

# Software Engineering Project Management

## Chapter 1: Introduction

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Learning objectives text.

## Course Materials

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### Online Course Material

Please select a subtopic to view its contents.

[Course Structure](#)

[What is a Project?](#)

[Why Projects Fail](#)

[Standards](#)

## Additional Materials

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There are no additional materials available at this time.

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# Software Engineering Project Management

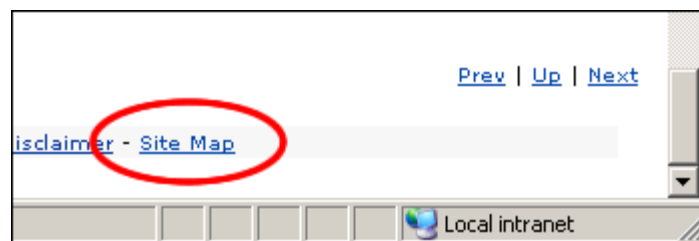
## Chapter 1: Introduction

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### Course Structure

Welcome to Software Engineering Project Management! This course is an in-depth look at how Software Engineering Projects are Managed - the issues that face a PM, the technologies that can be used, and the processes that can be applied.

### Navigating through this site



*A link to the site map is at the bottom of every page.*

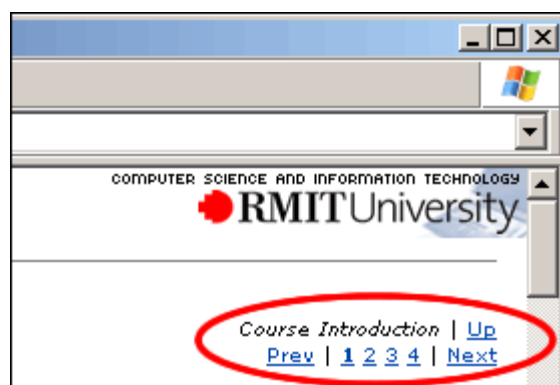
For a complete summary of every topic and sub-topic, view the [Site Map](#). The site map is available from anywhere, by the link in the footer (bottom of the page).

To navigate between subtopics, there are navigation bars at the top and bottom of each page.



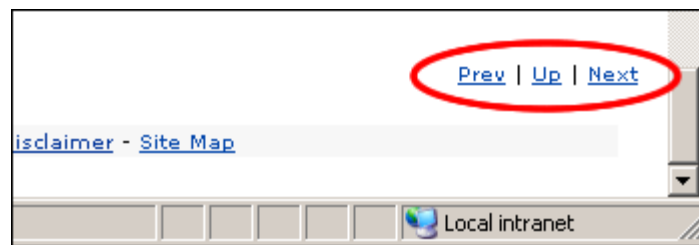
This navigation system requires a feature named *Javascript* to be enabled in your web browser.

If Javascript is disabled, you'll see a simpler navigation system that will let you move "up" a page (e.g. from a subtopic to the main topic page), or view the site map.



*The top navigation bar lets you jump between subtopics in a chapter.*

The top navigation bar lets you jump between subtopics, as well as to and fro. Each subtopic is numbered, and moving the mouse cursor over the numbers will show the subtopic name.



*The bottom navigation bar lets you move backwards and forwards.*

The bottom bar lets you move to and fro between topics, like leafing through pages in a book.

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### Introduction to Project Management

#### Projects

What is a Project?

- **PMI Definition:** A project is a temporary endeavour undertaken to create a unique product or service
- A group of inter-related activities that are planned and then executed in a certain sequence. Changes in technology, infrastructure and work processes are often managed through projects.
- Can be critical components of a business strategy. Can vary in size and complexity
- They may...
  - Involve changes to existing systems or introduce new systems
  - Entail organizational change
  - Involve a single business unit or multiple business units
  - Involve internal and/or external resources
  - Involve conflict!!
- Progressively elaborate with repetitive elements
- They can be characterized as having:
  - Definable, measurable outcomes that relate to corporate goals
  - Specific deliverables (outputs or outcomes)
  - Defined team and governance structures
  - Defined time lines
  - Criteria to manage project performance and success

#### Project Management

What is Project Management?

- Formalized and structured method of managing change in a rigorous manner. It focuses on producing specifically defined deliverables by a certain time, to a defined quality, and with a given level of resources so that planned outcomes are achieved within defined \$ budgets
- Effective project management is essential for project success
- What is a program?
  - Difference of scale
  - Number of sometimes related projects

**Developing Software - it's not just about the code!**

#### There is something about coding!

- This is a very common mistake to make
- The IT Industry is very dynamic and is changing very fast
- You need other skills too, such as...
  - Software Engineering
  - Project Management
  - Professional Communication (~ ^ ^ ouch!! ^ ^ ~)
  - ...and above all a humble disposition
- More interesting projects, bigger spectrum

#### Comparison of Project Management and General Management

Dimension	Project Management	General Management
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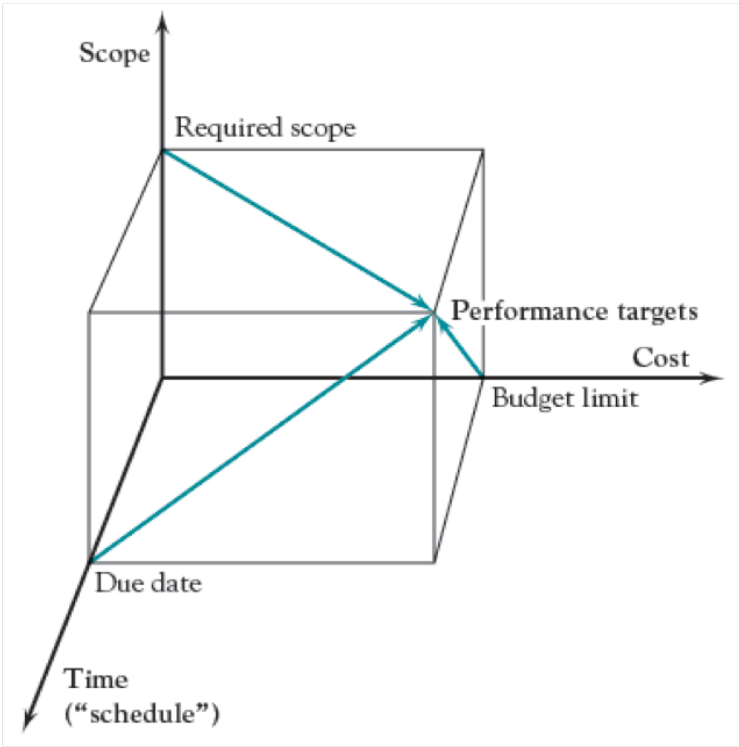
Type of work activity	Unique	Routine
Management Approach	Ability to adapt to change	Manage by exception
Planning	Critical	Important
Budgeting	Start from scratch, multiple budget periods	Often predetermined
Sequence of Activities	Must be determined	Often predetermined
Location of Work	Crosses organizational units	Within an organization unit
Managerial Hierarchy	Informal	Well defined

Acknowledgement: Some of the text for slides 20-27 has been adopted from the textbook, chapter 1

Three Goals of Project Management

- 1. Scope
- 2. Cost
- 3. Time

Scope, Cost and Time Project Performance Targets



Uncertainty

All projects are always carried out under conditions of uncertainty

- Effective project management requires anability to deal with uncertainty
- Projects are complex and include interfaces, interdependencies, and assumptions, which may turn out to be wrong
- People add to the uncertainty

Uncertainties Encountered in Project Management

We can categorise the types of uncertainties seen in a project...

- Effective project management requires anability to deal with uncertainty

- Availability and cost of key resources
- Timing of solutions to technological problems
- Macroeconomic variables
- The whims of clients
- Actions taken by competitors

### Can Uncertainty be eliminated?

It would be nice to be able to remove all uncertainty. Unfortunately this is not possible - there are always some aspect of a project that can't be controlled. However if managed properly, it can be minimized.

### Fourth Project Goal

There is a relationship between uncertainty and the three traditional project goals. Therefore, we adopt the view in that managing uncertainty is a fourth goal of project management. The primary role of the project manager is then becomes to effectively manage the trade-offs between cost, time, scope, and risk

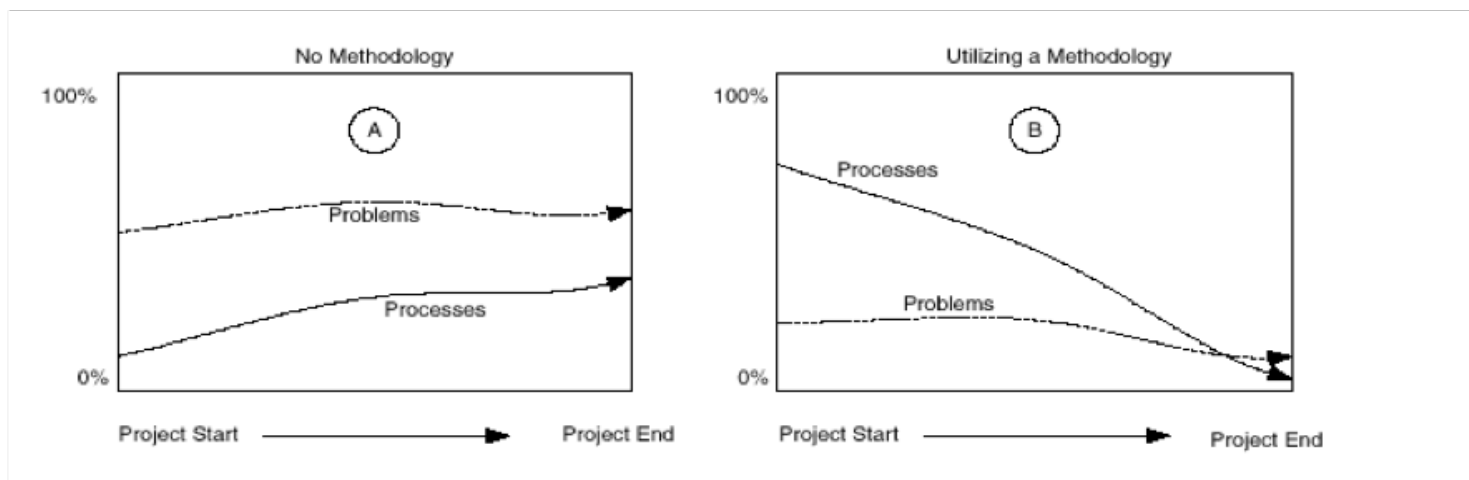
### Abilities Needed For Effective Project Management

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- Ability to resolve conflicts
- Creativity and flexibility
- Ability to adjust to change
- Good planning skills
- Negotiation skills

### Project Methodology

- A process that documents a series of steps and procedures to bring about the successful completion of a project.
- A series of steps through which the project progresses



### Project Methodologies and Development Lifecycles

There are many Project Methodologies - variations of a theme - common principles differently packaged

- PMI and the Project Management Body of Knowledge
- PRINCE2
- Software Development Life Cycles

- Traditional
- RUP
- AUP
- Agile
- All things in between

## Back To Basics

- Product (Scope), Resources and Time (\$\$)
- Planning
  - Estimating (does not = estimating Lines Of Code (LOC) expected to be written)
  - Scheduling and Partitioning
- Executing
- Controlling and Directing
  - To Plan - Results
  - Change
  - People
- Effective and Successful Projects and Teams

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### Why Projects Fail

#### What does project failure mean?

- The project is not delivered on time.
- The cost is over budget.
- The system does not work as required.

#### Failure can be costly

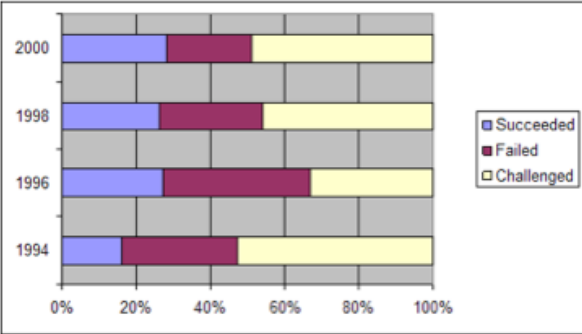
- \$\$\$
- Reputation
- Safety

#### Chaos Report 1995 (Standish Group USA)

- Anonymous Survey of 365 Companies of Various Sizes and Types
- Banking, Securities, Retail, Wholesale, Health, Insurance, Local and State Governments.
- Major Surveys Every few Years
- Annual (Smaller) Focus Groups
- CHAOS Chronicles
- Often Quoted

#### Findings

- 31 % cancelled before completion
  - = an estimated \$81 B
- 52% cost over 189% of their estimates
  - = \$59 B overrun costs
- Lost opportunities costs not measured
- 16.2% on time and on budget (large)
- 42% of original requirements met (large)
- 78% deployed with 74% requirements met (small)



Standish Group's study of 30,000 IT application projects in US companies (The Standish Group International, 2001).

A recent survey (2012) on why project fail by [Gartner](#)

Findings (Chaos Report)	% of responses
Incomplete requirements	13.0%
Lack of user involvement	12.4%
Lack of resources	10.5%
Unrealistic expectations	9.9%
Lack of executive support	9.3%
Changing requirements and specs	8.7%
Lack of planning	8.1%



No longer needed	7.5%
Technology illiteracy	4.3%
Other	16.3%

Other Studies

- KPMG Canada and UK
- Bull Survey UK Finance Sector
  - Missed deadlines 75%
  - Errm!! I kinda misread my exam date, can I have another exam please??
  - Exceeded budget 55%
  - Unmet requirements 37%

Some more statistics...

Bad Communications between relevant parties	57%
Lack of planning, scheduling	39%
No quality control	35%
Milestones not being met (outcome)	34%
Inadequate co-ordination of resources	29%
Costs getting out of hand (outcome)	26%
Mismanagement of progress	20%
Overall poor management	17%
Supplier skills overstretched	13%
Insufficient measurable outcomes	11%

The Bull Survey

The problem with statistics:

- Organizations often don't wish to make failures publicly known
- Media sensationalism
- Biases / fragmented information
- Determining clear project success or failure criteria
- Definition of failure
- Subjective responses
- Real number of failures not known

10 Easy Steps to Failure

- Don't use a specific methodology because coding is all that is really important
- Don't bother with a data model, just build whatever tables you need
- Create the project plan by working backwards from a drop dead end date
- Use a technical lead who has never built a system
- Hire 40 developers to make coding go faster
- Data migration is a breeze
- Skip the testing phase because the project is way behind schedule
- Change the system at the end to include new requirements
- Buy a package because it's cheap and then customize it - a lot!

OR consider:

- Organizational culture
- Strategy and strategic alignment ! IT and business alignment
- Approval processes
- Managed Business Case
- Project Management
- Scope / objectives / benefits

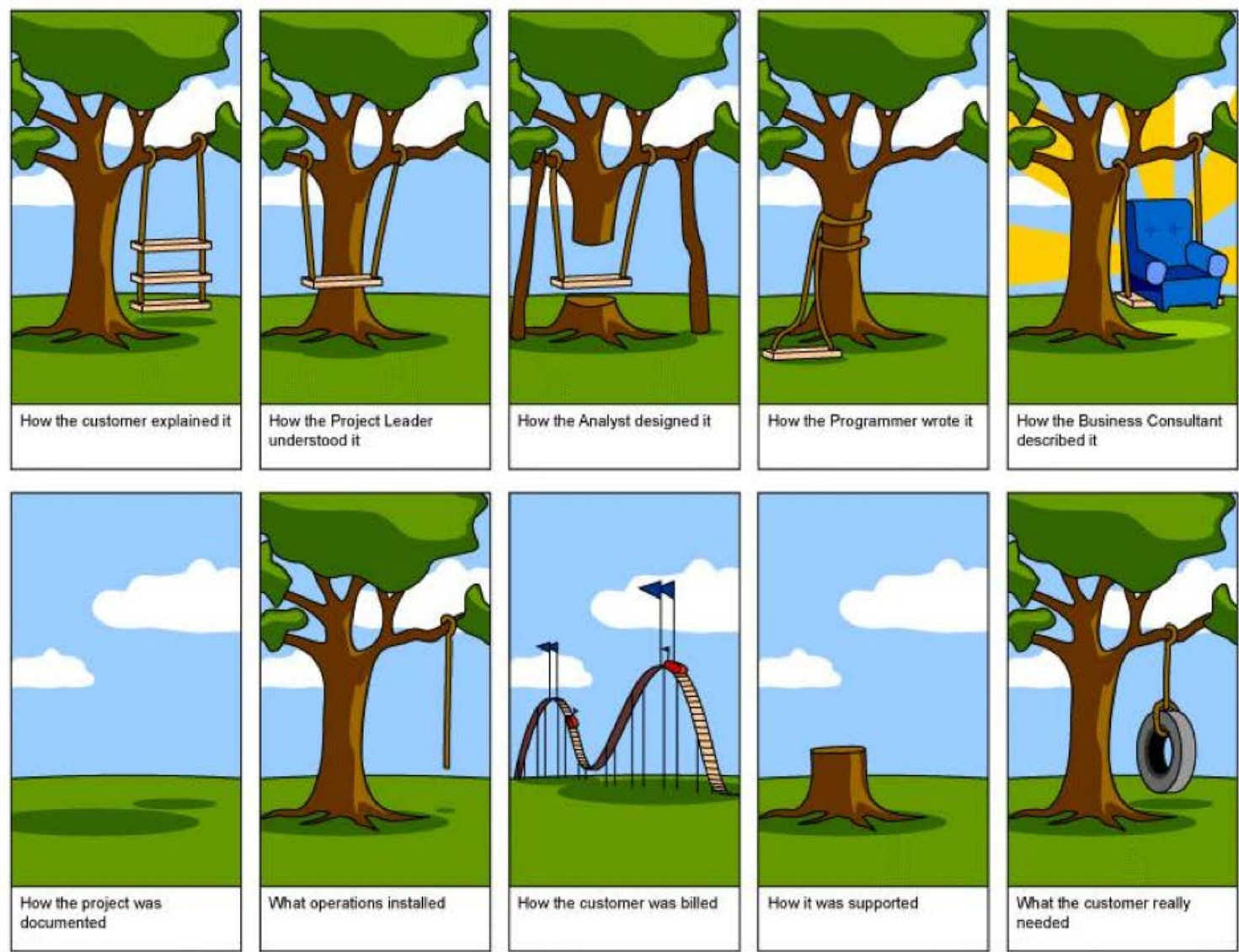
AND:

- Plan before starting the development or implementation.
- Understand your methodology
- Schedule and pay attention to tasks in the critical path.

Set up the necessary processes to calculate and inform risks.

- Understand project trade-offs when making decisions regarding changes.
- Understand how difficult estimation can be
- Obtain the support from executive and management
- Engage and manage 3<sup>rd</sup> parties correctly
- Make sure to procure appropriate resources and skills
- Require that ALL stakeholders participate in planning, design and implementation of the project
- Communicate project progress honestly and regularly

Unfortunate Realities



Even Dilbert says...

- Why projects fail?
- [Dilbert on why projects fail](#)

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### Standards

#### PMBOK, PRINCE2

#### PMI and the BOK

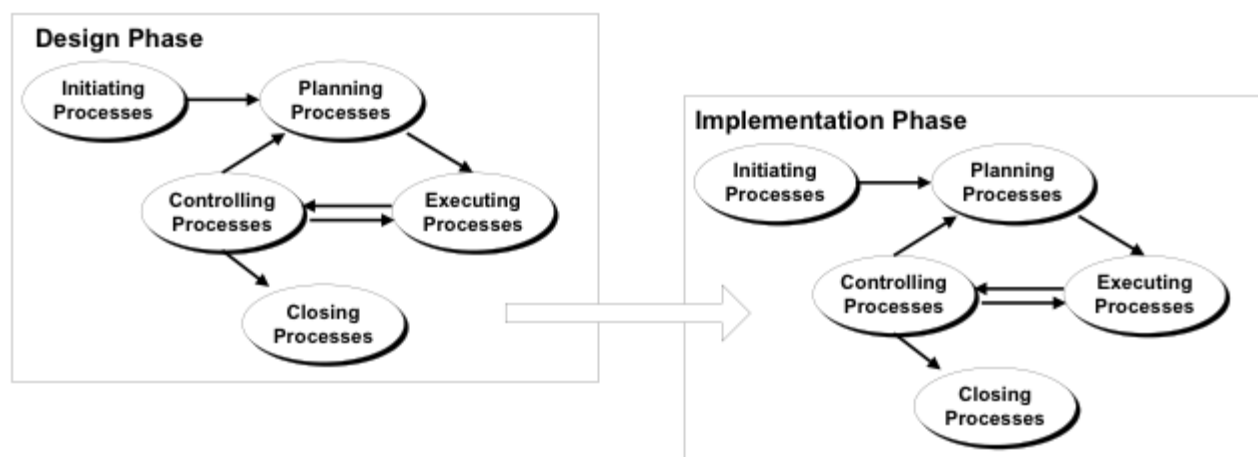
- The Project Management Body of Knowledge (PMBOK) is an inclusive term that describes the sum of knowledge within the profession of Project Management .
- The Full PMBOK includes knowledge of proven, traditional practices which are widely applied as well as knowledge of innovative and advanced practices which have seen more limited use .
- The Guide to the Project Management Body of Knowledge (PMBOK Guide) is a project management standard developed by the Project Management Institute (PMI)
- The PMBOK Guide is / was (?) widely accepted to be the standard in project management

#### PM Body of Knowledge

The nine knowledge areas are:

- Project Integration Management
- Project Scope Management
- Project Time Management
- Project Cost Management
- Project Quality Management
- Project Human Resource Management
- Project Communications Management
- Project Risk Management
- Project Procurement Management

#### PMI Process Groups



#### Project Management Framework - Introduction

The Project Management Body of Knowledge has been compiled by the Project Management Institute.

1. Purpose of PMBOK Guide

2. What is a Project?
3. What is Project Management?
4. Relationships Among Project Management, Program Management and Portfolio Management
5. Project Management and Operations Management
6. Role of a Project Manager
7. Project Management Body of Knowledge
8. Enterprise Environment Factors

## Purpose of PMBOK Guide

- Identifies with generally acceptable and recognised good practices in project management, including processes, skills, tools, and techniques which can have significant impact on project success
- Promotes a common vocabulary with project management profession
- A guide rather than a methodology, as one can use different methodologies and tools to implement framework
- Establishes guidelines for project management processes, tools and techniques
- Talks about basic obligations of responsibility, respect, fairness and honesty

## Relationship among Project, Program and Portfolio Management

- Portfolio Management
- Program Management
- Projects and Strategic Planning
- Project Management Office

## Portfolio Management

- Project management is governed by program and portfolio management
- Portfolio refers to a collection of projects or programs and other works grouped together to facilitate effective management of that work to meet strategic objectives
- Projects or programs of a portfolio may not necessarily be interdependent or directly related
- Portfolio management refers to centralised management of one or more portfolios, which includes identifying, prioritising, authorising, managing, and controlling projects, programs and other related work, to achieve strategic business objectives
- It focuses on ensuring that projects and programs are reviewed to prioritise resource allocation, and that the management of portfolio is consistent with and aligned to organisational strategies

## Program Management

- A group of related projects managed in a coordinated way to obtain benefits and control NOT available from managing them individually.
- Programs may include elements of related work outside the scope of the discrete projects in the program
- A project may or may not be part of program but a program will always have projects
- Program management is centralised coordinated management of a program to achieve the program's strategic objectives and benefits
- Projects within the program are related through the common outcome or collective capability
- If the relationship is only a shared client, seller, technology, or resource, the effort must be managed as a portfolio of projects rather than a program
- Program management focuses on the project interdependencies and helps to determine the optimal approach to managing them
- Actions relating to these interdependencies may include:
  - Resolving resource constraints an/or conflicts that affect multiple projects within the program
  - Aligning organisational/strategic direction that affects project and program goals and objectives
  - Resolving issues and change management within a shared governance structure
- Example - A new communications satellite system with projects for design of the satellite and of the ground

stations, construction of each, integration of the system, an launch of the satellite.

## Projects Management Office (PMO)

- An organisational body or entity assigned responsibilities related to the centralised and coordinated management of projects under it's domain
- Responsibilities can range from providing project management support functions to actually being responsible for the direct management of a project
- Project supported/administered by PMO may not be related other than being managed together
- It may be a delegated authority to act as an integral stakeholder at the beginning of each project to make recommendations, or terminate the project, or take other actions as required to keep the business objectives consistent
- It may be involved in the selection, management, and deployment of project resources
- PMs and PMOs pursue different objectives. But they are aligned with the strategic needs of the organisation. The differences are:
  - PM focuses on the specified project objectives, while PMO manages major program scope changes which may be seen as potential opportunities to better achieve business objectives
  - PM controls assigned project resources to best meet the project objectives, while PMO optimises the use of shared organisational resources across projects
  - PM manages the constraints (scope, schedule, cost and quality, etc) of the individual projects, while PMO manages the methodologies, standards, over all risk/opportunity, and interdependencies amongst the projects at the enterprise level

## Projects and Strategic Planning

- Projects are often utilised as a means of achieving an organisations strategic plan. They are typically authorised as a result of one or more of the following
- Market demand car company's need to deliver a more fuel efficient car in response to demand
- Strategic opportunity/business need training company authorising a project to create new course to increase revenue
- Customer Request electrical utility authorises a project to build a new substation to serve a new industrial park
- Technology advance project to develop faster cheaper cell phones
- Legal requirements project to comply with a new legislation e.g. GST compliance

## Project vs. Operational Management

- Operations are an organisational function performing the ongoing activities that produce the same product or repetitive service.
- Though projects are temporary in nature, projects can help change their operations.
- Organisations sometimes change their functions, products, or systems by creating strategic business objectives
- Projects require project management, while operations require business process management
- Projects can intersect with operations at various points during the product lifecycle.
- Closeout phase of a project, or end of the lifecycle of a product,
- Development/upgrade of product
- Improvement of operational (or product development) process

## Role of a Project Manager

- Person assigned by the performing organisation to achieve the project objectives
- It differs from a functional and operational manager
  - Functional manager is focused on providing project management oversight for an administrative area
  - Operations manager is responsible for a facet of core business
- Depending on the organisation a PM may report to functional, portfolio or program manager



## Role of a Project Manager

- In addition to area specific skills & general management proficiencies, PM posses the following characteristics
  - Knowledge what PM knows about project management
  - Performance what PM is able to do while applying his project management knowledge
  - Personal how PM behaves when performing the project related activity (attitude, core personality and leadership) with ability to guide team while achieving objectives and balancing constraints.

## Project Management Body of Knowledge (PMBOK) Guide

- It is the standard for managing most projects most of the time across many types of industries
- Describes processes, tools, and techniques used to manage a project towards a successful outcome
- It is unique to the project management field and has interrelationships to other project management disciplines such as project and portfolio management
- It does not address all details of every topic.
- It is limited to single projects and project management
- processes - generally recognised as good practice
- Other standards may be consulted for additional information on the broader context in which project is accomplished, including Program Management, Portfolio Management and OPM3

## PRINCE2

### PRoject IN Controlled Environments

- Structured method for effective project management
- The method was first established in 1989 by CCTA (Central Computer and Telecommunications Agency) ,now the Office of Government Commerce (OGC)
- PRINCE2 is a de facto standard used extensively by the UK government, and increasingly, in Europe and Australia, firstly in Government (e.g, Dept of Defence) but also progressively more widely introduced
- Non Proprietary - no license fee
- Accreditation levels and courses

## PRINCE2



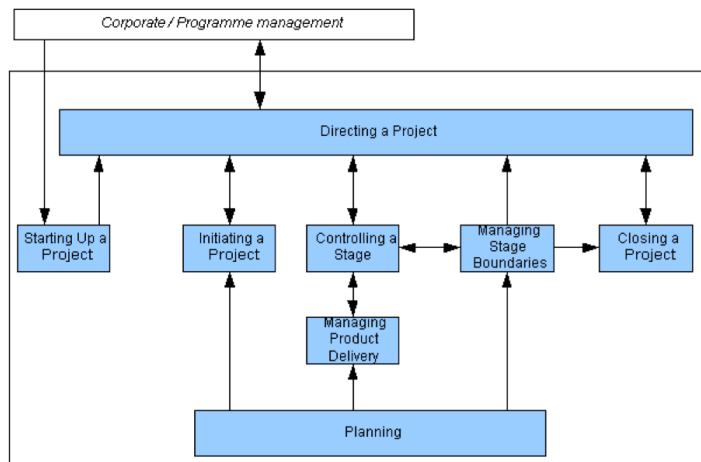
Prince2 consists of a number of components...

- Change control - who gets to modify documents/code, and how is that control enforced?
- Organization - how do people report/interact with other people in a team?
- Plans
- Controls
- Business Case

Management of Risk - how are risks identified and mitigated?

- Quality in a project environment
- Configuration management - who manages the set up of the software/tools?

## PRINCE2



## Lesson Number 1

- Teamwork is important!
- [Team Work](#)

Acknowledgement: Youtube videos copyright is held by the Youtube website and the owner, it has been cited for educational-purposes.

## References

- Project Management in Practice 5th Edition, Wiley Inc.

## Reading from textbook

- Chapter 1: The world of Project Management
- Pages 1-9, 22-31

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