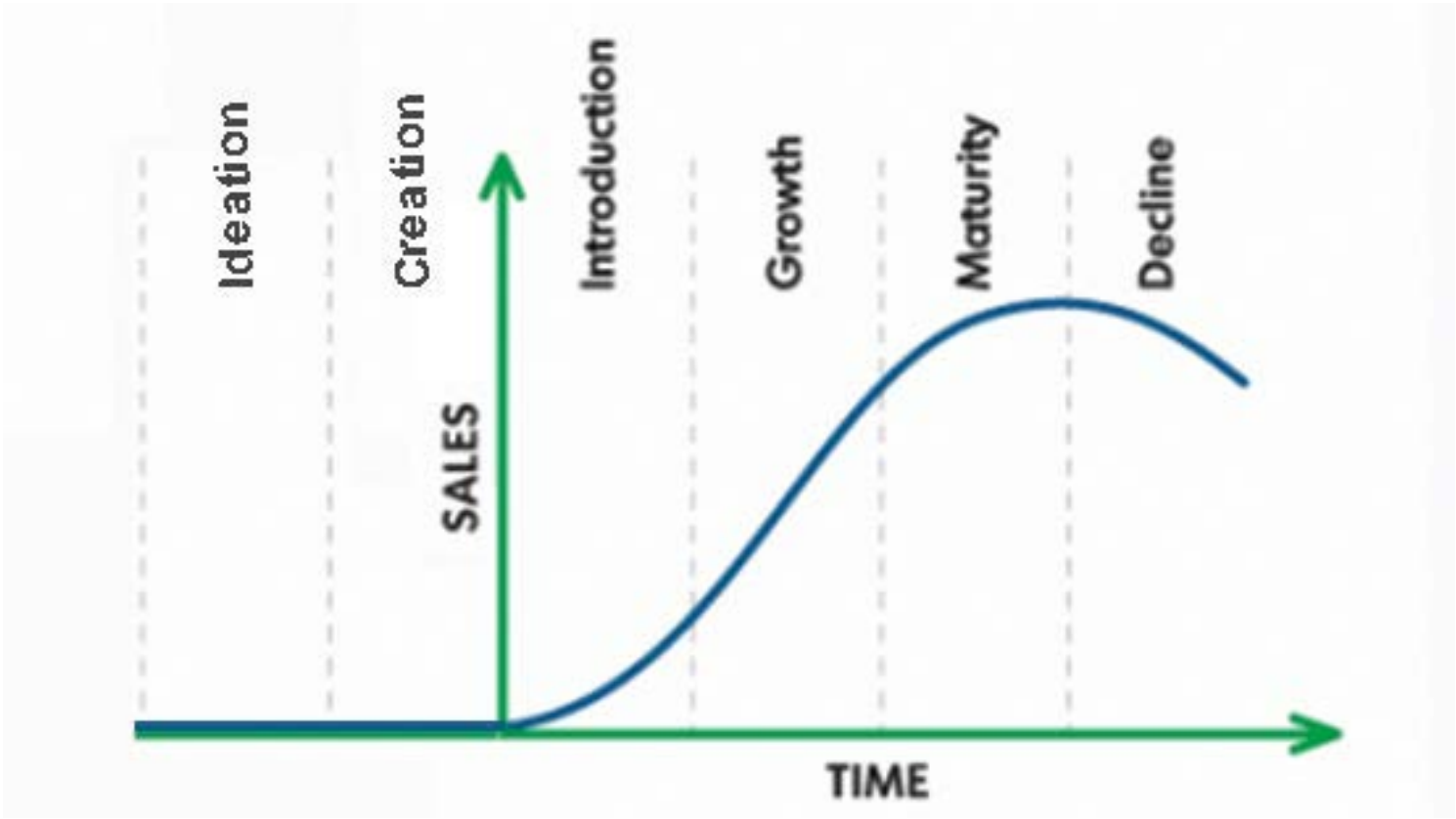
- Project life cycles are independent of product life cycles, which may be produced by a project. A product life cycle is the series of phases that represent the evolution of a product, from concept through delivery, growth, maturity, and to retirement.
  - The **product** life cycle is the overall life of the product from creation until retirement
  - The product life cycle contains many projects i.e. one or more project(s) life cycles can take place
  - A **project** can create a **product**, an other project can add new functions or features

1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

- **Product Life Cycle**

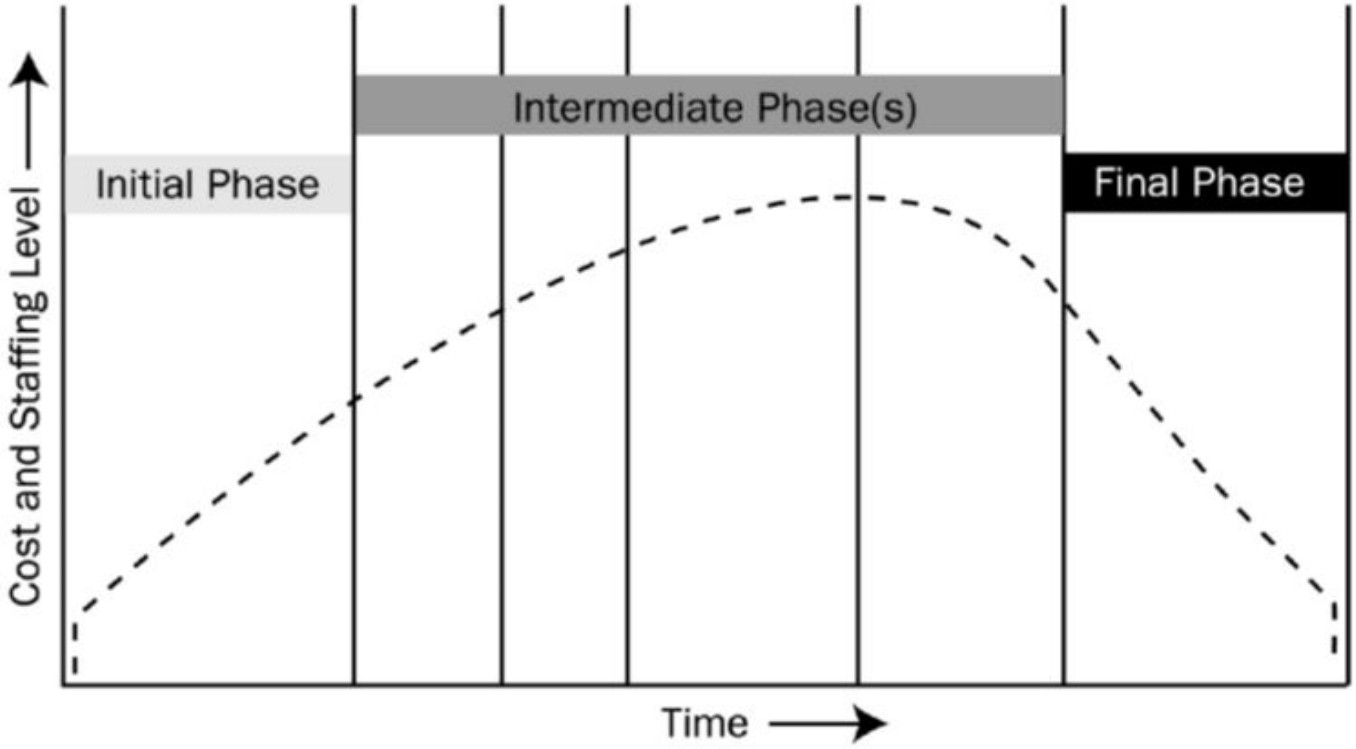


1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

- **Typical Project Cost and Staffing Level Across the Project Life Cycle**

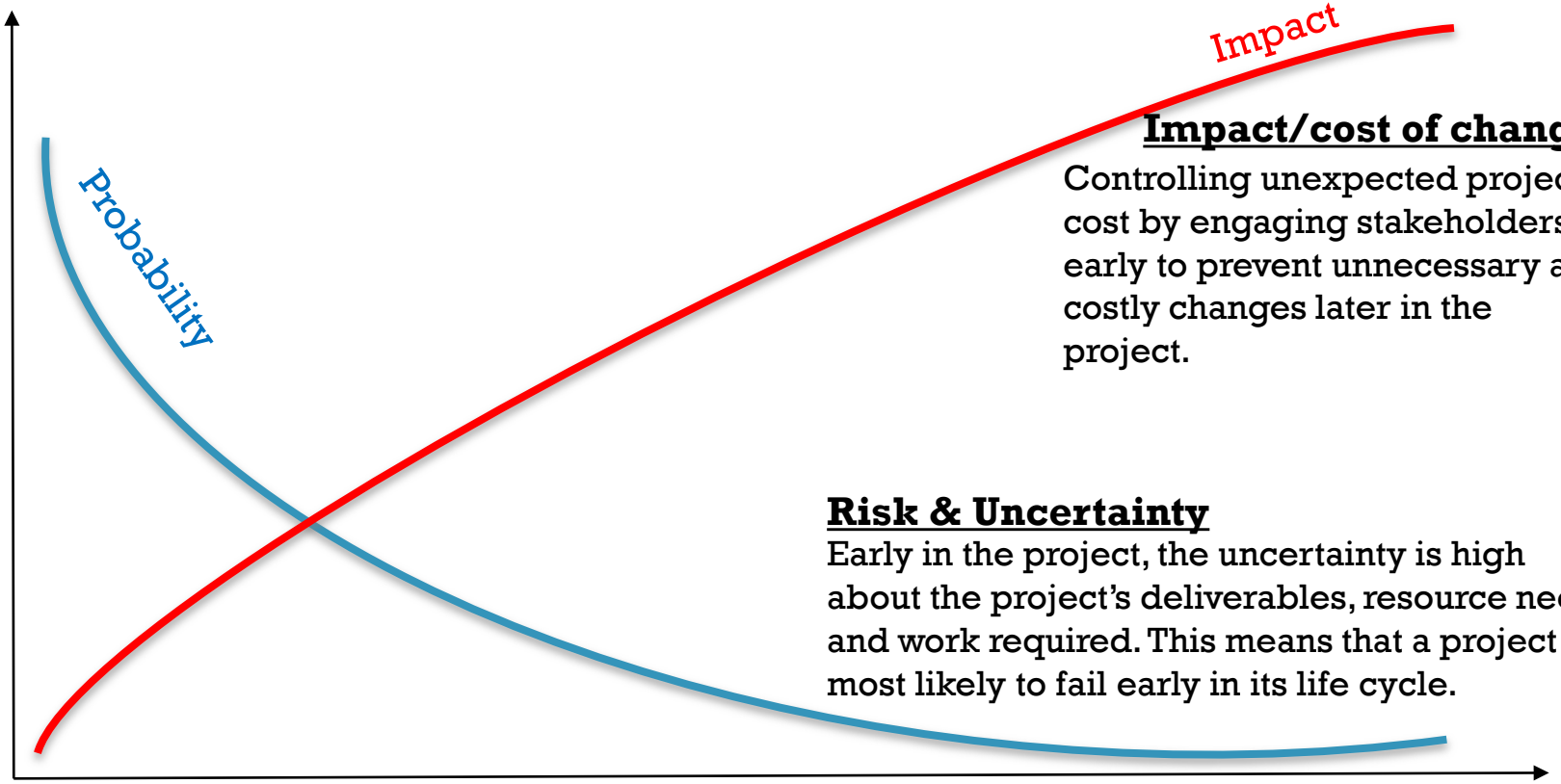


1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

- **Risk and Uncertainty**



Impact/cost of change

Controlling unexpected project cost by engaging stakeholders early to prevent unnecessary and costly changes later in the project.

Risk & Uncertainty

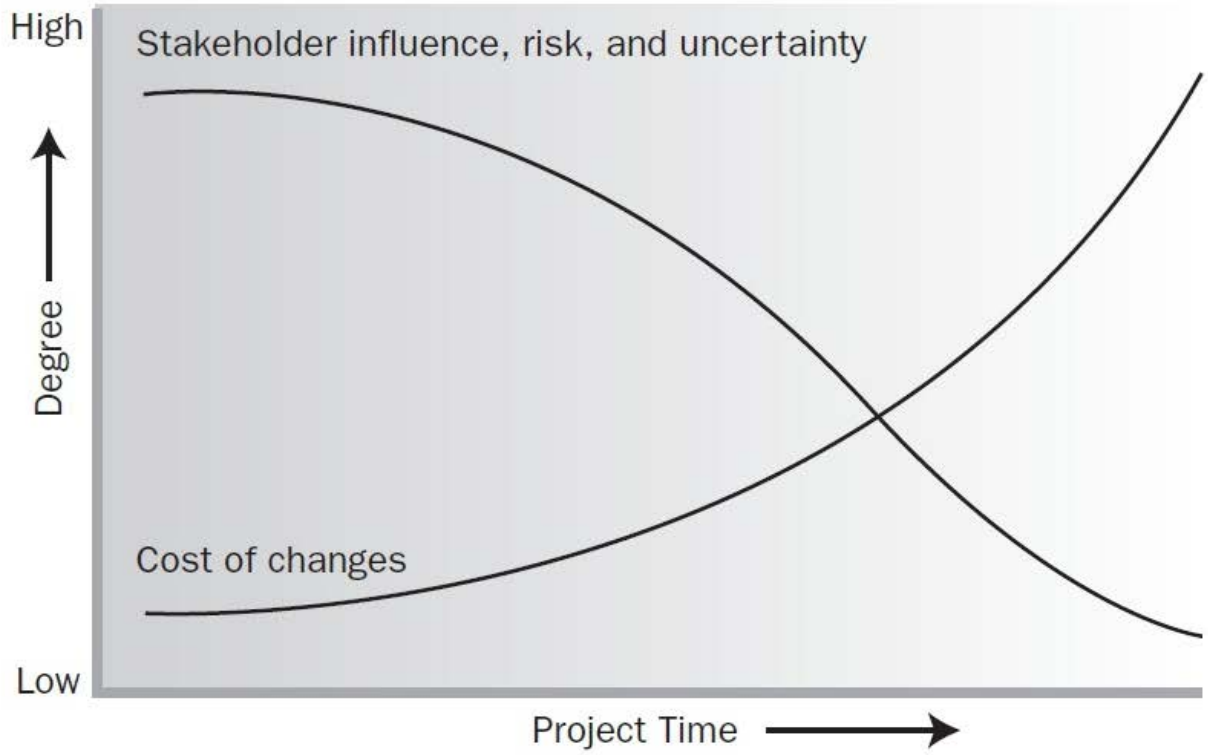
Early in the project, the uncertainty is high about the project's deliverables, resource needs and work required. This means that a project is most likely to fail early in its life cycle.

1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

- **Stakeholders influence over time**



1.2 Foundational elements

1.2.4 Components of the Guide

1. Project and Development life cycles (cont'd)

- **In early phases of a project life cycle:**
  - Resource needs are usually lowest.
  - The level of uncertainty (risk) is highest.
  - Project stakeholders have the greatest opportunity to influence the project.
- **In middle phases of a project life cycle:**
  - The certainty of completing a project improves.
  - More resources are needed.
- **The final phase of a project life cycle focuses on:**
  - Ensuring that project requirements were met.
  - The sponsor approves completion of the project.

1.2 Foundational elements

1.2.4 Components of the Guide

2. 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 and include:
  - Name (Phase A, Phase B, Phase 1, Phase 2, proposal phase),
  - Number (three phases in the project, five phases in the project),
  - Duration (1 week, 1 month, 1 quarter),
  - Resource requirements (people, buildings, equipment),
  - Entrance criteria for a project to move into that phase (specified approvals documented, specified documents completed), and
  - Exit criteria for a project to complete a phase (documented approvals, completed documents, completed deliverables).

1.2 Foundational elements

1.2.4 Components of the Guide

3. 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,
  - Benefits management plan.
- A decision (go/no-go decision) is made as a result of this comparison to:
  - Continue to the next phase, with or without modification,
  - End the project,
  - Remain in the phase, or
  - Repeat the phase or elements of it.

1.2 Foundational elements

1.2.4 Components of the Guide

3. Phase gate

- You will recognize phase completion because each phase has a specific ***deliverable***, or multiple deliverables, that marks the end of the phase.
- The completion of one phase does not automatically signal the beginning of next phase.
- Phase gates may be referred to by other terms such as, **phase review, stage gate, kill point, and phase entrance or phase exit**.

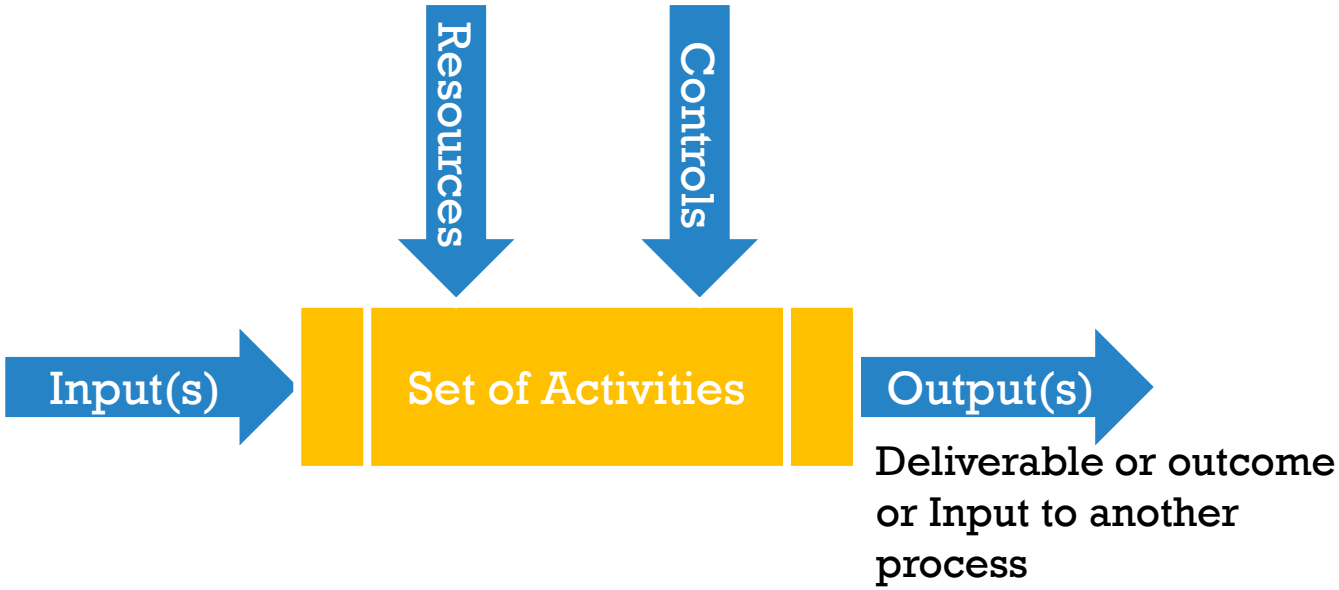
A **deliverable** is an output that must be produced, reviewed and approved to bring the phase or project to completion.
Deliverables are tangible and can be measured and easily proved.

1.2 Foundational elements

1.2.4 Components of the Guide

4. Project Management Processes

The project life cycle is managed by executing a series of project management activities known as project management processes.



1.2 Foundational elements

1.2.4 Components of the Guide

4. Project Management Processes

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 Foundational elements

1.2.4 Components of the Guide

4. Project Management Processes

The following shows an example of how processes are presented. Inputs, tools and techniques, and outputs relate to each other within a process, and with other processes.

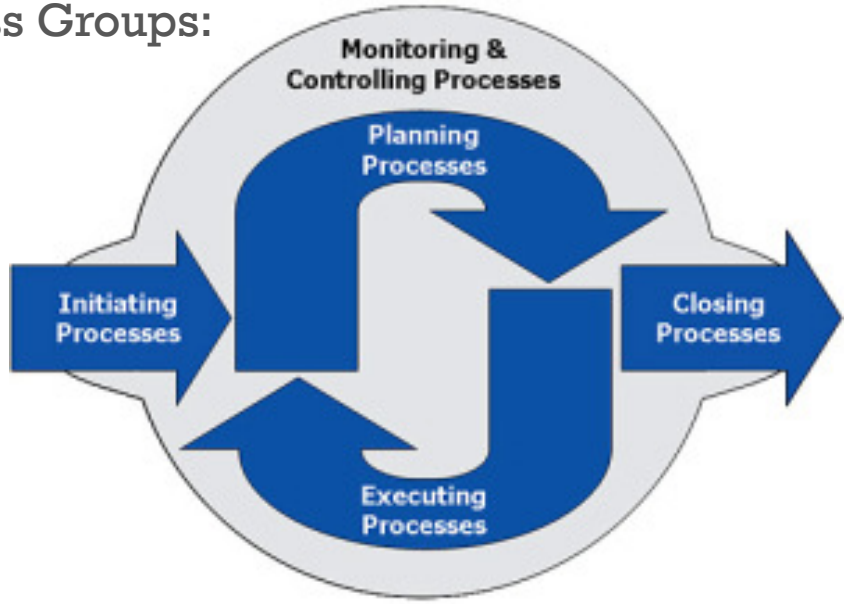
1.2 Foundational elements

1.2.4 Components of the Guide

5. 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.

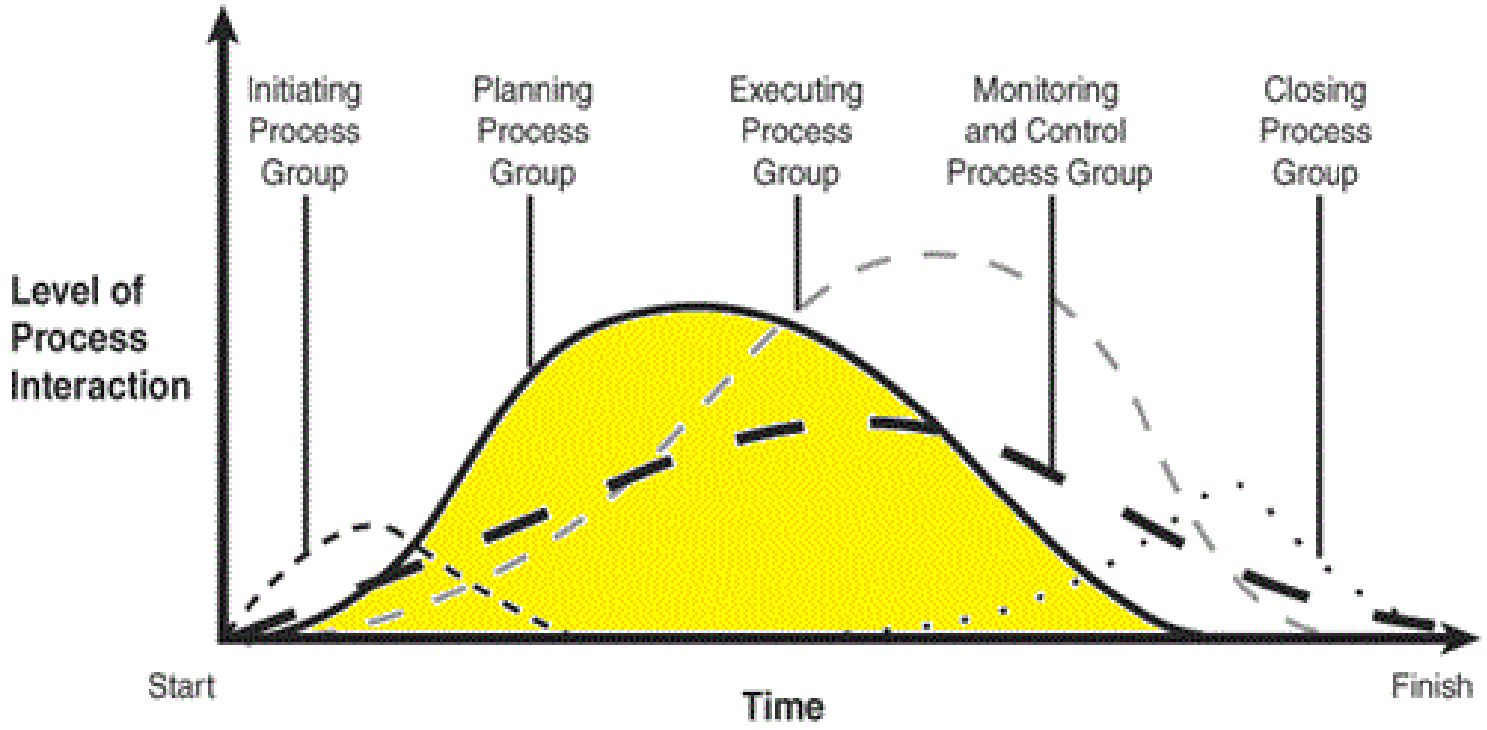
- Five Project Management Process Groups:
  - **Initiating**
  - **Planning**
  - **Executing**
  - **Monitoring and Controlling**
  - **Closing**



1.2 Foundational elements

1.2.4 Components of the Guide

5. Project Management Process Groups



1.2 Foundational elements

1.2.4 Components of the Guide

6. Project Management Knowledge areas

In addition to Process Groups, processes are also categorized by **Knowledge Areas**. ***A Knowledge Area is an identified area of project management defined by its knowledge requirements*** and described in terms of its component processes, practices, inputs, outputs, tools, and techniques.

1.2 Foundational elements

1.2.4 Components of the Guide

Knowledge Area	48	Management Process Groups				
		Initiating	Planning	Executing	Monitoring & Controlling	Closing
4- Integration	7	1	1	2	2	1
5- Scope	6		4		2	
6- Schedule	6		5		1	
7- Cost	4		3		1	
8- Quality	3		1	1	1	
9- Resource	6		2	3	1	
10- Communication	3		1	1	1	
11- Risk	6		5		1	
12- Procurement	3		1	1	1	
13- Stakeholder	4	1	1	1	1	
		2	24	9	12	1

1.2 Foundational elements

1.2.4 Components of the Guide

7. Project Management Data and Information

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.

- **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..

1.2 Foundational elements

1.2.4 Components of the Guide

7. Project Management Data and Information (cont'd)

- **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.

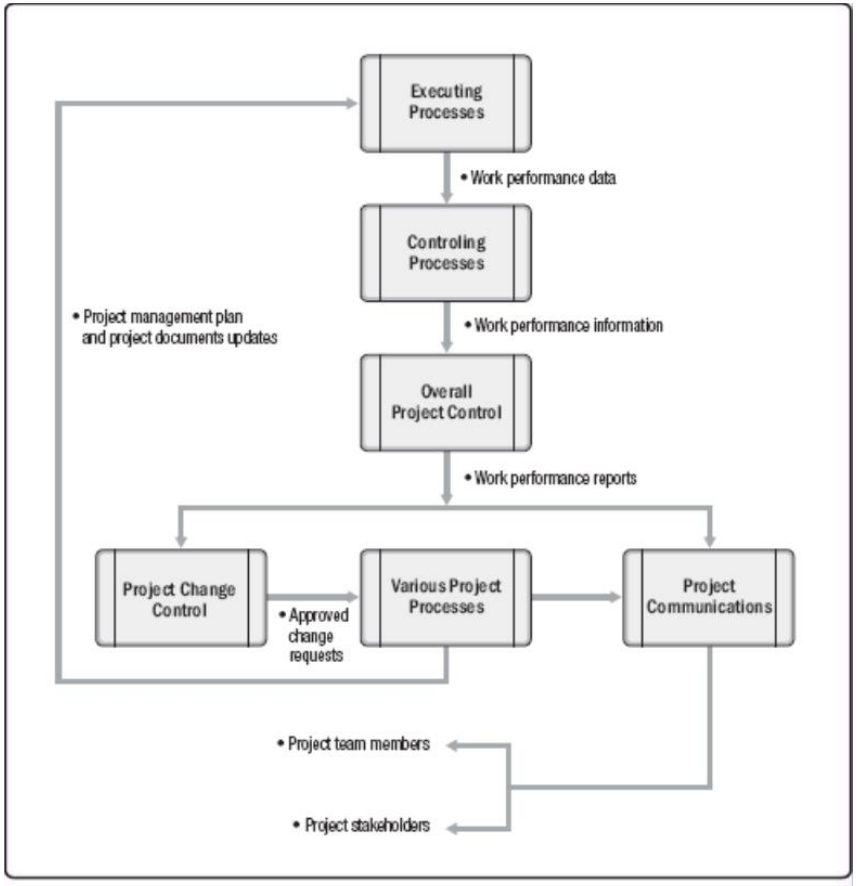


Figure 1-7. Project Data, Information, and Report Flow

1.2 Foundational elements

1.2.5 Tailoring

- Tailoring by the PM:

  The appropriate project management processes, inputs, tools, techniques, outputs, and life cycle phases should be selected to manage a project.

  This selection activity is known as **tailoring**

  - Tailoring is necessary because each project is unique; **not every process**, tool, technique, input, or output identified in the PMBOK® Guide **is required on every project**.
  - Tailoring should address the competing constraints of scope, schedule, cost, resources, quality, and risk. The importance of each constraint is different for each project, and the PM tailors the approach for managing these constraints based on the project environment, organizational culture, stakeholder needs, and other variables.

1.2 Foundational elements

1.2.6 Project Management Business Documents

- The PM needs to ensure that the project management approach captures the intent of business documents. These two documents are interdependent and iteratively developed and maintained throughout the life cycle of the project…

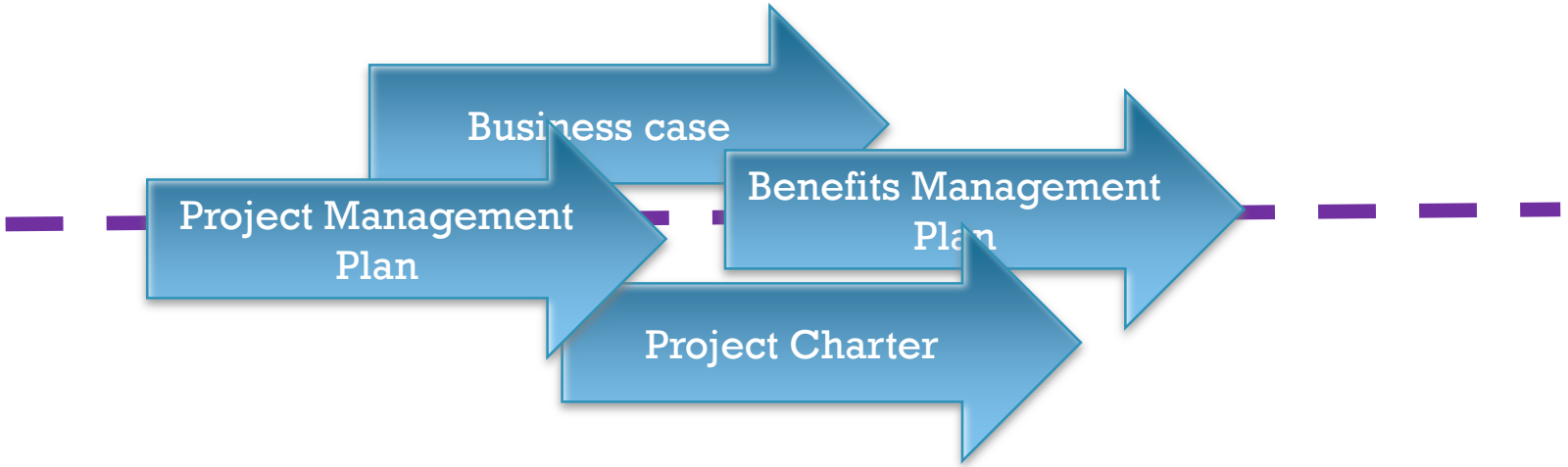
Project Business Documents	Definition
Project business case	A documented economic feasibility study used to establish the validity of the benefits of a selected component lacking sufficient definition and that is used as a basis for the authorization of further project management activities.
Project benefits management plan	The documented explanation defining the processes for creating, maximizing, and sustaining the benefits provided by a project.

1.2 Foundational elements

1.2.6 Project Management Business Documents

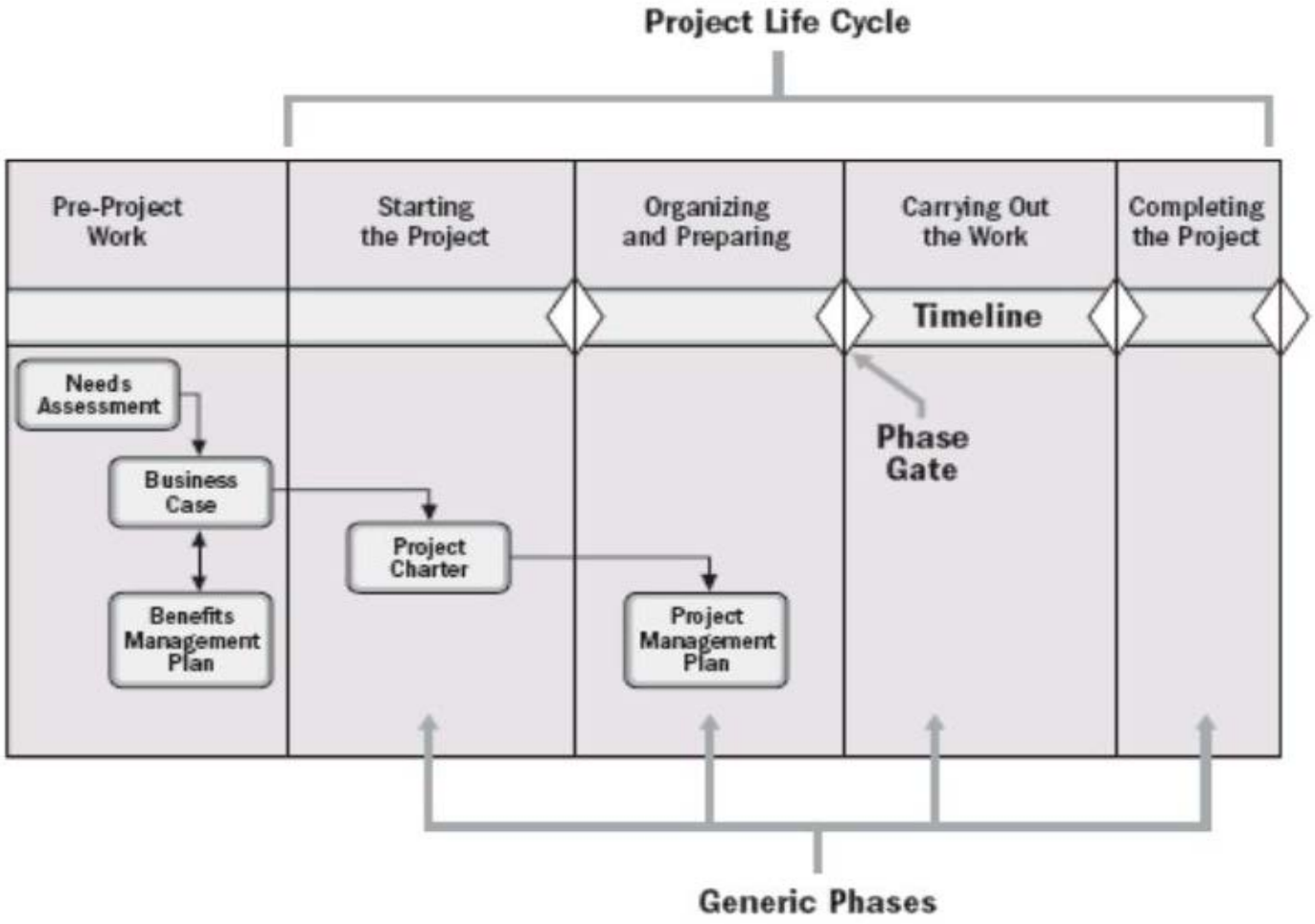
…

- The project sponsor is generally accountable for the development and maintenance of the *project business case* document.
- The PM is responsible for providing recommendations and oversight to keep the project business case, PMP, project charter, and *project benefits management plan* success measures in alignment with one another and with the goals and objectives of the organization.



1.2 Foundational elements

1.2.6 Project Management Business Documents



1.2 Foundational elements

1.2.6 Project Management Business Documents

1. Project Business case

The project business case is a documented economic feasibility study used to establish the validity of the benefits of a selected component lacking sufficient definition and that is used as a basis for the authorization of further project management activities.

- It lists the objectives and reasons for project initiation.
- It helps measure the project success at the end of the project against the project objectives.
- A document used throughout the project life cycle.
- It may be used before the project initiation and may result in a go/no-go decision for the project.

A needs assessment often precedes the business case. It involves understanding business goals and objectives, issues, and opportunities and recommending proposals to address them. The results may be summarized in the business case document.

1.2 Foundational elements

1.2.6 Project Management Business Documents

1. Project business case

A *business case* may include but is not limited to the following:

- **Business needs**
  - Determination of what is prompting the need for action;
  - Situational statement documenting the business problem or opportunity to be addressed including the value to be delivered to the organization;
  - Identification of stakeholders affected;
  - Identification of the scope.
- **Evaluation**
  - Statement describing the plan for measuring benefits the project will deliver. This should include any ongoing operational aspects of the recommended option beyond initial implementation;
- …

1.2 Foundational elements

1.2.6 Project Management Business Documents

1. Project business case (cont'd)

- **Analysis of the situation**
  - Identification of organizational strategies, goals, and objectives;
  - Identification of root cause(s) of the problem or main contributors of an opportunity;
  - Gap analysis of capabilities needed for the project versus existing capabilities of the organization;
  - Identification of known risks;
  - Identification of critical success factors;
  - Identification of decision criteria by which the various courses of action may be assessed;
  - Identification of a set of options (or business scenarios) to be considered for addressing the business problem or opportunity. Options are alternative courses of action that may be taken by the organization.
- …

1.2 Foundational elements

1.2.6 Project Management Business Documents

1. Project business case (cont'd)

- **Recommendation**
  - A statement of the recommended option to pursue in the project;
  - Items to include in the statement may include but are not limited to:
    - Analysis results for the potential option;
    - Constraints, assumptions, risks, and dependencies for the potential options;
    - Success measures.
  - An implementation approach that may include but is not limited to:
    - Milestones,
    - Dependencies,
    - Roles and responsibilities.

1.2 Foundational elements

1.2.6 Project Management Business Documents

2. Project Benefits Management Plan

The project benefits management plan is the document that describes how and when the benefits of the project will be delivered, and describes the mechanisms for measuring those benefits.

- Its development starts early in the project life cycle with the definition of the target benefits to be realized. It may include the following:
  - Target benefits (the expected tangible and intangible value to be gained by the implementation of the project; financial value is expressed as net present value);
  - Strategic alignment
  - Timeframe for realizing benefits
  - Benefits owner (the accountable person to monitor, record, and report realized benefits)
  - Metrics (the direct and indirect measures used to show benefits realized)
  - Assumptions
  - Risks (risks for realization of benefits).

1.2 Foundational elements

1.2.6 Project Management Business Documents

2. Project Benefits Management Plan (cont'd)

- Developing the *benefits management plan* makes use of the data and information documented in the *business case* and *needs assessment.*
- The *benefits management plan* and the PMP include a description of how the business value resulting from the project becomes part of the organization's ongoing operations, including the metrics to be used which provide verification of the business value and validation of the project's success.

1.2 Foundational elements

1.2.6 Project Management Business Documents

3. Project Charter and Project Management Plan

- The ***project charter*** is defined as a document issued by the project sponsor that formally authorizes the existence of a project and provides the PM with the authority to apply organizational resources to project activities.

- The ***project management plan (pmp)*** is defined as the document that describes how the project will be executed, monitored, and controlled.

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures

One of the most common challenges in project management is determining whether or not a project is successful.

- It is possible for a project to be successful from a scope/schedule/budget viewpoint, and to be unsuccessful from a business viewpoint. More recently, project success should also be measured with consideration toward achievement of the project objectives
- Stakeholders may have different ideas as to what the successful completion of a project will look like and which factors are the most important. It is critical to clearly document the project objectives and to select objectives that are measurable.

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures

- Three questions that the key stakeholders and the PM should answer are:
  - What does success look like for this project?
  - How will success be measured?
  - What factors may impact success?

The answer to these questions should be documented and agreed upon by the key stakeholders and the PM.

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Project success may include additional criteria linked to the organizational strategy and to the delivery of business results. These project objectives may include:

- Completing the project benefits management plan;
- Meeting business case nonfinancial objectives;
- Completing movement of an organization from its current state to the desired future state;
- Fulfilling contract terms and conditions;
- Meeting organizational strategy, goals, and objectives;
- Achieving stakeholder satisfaction;
- Acceptable customer/end-user adoption;
- Integration of deliverables into the organization's operating environment;
- …

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

- …
- Achieving agreed-upon quality of delivery;
- Meeting governance criteria;
- Achieving other agreed-upon success measures or criteria (process throughput).
- Meeting the agreed-upon financial measures documented in the business case. These financial measures may include:
  - Net present value (NPV),
  - Return on investment (ROI),
  - Internal rate of return (IRR),
  - Payback period (PBP),
  - Benefit-cost ratio (BCR).

Constant business alignment = Increased chance for success

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

- **Sunk Cost – Example**

Question:

Your company is in the process of deciding whether to continue with Project A or terminate it and begin Project B instead. You have already invested 12 months and $100,000 on Project A. It will take another 24 months and $50,000 to complete it. Project B is actually a better solution since the end product will result in a greater long-term savings. However, it will take 18 months and $250,000 to complete. Additionally, all time and money spent on Project A already would be wasted. Which project should the company chose?

A. Project A because the company has already spent 12 months and $100,000.
B. Project A because it is still more inexpensive than Project B.
C. Project B because time and money spent on Project A is irrelevant to the decision.
D. Project B because it can be completed in less time than Project A.

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

- **Sunk Cost – Example**
  - Answer: C. Project B because time and money spent on Project A is irrelevant to the decision. When a decision in being made from a cost perspective, expended (or sunk) costs are ignored. **The goal is to make the best decision regardless of what paths were taken prior to that point in time.**

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

- **Opportunity Cost – Example**

Question:

During the project selection stage, you learn that the value of Project A is $100,000 and the value of Project B is $75,000. Ultimately, Project A was chosen. As a result, the opportunity cost of that decision is:

A. $100,000
B. $75,000
C. $25,000
D. $175,000

Answer: B. $75,000

The opportunity cost is simply the value of the project not chosen. There is no math involved.

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

- **Net Present Value (NPV)**
  - Present value means the value today of future cash flows by the formula:

$PV=FV / (1+i)^t$	FV = Future Value i =interest rate t = number of time period

  - Watch out! PV also stands for planned value (described in Cost Management chapter). Avoid confusing these two terms.

Please note: Historically, present value has only been mentioned once or twice in the exam. You will not have to calculate it, nor know the formula; just understand the concept.

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

- **Net Present Value (NPV) – Example**

Question:

While determining which project to pursue, your management decides to use net present value (NPV) as the key criteria. If the NPV for project X is 12,000 and the NPV for Project Y is 15,000, which project should be chosen?

A. Project X
B. Project Y
C. Either can be chosen since the numbers are so close
D. NPV cannot be used to chose projects

Answer : B. Project Y

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

- **Net Present Value (NPV)**

The net present value (NPV) is basically the value of total benefits minus the costs. It can be used to determine which project to embark on. If you are comparing project using NPV, the higher the value, the better.

Net Present Value (NPV)

$$NPV = \sum_{t=1}^{T} \frac{\text{Cash Flow}_t}{(1+i)^t} - \text{Initial Cash Investment}$$

t = Cash Flow Period
i = Interest Rate Assumption

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

- **Internal rate of return (IRR)**

To explain this concept, think of a bank account. You put money in a bank account and expect to get a return of 2 percent. You can think of a project in the same way. If a company has more than one project in which to invest, the company may look at the different projects returns and then select the highest one.

Question:

You have two projects from which to choose from:

- Project A with a IRR of 21 percent
- Project B with a IRR of 15 percent

Which one would you prefer?

Answer: **Project A**

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

- **Payback Period (PBP)**

The length of time required to recover the investment in the project before accumulating profit.

Question:

You have two projects from which to choose from:

- Project A with a Payback period of six months
- Project B with a payback period of 18 months.

Which one would you prefer?

Answer: **Project A**

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

- **Benefit Cost Ratio (BCR)**

The total revenue of the project divided by the total cost , Calculated as: **BCR = REVENUE / COST**

Question1: You have two projects from which to choose from:

- Benefit cost ratio of Project A is 2.3
- Benefit cost ratio of Project B is 1.7

Which one would you select?

Answer: **Project A**

Question2: What does a benefit cost ratio of 1.7 means:

A. The cost are greater then the benefits
B. Payback is 1.7 times the cost
C. Profit is 1.7 times the costs
D. Cost is 1.7 times the profit

Answer: B. Benefit cost ratio talk about revenue (Payback), not just Profits.

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

- **Benefit Cost Ratio (BCR) - Example**

Question3:
There are two projects being evaluated but only one can be undertaken. Your finance department decides to use Benefit Cost Ratio (BCR) to help make the decision. Before they even perform the BCR, they inform you that a possible outcome is that neither is a good fit for the organization and you may have to find another solution. After completing their analysis they determine that Project A has a BCR of 0.8 and Project B has a BCR of 0.6. Based on their BCR scores ,you should:

A. Choose Project A
B. Choose project B
C. Choose neither and seek alternative projects
D. Ask for more information to make a decision

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

- **Benefit Cost Ratio (BCR) - Example**

Answer : **C. Choose neither and seek alternative projects.**

A Benefit Cost Ratio (BCR) weighs benefits against costs. A BCR of 1.0 means that benefits equal costs. Anything over 1.0 represents that benefits outweigh the costs. For instance, a BCR of 3.5 means that benefits are 3.5 times the costs. Conversely, a BCR of under 1.0 shows that the costs outweigh the benefits. Unless the project must be completed ,such as meeting a regulatory requirement, a BCR under one should not be started. In this example, both projects have a BCR of under 1.0.

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

- **Discounted Cash Flow (DCF) - Example**

A discounted cash flow (DCF) is a valuation method used to estimate the attractiveness of an investment opportunity. DCF analysis uses future free cash flow projections and discounts them to arrive at a present value estimate, which is used to evaluate the potential for investment. If the value arrived at through DCF analysis is higher than the current cost of the investment, the opportunity may be a good one.

Calculated as:

$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \ldots + \frac{CF_n}{(1+r)^n}$$

CF = Cash Flow

r = discount rate

DCF is also known as the Discounted Cash Flows Model.

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

Select the project with

- Higher Net Present Value (NPV)
- Higher Internal rate of return (IRR)
- Higher Benefit Cost Ration (BCR)
- Less Payback Period (PBP)
- Higher Discounted Cash Flow (DCF)

1.2 Foundational elements

1.2.6 Project Management Business Documents

4. Project Success measures (cont'd)

Financial measures:

Select the project with

	Project A	Project B	Selection?
Net present value	$95,000	$75,000	A
IRR	13 %	17%	B
Payback period	16 months	21 months	A
Benefit cost ratio	2.79	1.3	A

Exam Focus

Need to have large projects in mind, when you answer questions on the exam.

For example: You are managing a new project in your organization (new to the company) utilizing resources from many countries, has more than 200 people on the team, duration is more than 1 year and costs US100 million.

There is a big difference in managing small and large projects.

On large projects, you may need to spend weeks for planning communications.

Exam Focus

Where there is an issue, you need to identify who is involved and where they are located, look up their preferred communication method and their contact information in the stakeholder register and then communicate with them in that way

The exam asks questions from a large project perspective, if you keep this in mind, the project management activities /processes described throughout this course make sense and if it makes sense, you do not need to memorize anything

you can use your logic

Assume that all the project proposals are formally reviewed and approved by management in your organization after a comparison of all possible projects

Thank you

Knowledge area

- You can find the whole Project Management Professional course on Z:\eLibraries\eBooks\Management\PMP 6 Course
- You can also visit www.pmi.org for more information

Please call us for any support