Study Guide

APM Project Management Qualification

Limited Second Edition 2021

Study Guide

APM: The Project Management Qualification

‘It always seems impossible until it is done!’

Nelson Mandela

Contents

Preface

Welcome to the **Study Guide for the APM Project Management Qualification** (APM PMQ). It has been written by an experienced project management professional with over 20 years of experience in training project practitioners and teaching in business schools in various universities both in the UK and internationally.

This guide will support you in passing your APM Project Management Qualification, as well as being a resource for learning about the key principles of project management, tools and techniques. The content is aligned to the APM Body of Knowledge 7th edition and referenced by the qualification syllabus and learning outcomes as well as the assessment criteria. It is this syllabus that informs this study guide and its content.

The Study Guide builds upon the knowledge of each section culminating in a total framework for managing projects successfully. We have provided tasks and exercises that allow deeper learning and reflection together with sample questions to build confidence and give you practice in passing the examination.

We very much hope you enjoy your learning experience for this qualification, and also that it accelerates your project management career.

Acknowledgements

APM Body of Knowledge 7th Edition, 2019, Association for Project Management

Action Centred Leadership, John Adair, 1960 Taylor and Francis (Books) Limited UK

Association for Project Management Guides:

- APM Estimating Funnel
- APM Extended Project Life Cycle
- Governance and project management link
- Governance for PM model, Guide to Directing Change
- Governance and sponsorship model, Guide to Sponsoring Change
- Hard and Soft Benefits PRAM APM Guide
- Introduction to Project Planning
- Risk Management Process APM PRAM Guide

Team Development Theory, Bruce Tuckman 1965, Psychological Bulletin, 63(6), 384-399. http://dx.doi.org/10.1037/h0022100. Abstract. 50 article.

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Theory of Motivation - Hygiene Theory, Frederick Herzberg, 1959, HarperCollins

Team Roles at Work, Meredith Belbin, 1981 Taylor and Francis (Books) Limited UK,

Situational Leadership model – Management of Organizational Behaviour, Hersey and Blanchard 1982, Pearson Education Limited

The Human Side of Enterprise – Douglas McGregor 1960, John Wiley and Sons Limited (Books)

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Conflict and Conflict Management" by Kenneth Thomas in The Handbook of Industrial and Organizational ... (Houston: Gulf Publishing, 1964, 1994).

Praxis Framework Online

Introduction

Welcome to the **APM Project Management Qualification study guide**. We are very pleased you have joined and started your journey towards your project qualification. To study for this award you need no prior knowledge or experience in project management. It is designed for anyone starting out or wishing to progress their project management career.

This guide provides the content of the syllabus for the APM Project Management Qualification. The syllabus breaks down the **APM Body of Knowledge 7th edition** (launched in 2019) into learning outcomes and the assessment criteria provided in the next section. It is important for you to consider and reflect on this, to steer your learning and help you to understand what areas you will be assessed on.

Your tutor will provide you with further information on the content, schedule of learning, and structure of the course; as well as details of the examination. The examination consists of one three-hour examination at the end of the programme.

The tutors will also take you through this study guide and how to use it to get the best out of it and yourself. The tutors will also give you guidance on exam techniques, to ensure that you are well prepared prior to the examination giving you the best possible chance for success. Sample paper(s) are provided to allow you to develop and refine your exam technique to maximise your chances of success.

This guide is sectioned with tasks and exercises for you to complete and sample questions within the exam for you to practice. The classroom sessions are very important as is your engagement. Be curious and inquisitive so that you are able to understand the underlying principles of project management and their application. This will allow greater learning and reflection.

About the APM

Association for Project Management (APM) is the only chartered body for the project profession, with over 30,000 individual members and more than 500 organisations participating in our Corporate Partnership Programme within the United Kingdom. As an educational charity, APM is committed to developing and promoting the value of project management in order to deliver improved project outcomes for the benefit of society.

There are a number of ways in which you can benefit from what we do, including **membership, qualifications, chartered status, publications and events**.

Professional UK Body:

Association for Project Management - the chartered body for the project profession

The Association for Project Management, the chartered body for the project profession, is committed to developing and promoting project and programme management through its **FIVE Dimensions of Professionalism**:

1. **Breadth**
The APM Body of Knowledge defines the knowledge needed to manage any kind of project. It underpins many project management standards and methods including the National Occupational Standards in Project Management.

2. **Depth**
The APM Competence Framework provides a guide to project management competences. It is part of your professional toolkit; mapping levels of knowledge and experience to help you progress your skills and abilities.

3. **Achievement**
APM qualifications take your career in new and exciting directions. They are recognised across the profession and aligned with IPMA's Four Level Certification Program.

4. **Commitment**
Continuing Professional Development helps develop your project management practice. A targeted development plan will enhance your project management career.

5. **Accountability**
The APM Code of Professional Conduct outlines the ethical practice expected of a professional. Becoming an APM member shows your commitment to the Code and sets you apart from others.

In 2017, APM was awarded a **Royal Charter** as part of its strategy to raise awareness and standards in the profession. The receipt of a Royal Charter marks a significant achievement in the evolution of project management. There are a number of ways in which you can benefit from what they do, including:

- membership
- qualifications
- publications
- events.

The award-winning association has over **23,000 individual members** and **500 organisations** participating in the Corporate Partnership Programme making it the largest professional body of its kind in Europe.

APM's vision, mission and objectives

APM's vision is ambitious, challenging and radical. APM recognise that to deliver it they need to inspire everyone to create:

“a world in which all projects succeed with project management as a life skill for all.”
The mission is:

> **“Inspiring communities to deliver meaningful change for societal benefit by advancing the art, science, theory and practice of project management.”**

The mission is underpinned by five key objectives, which set out a clear direction of travel for APM:

1. Chartered Standard
2. Membership & Growth
3. Knowledge & Research
4. Organisational Innovation
5. Collaborate & Engage.

For further details and becoming a member of the APM, please visit: www.apm.org.uk .

APM Glossary for Project Management – visit the website for a glossary of terms and definitions: www.apm.org.uk/resources/glossary/

Section 1:

Project Management Roles, Organisational Structures, and P3M

Learning Objectives

- **Explain the role and key responsibilities of the project manager**
- **Differentiate between the responsibilities of the project manager and project sponsor throughout the project**
- **Describe other roles within project management (including users, project team members, the project steering group/board and the product owner)**
- **Describe the functions and benefits of different types of project office (including project/programme/ portfolio management office (PMO), embedded PMO, central PMO and hub and-spoke PMO)**
- **Differentiate between project management, portfolio management and programme management – P3M**
- **Outline the relationship between programmes, projects and strategic change**
- **Describe situations where the use of programme management or portfolio management may be appropriate**
- **Differentiate between projects and business as usual (BAU)**

PMQ Learning Outcomes:	APM BoK Reference:
1, 3	1.1 – 1.5, 1.3.8, 1.3.10, 2.1, 2.2.1

Projects

> **'Projects are unique, transient endeavours, undertaken to bring about change and achieve planned objectives, which can be defined in terms of outputs, outcomes or benefits.' APM BoK, 2019**

Projects are *unique, temporary* in nature and consist of planned activities to deliver particular ***goals*** and ***objectives*** agreed by the key ***stakeholders.*** Because projects are temporary and unique there is UNCERTAINTY and RISK involved in undertaking a project. They are finite and have a definite beginning and end point.

Projects have defined *deliverables* whether they are physical product like, IT hardware, OR service delivery. Therefore, *quality and acceptance criteria* are agreed in advance of the project.

Projects usually need teams for successful delivery that are well organised and lead.

Project management

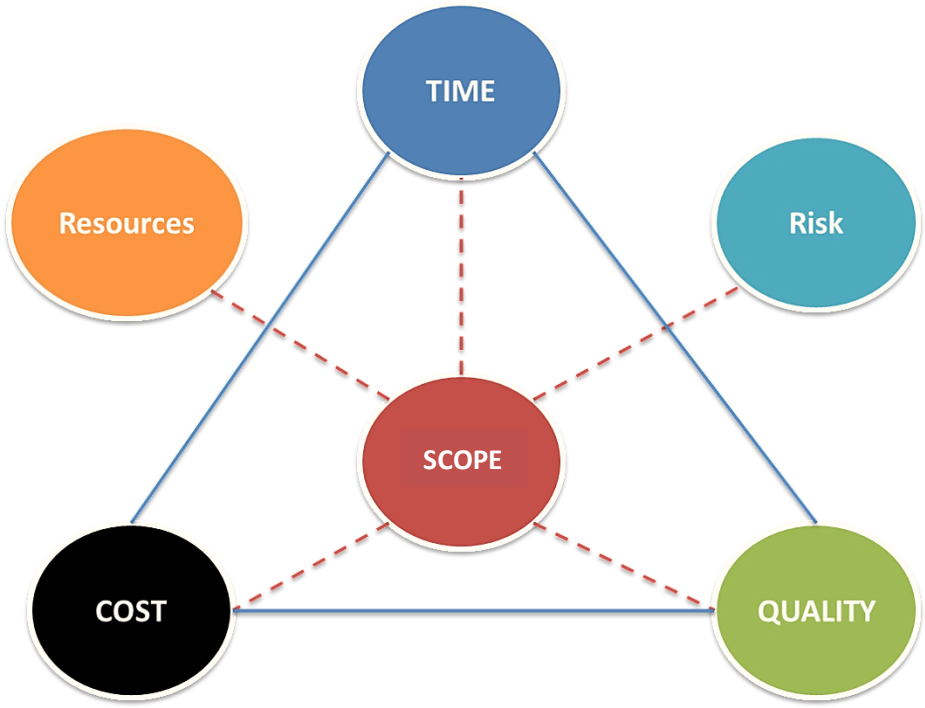
'The application of processes, methods, knowledge, skills and experience to achieve specific objectives for change.' APM BoK, 2019

Project management requires planning, monitoring and controlling all aspects of a project within agreed parameters such as goals/objectives, time, cost, quality and performance targets.

Key components of Project Management are:

1. Planning
2. Governance
3. Scope Management
4. Identifying stakeholder requirements
5. Time/Schedule
6. Budgets
7. Quality
8. Risk
9. Resources
10. Communication and team management
11. Procurement
12. Change control

Project success can be measured using the triple constraints or iron triangle below:



Quadruple Constraints

Typically project success is measured against 4 main constraints that impact on projects:

1. **Time**
2. **Cost**
3. **Quality**
4. **Scope.**

These are often used as success metrics, did the project deliver to time, cost and quality and furthermore did it remain within the scope agreed.

Key Benefits of Project Management

Organisations accept that formal project management brings about change in organisations, and that this requires formal disciplines that project management frameworks provide. The key benefits of project management are:

- Breaks the goals and objectives of the project into manageable phases and stages
- Provides a structure, discipline and order to a unique undertaking
- Reduces risk of failure from poor investment decisions, scope creep, inadequate business case and stakeholder management
- Monitors and controls project processes designed to maximise the chance of successfully delivering the project
- Assigns roles and accountability to key project roles like the project manager, sponsor and team
- Optimises the deployment of resources to where they are most needed
- Increases project acceptance through quality management
- Provide learning for future projects through project reviews and evaluation.

Projects and Business as Usual

Normal business activities are usually defined as operations that are ongoing on a day-to-day basis. This is known as ***"Business as Usual"*** in the project world. Most of it is *repeated and routine* through established management practices. The focus is on provision of customer services or production of products. The focus is on:

- On-going performance targets
- On-going output targets
- Satisfying customer needs and requirements
- Managing and responding to daily issues, often repeated
- Operating within established systems, procedures and practices where risks are minimised
- Funding through normal budgets, such that the business case for their continuation is less critical
- Permanent and stable staffing

Projects, on the other hand:

- Are unique and finite

- Bring about change to practices, behaviours and culture
- Involve risk and uncertainty
- Have specially selected teams which are usually dissolved when the project is completed
- Operate in changing dynamic environments.

Key roles in Project Management

The APM BoK, 2019 section on Governance states that good governance can be demonstrated through:
'the roles and responsibilities of the team and wider stakeholders to be clearly defined.'

The main roles and responsibilities for project governance are illustrated below in Figure 1.1, although these may vary across different organisations and even across different types of projects within the same organisation.

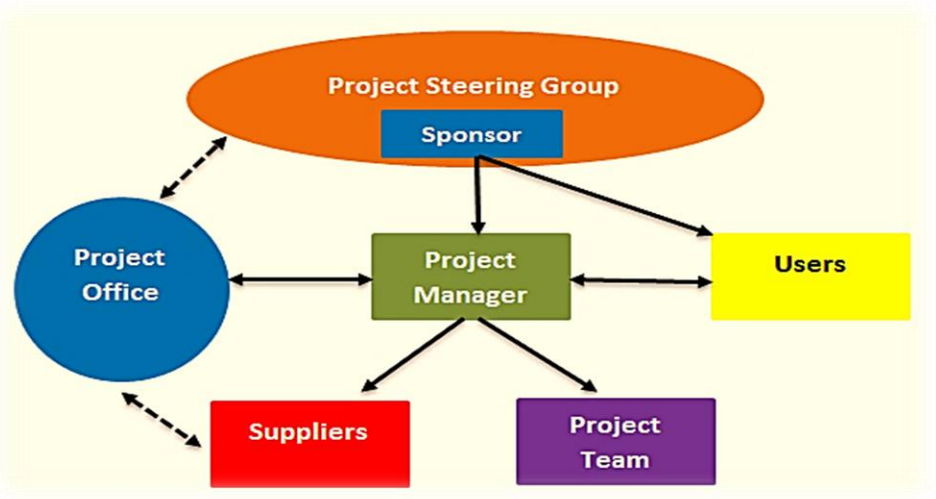


Figure 1.1 Main roles relating to a project

The project manager sits at the heart of the structure, thereby pulling all relationships to the centre. However, the vertical hierarchical relationship between the project sponsor (executive steering group) and the project team is clearly visible. Horizontal relationships of the users and suppliers are just as important.

Project Manager

This role appointed to lead the project and project team on a day to day basis. Their key role is to plan, monitor and control the project to its successful delivery of goals and objectives that satisfy the project sponsor. Also, they are responsible for the project team and ensuring that they work effectively together through effective communication and leadership.

Key Responsibilities of a Project Manager

The project manager is responsible for:

- Delivery of the project
- Manage and lead the project team effectively
- Managing key stakeholder relationships of the project management plan
- Directing and motivating the team
- Producing and taking responsibility/**ownership for the Project Management Plan (PMP)**
- Monitor and control the PMP in accordance with agreed tolerances
- Accountability for project deliverables
- Manage key relationships and stakeholders
- Liaise with end users
- Ensuring that risks are identified, managed and the issue and risk management process is applied
- Controlling change and configuration records
- Ensuring that appropriate quality systems are established to meet stakeholder requirements
- Manage supply chain, with possible involvement in procurement activities
- Establishing communication systems and conflict resolution processes
- Establishing monitoring and control systems for the project
- Ensuring participation in reviews and post-implementation 'lessons learned' processes.

Project Sponsor/ Executive

The project sponsor may be appointed by the project board (steering group) to act as their eyes and ears. They will have responsibility for the business case and the realisation of benefits. The role of the project sponsor is to outline the reasons for the project and establish why the project needs to happen by stating the business justification for it. They will manage the key senior relationships and communicate with the project board (steering group). Furthermore, they are responsible for the capital/funding of the project. Key responsibilities will include:

Key Responsibilities of a Project Sponsor

- Lead and manage P3M (Portfolio, Programme, Project)
- Primary ownership of the project on behalf of the business with the appropriate levels of authority
- Produce and be **responsible for the business case**
- Appoint the project manager

- Be the project champion for the change it will bring
- Approve expenditure (or seek approval from the PSG)
- Monitor project progress and take control decisions
- Accountability for the investment in the project
- Obtain **approval for investment**
- **Authorise the phase transition** and the key management outputs from the project management plan (PMP)
- Close the project if necessary
- **Initiate the project**
- **Agree the success criteria**
- **Responsible for benefits realisation**
- Ensure project delivers the business case and the benefits within
- Support the project manager through the project life cycle
- Keep executive stakeholders informed
- Monitor project progress and makes control decisions
- Monitor business environment and business risks.
- If necessary, recommend closure should the project no longer remain viable.

Compare the responsibilities of the Project Sponsor with the Project Manager

Project Manager	Project Sponsor
Operations (tactical) management	**Strategic management**
Stages/ phases view	**Project view**
Day-to-day controls	**Benefits realisation**
Product delivery focus	**Benefits assurance focus**
Product assurance	**Project assurance**
Project efficiency	**Business efficiency**

The Project Steering Group (PSG) or Board

This body oversees the project from initiation to closure under the guide of the project sponsor. The PSG will formally appoint the project sponsor (usually a person) which can be a sub-group who will have delegated authority.

The typical composition of the Steering Group or Board is:

- Project Sponsor
- Client representatives
- End User representatives
- Supplier representatives
- Relevant Senior Managers from the organisation

Responsibilities include:

- **Manage key high-level stakeholders**

- **Provide Strategic Direction**
- **Manage the Portfolio and balance BAU activities – P3M**
- **Project Sponsorship** - Nominate the project sponsor
- **Change Management –** deliver change for the organisation
- Support and advise the PS
- Authorise the business case
- Help identify and manage high level risks
- Approve changes to the PMP within agreed levels of authority
- Arbitrate between different users and stakeholder requirements and control scope creep

Project User: Project User is a reference to the client or customer or both. They will be involved in the detail of the requirements, approve the outputs of the project and defining the acceptance criteria. They may be involved in defining quality criteria and testing.

Project Team Leaders: specialist or experts leading the project team for their particular work package. Appointed to do the specialist work of the project. They report to and take instructions from the project manager. Can be project managers within their own organisation.

Project Team: members of the project team are selected on the basis of their respective specialisms to deliver various elements of the project plan. Their roles and responsibilities are allocated by the project manager, whom they will support to deliver the project successfully. This requires the team to work very closely with the project manager and communicate effectively with each other. Their responsibilities include reporting on adverse issues that may arise to the project manager.

Other Roles:

- **Project Management Office:** people who provide specialist advice or services for the project.
- **Project Support/ Administrator:** responsible for project documentation, plans, reports and logs etc. Keeping documents up to date and supporting the project manager and team with administrative support.
- **Resource Manager:** person responsible for the provision of resources for the project (this role needs to be clearly defined as to what resources fall within this role and their authority levels, i.e. people, finance, IT, equipment, etc.).
- **Configuration Manager/Librarian:** Responsible for the configuration management system; version control; and ensuring the project plans are recorded, maintained, updated, and kept safe within an appropriate system for easy access, retrieval and circulation.
- **Procurement Manager:** acquires goods and services externally for the project according to the project plans.
- **Quality Manager:** ensures the project satisfies and delivers to the agreed quality standards as defined within the plans.

- **Product Owner:** The owner of a product who may contribute to decisions concerning the development of a product.

Project Team

The responsibility of the team is to deliver the project deliverables stated within the agreed PMP. They will apply their respective specialisms to help deliver a successful project, under the guidance of the PM. Their responsibilities include:

- Work according to their assigned roles
- Help to identify changes, risk and quality issues
- Trigger processes such as change control
- Support the PM to deliver the project efficiently and effectively by working to the agreed work packages

Project End Users

The End users are a group of people who will benefit from the project and therefore have a keen interest in its success. They are the customers of the project and will define quality of the deliverables and finally accept them at the end. For this to occur, it is important to ensure end user representation and engagement through the life cycle of the project. The responsibilities include:

- Support the PS and PM in defining success and acceptance criteria
- Help define quality standards and suitability of the deliverables
- If necessary, be involved in any testing and suggest any changes or recommendations
- Accept the authority of the project sponsor who has the overall responsibility for the project.

Project Suppliers – Supply Chain/Procurement

Suppliers to the project are distinct from the project team. They are responsible for providing products and services that are not available from within the project, OR for providing expertise in areas where this is lacking. Therefore, through **procurement**, the PM will secure their service and agree terms of engagement known as the service level agreement. The supplier's responsibilities include:

- Operate and deliver required services according to the agreed terms
- Work with the PM closely to resolve any issues
- Report on progress and any potential issues
- Support the PM in managing any risks or quality issues

Product Owner

This role is often categorised as part of the overall 'supplier' input. The main responsibility is to focus on product development and ensure it fits the requirements as expected. They have a deep knowledge and understanding of stakeholder needs of the product. This role is also beneficial as the product owner can act as a mediator between stakeholders and those delivering the product. The product owner's responsibilities include:

- Define goals and creating vision for the use of project outputs
- Act as the on-site customer/user for iterative (or Agile) projects
- Communicate with stakeholders to make sure that the project remains aligned to business/corporate objectives
- Provide feedback to the project team on iteration planning, be aware of interdependencies between tasks, be aware of any constraints, understand the priority and progress of the project in relation to business needs
- Establish priorities for scope budget and time in relation to the stakeholder requirements including accepting incremental delivery of outputs
- Act as the primary communication link between stakeholders and the project teams, this includes ensuring stakeholder buy-in, linking major decisions with strategy as well as providing clear instructions and an outline of deliverables to product developers
- Evaluate the progress and provide feedback to the team on performance including advice if continuation is likely.

Project Management Office

There are two types of project offices:

- **Project Support Office, and**
- **Project Management Office (PMO).**

PSO provides administrative support to PM and team members. Its staff collect routine data, share information and consolidate reports for circulation to key stakeholders as agreed.

PMO has more hands-on role and operates outside the PM levels of authority. It usually reports directly to the PSG or Sponsor. The responsibilities of the PMO include:

- Providing support to the PM through the project life cycle
- Conducting project quality audits and reports
- Identifying and developing PM methodology, standards templates, processes, etc.
- Co-ordination of resource allocation across projects
- Providing expert advice to the PM
- Facilitating gateway and post project reviews

- Supporting PM with job descriptions, mentoring, coaching, training and professional development programmes
- Conducting benefits reviews
- Good project governance and practice, as delegated by the project manager

Benefits of a Project Management Office

- Can develop into a centre of excellence for project management activity, sometimes referred to as the EPMO - **Enterprise Project Management Office**
- Provides economies of scale by supporting a portfolio of projects
- Provides consistency in the application of standards and quality assurance
- Supports effective governance
- Facilitates priorities and selection of best projects aligned to the business strategy
- Improves communication between the PSG, PS and PM
- Expert in project planning and best practice
- Focal point for PM activities and knowledge sharing
- Promotes professional project management development and maturity

Quick Tasks

1. What is the purpose of the Project Office?
2. What are the responsibilities of the project sponsor?
3. Explain the role of the project manager
4. Explain a benefit of having a product owner.

What is P3 Management?

Project, programme and portfolio management (P3M) according to APM BoK, 2019 is:

'…multiple options for delivering change and benefits, depending on the purpose and overall desire. The scale, significance and complexity of the proposed undertaking play a part in determining which approach to use.'

No two projects are going to be the same in all aspects and will inevitably offer different challenges. Think of Crossrail and HS2: both are transport infrastructure schemes, but they vary in complexity and scale. One goes from East of England to West whilst crossing the heart of the city of London; the other goes from the South of England to the North, crossing greenbelt terrains. Both are examples of portfolios of programmes, with business related projects sitting within the portfolios.

Scale and complexity are not the only factors. Managing a major infrastructure development for delivery to a client will need a different approach to internally managing the merger of two banking organisations.

A good way to consider **P3M is to consider the goals and objectives**:
A **project will have objectives like**:

- Landscape garden
- Update bathroom suite
- Modernise kitchen with new fittings

Whereas a **programme's objectives could be**:

- Refurbish housing stock with modern furniture and fittings
- Landscape communal green spaces for wellbeing
- Ensure all buildings comply with accessibility regulations

The **Portfolio objectives then may be**:

- Review organisational housing stock for refurbishment and modernisation
- Deliver all stock to comply with all regulations for the diverse community populations aligned to organisational business strategy.

Commonly, work of a lesser scale and complexity, leading to an output, is referred to as a project. Work that combines projects with change management to deliver benefits is considered to be a programme, while a collection of projects and programmes designed to achieve strategic objectives is called a portfolio.

In summary, some projects only deliver outputs whilst others deliver large scale change and benefits requiring different managerial tools of governance.

Project	Programme	Portfolio
Delivers products	Delivers strategic objectives	Provide strategic direction
Consists of processes and activities	Consists of projects	Consists of projects and programmes as well as BAU
Emphasis on managing: • **Resources** • **Risk** • **Operations** • **Change control**	Emphasis on managing: • resource conflict • cross project risk • coordination of projects • Change Management	Emphasis on: • Managing resource constraints • Managing risk v rewards • governance of projects and programmes • Co-ordinated Management of change
Priorities are given	Projects are prioritised	Projects and programmes are prioritised in accordance with business strategy and objectives
Benefits delivered after project (usually)	Benefits are realised during and after the programme	Defines benefits management approach
Clearly defined start and finish	Finish on realisation of strategic objectives (vision)	On -going
Management of relationships relating to the project	Cross project relationship management	Organisational wide management of relationships and structures

Programme Management

"Programmes are unique and transient strategic endeavours, undertaken to achieve a defined set of objectives, incorporating a group of related projects and change management activities…combined to deliver beneficial change" APM BoK , 2019

APM BoK 2019 defines Programme Management as:

> **'The coordinated management of projects and business-as-usual (steady-state) activities to achieve beneficial change.'**

A programme is **a group of projects that are inter-related and /or interdependent, contributing to common strategic goals/objectives**. Projects may be managed independently, but there must be a common goal and they must all be subject to the overall coordination of Programme Director/Manager.

The key role of Programme Management is to initiate, accelerate, redefine, decelerate, and close projects where necessary. It manages the interdependencies between the projects within the programme and business as usual activities. Furthermore, issues of resources, resource conflict risk, change and strategic benefits are managed.

Programme Manager's role:

- Strategic role to **deliver change**
- Identify and **define projects within the programme**
- **Focus on strategic benefits**
- **Manage resource conflicts**
- Appoint, and delegate to, project managers
- Monitor projects to time, cost, quality, risk and performance
- Communicate with the senior executive and key stakeholders on key programme decisions
- Accountable for programme

Benefits of Programme Management

- **alignment with corporate business strategies**
- Improved **prioritisation of projects**
- Improved **focus on benefits** and resource management
- **Consistent reporting** within the programme
- Programme and **cross-project perspective of performance, risk and quality issues**
- **Deployment of consistent project management processes and standards** within the programme.

Portfolio Management

Portfolio Management is defined by APM BoK, 2019 as follows:

Firstly, a portfolio is:

> **'the grouping of an organisation's projects, programmes. Portfolios can be managed at an organisational or functional level.'**

Then Portfolio Management is:

> **"portfolios are used to select, prioritise and control an organisation's programmes and projects, in line with it's strategic objectives and capacity to deliver. Their goal is to balance the implementation of change initiatives and the maintenance of business-as-usual activity, while optimising return on investment." APM BoK, 2019**

A key element of Portfolio Management is prioritisation and selection of projects and

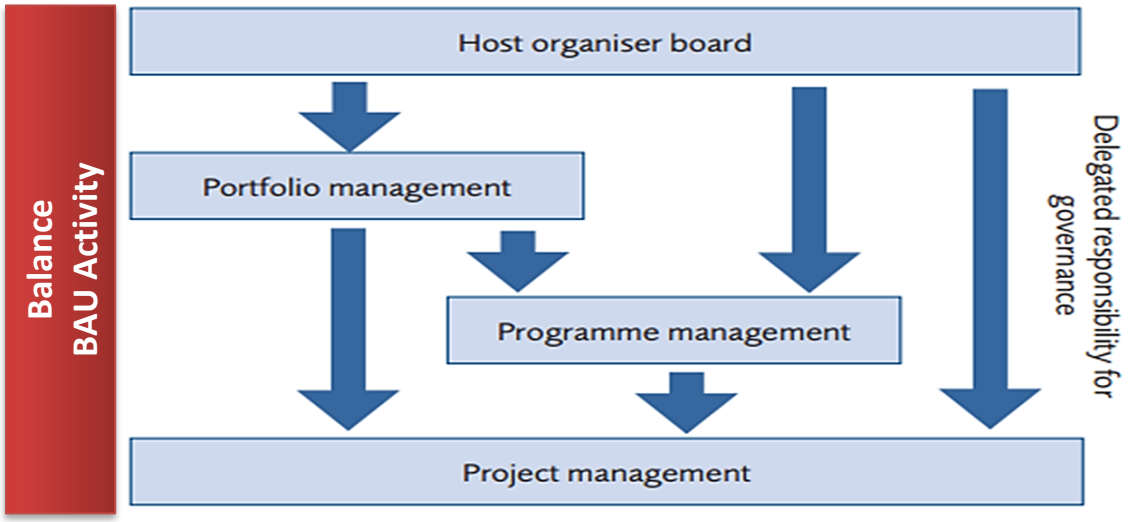


Figure 1.2: Governance structure

programmes to deliver strategic organisational goals and objectives through its business portfolio. This involves screening of proposals, operating within resource constraints and balancing risk against rewards. The key to success is governance and on-going monitoring of the portfolio through adjustments, considering the changing environments and providing strategic direction. The portfolio may contain projects and programmes that are unrelated and do not necessarily have a common business objective.

Source:APM Sponsoring change (2009)

The context of Portfolio Management helps us to understand it in more depth by asking certain questions:

- Have we selected to right projects/programmes?
- How do they contribute to the overall business strategy and fit in with the business plans?
- Are we co-ordinating the portfolio and managing it effectively? i.e. do we have effective governance processes in place?
- What is the overall organisational exposure to risk? – Too many risky projects undermine the organisation.
- Are the project programmes contributing sufficient value?
- Who has responsibility and accountability for governance for the portfolio?
- Is there effective deployment of scarce resources throughout the portfolio of projects?

In figure 1.2 it can be seen that the organisation makes choices as to the selection of projects. Governance structures are developed for accountability and responsibility together with role allocation. This results in a formal structure for governance, project control, outlining

priorities, risk management and reporting. The formal governance structure allows the alignment of the portfolio projects with strategic business goals and ensures that overall benefits for the organisation are realised.

Exercise:

1. Define portfolio management.
2. How does Portfolio management support change initiatives within a organisation, provide examples?
3. Explain five benefits of using programme management.
4. Outline the characteristics of programme management and its relationship with strategic change.

Section 2

The Project Context and Environment & Structural Choices

Learning Outcomes

- **Explain tools and techniques used to determine factors which influence and impact projects (including PESTLE, SWOT and VUCA)**
- **Explain the impact of the legal and regulatory environment on projects (such as the impact on working conditions, risk management, governance and sustainability)**
- **Differentiate between types of permanent and temporary organisation structures (including functional, matrix, and project)**

PMQ Learning Outcomes	APM BoK Ref
3.	1.1.1, 1.1.5, 3.2.7, 3.3.4

The main driver of any project is its context and operating environment. The context can be sector, industry type, location etc. Examples of sectors include agriculture, construction, finance, media, manufacturing, public government, health care and the voluntary third sector. Each sector is regulated by different rules, laws and regulations. Project professionals and practitioners need have an awareness of these and their impact on the project and its implementation. Furthermore, a project can have a diverse range of stakeholders that are affected by the project such as the end users. For example, new health care services or a new sports stadium.

Projects have internal and external environmental factors that may impact on their success. The project sponsor and the project manager share responsibility for monitoring and responding appropriately to the project context. Internal factors may include:

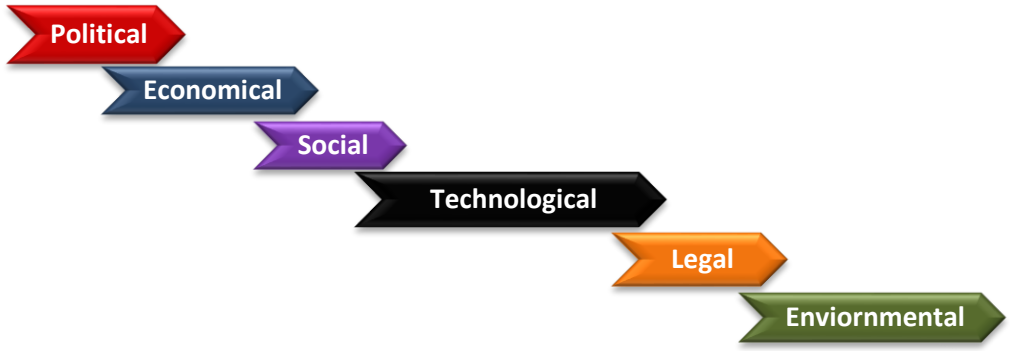
- Organisational systems and procedures
- Talent and skills; capabilities of staff
- Types of relationships with key stakeholders
- Culture, governance, and decision making
- Company structures, roles and responsibilities, and contractual relationships
- Information systems and quality standards
- Appetite for risk and risk thresholds.

APM BoK, 2019 define the context as follows:

'A collective term for the societal and/or organisational setting of a project, programme or portfolio. Also known as environment.'

Furthermore APM BoK, 2019 refers to the PESTLE method for evaluating the project environment. The external factors of the project can be analysed by applying the **Environmental Impact Analysis** tool:

PESTLE Analysis



Here each factor is considered in turn and an assessment of its impact on the project is analysed. The table below provides an example.

Factor	Project Type	Impact
Political	Construction Transport	Government policy, regeneration, social housing Regeneration, connectivity, alleviate overcrowding, speed up journey times, business travel.
Economical	Construction Transport	Ability to raise capital in uncertain economic climate, interest rates, inflation. Funding from government. Private sector investment Infrastructure Projects such as HS2-HS3
Social	Health care	Increasingly aging population within the UK. Differing needs of diverse populations. Regional poverty levels. Increasing obesity levels within the UK population
Technological	Health care	New technology and its associated costs. New advances in treatments and care. Breakthrough research using new technology and its roll out
Legal	Sustainability New trains	Safety regulations, operating licences, health and safety standards. Storage of Data and information. Security. Deregulation by government. Waste, materials, technology, disposal/landfil
Environmental	New trains Sustainable projects	Pollution, air and noise levels, impact on environment, Sustainability issues, Recyclable materials

Quick Task: Select a project or an organisation and apply the Environmental Analysis tool to it. Reflect on your analysis and consider the business context as whole.

- What is the state of the economy?
- What is the political interference?
- What social changes do we need to consider?
- What impact is the rate of technological change having on the project or organisation?
- Is there any new or existing legislation likely to impact on the project and its success?
- What are the real environmental issues that concern people and their engagement with the deliverables of this project?

SWOT Analysis

The SWOT analysis is a technique for evaluating the **internal capability of the organisation** or project, its strengths and weaknesses against external threats and opportunities that will either result in risk or there may be opportunities to be taken.

Strengths: Organisation brand and image, small-medium projects

Weaknesses: Ability to raise capital, large projects

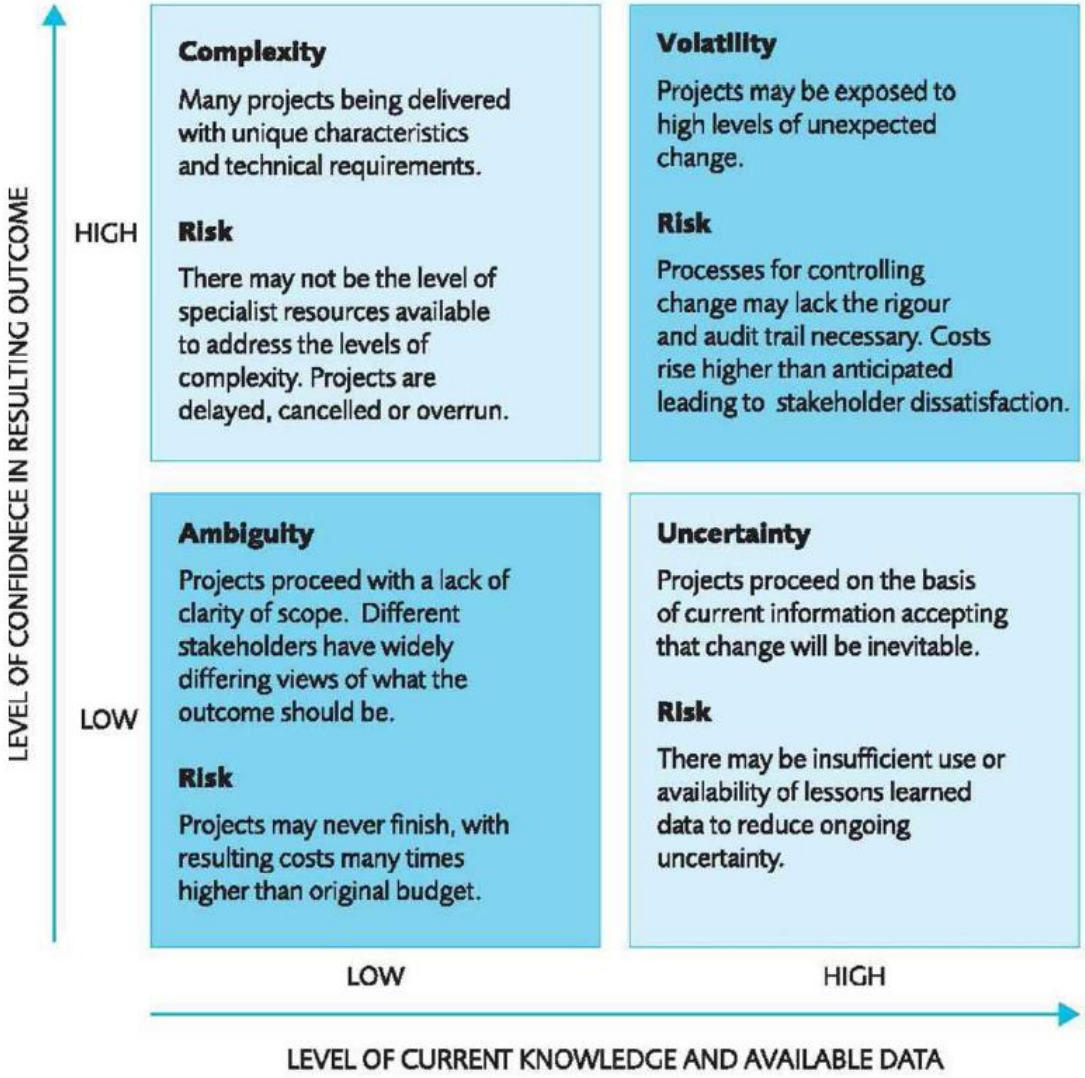
Opportunities: Government funding, private public partnerships

Threats: Uncertainty in the economy and Brexit

When carrying out this analysis it will be worth considering the business strategy of the organisation, its direction and intent, and project experience in delivering such projects.

VUCA

VUCA derives from the US military. It is used to assess the Volatility, Uncertainty, Complexity and Ambiguity of the project and its environment. VUCA has been widely adopted to represent the increasing unpredictable and vulnerable factors we face when delivering projects.



The example above shows how an organisation might use VUCA to understand the risks in specific project situations.

Quick Tasks

1. What is meant by the term project context?
2. Explain four distinct factors that may influence project context.
3. Describe three tools that can be used to assess the project's environment.
4. How can VUCA support the project manager's understanding of the project context?

Location or Geography

Project location and geography is an important consideration as each region will present different challenges and issues. These can range from the physical, where engineering or construction projects require access, to the political and socio-economic conditions of the area. Other issues could be language, culture, customs, climate, transport, and local regulations.

Legal Awareness

A project manager must be aware of relevant legislation and regulations that may impact on the project and its success.

These include the areas of the law that P3 Managers must take into account as listed below, including employment and health and safety legislation.

Employment Regulations and the Law

Each sector as stated earlier has its own body of laws and regulations that impact on projects. These rules and regulations can help to ensure that the deliverables of the project are legal and 'fit for purpose,' ensuring the health and safety of the end users as well as the project workers. The project manager will need to be aware of relevant laws and regulations, including the following:

- Employment law
- Contract law
- Common law
- Health and Safety legislation and regulations
- Environmental control and regulations
- Industry standards
- Data Protection and GDPR
- Freedom of Information.

Recruiting and selecting new members for the project team involves bringing people on board who will be subject to a contract of employment, as well as the various pieces of legislation that shape the contract. This contract places duties on both the employer and employee.

A contract is a **'binding agreement on both parties'** which must be issued in writing and signed by both parties. It must clearly contain:

- Details of the role
- Salary
- Benefits and entitlements
- Payment periods

- Date of commencement
- Location
- Rules of engagement
- Reference to rights under employment legislation
- Employer duty of care under Health and Safety legislation
- Employee duty of care under Health and Safety legislation
- Period of notice to termination.

Examples of employment legislation include:

- Data Protection Act (1998) and **General Data Protection Regulation (GDPR, 2018**)
- ACAS statutory Code of Conduct for Disciplinary and Grievance Action, as mandated by the Employment Act (2008)
- Equality Act (2010) which covers discrimination on the basis of nine 'protected characteristics,' i.e. sex, gender reassignment, race, disability, age, pregnancy and maternity, marital or civil partnership status, sexual orientation, and religion
- **Working Time Regulations (2007)**
- **Public Interest Disclosure Act (2013)**
- **Freedom of Information Act (2000).**

The main legislation for health and safety and welfare is:

- **The Health and Safety at Work Act (1974), and**
- **The Environmental Protection Act (1995).**

These are enforced by agencies:

- Health and Safety Executive, and
- The Environment Agency.

Local Councils responsible for planning and managing local areas will also act as an inspectorate to ensure safeguarding practices.

The Health and Safety at Work Act states the employers must provide:

1. A safe place of work
2. Safe system of work
3. Safe means of access and egress (i.e. entry to, and exit from, the workplace)
4. Safe appliances, equipment and plant machinery
5. Competent and safety-conscious fellow employees (behaviour and attitude)
6. Protection from unnecessary risk or injury

Employers must *demonstrate a duty of care* and *co-operate with health and safety efforts* and to *act responsibility for their own and others health and safety*. Staff must be properly trained

in health and safety matters and there must be open and honest disclosure together with regular health and safety reviews. Some prominent safety regulations are listed below:

- **Manual Handling Operations Regulations** (1992)
- The Health & Safety (Display Screen Equipment) Regulations (1992) - **DSE**
- Personal Protective Equipment at Work Regulation (1992) - **PPE**
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (1995) – **RIDDOR**
- Control of Substances Hazardous to Health Regulations (2002) - **COSHH**

Project Manager's Role

The project manager must have concern for two areas with regards to health and safety matters. First, the duty of care that arises from their role in managing people; and secondly, their duty of care relating to project outputs or products:

- People Management:
    - Health and safety system of work, policies, processes and procedures
    - Health and safety training
    - Safe environment for operations
- Project Outputs/ Products:
    - Ensure safe systems of operations
    - Safe operating environment
    - Project manager must ensure that suitable assessments are conducted to reduce risk of injury to 'As Low As Reasonably Possible' – ALARP.

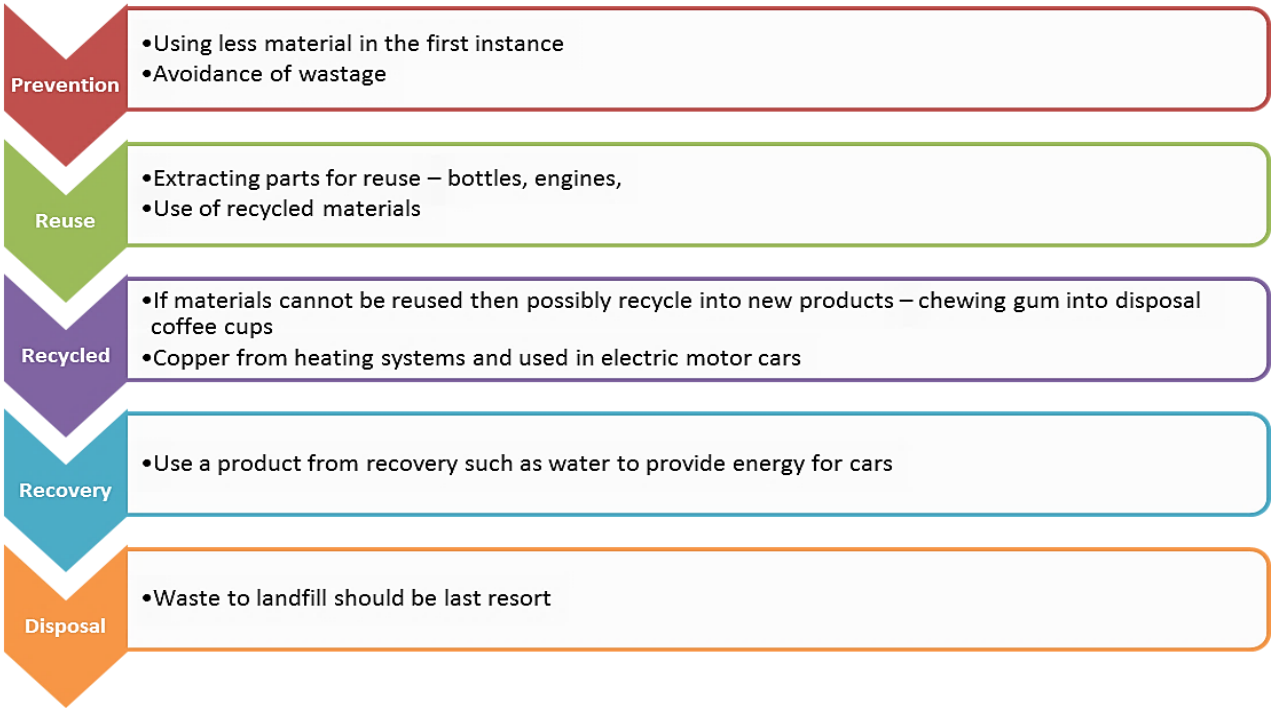
Environmental Factors

Government and public concern for the environment requires project managers to be mindful of their work, its impact on the environment in which they are operating, and the regulations which cover these aspects. This ranges from energy consumption to waste disposal. This means project managers must demonstrate they understand, and have plans to deal with, the environmental factors within the project management plan. Some of the issues may include:

- Ensuring a given environmental factor has received due consideration within PM plans
- Ensuring that the project organisation operates an Environmental Management system
- Assessing and identifying all relevant environmental legislation
- Taking account of different environmental regulations across national and international borders
- Assessing requirements on noise, dust, protection of flora and fauna, waste and sustainability

Waste Management

As waste disposal issues rise up the agenda, there is now large-scale concern for the damage to the environment and long-term impact on the planet. When waste is generated, it is given priority for reuse, recycling, recovery and disposal as follows:



Health, Safety and Environmental Management Plan

This document usually sits within the Project Management Plan and will include the scope of the project, the roles and responsibilities associated with it. The plan is developed in consultation with key stakeholders and approved by the health and safety functions within the organisation, or externally if appropriate. The plan should include:

1. **Risk assessment and action plan** to manage any risks identified
2. **Training for the project team**
3. **Open and honest disclosure** – establishing a safety culture, regular meetings, briefings and reports. Ensure everyone takes responsibility for safety
4. **Regular reviews** – continuous assessment of policies and procedures so people do not become complacent.
5. **Environmental issues** – are addressed and communicated to all parties that impact on both people and the project.
6. **Safety equipment** – is provided, also ensuring that people adhere to the rules of wearing safety equipment and clothing
7. **Stress** – deemed a health issue under health and safety legislation. Work should be allocated fairly, and people should be supported in their roles.

Exercises:

1. Explain the importance of legislation to projects.
2. Explain the tools and techniques used to assess a project's context (including PESTLE, SWOT and VUCA)
3. Describe how environmental factors affect projects (including the sector, geography and regulation)
4. Explain the purpose of health and safety legislation

Structural Choices

Definition

The APM BoK (2019) states that **'Organisations operate in a dynamic context, full of uncertainty, novelty and turbulence. Projects, programmes and portfolios are introduced in order to enhance performance, bring about change and enable organisations to adapt, improve and grow.'**

The organisational structure contains systems, reporting lines, processes procedures, roles and functional reporting/accountability lines. The organisation's structure can influence the way the project is managed (culture), as well as project authority levels and the overall priority assigned to a given project.

There are three main types of organisational structures:

1. **Functional**
2. **Project, and**
3. **Matrix.**

Each has its strengths and weaknesses.

Functional Structure

The functional organisational structure (Figure 1.3) is set up so that specialist areas provide support to each other, but the organisation as a whole offers expertise to external clients and customers. The reporting and accountability lines are very clear, and this type of organisation does not undergo change quickly: it's more of an evolution where the pace of change is slow. Any project work undertaken is coordinated at the function head level (outlined in red in the organogram below).

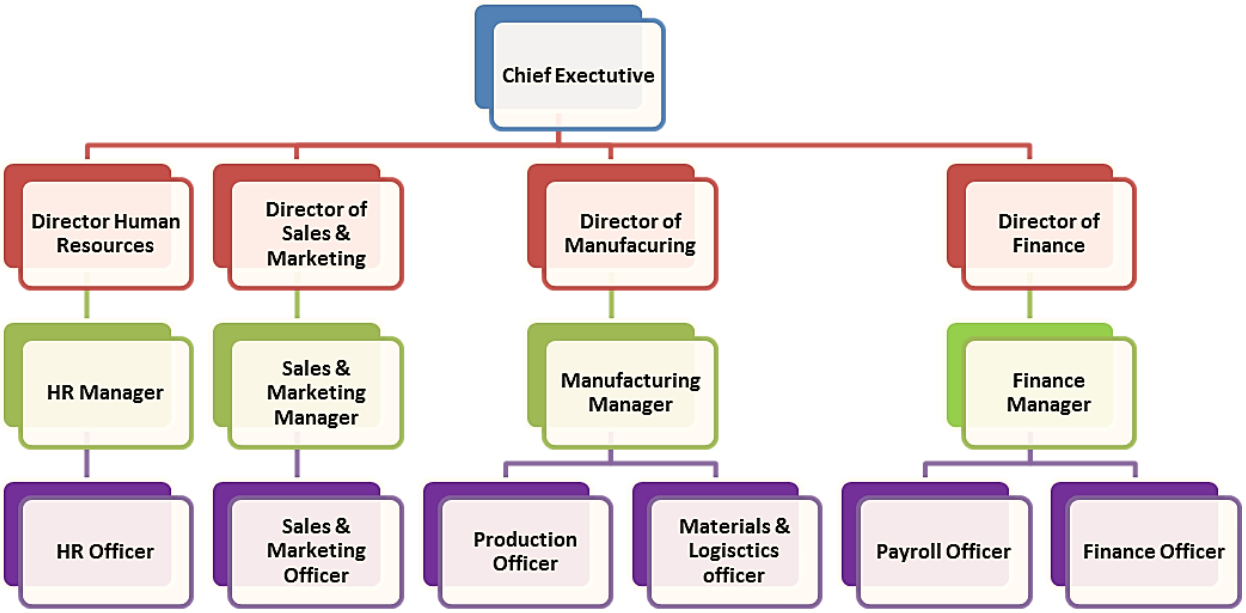


Figure 1.3: Functional Structure

The **Project Structure** illustrated in Figure 1.4 has its own dedicated resources and structures developed specifically for the project/ programmes. Once the project/programmes are complete, in theory, they cease to exist. Crossrail or research projects are examples of these. The project structure has its strengths and weaknesses too.

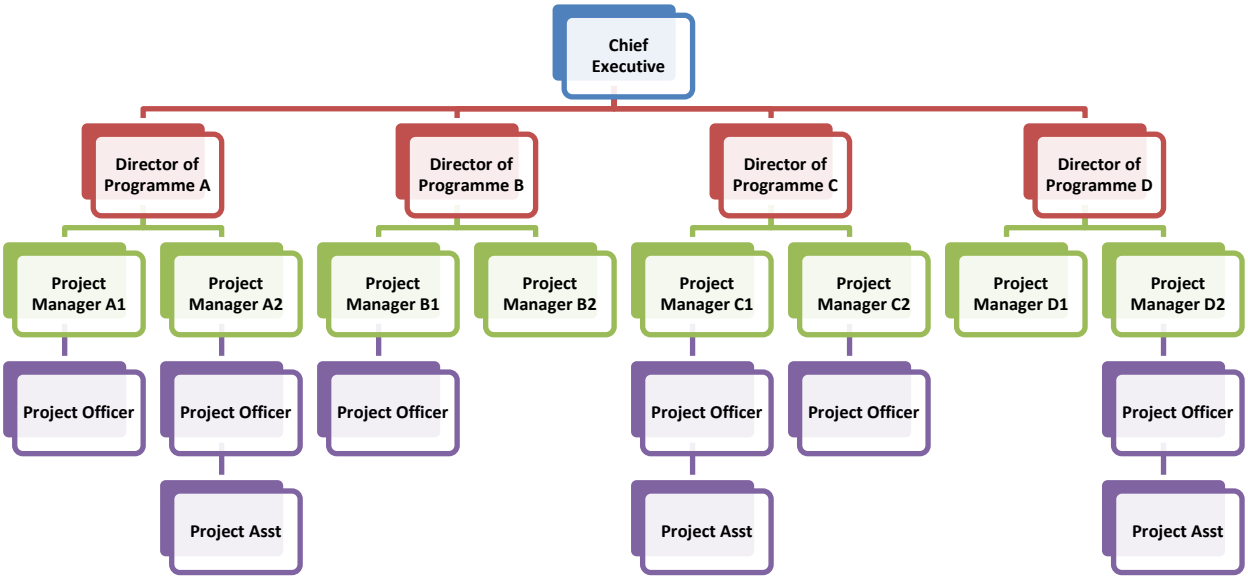


Figure 1.4: Project Structure

Matrix Organisation

The matrix organisational structure (Figure 1.5) combines the functional and project structures. In this type of structure, the project team's expertise is assembled from across the business functions. This allows the project managers and the organisation to combine the benefits of the other two structures, functional and project. The key objective is to resource the project with the right people from the right place at the right time allowing the optimisation of people resources and the retention of talent within the organisation. Again, the matrix structure has its positives and negatives.

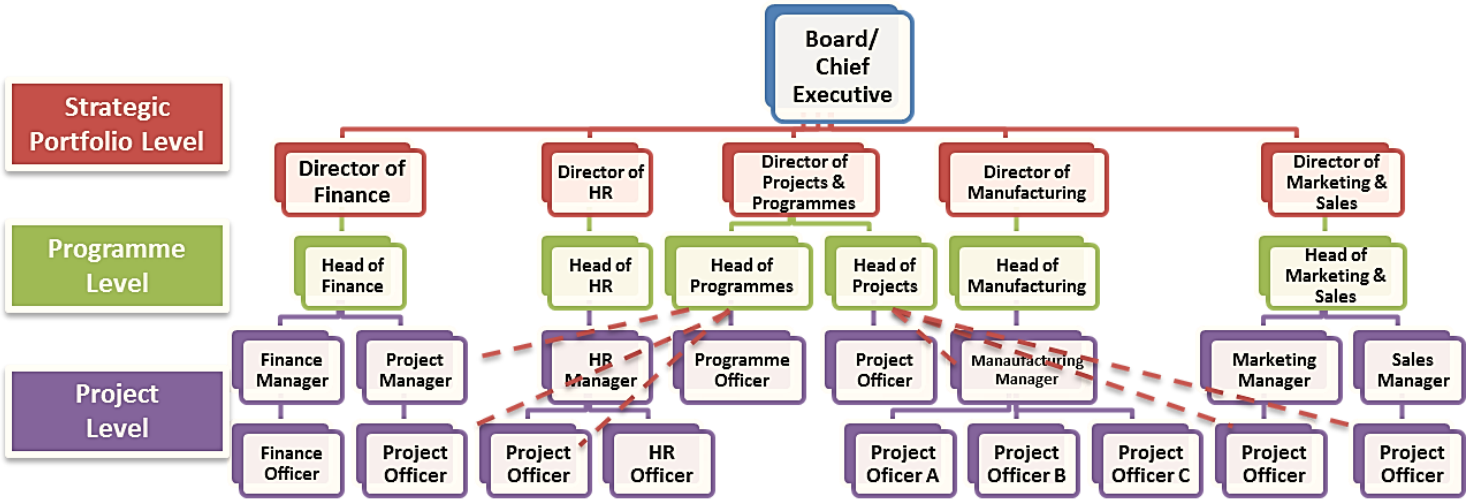


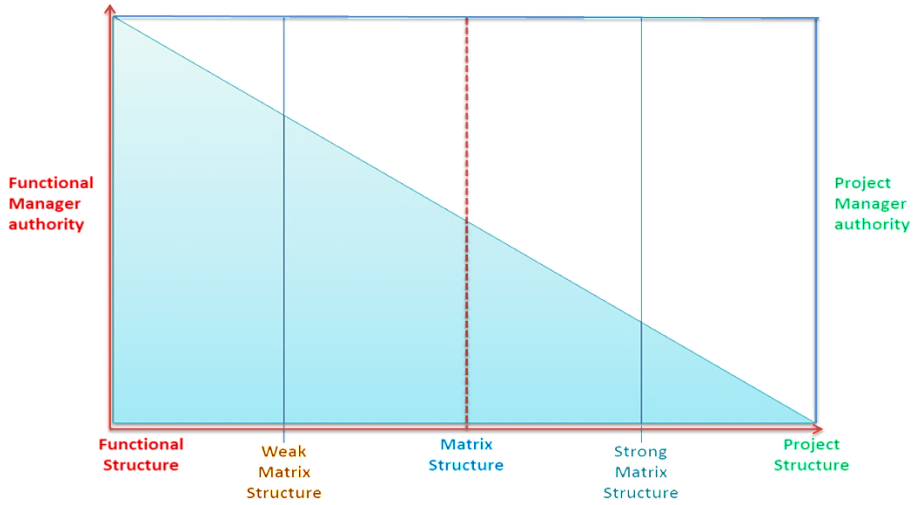
Figure 1.5: The Matrix Organisation

Strengths and Weaknesses of each organisational structure

Type of Structure	Strengths	Weaknesses
Functional	• Functional expertise • Control over resources for functional projects • Access to expertise • Stable communication structures • Clear lines of authority and reporting • Personal development and career progression • Projects allow learning opportunities	• Resources are prioritised to the function rather than the project • Projects can be isolated • focus maybe on business-as-usual • Poor flexibility to adopt project working practices • Complex large projects may have many reporting lines (bureaucracy) • No single line of authority/responsibility for large projects – poor ownership

		• Functional heads make project decisions • 'Silo mentality' can lead to poor project delivery
Project	• Project manager has full authority • Focus is on project goals and objectives • Strong identity with the project team and able to clearly define project roles for success • Projects are prioritised in line with strategic objectives • Dedicated resources • Good environment for sharpening PM skills	• **Lack of career progression** • Project team is disbanded once project is complete, thus **loss of valuable knowledge and talent** • **Duplication** of core functions • Possible underutilisation of human resources as project staff dedicated to the project – efficiency? • Isolation of project team
Matrix	• Efficient use of resources Selection of expertise across functional boundaries (talent pool) • Project managers have authority over organisational managers • Specialist skills and experience (talent) is retained • Application of consistent PM methods • Handle different types and scale of projects • Career progression and development • Develops project maturity	• **Conflict over staff authority** (loyalty and instruction) • Requires sophisticated resource management • **Conflict of priorities for staff** between project and BAU • Requires **strong communication** and interpersonal skills by the project manager

The organisational continuum demonstrates functional and project authority lines with the matrix in between the two on the continuum. As we move along the continuum the functional structure weakens and the matrix gets stronger giving way to project structure:



Exercises

1. Explain the differences between types of organisational structures and the advantages and disadvantages of each.
2. Highlight two difficulties that a project manager may experience when working in a matrix environment.
3. Explain the links between good governance and structural choices made.

Section 3

Project Life Cycles

Learning Objectives

- **Differentiate between linear, iterative and hybrid life cycles**
- **explain why projects are structured as phases in a linear life cycle**
- **Explain the difference between a project life cycle and an extended life cycle**
- **Explain the different types of project reviews**
- **Explain the benefits of conducting reviews throughout the life cycle (including decision gates, benefits reviews and audits)**
- **Explain the importance of a project life cycle to project management**
- **Understand the difference between the project lifecycle and product lifecycle**
- **Understand the change of Governance and where it applies – project governance to product governance**

PMQ Learning Outcomes:	APM BoK Reference:
2	1.2.1 – 1.2.6

The Project Life Cycle

The project life cycle identifies the key phases of a project, allowing effective management from beginning to end. The length of each phase can vary greatly from project to project depending on their nature, type and complexity. These phases guide the project manager to plan the project in an orderly way and provide a logical flow. It can be regarded as a journey from departure point to destination, and the challenges faced along the journey.

APM BoK, 2019 define the project life cycle as follows:

> **'A framework comprising a set of distinct high-level stages required to transform an idea of concept into reality in an orderly and efficient manner. Life cycles offer a systematic and organised way to undertake project-based work and can be viewed as the structure underpinning deployment.'**

The generic project life cycle consists of the following phases:

1. **Concept phase** includes developing the idea, research and collection of data, developing the outline business case, scheduling, and consideration of its viability and acceptability to project sponsor and stakeholders. High level risks and quality issues may also be considered in this phase.

   Key Qs:

   A. Is the project feasible?
   B. Is the Definition phase worth investing in?

   Output: Business Case

2. **Definition or 'planning' phase** is where the project management plan (PMP) is developed in detail by appointing the project team (specialists), refining the scope and getting approval from the project sponsor. This phase also involves identification of schedule, costs, risk, quality and acceptance criteria, establishment of systems and processes of operations. The Business Case for the project is developed and approved in this phase, justifying the investment.

   Key Qs:

   A. Does the Business Case justify the investment and resources?
   B. Does the project deliver on the business strategic goals?
   C. Will the project deliver benefits for the organisation and key stakeholders?

   Output: Project Management Plan

3. **Deployment (or Implementation) phase**. Once the project business case and project management plans have been approved, the project can move into the third phase. In this phase the project plan is executed, monitored and controlled against the baselined plan. The iron triangle is applied to measure progress against time, cost, quality and team performance; as well as keeping an eye on scope, risks or threats to the project.

   Key Qs:

   A. How is the project progressing against the PMP?
   B. Is the project still viable?
   C. Are we on course to deliver the business case benefits?
   D. How is the team performing against the PMP?
   E. Is the team being led effectively?
   F. Is conflict being managed effectively?
   G. Is communication effective with the project sponsor and stakeholders, especially regarding issues and progress?

H. Is governance of the project effective to ensure efficiency and adherence to overall agreed project goals and objectives?

Output: **Project Deliverables**

4. **Transition (or Handover/Closure phase)** is where the project is heading towards its end and the project manager needs to start thinking of handing over the ownership processes, documents, procedures and continuation of the systems developed through training to business-as-usual staff or end users. This will involve the agreement of the project sponsor and sign-off according to the acceptance criteria. **The project is being prepared for transition to BAU**.

Key Qs:

A. Have the key project deliverables been realised and accepted by the end user?
B. Have we got agreement/ approval for project handover and closure from the project sponsor and end users?
C. Can we start the process of transferring ownership?
D. Have appropriate levels of training been provided to the end users to continue?

Output: **Project Processes/systems of operations**
Project documentation

As part of the Transition phase is Closure, which is concerned with closing down the project, archiving the documents and demobilising the project team. At this stage, project reviews and evaluations will also take place to capture any lessons learned for future projects of a similar nature.

Key Qs:

A. What are the lessons learned?
B. How did the team perform?
C. How did the project manager perform?
D. Did the project manager and sponsor work well together?
E. How was project managed against the PMP?
F. Was conflict resolved effectively?
G. Was stakeholder communication effective?
H. How happy were the end users with:
    1. Performance
    2. Product/service
    3. Behaviour of team
I. Have the outputs been delivered?

Output: **Project Deliverables - Outputs**
Project Review and Lessons Learned

APM BoK, 2019 outlines the project life cycle as shown in Figure 2.1. This also illustrates the extended life cycle and the extra phases.

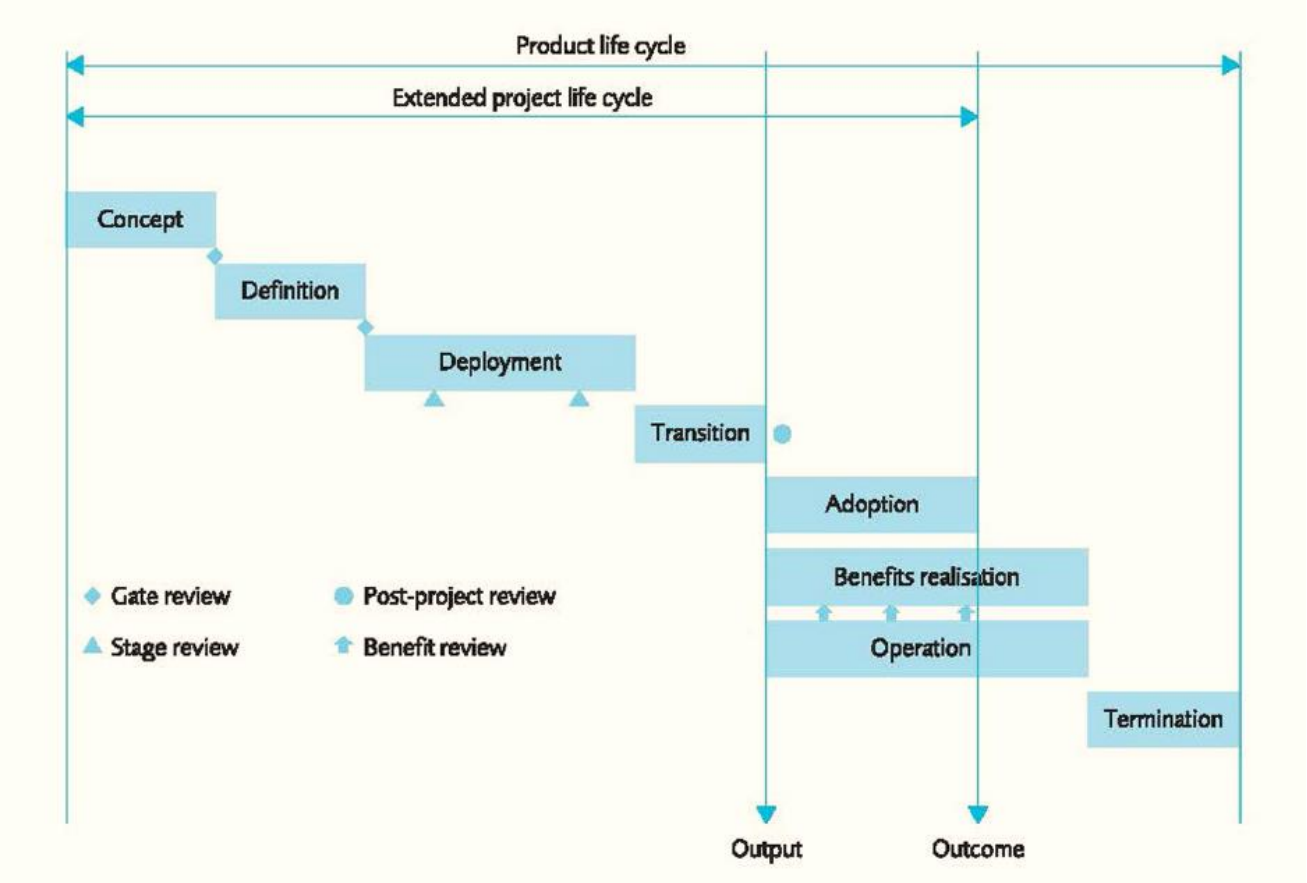


Figure 2.1 APM Project Life Cycle model

Source: APM PMQ Study Guide, 2020

Although the project might be considered closed when formally handed over, the project sponsor remains involved (perhaps alongside the project manager in a reduced role) until the benefits have been realised. **Benefits Realisation** takes place during the early stages of the **adoption phase (operations phase)**; this element is referred to as the **Extended Project Life Cycle (see Figure 2.1)**. Examples of this include transformation work involving the observation and assessment of new behaviours in attitude and customer service; or a piece of new software 'going live,' requiring the assessment of its impact over a certain period after project closure. The inclusion of *Operational and Termination* makes up the **Product Life Cycle**. The termination phase should also draw out the cost of disposing of the product at the end of its useful life. Examples include decommissioning a nuclear power station or train carriages/engine stock.

Types of Project Reviews

In the project life cycle, various types of reviews are mentioned to ensure accountability and control over the project.

Project Reviews

These regular reviews are vital to the management of the project as they provide feedback as to progress against the PMP and aid effective communication. Reporting also demonstrates that the project is under control, with any issues are highlighted and communicated to key stakeholders.

Phase, Stage or Gate Reviews

These reviews are carried out at the end of each Phase or Stage. These are known as 'gateways.' At each gateway the project manager is responsible for reporting and seeking approval to progress to the next phase or stage. The authority to pass through the gateway usually sits with the sponsor or executive. At these gateways, progress is reviewed against the PMP and business case. If approved, further funds may be released for continuation. If not approved, changes may be needed to the baselined plan and/or conditions imposed for movement through the gateway. If the problem is wider in scope, it may be decided that the project is no longer viable against the business case and that it should be terminated. The gateway review builds confidence for both project manager and sponsor that the project is being well managed and is on course for successful completion.

Project Status/ Evaluation Reviews

Project Status reviews are carried out at a particular moment in time within the project life cycle, to determine its status. These are internal reviews by the project manager. They may be built into the PMP or be triggered as a result of:

- missed major milestone
- project scope creep (see Scope Management)
- technical issues impacting on the project deliverables
- resource crisis
- over-spend on budget
- over schedule
- ineffective governance.

Project Audits

Projects audits are aligned to quality assurance (see Quality Management) and involve the evaluation of project performance on a regular basis, to provide confidence that the project will deliver to agreed quality standards as stated in the Quality Plan.

Peer Reviews

This is the use of experienced colleagues or other team members to review performance, processes, plans and project practices. They are regarded as 'health checks' and can enhance the management of a project by utilising colleagues' direct knowledge and experience of the project work or processes. Peer review often provides valuable support and suggestions for improvement.

Post Project Review

These are carried out at the end of the project to **capture lessons learned** using the success and/or acceptance criteria by the **Project Manager**. Project processes and practices are reviewed and evaluated together with team and overall project performance. 'How well were the resources deployed and utilised?' will be a key question. The organisation receives the project evaluation report to capture any lessons that may include good practice as well as areas of development for the future.

- Were the project outputs/deliverables accepted?
- How well did the project team perform?
- What were the key issues raised through the project life cycle?
- What were the lessons learned from delivering the project?

Benefits Realisation Review

These reviews will be led by the **project sponsor** after the project has been closed and handed over. This will involve a thorough assessment and analysis of project performance and the achievement of benefits as stated in the business case. Key questions are:

- Were the intended outcomes delivered?
- Did the project make a difference?
- Did the project deliver beneficial change?
- Did the project deliver the benefits stated?
- Were there any unexpected benefits from the project?

Different Types of Lifecycles

All projects are managed differently. Some will need to be managed in a more linear way which is sometimes known as a **waterfall project** e.g. construction of a new office block. This approach is suited to projects with a known or tight scope. Other projects will be managed in

an iteratively which is more of an **Agile approach** e.g. IT software development. This project approach is suited to where the scope needs to evolve. Whilst some projects will be managed using both, known as **hybrid** e.g. if the deliverables required are varied it might be best to deliver these using mixed approaches.

A **Linear Lifecycle** (also known as waterfall project) will run exactly the same as above from the concept phase to the transition (handover phase) with the product released to the client, or user in the extended phases – adoption and benefits realisation.

An **Iterative lifecycle** (also known as agile approach) is different. You will still have a pre-project phase, establish the feasibility and foundations of the project. However, you move into development which is evolutionary, in that you release a deliverable, obtain feedback on its performance, make any changes or fixes based on the feedback from the testers, and then re-release for checks until approved. We call this the **Assemble – Review – Deploy cycle** within the Evolutionary Development. Once products are approved, it is released to the user and swiftly moves into post-project, ready for a project review. See Figure 2.2

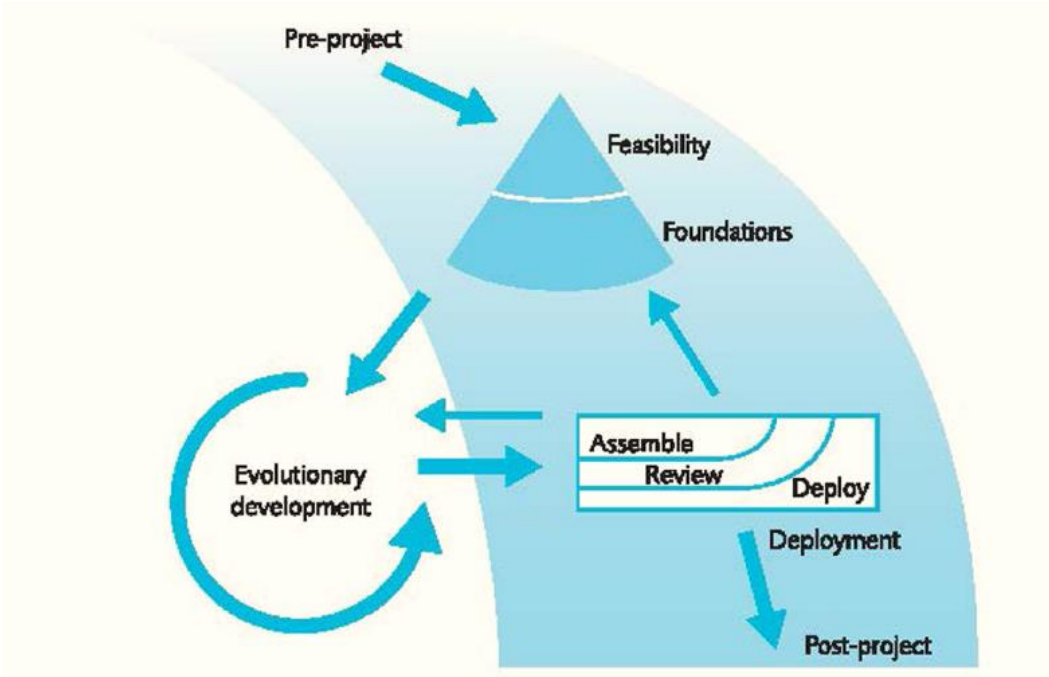


Figure 2.2 Iterative development in dynamic, agile context

Source: The DSDM Agile Project Framework Handbook, 2014

A **hybrid programme lifecycle** is a mix of the two, this is catering for those projects that have elements of both waterfall and agile approaches needed to achieve chosen objectives of programme. An example of this would be utilising iterative or agile methods to gather requirements early, where the uncertainty is greatest, and following it up with incremental or sequential processes, which would be derived from the two mentioned lifecycle models as shown in Figure 2.2 and 2.1, to formalise the development. See Figure 2.3.

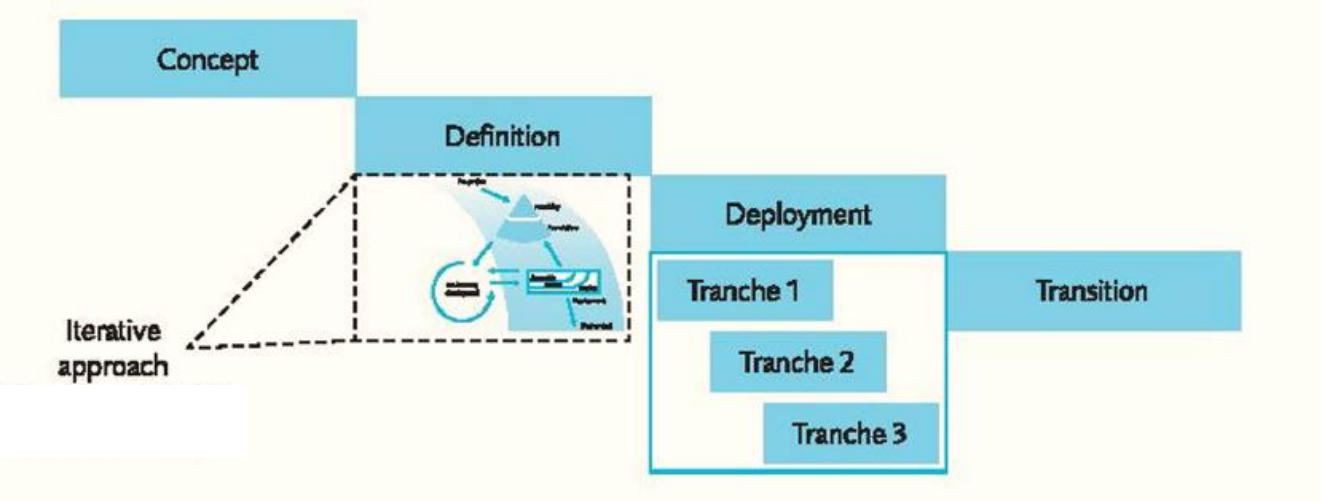


Figure 2.3 Hybrid Programme Lifecycle

Notice the deployment phase is managed by tranches which shows the linear projects being delivered within the programme.

Project Governance and Product Governance

A point to remember is that whilst you are following procedures, policies and regulations that are local within your project teams, the governance changes once the project's product becomes in full operational use. This therefore means the **governance around this product is organisational wide and not project wide** as before.

Exercises

1. Define the project life cycle and project life cycle phases.
2. Why are projects structured in phases?
3. Explain the difference between a project life cycle and an extended project life cycle.
4. Explain the linear, iterative and hybrid life cycle.

Section 4

Governance and Project Methodologies

Learning Outcomes

- **Explain why aspects of project management governance are required (such as the use of policies, regulations, functions, processes, procedures and delegated responsibilities)**

PMQ Learning Outcomes	APM BoK Reference
1	11.3, 1.3.1

Corporate Governance

The Organisation for Economic co-operation and Development (OECD, 2004) provides a definition for corporate governance as follows:

> **'Corporate governance involves a set of relationships between a company's management, its board, its shareholders and other stakeholders. Corporate governance also provides the structure through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined.'**

The APM BoK, 2019 states that the governance is:

> **'The framework of authority and accountability that defines and controls the outputs, outcomes and benefits from projects, programmes and portfolios. The mechanism whereby the investing organisation exerts financial and technical control over the deployment of the work and the realisation of value.'**

The task of project governance then is to ensure that P3M is done efficiently and effectively. Governance of portfolios, programmes and projects is a necessary part of organisational governance. It provides for internal controls, while externally, it reassures stakeholders that their investment is justified.

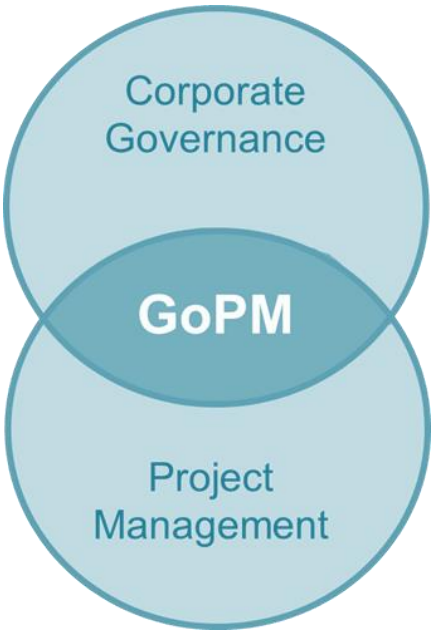
Good governance is increasingly demanded by shareholders, government and regulators and to comply with external regulations and legislation (e.g. the UK Corporate Governance Code and Sarbanes-Oxley in the USA).

The benefits of good P3M governance include the optimisation of investment, avoidance of common reasons for failure, and motivation of staff through better communication. The application of good governance minimises risks arising from change and maximises the benefits.

Good governance can be demonstrated through:

- the adoption of a disciplined life cycle governance that includes approval gates at which viability is reviewed and approved
- ensuring that P3 management adds value
- recording and communicating decisions made at approval gates
- the acceptance of responsibility by the organisation's management board for P3M governance
- establishing clearly defined roles, responsibilities, and performance criteria for governance
- developing coherent and supportive relationships between business strategy and P3M
- procedures that allow a management board to call for an independent scrutiny of projects, programmes, and portfolios
- fostering a culture of improvement, transparency, and disclosure of P3 information
- giving members of delegated bodies the capability and resources to make appropriate decisions
- ensuring that business cases are supported by information that allows reliable decision-making
- ensuring that stakeholders are engaged at a level that reflects their importance to the organisation and in a way that fosters trust
- the deployment of suitably qualified and experienced people

Good governance of projects therefore is the link between organisational and project governance as illustrated below in Figure 4.1:



Reproduced by the kind permission of APM: Figure 4.1: Governance of Project Management

So how does governance fail in projects? The APM Special Interest Group, of which the author is a key member, cites the following areas of project failure:

1. Lack of alignment between project and organisational strategic priorities and objectives
2. Senior level engagement and ownership is inadequate
3. Stakeholder relationship management is poor and ineffective
4. Proposals driven by price rather long-term value for money or benefits
5. Inadequate project competencies to deliver portfolio – organisational capability.

The Board of Governance is there to provide strategic leadership and ensure alignment of the portfolio with the business strategy. In the absence of this, portfolios often lack effective leadership and direction. The structure of governance is illustrated in Figure 4.2

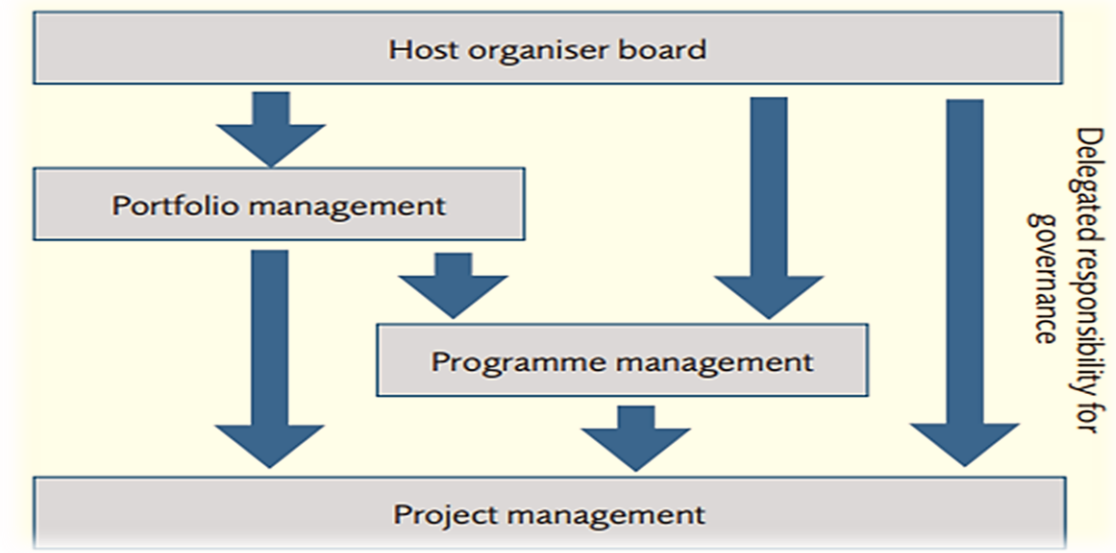


Figure 4.2: Governance for Project Management

Reproduced by the kind permission of APM: Guide to Directing Change

The roles and responsibilities for the organisation's board are clearly defined in the APM's guide *Directing Change*. These are set around four key principles:

1. **Portfolio strategic direction**
2. **Project sponsorship – commission/sponsor projects/programmes for beneficial change**
3. **Project management capability – balance organisational resources and BAU**
4. **Disclosure and reporting – transparency, integrity, sustainability**

The APM guides to governance outline some 13 key principles and draw attention to good practices for Directing and Co-Directing Change. The latter is becoming increasing important as more and more organisations come together to deliver projects/programmes in a partnership arrangement of some kind. In this instance then governance becomes even more

imperative to ensure boundaries are respected and conflict is resolved using sue processes that must be established. See Below.

No.	Governance of Project Management Principles
1	The board has overall responsibility for the governance of project management.
2	The organisation differentiates between projects and non project-based activities.
3	Roles and responsibilities for the governance of project management are defined clearly.
4	Disciplined governance arrangements, supported by appropriate cultures, methods, resources and controls are applied throughout the project life cycle. Every project has a sponsor.
5	There is a demonstrable coherent and supporting relationship between the project portfolio and the business strategy and policies, for example ethics and sustainability.
6	All projects have an approved plan containing authorisation points at which the business case, inclusive of cost, benefits and risk is reviewed. Decisions made at authorisation points are recorded and communicated.

No.	Governance of Project Management Principles
7	Members of delegated authorisation bodies have sufficient representation, competence, authority and resources to enable them to make appropriate decisions.
8	Project business cases are supported by relevant and realistic information that provides a reliable basis for making authorisation decisions.
9	The board or its delegated agents decide when independent scrutiny of projects or project management systems is required and implement such assurance accordingly.
10	There are clearly defined criteria for reporting project status and for the escalation of risks and issues to the levels required by the organisation.
11	The organisation fosters a culture of improvement and of frank internal disclosure of project management information.
12	Project stakeholders are engaged at a level that is commensurate with their importance to the organisation and in a manner that fosters trust.
13	Projects are closed when they are no longer justified as part of the organisation's portfolio.

is One of the key roles highlighted is project sponsorship. The APM BoK, 2019 states that Governance Board is:

'A body that provides sponsorship to a project, programme or portfolio. The board will represent financial, provider and user interests. Members of a governance board oversee deployment and make decisions through the chosen life cycle. Alternatively called steering committee, steering group, project board, programme board, etc.'

Figure 4.3 illustrates this important link between board and project governance.

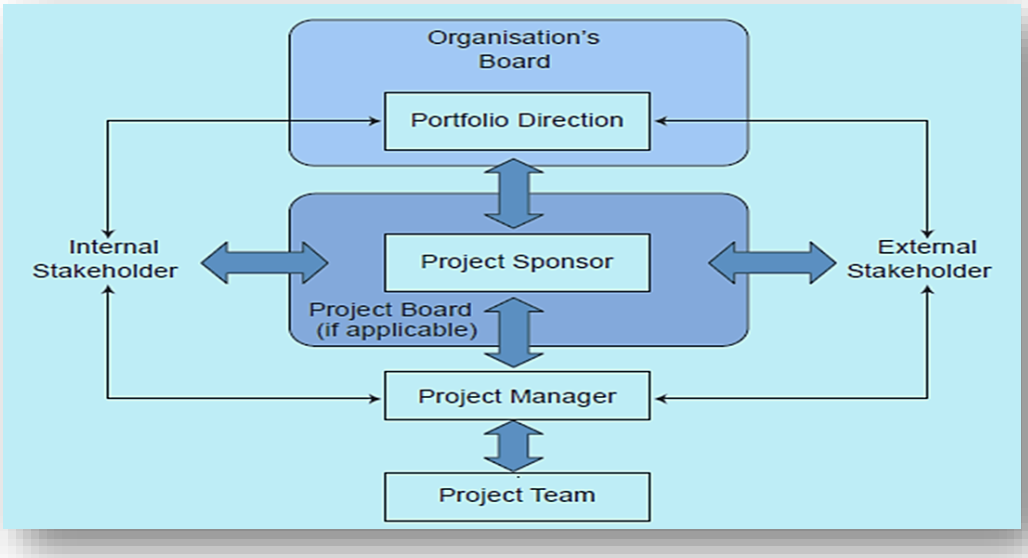


Figure 4.3: Project Sponsor and its links to the Board and Project Manager

Reproduced by the kind permission of APM:
Sponsoring Change: A Guide to the Governance Aspect of Project Sponsorship

Here it is worth bringing the role of the **Project Management Office** as it plays a delegated assurance role and works independently as the eyes and ears of the Board to ensure effective governance.

Project Methodologies & Approaches

Project Methodologies are used to provide consistency in the application of PM tools and techniques and structure to project governance. Methodologies typically include:

- Process models
- Defined life cycles
- Structure and defined roles
- Templates for documentation/ plans
- Risk management
- Quality assurance (QA) and earned value management (EVM)
- Reporting and monitoring standards
- Risk management and change control
- Guidance on the adoption of the methodology to different project environments.

The benefits of using a standard methodology across an organisation include:

- encourages **a structured approach** to delivering projects
- **use of consistent terminology**
- a **common understanding of the responsibilities** associated with roles
- standardisation of methods and processes
- standard templates allow new project staff to learn with reduced support
- faster implementation – off the shelf
- **develops a common language, terminology** and a culture of managing projects
- **encourages best practice – project maturity models**
- a structure for development of new project managers
- improves communication between various stakeholders
- greater mobility of staff between projects
- can be tailored to own project
- **facilitates improved project governance**
- consistent documentation across projects

One of the well-known methodologies is **PRINCE2®** (PRojects IN Controlled Environments) which was developed by the Cabinet Office and AXELOS Global Best Practice to deliver public projects more effectively, insisting that all suppliers and organisations doing business with the government adopt this methodology. From its public release in 1996 and further updates in 2009 and more recently 2017, it has become the *de facto* UK standard for managing projects, despite its critics.

A project methodology can be used alongside a development method such as waterfall or agile. The former is a sequential, staged development process, whereas the latter provides an iterative and incremental development process.

The traditional **waterfall approach** concentrates on gathering all the key stakeholder requirements from the beginning, and then calculating the time and resource required to deliver the project. **Agile** focuses on which requirements can be delivered within constrained time and resources.

Exercises:

1. State six principles of the governance of project management.
2. For any of the above, explain the possible consequences of failing to abide by them.
3. Explain five benefits that would accrue to an organisation that adopted good governance of projects.
4. Explain the benefits of adopting a project methodology for an organisation.

Section 5

Stakeholder Management, Information Management, Reporting and Communication

Learning Outcomes

- **Describe the stakeholder management process**
- **Outline the role of knowledge and information management to inform decision making**
- **Explain the benefits, to a project, of a communication plan**
- **Explain the relationship between stakeholder analysis and an effective communication management plan**
- **Explain the relationship between stakeholder analysis, influence and engagement**
- **explain the importance of managing stakeholder expectations to the success of the project**

Learning Outcome	APM BoK Reference
2, 4, 6	2.2.3, 3.1.1, 3.1.3, 3.3.1

Stakeholder Analysis and Management

Stakeholder engagement as stated in the APM BoK, 2019 is:

> **'The systematic identification, analysis, planning and implementation of actions designed to influence stakeholders.'**

Stakeholder management would be how you would apply these actions and define processes of management.

A stakeholder is any person or organisation that can be impacted by, or has an impact upon, the project. Therefore, they have an interest in the project. They may also have a key role in defining the success criteria of the project. In identifying the key stakeholders, their power and interest should be assessed to formulate a strategy as to how best to manage them. This process is known as **stakeholder analysis**.

The ***stakeholder management process*** is set out in the table below:

Process	Action
Identification	**Identify** the key stakeholders: who are they? And what are their requirements?
Assessment	**Assess** their influence and interest: what are their levels of power/influence in relation to the project? What are their levels of interest in the project?

Strategy	**Develop** an action plan to manage the stakeholders, i.e. a communication/ engagement plan using the Assessment and Strategy Grid in Figure 5.1
Review	**Monitor** - Influence and power levels may change and/or new stakeholders may emerge during the life cycle of the project. Also actions taken and action plan may need reviewing.

Applying Assessment and Strategy Grid

Figure 5.1 shows the stakeholder analysis grid (Menedelow Matrix, 1991) that can help developing a stakeholder strategy and communication plan. Identifying stakeholders can assist with:

- Scoping the project – requirements of end users
- Resource planning – budgets may be needed for effective communication and management
- Impact on organisation and people
- Regulatory bodies may need to be represented at key events and meetings
- Influential people may need greater care and attention – therefore managed by project sponsor.

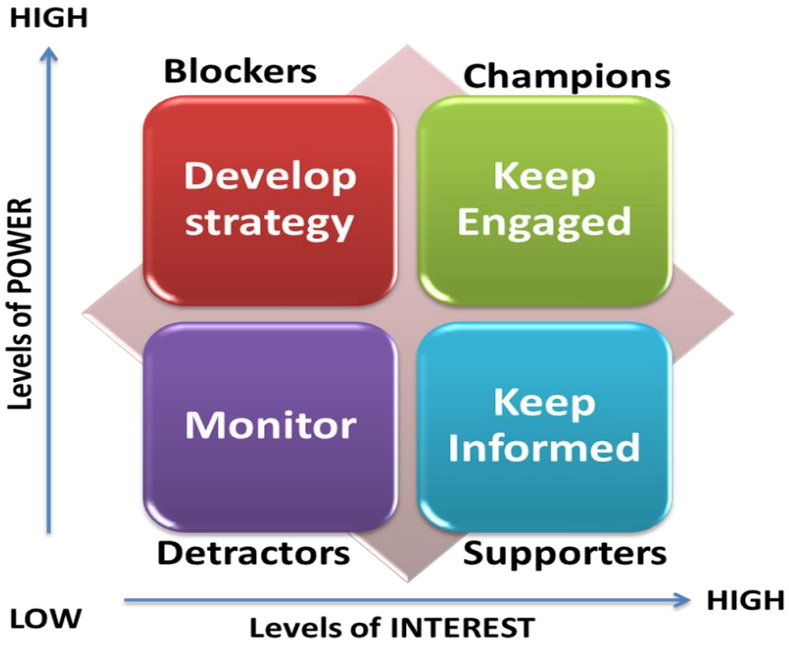


Figure 4.4: Stakeholder Analysis

The **assessment of the key stakeholders** allows to us to develop communication strategies to engage the stakeholders and generate commitment to its success. From the stakeholder analysis, the **communication plan (section 14)** can be developed. Responsibility for managing the relationship with a particular stakeholder group can be assigned to a role or individual on the project team, and resources can be apportioned where needed. For example, a

community pressure group may need convincing that the project is necessary – e.g. the third Heathrow runway. Stakeholders can be categorised into:

- Champions
- Blockers
- Detractors
- Supporters

The project sponsor who is the **project champion** can be a key person to help manage the 'blockers' by organising 'supporters.'

The analysis and process may need to be repeated if the project lifecycle is long and people's opinions, attitudes etc. may change.

Importance of Stakeholder Management

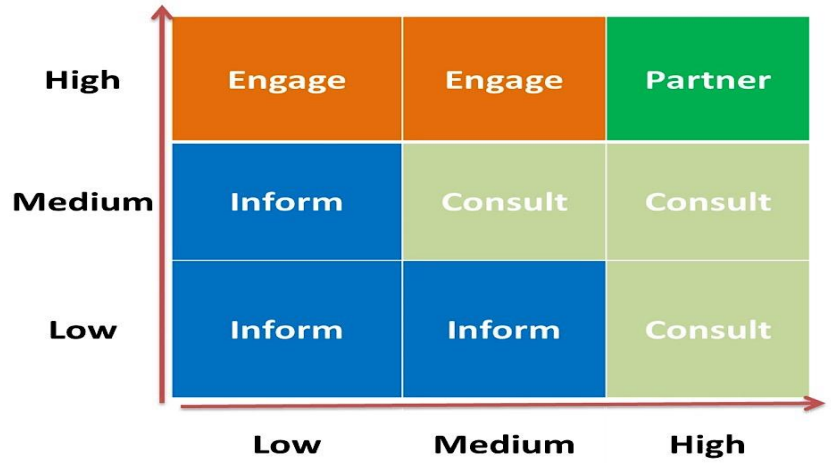
Stakeholders will have certain expectations from the project. Therefore, not only is it important to identify the stakeholders, but also to ensure their requirements are met. This should help to refine the project management plan and improve the project's execution, by:

- Adding definition to the scope of the project
- Supporting the project, especially in difficult times
- Securing resources
- Securing commitment and engagement
- Understanding stakeholder reactions to risks and issues
- Supporting regular communication and reducing conflict.

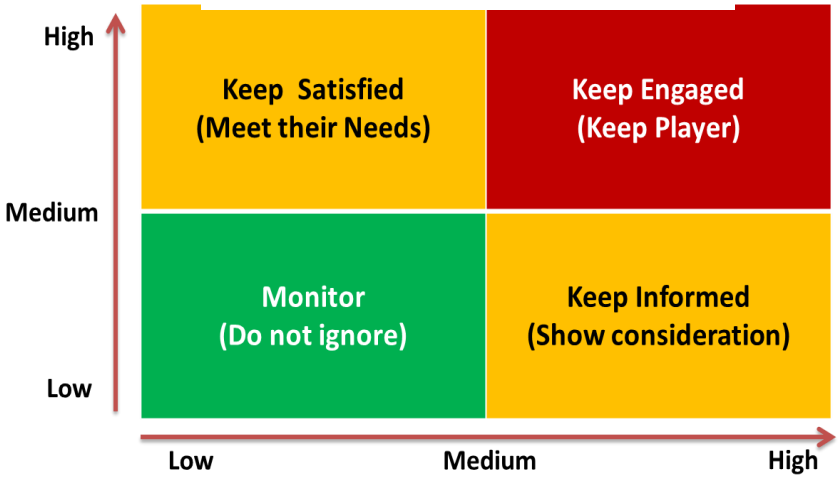
Stakeholder Management Action Plan (Strategy)

Having identified the stakeholders and assessed their influence and commitment, we can then devise an action plan (strategy) as to how to best manage them and their expectations, whether they are 'champions' or 'blockers'!

Using the Assessment grids, we can apply the action strategies to each of the stakeholders:



Grid 1: Stakeholder



Grid 2: Stakeholder Strategy

Information Management

According to APM BoK 2019 information management is:

'is the process that includes the collection, storage, curation, dissemination, archiving and destruction of documents, images, drawings and other sources of information.'

Information Management or Data Management is concerned with ensuring that the organisation manages the project's information effectively and efficiently. There must be a dedicated system to ensure that all relevant information is captured, stored, disseminated, and archived securely and safely. In a world where 'soft' data is easily accessible, consideration must be given to how project information will be managed as well as adhering to regulations that include:

- The Data Protection Act (1998) and **General Data Protection Regulation (GDPR, 2018)**
- Freedom of Information Act (2000)
- Official Secrets Act (1911 to 1989).

The Information System should consist of six phases:

1. ***Collection*** – how project information will be acquired, i.e. where is it coming from – source written, audio, web based, etc.
2. ***Storage*** – determining how the information will be stored, how will access be controlled?
3. ***Curation (Analysis)*** – checking the validity of the information and its relevance
4. ***Dissemination*** – how will it be distributed to stakeholders?
5. ***Archiving*** – what will be the process for archiving inactive information, whilst ensuring that it remains accessible?
6. ***Destruction*** – what will be the process for defining and legally destroying archived data?

People need information that is:

- **Accurate** – factual and well established as a basis for decision making
- **Relevant** – the audience will benefit from the information; its volume and detail is appropriate to their needs.
- **Clear** – well presented, graphical, visual and without clutter – eliminating words which won't be read, which risks the loss of the message.
- **Timely** – monthly reports that are provided six weeks after the month end are not useful, and indeed things may have progressed since then. – know the reporting cycles.

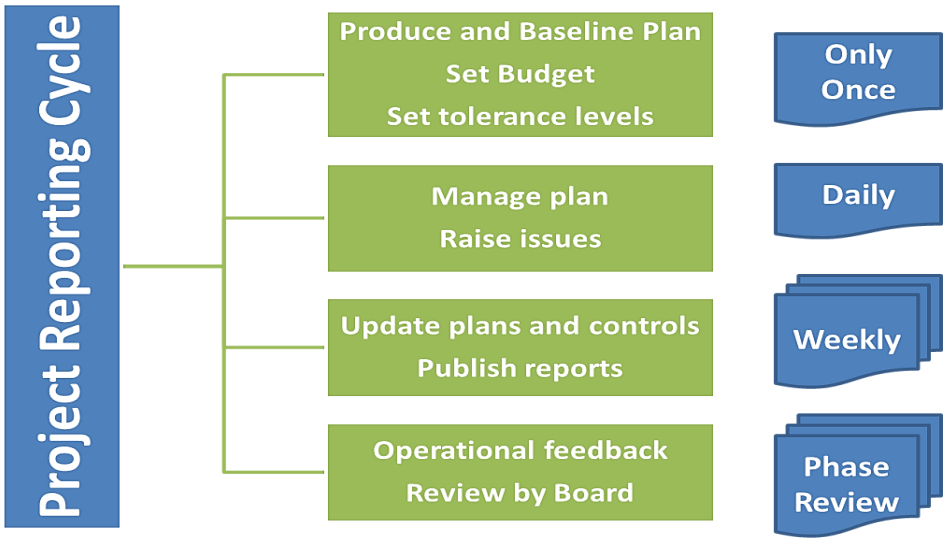
Document Management System

A key element of Information Management is Document Management System. The key requirements for DMS are:

- It needs to cater for all types – reports, plans, letters, minutes, specifications, etc.
- All documents, including their format and location, should be listed
- There should be version control in place – Configuration Management
- Access should be easy but secure and safe at the same time

Project Reporting

Part of effective governance is the reporting cycle imposed on project managers to monitor and control project progress and ensure effective delivery. The reporting cycle will be agreed between the sponsor and the project manager, who in turn will agree similar patterns with their teams. **This forms part of the overall Communication Plan for the project**. These can be *weekly, monthly, quarterly or annually*.



Different types of reports will be required with varying degrees of detail, depending on the different stakeholders. The project board's requirements are different to that of the project team or the public. Avoid overloading stakeholders and use **Exception Reporting** where appropriate – i.e. the report concentrates on variances rather that those items that are on track – also known as **Reporting by Exception**.

Typical reports include:

- Weekly/ monthly progress reports
- Cost and Schedule variance reports
- Progress and Milestone achievement reports
- Team Performance Reports
- Benefit Review and Update reports
- Project Progress and forecast report.

Effective Stakeholder Management relies on effective communication; therefore Information Management and Reporting are intrinsically linked to Communication planning and Stakeholder Management.

Exercises:

- Explain the importance of managing stakeholders' expectations.
- Explain the Information Management Process with examples.
- Explain the benefits of a formal reporting cycle.

Section 6

Planning for Success

Learning Outcomes

- **Explain the importance of a business case throughout the project life cycle**
- **Explain what is meant by benefits management (including identification, definition, planning, tracking and realisation)**
- **Explain Financial Investment Appraisal Techniques used by a Project Manager:**
  - **Internal Rate of Return**
  - **Net Present Value**
- **Explain the relationship between the deployment and the development of a project management plan in linear and iterative life cycles**
- **Explain the importance of producing a Project Management Plan (PMP)**
- **Describe the typical contents of a PMP**

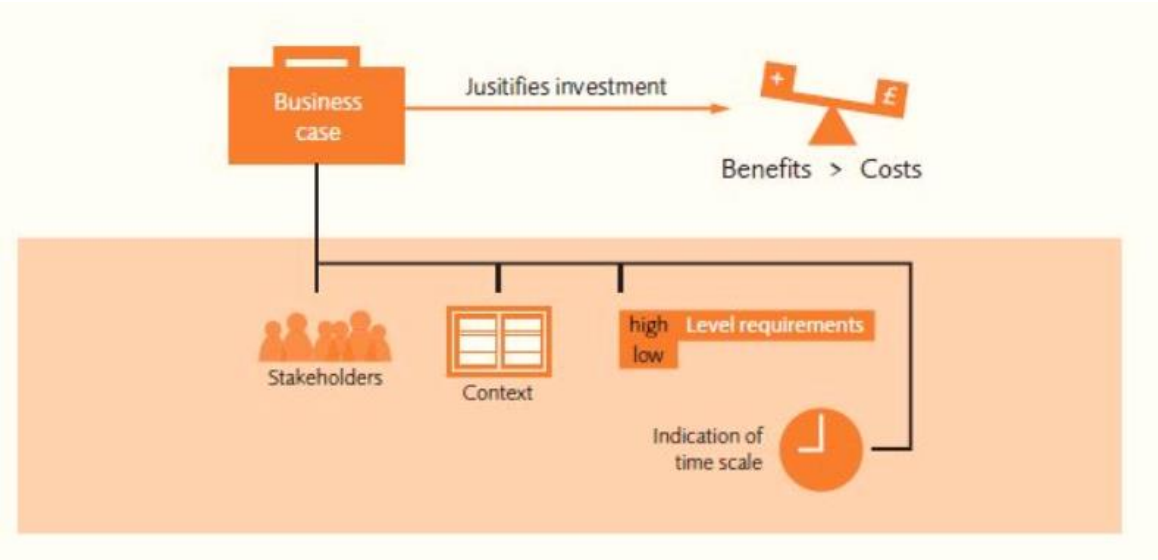
PMQ Learning Outcomes	APM BoK Reference
6	1.1.3, 1.1.4, 1.2.2, 1.2.5, 1.3.7, 4.2, 4.2.10,

Project planning is vital to the success of the project; therefore, it is imperative that the need, problem or opportunity that defines the project is understood. What are the goals and objectives of the project and why does it need to happen? The *'why' statement addresses the change that needs to be delivered and the benefits to be realised*. This is often referred to the initial or high-level **Business Case**.

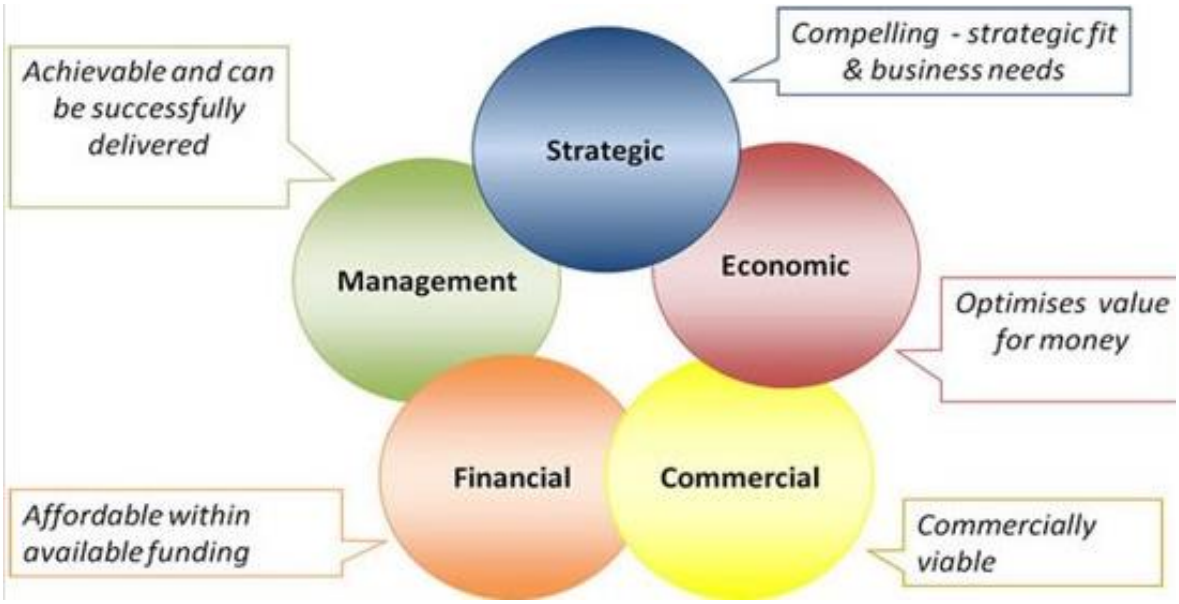
The Project Business Case

> **'The business case provides justification for undertaking a project or programme. It evaluates the benefit, cost and risk of alternative options and provides a rationale for the preferred solution.' APM BoK, 2019**

The objective in developing the business case is to provide ***a justification for the project***. It demonstrates the ***expected investment against benefits*** and how it ***aligns with the business strategy of the organisation***. Bear in mind that not all benefits are tangible, measurable, or easily expressed in monetary terms. The Business Case is prepared in the initial phase of the project life cycle and provides **evidence of the level of priority and resources required for success**. Although no detailed planning is carried out at this stage, there still needs to be enough information to make an informed decision as to the **viability of the project** and **why this project should be chosen over another**. Once the Business Case agreed and baselined, it will be used to monitor the viability of the project throughout the project life cycle.



The information presented in the business case results from the work conducted in the early phases of the chosen life cycle. A common way of thinking about the business case is using these five dimensions:



Source: APM BoK 7, 2019

A common way of thinking about a **business case** is using these five elements:

1. **Strategic context**: The compelling case for change.
2. **Economic analysis**: Return on investment based on investment appraisal of options.
3. **Commercial approach**: Derived from the sourcing strategy and procurement strategy.
4. **Financial case**: Affordability to the organisation in the time frame.
5. **Management approach**: Roles, governance structure, life cycle choice, etc.

The **business case** is reviewed and revised at decision gates as more mature estimates and information become available. The approved business case provides a record of the decisions made by governance about how to achieve the required return on investment from the work. It documents the options considered and it is normal practice to include the 'do-nothing' option as a reference. Through this approach, the business case becomes a record of the recommended option with rationale and evidence to support the decision.

The presentation of the business case, if approved, results in the formal start-up of the project, programme, or portfolio. The sponsor owns the business case.

It brings together the **investment appraisal** with evidence of how the investment is intended to lead to realisation of the intended benefits. All projects must have a business case that demonstrates the value of the work and it is outlined during the concept phase of the **life cycle**.

Typical contents of the Business Case

- **Strategic Case** – background and description of the problem/ opportunity together with an outline of the scope of the project. How this project fits the business strategy.
- **Goals and objectives of the project** – a clear statement of goals and objectives
- **Options appraisal** – what options have been considered and which have been chosen including the option of 'do nothing.'
- **Expected benefits** – the benefits that will arise from the project and deliverables, tangible and intangible.
- **Financial Investment** – investment appraisal and funding arrangements.
- **High-level Work Breakdown Structure**
- **Timescales** – outline of schedule and milestones.
- **High level risks and assumptions** – their impact on the business case.
- **Success criteria** and project success factors
- **Procurement strategy**
- **Stakeholder Analysis**
- Any **impact on Business-as-Usual** activity.

Constructing the business case (see Figure 6.1) is really the first attempt in project planning. It is important to remember that this is an iterative process, until there is a sense of satisfaction that key factors and issues have been considered and addressed. Remember that any project involves risk and it is inevitable that some risks will need to be taken.

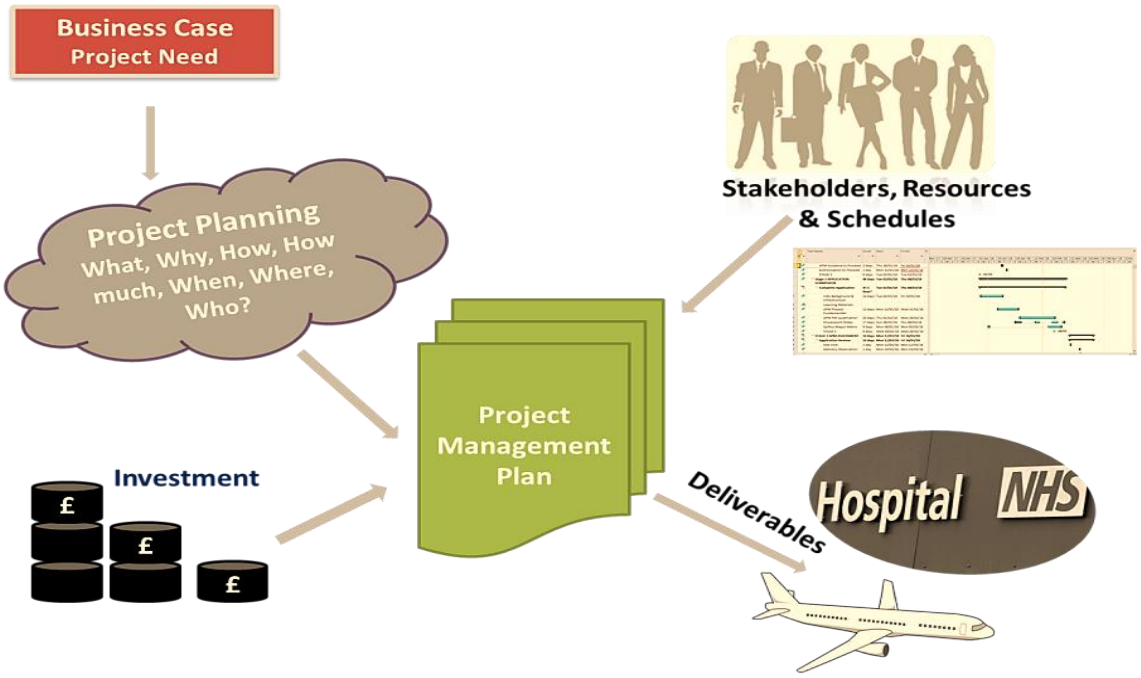


Figure 6.1: Outline Business Case to Project Plans

Business Case importance during the Project Life Cycle

The Business Case owned by the Project Sponsor and may seek the support of the project management to fully develop it, during the first phase of the project life cycle. In consultation with the project sponsor and other key stakeholders, the project is **clearly defined and scoped, outlining the goals and objectives**.

During the planning stage, the **Project Management Plan** (PMP) is developed (although in reality this is probably happening alongside the evolving detailed Business Case) and is guided by the high-level Business Case. The PMP is owned by the Project Manager.

During the deployment (implementation) phase, the PMP will provide the operational plans for the project, but the Business Case will set out the benefits to be achieved. The PMP is the blueprint for project delivery while the Business Case provides the rationale for high level stakeholders to invest, deliver, and reap the benefits of the project. During implementation, should the execution of specific work packages or tasks raise questions of continued viability of the Business Case, the Project Sponsor and the Project Manager will need to take appropriate action. This might include adjusting the project's scope and plan or terminating it entirely. Therefore, the Business Case benefits must be reviewed alongside the performance of the project team and project progress during gate reviews and milestones.

During the transition (handover and closure) phase, the Business Case will be used to check products for acceptance and review when benefits will be realised. During benefits realisation, the Business Case will be the document for reference to investigate whether the stated benefits have been realised, both in value and time.

Key Roles in developing the Business Case

The Business Case is developed not in isolation by the project manager but by key contributors that include:

- **The Sponsor** who oversees the development of the business case in conjunction with the Board or Steering Group. ***The Sponsor owns the Business Case.***
- **The Project Manager** should ideally write the Business Case together with the Sponsor. In reality, the Business Case has often already been written and passed to the Project Manager. At this point the PM should digest it very carefully and probe the reasons for the project, its priority and strategic alignment, and the availability of resources to fully understand the size, scale, objectives and deliverables of the project. The ***Project Manager will report on the viability of the Business Case through the life cycle of the project.***
- **The Suppliers** – who may be supplying expertise to the project. Their early input may help to shape the Business Case and possible benefits
- **The End Users/ clients** who know what they want (not what they wish for) may provide vital information to confirm the objectives. They will ***help identify requirements and KPIs, benefits and the continued on-going viability through the life cycle***.
- **Finance/ Technical Experts,** who may provide the project with professional specialist work that helps fine tune the business case, identify significant risks and help answer the question 'what is actually possible here?' ***They will verify the technical feasibility of the project***.

Government case study: https://www.apm.org.uk/resources/find-a-resource/from-business-case-to-benefits-realisation/

Benefits Management

> **"Benefits management is the identification, definition, planning, tracking and realisation of benefits. Benefits realisation is the practice of ensuring that benefits are derived from outputs and outcomes." APM BoK 7, 2019**

The Benefits Management process (see Figure 6.2) consists of clearly stating the expected benefits from a project, then ensuring those benefits are delivered through the project life cycle. Such benefits are rarely realised at the Handover stage and may take months before they begin to surface, therefore the project sponsor maintains involvement by monitoring the agreed benefits and their ultimate realisation.

Benefits are the reason why the project is being funded, and therefore they should be clearly stated and be measurable. ***The responsibility of Benefits Realisation rests with the Project Sponsor who should ensure benefits reviews are undertaken regularly through the lifecycle*** of the project by the project manager and reported on in a timely manner.

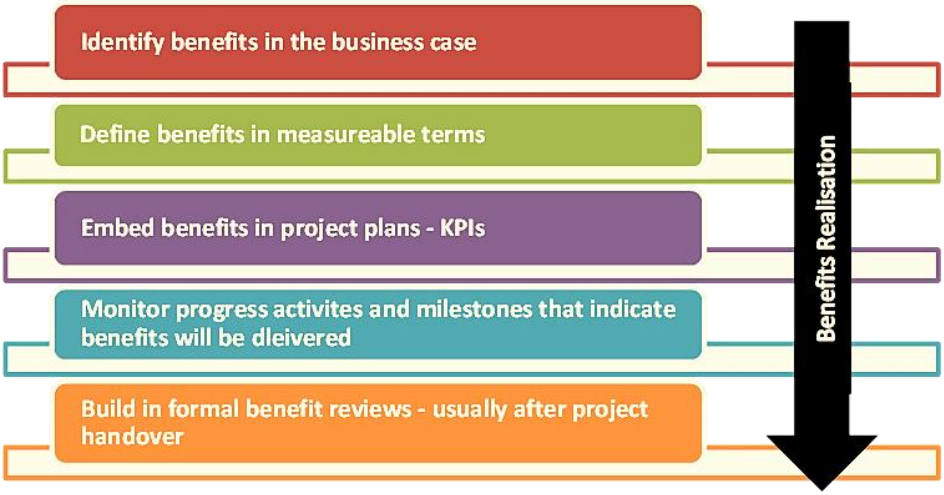
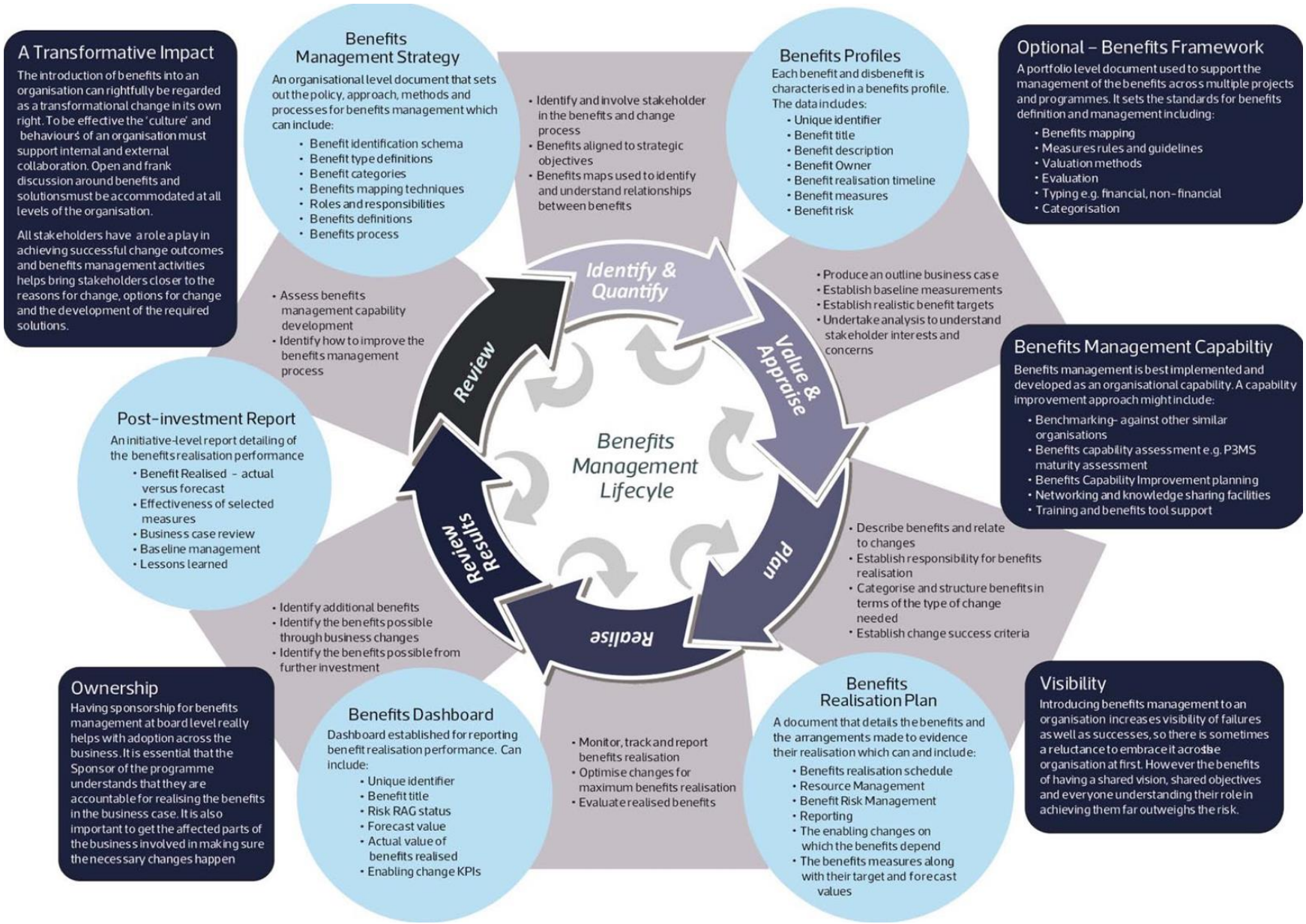


Figure 6.2: Benefits Management Process

Benefit reviews check that planned business benefits are being delivered, as some may begin to be realised during the life cycle. The project sponsor will review the benefits with mainly operational staff and consider forecast (stated in the Business Case) against actual (Benefits Review). If the benefits are not forthcoming, this should be proactively investigated, and an action plan drawn up to remedy the situation.

Benefits Management Process

The Benefits Management process illustrated in Figure 6.2 provides an outline of the key steps. This must be clearly indicated in the Business Case. Using the 'SMART' mnemonic, benefits must be specific, measurable, appropriate, realistic, and time bound. The benefits should be embedded in the plans as extra activities to ensure they are achieved as well as actively monitoring their progress. The APM Benefit's Management SIG provide the following diagram to illustrate the Benefits Management Cycle:


A Transformative Impact
The introduction of benefits into an organisation can rightfully be regarded as a transformational change in its own right. To be effective the 'culture' and behaviours of an organisation must support internal and external collaboration. Open and frank discussion around benefits and solutionsmust be accommodated at all levels of the organisation.
All stakeholders have a role a play in achieving successful change outcomes and benefits management activities helps bring stakeholders closer to the reasons for change, options for change and the development of the required solutions.
Benefits Management Strategy
An organisational level document that sets out the policy, approach, methods and processes for benefits management which can include:
• Benefit identification schema
• Benefit type definitions
• Benefit categories
• Benefits mapping techniques
• Roles and responsibilities
• Benefits definitions
• Benefits process
• Identify and involve stakeholder in the benefits and change process
• Benefits aligned to strategic objectives
• Benefits maps used to identify and understand relationships between benefits
Benefits Profiles
Each benefit and disbenefit is characterised in a benefits profile. The data includes:
• Unique identifier
• Benefit title
• Benefit description
• Benefit Owner
• Benefit realisation timeline
• Benefit measures
• Benefit risk
Optional – Benefits Framework
A portfolio level document used to support the management of the benefits across multiple projects and programmes. It sets the standards for benefits definition and management including:
• Benefits mapping
• Measures rules and guidelines
• Valuation methods
• Evaluation
• Typing e.g. financial, non-financial
• Categorisation
Identify & Quantify
Value & Appraise
Plan
Realise
Review Results
Review
Benefits Management Lifecyle
• Produce an outline business case
• Establish baseline measurements
• Establish realistic benefit targets
• Undertake analysis to understand stakeholder interests and concerns
Benefits Management Capabiltiy
Benefits management is best implemented and developed as an organisational capability. A capability improvement approach might include:
• Benchmarking- against other similar organisations
• Benefits capability assessment e.g. P3MS maturity assessment
• Benefits Capability Improvement planning
• Networking and knowledge sharing facilities
• Training and benefits tool support
• Describe benefits and relate to changes
• Establish responsibility for benefits realisation
• Categorise and structure benefits in terms of the type of change needed
• Establish change success criteria
Visibility
Introducing benefits management to an organisation increases visibility of failures as well as successes, so there is sometimes a reluctance to embrace it across the organisation at first. However the benefits of having a shared vision, shared objectives and everyone understanding their role in achieving them far outweighs the risk.
Benefits Realisation Plan
A document that details the benefits and the arrangements made to evidence their realisation which can and include:
• Benefits realisation schedule
• Resource Management
• Benefit Risk Management
• Reporting
• The enabling changes on which the benefits depend
• The benefits measures along with their target and forecast values
• Monitor, track and report benefits realisation
• Optimise changes for maximum benefits realisation
• Evaluate realised benefits
Benefits Dashboard
Dashboard established for reporting benefit realisation performance. Can include:
• Unique identifier
• Benefit title
• Risk RAG status
• Forecast value
• Actual value of benefits realised
• Enabling change KPIs
• Identify additional benefits
• Identify the benefits possible through business changes
• Identify the benefits possible from further investment
Ownership
Having sponsorship for benefits management at board level really helps with adoption across the business. It is essential that the Sponsor of the programme understands that they are accountable for realising the benefits in the business case. It is also important to get the affected parts of the business involved in making sure the necessary changes happen
Post-investment Report
An initiative-level report detailing of the benefits realisation performance
• Benefit Realised - actual versus forecast
• Effectiveness of selected measures
• Business case review
• Baseline management
• Lessons learned
• Assess benefits management capability development
• Identify how to improve the benefits management process

FIVE TOP TIPS FOR SUCCESSFUL BENEFITS MANAGEMENT Stakeholders affected by the change should feel connected with the project and, where possible, be engaged in two-way communication with the team.

1. Ensure that measures used for benefits progress are, where possible, already used for measuring day-to-day performance of the business.

2. Build your benefits map right to left. Start with the problem you are trying to solve (or objective you are trying to achieve). Then ask what benefits would be realised if the problem was solved or objective achieved. Then ask what work would be required to bring about those benefits.

3. Use a dual dimension approach, whereby benefits are classified first by type, eg financial, cashable, and then by category, eg quality, efficiency, innovation.

4. Establish a benefits management forum within the organisation or with partner organisations. Meeting delivery and change management colleagues on a regular basis to discuss ideas and disseminate lessons learned really helps individuals to learn and grow.

(APM Article, Neil White and Rebecca Casey, 2017)

Project Success Criteria

Project Success Criteria as defined by APM BoK, 2019 as:

> **'the qualitative and quantitative criteria by which the success of the project is judged.'**

A brand-new community hospital building needs to address the diverse needs of the community and local population. If it is difficult to get to, owing to poor transport links, and does not support certain services, then it will not deem to be fit for purpose. The hospital building itself may have been built and equipped on time, to specification and on budget – representing success in project management terms - but it will not be a success in the eyes of the stakeholders: the community.

Project Managers are usually operationally focused, and their success criterion is delivery in KPs and critical milestones, i.e. quantitative measures. However, business stakeholders hold a wider view and focus on business benefits and qualitative measures. Examples include:

- Delivery to time and budget tolerances
- Performance of team and PM was to set KPIs and milestones
- Benefits realised
- Increased customer satisfaction
- Improved market share
- Improved health services.

Term Definitions:

Success Criteria: measures by which success is judged – time, cost, accident reduction.

Outputs: the project deliverables – physical outputs, IT Hardware.

Outcomes: because of the outputs, there have been improvements and change; the IT system has provided measurable efficiencies and resulted in less complaints from users.

Benefits: measurable outputs of completed project deliverables as perceived by the stakeholders, normally expressly stated as tangible values – KPIs, milestones or improved employee behaviour leading to increased sales, which justify the investment.

Key Performance Indicators: Metrics used throughout the lifecycle of the project to ensure progress and successful completion. For example, staying within 3% overspend target.

Success Factors: Management practices that support the project towards success, such as adopting a project methodology, clarity of goals and objectives, effective governance, structure and communication.

Investment Decisions

Definition

> ***"Investment appraisal is the analysis done to consider the profitability of an investment over the life of an asset alongside considerations of affordability and strategic fit."***
>
> ***"Project funding is the means by which the money required to undertake a project, programme or portfolio is secured and then made available as required. Funding for standalone projects may be via a single source or through multiple investors."***

Financial Investment Appraisal Techniques

The importance of investment appraisal

The investment appraisal and business case for the project or programme depends on attribution of benefits at the right level. The business case brings together the investment appraisal for the project, programme, or portfolio, with a wider evidence-based narrative of how the investment is intended to lead to realisation of the intended qualitative and quantitative benefits.

It is normal to compare options using an investment appraisal that considers the trade-off between whole-life costs, benefits, and deployment risks to determine the best value for money option.

The time taken to deliver projects can vary enormously, from weeks to many years. In addition, the time taken to realise the benefit from a project can again vary enormously. If the project is to take place over multiple years, the time value of money needs to be considered.

Project funding

Funding for projects may be via a single source or through multiple investors. The governance of the project will vary to meet the needs of the investors in the project and the life cycle option chosen.

All projects require funding in some way. In most situations, money (capital) needs to be provided to carry out the project. It is the business case that provides the justification for this funding. It is important when starting a project to have the necessary funds available or obtain a guarantee that they will be. Projects can be funded internally to the organisation or externally through things like grants, loans, joint ventures, or other mechanisms such as a private finance initiative (PFI) or public private partnerships (PPP). It would be wrong, if not illegal, to commence any project without appropriate funding in place.

Definition

APM BoK, 2019 states that:

> 'Investment appraisal is a collection of techniques used to identify the attractiveness of an investment.'

Also that:

> 'The purpose of investment appraisal is to **assess the viability** of project, programme or portfolio decisions and the value they generate. In the context of a business case, the primary objective of investment appraisal is to **place a value on benefits so that the costs are justified.'**

Financial Investment Appraisal techniques **allow stakeholders to see potential gains (benefits) from their investment and allow them to consider other options against this and other projects.** During the Business Case development, the investment appraisal involves cost benefit analysis. This appraisal will determine whether the benefits yielded by the project (investment) outweigh its cost.

Scoring methods

Scoring methods are used in investment appraisal. They have two primary purposes.

1. they are useful where benefits are difficult to quantify objectively
2. they can be used to aggregate the results of multiple appraisal methods to provide an overall comparison

The simplest form of scoring model is where a list of criteria is assessed in a binary way, i.e. they are either met or not.

	Project A		Project B	
	Yes	No	Yes	No
Payback within 4 years		X	✓	
Uses existing technology		X	✓	
Breaks into new markets	✓			X
Develops reputation with:				
existing customers		X	✓	
potential investors	✓		✓	
Attracts gov't support	✓		✓	
Total	3	3	5	1

On this basis the scoring shown above seems to indicate that Project B should be preferred over Project A.

However, a more accurate picture is gained by scoring each factor according to how well it meets the criteria and weighting each factor according to its importance to the organisation.

	Weight	Project A		Project B	
		Score	Weighted Score	Score	Weighted Score
Payback within 4 years	1	2	2	5	5
Uses existing technology	2	2	4	5	10
Breaks into new markets	5	5	25	2	10
Develops reputation with:					
existing customers	2	1	2	3	6
potential investors	5	4	20	2	10
Attracts gov't support	3	3	9	1	3
Total			62		44

Source: Praxis Framework

This suggests that Project A is the preferred solution.

The simplest of the financial techniques is the **payback method**. This calculates the payback period, i.e. the time taken for the value attributable to benefits to equal the cost of the work. This is a relatively crude mechanism but can be useful for initial screening, especially when reviewing projects and programmes for inclusion in a portfolio.

Payback method

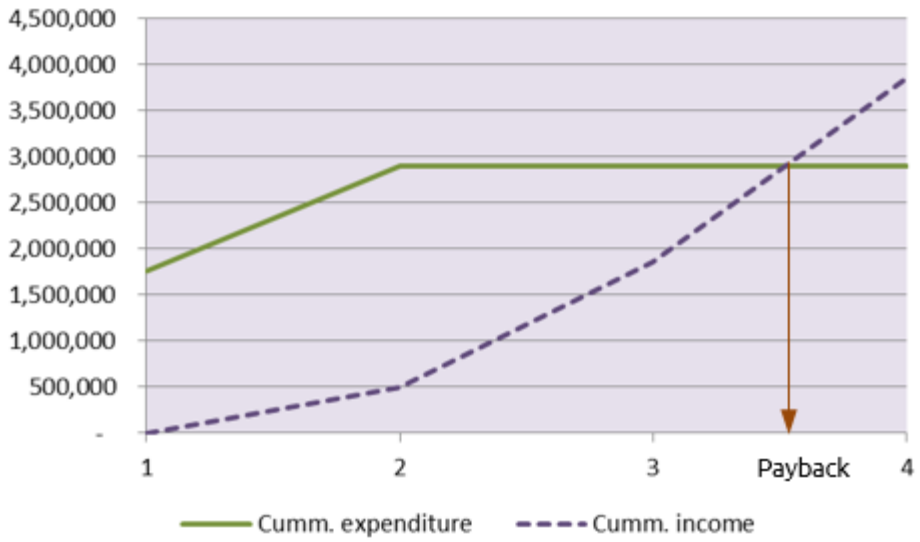
The payback method is one of the simplest forms of investment appraisal. It is most suited to projects of lower complexity in contexts where liquidity is important. The method is easy to apply and simple to communicate to stakeholders.

Example 1:

A retail chain is refurbishing an existing property and wants to know what the impact on cash flow will be. It estimates the refurbishment costs and net income from the new store.

Year	1	2	3	4
Refurbishment costs	1,750,000	1,150,000		
Net income		500,000	1,350,000	2,000,000
Net cash flow	-1,750,000	-2,400,000	-1,050,000	950,000

If the income and expenditure are shown on a graph it is clear that the payback period is just over three and a half years. If company policy is to achieve payback in four years then the project passes the test; if company policy is payback within three years, it doesn't.



The exact payback period can be calculated with the formula:

Payback period = A + B/C

Where:

- A is the last period with a negative net cash flow (in the example this is 3)
- B is the absolute value[1] of the net cash flow at the end of period A (in the example this is 1,050,000)
- C is the net income in the period after A (in the example this is 2,000,000)

Therefore:

Payback period = 3 + (1,050,000/2,000,000) = 3.53 years

Example 2:

Payback can also be used to assess the 'do nothing' option required by a business case.

A company is considering a project to replace an existing computer system that costs £2,000 a year to maintain and £1,000 a year to operate.

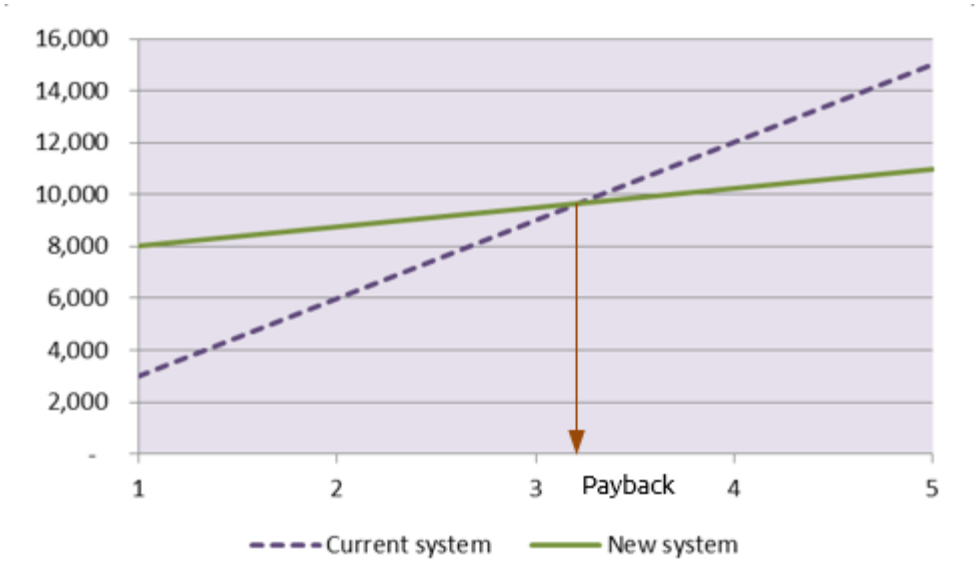
A replacement package will cost £6,000 and implementation costs will be £2,000. Maintenance will be £250 per annum and operating costs £500 per annum.

The two cash flows are shown below:

Months	1	2	3	4	5
Current system					
Maintenance costs	2,000	2,000	2,000	2,000	2,000
Operating costs	1,000	1,000	1,000	1,000	1,000
Total cost	3,000	6,000	9,000	12,000	15,000
New package					
Purchase	6,000				
Implementation	2,000				
Maintenance costs		250	250	250	250
Operating costs		750	750	750	750
Total cost	8,000	8,750	9,500	10,250	11,000

Continuing with the current system is the 'do nothing' option and if these are shown on a graph, it is clear that the project to implement a new package will payback in just over three months.

This approach could also be used as part of a make or buy decision where the comparison is between the purchase of a proprietary package as opposed to the development of a new package in-house.



The key factor that is ignored by the payback method is how the value of money changes over time, i.e. in an economy that has price inflation; the value of money earned today is different to the same amount earned in five years' time. This is considered in the more sophisticated discounted cash flow methods.

A better way of comparing less, complex investments, is the accounting rate of return (ARR). This expresses the 'profit' as a percentage of the costs but has the disadvantage of not taking the timing of income and expenditure into account. This makes a significant difference on all but the shortest and most capital-intensive of projects.

Accounting rate of return

The accounting rate of return (ARR) is a simple investment appraisal technique for evaluating less, complex projects and their benefits.

The formula as expressed in accounting terms is:

$$ARR = \frac{\text{Average annual profit}}{\text{Initial investment}}$$

In P3 Management terms this could be expressed as:

$$ARR = \frac{\text{Average annual value of benefits}}{\text{Project cost}}$$

Therefore, in simple terms, if a project cost £1m and produced benefits that averaged £150,000 per annum thereafter, the ARR would be 15%.

Of course, when the business case is first prepared the project cost and value of benefits are both estimates of varying accuracy. As the work progresses the estimates can be updated and ARR could therefore be a key performance indicator of the project's continuing viability. If regularly updated, it could be used in the boundaries process as part of the go/no go assessment.

A key factor that is ignored in ARR is how the value of money changes over time, i.e. in an economy that has price inflation; the value of money earned today is different to the same amount earned in five years' time. This is considered in more sophisticated discounted cash flow methods such as net present value and internal rate of return.

The two core techniques that APM focus on are:

1. Net Present Value (NPV)
2. Internal Rate of Return (IRR)

Net Present Value

The Net Present Value (NPV) method takes into account all the costs associated with an investment and also makes an allowance for the timing of the costs and benefits. The NPV approach considers the cash flows rather than net profits, as it is the cash that is used to finance investments, cash that generates interest when re-invested, and cash that must be handed over in interest payments.

Interest and Opportunity Cost

If a business invests money in a Management Information System then it is denied the opportunity to invest that money in the bank and earn interest. So unless the investment offers at least as much of a return that can be obtained elsewhere (such as a bank) then you have incurred an *opportunity cost.*

Using Net Present Value Tables

To a business, cash now is much more valuable than cash in the future due to the fact that if money depreciates in value then it will have to borrow more to invest in projects. To adjust for this, we reduce the value of money received by applying the discount factor (DCF). These are set by the organisation based on its own industry and policies. A management accountant or actuary will normally define the DCFs to be applied.

The table below can be used to find the present value of £1 received in *n* years' time if the interest rate is 1%:

Number of Years	Interest Rate per Year														
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%
1	.990	.980	.971	.962	.952	.943	.935	.926	.917	.909	.901	.893	.885	.877	.870
2	.980	.961	.943	.925	.907	.890	.873	.857	.842	.826	.812	.797	.783	.769	.756
3	.971	.942	.915	.889	.864	.840	.816	.794	.772	.751	.731	.712	.693	.675	.658
4	.961	.924	.888	.855	.823	.792	.763	.735	.708	.683	.659	.636	.613	.592	.572
5	.951	.906	.863	.822	.784	.747	.713	.681	.650	.621	.593	.567	.543	.519	.497
6	.942	.888	.837	.790	.746	.705	.666	.630	.596	.564	.535	.507	.480	.456	.432
7	.933	.871	.813	.760	.711	.665	.623	.583	.547	.513	.482	.452	.425	.400	.376
8	.923	.853	.789	.731	.677	.627	.582	.540	.502	.467	.434	.404	.376	.351	.327
9	.914	.837	.766	.703	.645	.592	.544	.500	.460	.424	.391	.361	.333	.308	.284
10	.905	.820	.744	.676	.614	.558	.508	.463	.422	.386	.352	.322	.295	.270	.247
11	.896	.804	.722	.650	.585	.527	.475	.429	.388	.350	.317	.287	.261	.237	.215
12	.887	.788	.701	.625	.557	.497	.444	.397	.356	.319	.286	.257	.231	.208	.187
13	.879	.773	.681	.601	.530	.469	.415	.368	.326	.290	.258	.229	.204	.182	.163
14	.870	.758	.661	.577	.505	.442	.388	.340	.299	.263	.232	.205	.181	.160	.141
15	.861	.743	.642	.555	.481	.417	.362	.315	.275	.239	.209	.183	.160	.140	.123
16	.853	.728	.623	.534	.458	.394	.339	.292	.252	.218	.188	.163	.141	.123	.107
17	.844	.714	.605	.513	.436	.371	.317	.270	.231	.198	.170	.146	.125	.108	.093
18	.836	.700	.587	.494	.416	.350	.296	.250	.212	.180	.153	.130	.111	.095	.081
19	.828	.686	.570	.475	.396	.331	.277	.232	.194	.164	.138	.116	.098	.083	.070
20	.820	.673	.554	.456	.377	.312	.258	.215	.178	.149	.124	.104	.087	.073	.061

For example if the interest rate is 5% and £1 received in 2 years' time, it's worth is 91 pence (rounded up) in today's money, i.e. 91 pence invested today at an interest rate of 5% will be worth £1 in 2 years' time.

If the interest rate was 10%, then £1 received in 4 years' time is worth 68p today.

NPV Worked Example – JA Lankaster Plc

NPV is defined as the present value of all the future cash flows from an investment minus the initial outlay.

For JA Lankaster Plc let us assume the interest rate is 5%. NPV is calculated as follows:

Time	Net Cash flow (000)	Present Value Factor (DCF) 5%	Present Value
Immediate (Period 0)	-1500	0	-1,500
1 years' time – Period 1	250	0.95	237.5
2 years' time – Period 2	650	0.91	591.5
3 years' time – Period 3	650	0.86	559
4 years' time – Period 4	650	0.82	533
5 years' time - Period 5	650	0.78	507
			Total NPV = 928

So the NPV is £928,000. It represents the return from the project compared to the alternative of investing money elsewhere if that investment would produce an annual return of 5%. As it is a positive figure, it means that the returns from the project are higher than the 5% that could be achieved elsewhere. By calculating the present value we have effectively taken into account the interest that we would have earned had we invested the money in the next best option (which might be another project or simply depositing the money in the bank).

The main advantages of NPV are that it overcomes the shortcomings of ARR and payback methods by:

- Considering the impact of time on the value of money
- Considering all relevant cash flows
- Considering the whole life cycle of the project

Disadvantages are:

- Calculations can be complex
- Relies on which percentage is used as DCF (subjective)
- Greater complexity of detailed calculations gives the impression of greater certainty – but this is not necessarily true.

Internal Rate of Return

Selecting the right DCF percentage figure can be subjective, and therefore it can be difficult to see if the project is profitable. If we turn the problem around – instead of selecting a rate and then seeing if the project is profitable, we can work out the rate which would make the cost and benefits equal each other, i.e. zero. In other words, asking the question – 'what rate would produce a NPV of zero?' This can be calculated using an Excel spreadsheet, or done manually by iteration.

Using the JA Lankaster worked example with the NPV we can work out the IRR as shown below by entering the data into an Excel spreadsheet and selecting the IRR formula function:

Year	Cash Flow	DCF 5%	NPV
0	-1500	0	-1500
1	250	0.95	237.5
2	650	0.91	591.5
3	650	0.86	559
4	650	0.82	533
5	650	0.78	507
		IRR	**17%**

For this project, the IRR is 17%, which needs to be interpreted in line with the organization's objectives and requirements.

Limitations of Investment Appraisal Techniques

Financial Investment Appraisal Techniques have their limitations when applied to a project, in that they are forecasting techniques and only as good as the data. The **accuracy of data** needs to be assessed and managers satisfied that the forecasts and estimates are realistic and at best true. The data does not consider possible productivity efficiencies or improvements, and ultimately it is people who are making decisions based on their expertise.

In any project, there will be supporters and those who are against it. Supporters tend to stress the benefits, whereas the detractors will stress the costs and resources that can be deployed elsewhere.

Sometimes the data demonstrates that an investment is not worthwhile if analysis is confined to the project's immediate benefits. However, the **strategic business case** may demonstrate otherwise where new markets and opportunities may arise in the future as a collateral result of undertaking the project. Furthermore, some projects are necessary due to new legislation and regulations, regardless of their financial soundness.

Finally, **not all projects can be evaluated in monetary terms** and some just improve quality of life or the morale of the workforce. These are still legitimate projects and require **managerial judgement** to provide a business case with clearly stated benefits.

Project Management Plan

Project Planning and the Project Management Plan

Definition

> **'Planning determines what is to be delivered, how much it will cost, when it will be delivered, how it will be delivered and who will carry it out.' APM BoK, 2019**

The *purpose* of the PMP is to bring together all of the plans into one document, allowing formal authorisation and accountability. It converts the project strategy into a plan for implementation, by engaging the key stakeholders and acting as contract between sponsor and manager.

Project planning can be thought of at two main levels in accordance with the APM BoK, 2019:

1. **Policy level, and**
2. **Delivery**

1. Policy Level

Project planning at policy level provides a series of plans that outline how each principal area of work will be managed. These plans include the risk management plan, quality management plan and benefits management plan. These can be referred to as strategies (e.g. the benefits management strategy) depending on the complexity of the project-programme or portfolio.

The *policy-level project plans* set out procedures and processes for each aspect of management. They detail the preferred methodology and techniques, including templates for documentation and defined roles and responsibilities.

The PMP provides the reference point for managing the project and acts as a primary document to communicate how the project will be delivered to the key stakeholders. So it becomes a stakeholder communication tool. The project manager together with the team is responsible for successful project delivery and its deliverables.

2. Delivery Level

PMP acts a contract document between the project sponsor and the project manager. It is a reference for audits, control and review. In developing the PMP, key question needs to be asked and answered:

- **Why?** – Developed in the Business Case it is a statement of the reasons why the work is required. It is a definition of the need, problem or opportunity being addressed.

- **What?** – This is the scope of the project in terms of exactly what is to be delivered. It states the objectives, scope, deliverables of the work, and the acceptance/success criteria.

  Key performance indicators (KPIs) will also be clearly stated and used to measure success. The 'what' will consider and state any constraints, assumptions and any dependencies.

- **How?** – This question outlines the project strategy including tools and techniques to be applied. Issues of how the project will be monitored and controlled will also be stated, together with reporting arrangements, project methodology and procurement issues.

- **Who?** – Within the PMP the project organisation structure is defined, along with key roles and responsibilities. Any outsourcing activity is also addressed here.

- **When?** – The project schedule will provide the key milestones, phasing and detailed timings for the activities required to complete the work.

- **How much?** A key element of the PMP is how much the project will cost. The funds/ budgets and cash flows for project expenditure are clearly detailed together with authority levels and communicated to the project sponsor and other key stakeholders.

- **Where?** – Is geographical location is a key consideration in the success of the project? This factor is also considered and how the resulting issues will be managed outlined.

The Project Management Plan is a live document under configuration control that is used to execute the project, manage risk, cost, time, and quality issues. The ***typical content of the PMP*** includes:

- **Project definition** – background, **what and why**?
- **Project implementation strategy** – methodology, the **how** of the project
- **Scope of the Project** – Product/ Work Breakdown Structure, Key Deliverables, more detail on the 'what'
- **Project Schedule Plan** – Gantt Chart, milestones, KPIs – the **when** of the project
- **Organisation Plan** – Project Team and Reporting, Responsibility Matrix, the **who** of the Project
- **Risk Management Plan** – Risk Register
- **Quality Management Plan** – Quality Register
- **Cost/Expenditure Plan** – budgets and cash flow

- **Communication and Stakeholder Management Plan** – Reporting and communication methods
- **Health and Safety Plan**
- **Procurement Management Plan** – outsourcing activity
- **Change Control Management Plan** – Change control & Configuration Management

Ownership, Authorship and Audience

Although the project manager owns the project management plan, it should be developed with the wider team. Greater involvement of other stakeholders allows commitment and engagement with the project. Ultimately the PMP is for major stakeholders for communication and building confidence in the investment.

Ownership	Authorship	Audience
• **Project manager responsible for the creation, maintenance and implementation of the plan** • The sponsor approves the plan and has overall accountability for it • Project Manager should be involved in the creation of PMP for ownership and commitment (this is not always the case) • Major stakeholders' buy-in is paramount for success	• **PM is the author** • Project Team should be involved and may write subsections according to their expertise	PMP is for key stakeholders i.e. Sponsor, Project Steering Group/Board, Team Members, Suppliers, End Users

Once agreed, the PMP provides a baseline which is periodically reviewed and updated with rigorous change control. The PMP forms the basis of gate reviews where the continuing viability of the project is assessed against the business case.

Benefits of Project Planning

Project Planning provides key benefits from a well-designed plan that include:

- The scope clearly outlines what is included and excluded in the project activity and deliverables to minimise failure or non-acceptance
- Problems and issues are anticipated and dealt with proactively
- Improves communication and understanding of project activity, delivery and management
- Provides a basis for monitoring and control
- Builds understanding and commitment of the project team through involvement

- Establishes realistic targets, milestones, KPIs for performance measurement
- Identifies resource requirements and allows effective management
- Establishes lines of responsibility and accountability
- Increases chances of project success and benefit realisation.

The deployment baseline and project management plan are approved at the decision gates associated with the approval of significant costs on the project. Some projects may have an integrated baseline review to provide assurance before formal approval at decision gates.

The deployment baseline is the starting point for progress monitoring and implementation of change control where necessary.

For linear project life cycles, the baseline (scope, quality, resourced scheduled and associated cost) is set for the whole project and the planned value is understood for the whole project. For iterative project life cycles, the baseline resources and schedule are determined, but the achievement of scope and quality may vary from the plan as teams may have autonomy to re-prioritise and act on new knowledge. Any work not achieved in the timebox (equivalent to a stage) is then returned to the backlog of work to be done.

Exercises

1. Explain the purpose of the business case and its importance during the project life cycle
2. Describe three components of the Project Management Plan
3. Explain the benefits management and its importance to the business case
4. Explain the two investment appraisal techniques (NPV and IRR)
5. Explain two benefits of undertaking investment appraisal

Section 7

Scope Management, Estimating, Requirements, Configuration Management and Change Control

Learning Objectives

- **Explain how to define scope in terms of outputs, outcomes and benefits (including use of product, cost and work breakdown structures)**
- **Explain how to establish scope through requirements management processes (such as gather, analysis, justifying requirements, and baseline needs)**
- **Explain how to manage scope through configuration management processes (such as planning, identification, control, status accounting, and verification audit)**
- **Explain different stages of a typical change control process (such as request, initial evaluation, detailed evaluation, recommendation, update plans, and implement)**
- **Explain approaches to producing estimates (including parametric, analogous, analytical and Delphi)**

Learning Objective	APM BoK Reference
6, 7	4.1.4, 4.2.4

Definition

> **'Scope' is the term used in the management of projects to refer to the totality of the outputs, outcomes and benefits and the work required to produce them.'**
>
> **'Scope management is the process for identifying, defining and controlling scope.'**
>
> **APM BoK, 2019**

Scope Management is concerned with controlling the boundaries of the project and all related work carried out is linked to the project goals and objectives. Any new related work is subject to formal change control processes. It is imperative to agree with the stakeholders what is within the scope of the project and what is outside of it. Once agreed the scope is baselined and used to develop the breadth of the Business Case. The high-level scope will be defined in the Business Case and further elaborated within the Project Management Plan (PMP).

It is important at this stage understand and define the following:

- **Outputs:** the tangible or intangible products typically delivered by the project
- **Outcomes:** the changed circumstances or behaviour that results from the use of outputs
- **Benefits:** the quantifiable and measurable improvement resulting in from completion of deliverables that is perceived as positive by the stakeholders.

Source: APM BoK, 2019

Scope Management works with 6 areas to control the project and reduce ***Scope Creep*** (where scope of the project is allowed to grow and adds to time, cost and quality issues, thereby putting the project at risk). This is illustrated in Figure 7.1. The stakeholders' project requirements provide the scope for the business case. To control scope creep, we apply Change Control processes together with Configuration Management. As any project delivers Change Management principles may need to be applied particularly in transformation projects.

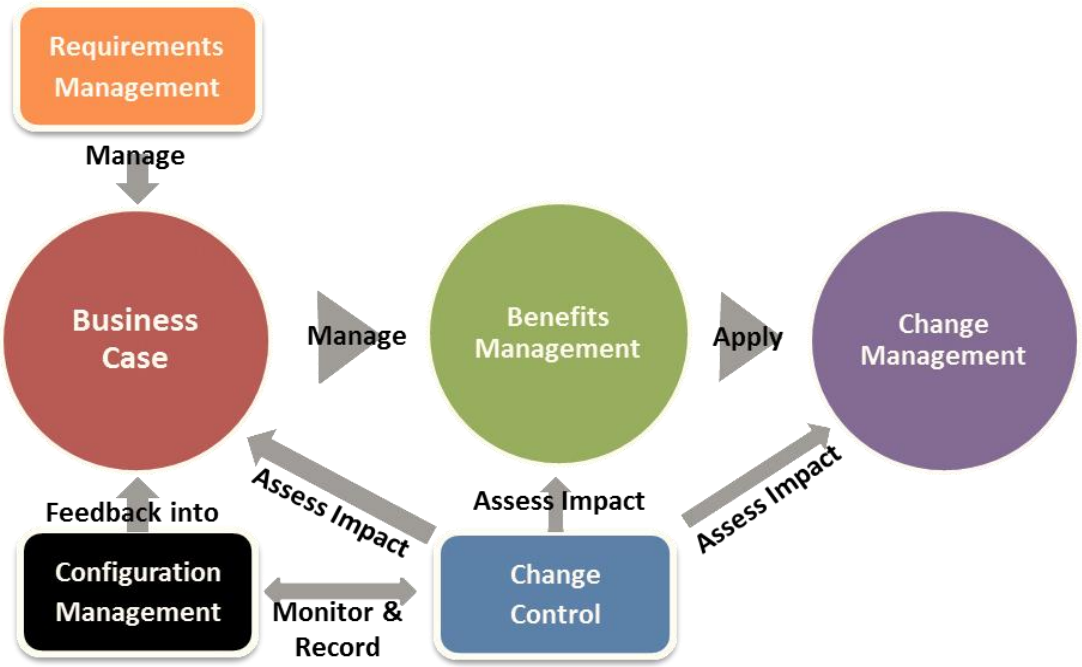


Figure 7.1 Six areas relating to Scope Management

Requirements Management

Requirements Management is concerned with capturing the requirements of the key stakeholders, to ensure acceptance and success of the project. To ensure this happens, a formal process allows the requirements to be documented and properly managed through the project life cycle.

Definition

> **APM BoK, 2019 states that 'Requirements management is the process of capturing, assessing and justifying stakeholders' wants and needs.'**

Requirements Management Process

The Requirements Management process (see Figure 7.2) provides the formal steps to capture, assess, justify and baseline the agreed requirements. The APM BoK, 2019 states that each requirement must be clearly assessed:

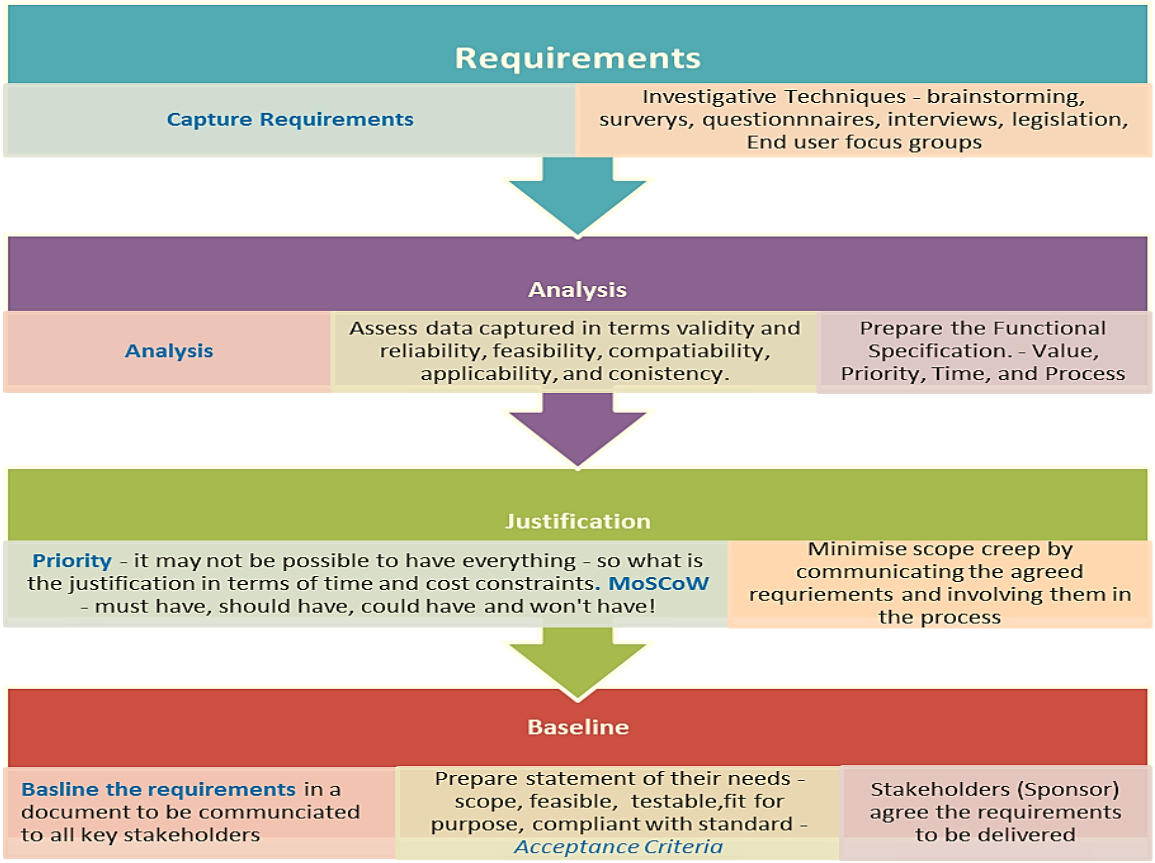


Figure 7.2: Requirements Management Process

Each step in the Requirements Management process involves its own process with an end output culminating in the **Functional Specification** – a document that clearly states the stakeholder requirements. It defines the 'what' but not the 'how.' The 'what' is used for the Business Case which adds the 'why' (although that debate will also take place here under assessment and justification). The functional specification will have defined acceptance criteria as well as performance and standard requirements for each function area.

What is MoSCoW?

MoSCoW is a prioritisation technique commonly used by agile project teams. It stands for:

Must have
Should have
Could have
Won't have / Won't have yet

It helps teams understand which requirements or tasks they should focus on. MoSCoW was invented by Oracle employee Dai Clegg in 1994 and is the most common prioritisation technique used on agile projects.

Though MoSCoW is often used to prioritise customer's requirements on projects, it can also be used outside of projects. For example, to prioritise business as usual work within an organisation or to prioritise jobs to do at home in your personal life.

In agile project management, MoSCoW is one of the many key agile techniques which you need to understand. It's one of the techniques covered on the popular AgilePM courses.

Why should I use it?

Using **MoSCoW** is a highly effective way for a project team to prioritise its work. Focussing on the most important tasks means they can get the main components of the project finished quickly, before the fancy bits are added later. It keeps the entire team on the same page, ensuring everyone knows what is being worked on.

Using MoSCoW also means both customer and project team might decide that some requirements do not even need to be there. It helps cut out unnecessary things and keeps things lean, agile and simple. MoSCoW is one of the aspects of agile that helps the team minimise wasted time, effort, resources, and money.

MoSCoW is simple to use. Firstly, you will need a list of the customer's requirements. A great way to use MoSCoW is in a workshop with users. Brainstorm a list of requirements, writing each one on a post-it note, and then apply MoSCoW. It is also commonly used during Scrum planning meetings to prioritise user stories for the next sprint.

So, with your list of requirements, ask whether each requirement is one of the following:

Must
A requirement which must be completed and is vital for the project's success. Without this requirement, the project will likely fail.
Should
Whilst these requirements are important, they can be delayed if time, resources, or money are tight. They are not as time critical as musts.
Could
These requirements are not necessary, but they can be completed if there's enough time.
Won't
These requirements are the least critical and can be completed at a later stage.

In a worked example. Your customer wants a new e-commerce website for their small clothing business. Their requirements for this project are:

- It needs a homepage

- It needs product pages
- Each product needs a photo and description
- There needs to be a shopping cart
- There needs to be an about us page
- There needs to a be a terms & conditions, returns page
- There should be a banner with special deals
- There should be live chat
- It would be nice to have social media buttons
- It would be nice to have a pop up for subscribing to mailing lists
- Perhaps there can be a blog, but not sure

Using MoSCoW, you might want to prioritise these requirements like this:

- **Must**
  Homepage, product listings, product photos and descriptions, shopping cart, about us page, returns page, terms & conditions page.
- **Should**
  Banner and live chat
- **Could**
  Social media
- **Won't**
  Blog

Once prioritised, your team will know which requirements to work on first. To help keep everyone on the same page, it's highly recommended you use a Kanban board. This can be a physical board in the office, or you can investigate digital boards, such as KanbanFlow and Trello.

A well specified requirement is:

- **uniquely identifiable:** it addresses only one core requirement;
- **current:** it is up to date and relevant to the business need;
- **consistent:** it does not contradict any other requirement;
- **understandable:** concisely stated and not open to different interpretations;
- **verifiable:** compliance can be verified through inspection, demonstration, test or analysis;
- **traceable:** the requirement can be traced from the originating need, through the plan, to what is delivered;
- **prioritised:** its relative importance is understood.

Linking Requirements with Quality

The Requirements Management process aligns with quality requirements as stakeholders will have a view not only to requirements, but also to the standard of those requirements. Through this process those quality requirements are captured, whereas the Quality Management section focuses on the achievement of quality.

Product Breakdown Structure (PBS)

Clients or stakeholders will identify products that are expected to be delivered by the project. This may need to be broken down into constituent sub-products. This is illustrated in figure 7.3 below:

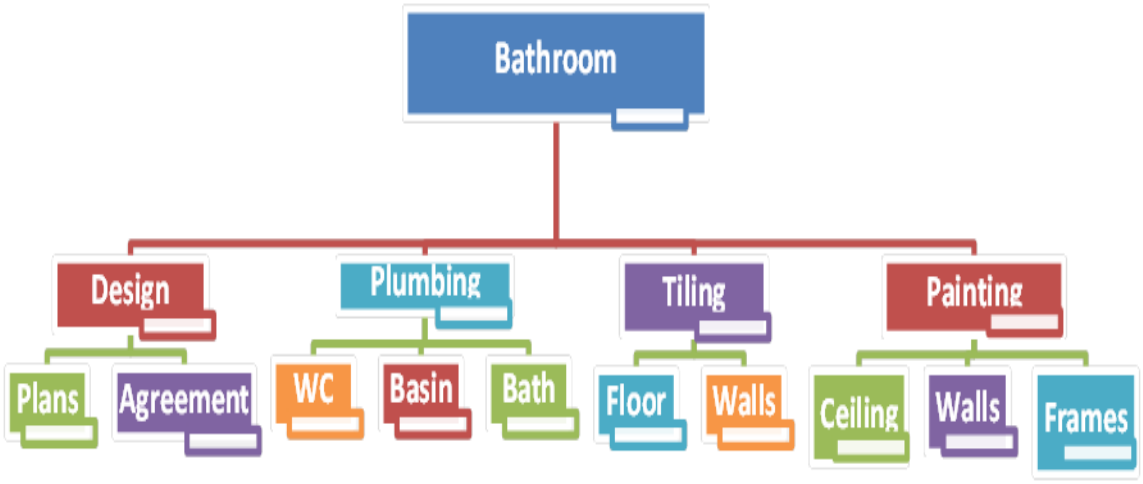


Figure 7.3: Product Breakdown Structure PBS

The PBS provides the high level deliverables of the project work, and it is paramount to get agreement to this from the stakeholders, as well agreeing a logical grouping of tasks, work packages and deliverables to allow efficient deployment of resources.

The PBS:

- **Is a *hierarchical decomposition* of a project into products**
- A *graphical diagram* that helps to clarify scope
- Is usual provided in the business case and communicated to key stakeholders to *generate understanding and engagement*
- Forms an *input to the Work Breakdown Structure*
- Provides acceptance criteria for each product or deliverable identified.

Work Breakdown Structure (WBS)

The Work Breakdown Structure (WBS) takes the products or **deliverables and decomposes them into the lowest levels called *work packages*** and/ or tasks depending on the complexity and scale of the project. Each work package has a defined product and acceptance criteria. The process of creating the WBS involves the project manager and all involved in planning to carefully consider all aspects of the project and their specialist areas of work. Figure 7.4 provides an example of a WBS. For the WBS to be meaningful composition to *at least three levels* is recommended.

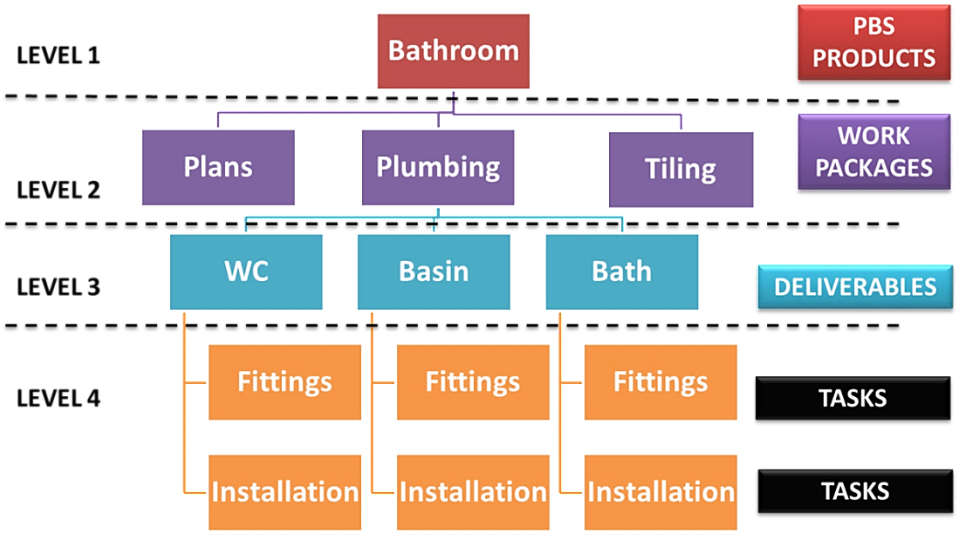


Figure 7.4: Work Breakdown Structure

The WBS demonstrates how each work package contributes to the overall project objectives and in doing so provides a solid basis for planning and controlling the project. Each work package or task represents the level at which the project manager exerts control and each work package or task can be delegated to the project team or a single person OR outsourced.

The WBS clearly outlines the scope of each work package and thus the project. Furthermore, each WP will have a set of attributes:

- Specification
- Responsibility
- Budget
- Duration
- Dependencies
- Resource Requirements
- Risks
- Quality Standards
- Acceptance Criteria.

The size of the packages must be kept realistic, not so small that they can be seen as individual tasks but not so large that they may be deemed to represent projects within themselves.

Benefits of WBS

The benefits of the WBS include:

- facilitates team building if involved in planning and production of WBS
- defines the scope of the project
- defines work packages
- increases understanding with stakeholders and the project team
- allows for allocation of responsibility for WPs and tasks
- facilitates detailed planning
- Enables bottom up cost estimating
    - Budgeting
    - Scheduling
    - Change control
    - Configuration management
    - Risk planning and management
    - Quality Management
- Indicates when a project becomes a programme.

Relationship between PBS and WBS

The PBS breaks down the project into products and products into components, and each component requires work. The **WBS breaks down the product and components into work and the work into tasks to deliver the outputs**. In the PBS the lowest level is a 'deliverable'; in a WBS it is the 'work tasks'.

Cost Breakdown Structure (CBS)

The CBS identifies the various cost categories that make up total project costs. Each work package and the tasks within can be estimated enabling costs to be rolled up to the required levels (see Estimating sub section below). The accumulation of the WPs and PBS is the total cost of the project. The structure of the CBS depends upon requirements but usually mirrors the PDS and/or WBS for consistency. See Figure 7.5.

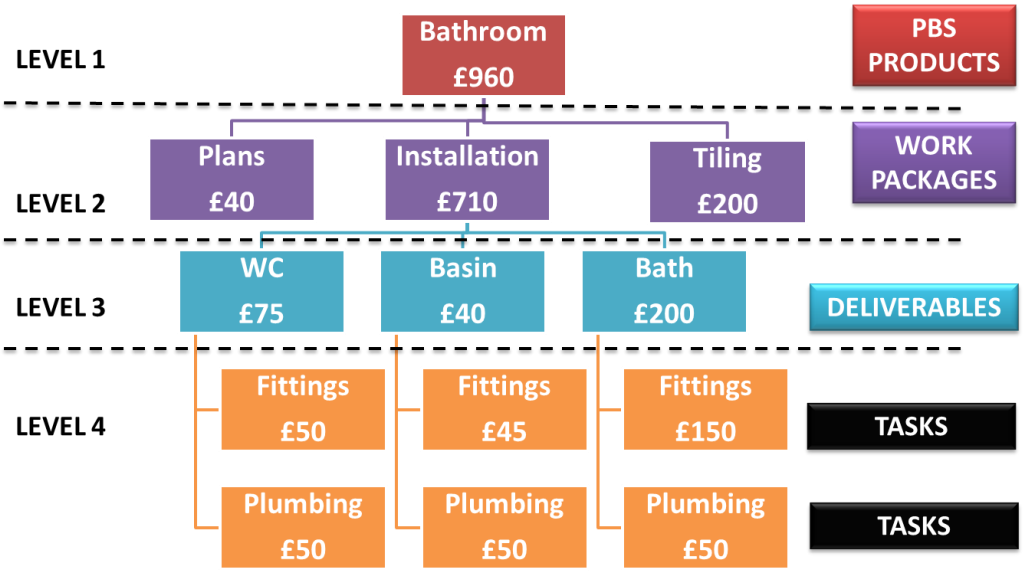


Figure 7.5: Cost Breakdown Structure

Organisational Breakdown Structure

The Organisational Breakdown Structure (OBS) shows the people who form the project team and reporting hierarchy. It is not a company organisation chart that can be copied and pasted across but a customised project organisation structure that has been given careful thought and developed using the PBS and WBS. So however small their role, project staff must appear in the OBS. Figure 7.6 illustrates the OBS developed from the WBS and PBS.

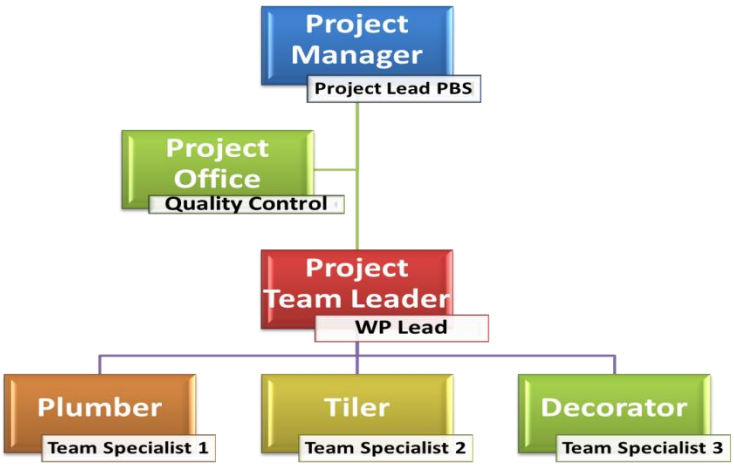


Figure 7.6: Organisational Breakdown Structure

Responsibility Assignment Matrix and RACI Chart

Having assigned roles and defined reporting lines we can now assign tasks and accountabilities by developing the Responsibility Assignment Matrix (RAM) or RACI chart. This is useful for clarifying roles and responsibilities.

Project WP: Bathroom	PM	PS	TL	TS1	TS2	TS3	PO
Plans & Design	PM – RA	CI	A	A	A		C
Purchase: • **Fixture & Fittings**	I	CI	R	A	A	A	C
Installation: • **WC** • **Basin** • **Bath** • **Materials**	I	C		R			
Tiling: • **Floor** • **Walls** • **Materials**	I	C			R		
Decorating: • **Painting** • **Materials**	I	C				R	
Finish	I	I					C

Key:			
Responsible = R	Accountable = A	Consult = C	Inform = I

- ***Responsible:*** those responsible for carrying out the tasks
- ***Accountable:*** those who are accountable for getting the tasks done
- ***Consult:*** those people who need to be consulted in executing the tasks
- ***Inform:*** those people who need to be informed about the activity of the task and may provide input or authorise stages within the task.

This chart is excellent communication tool for informing the project sponsor of responsibilities and roles, as well as allowing the team to see who they will be working with and dependencies between individuals.

Estimating

Planning by its very nature is a speculative activity. It involves assessing the future and estimating what will happen. Estimates will be based on data available a given point in time and decisions made based on expertise and interpretation of the data. Data analysis requires accurate and reliable data that will provide accurate estimates. In the early phases of any project or programme, there is minimal data available compared with the later phases. This results in an **estimating funnel** as shown in figure 7.7.

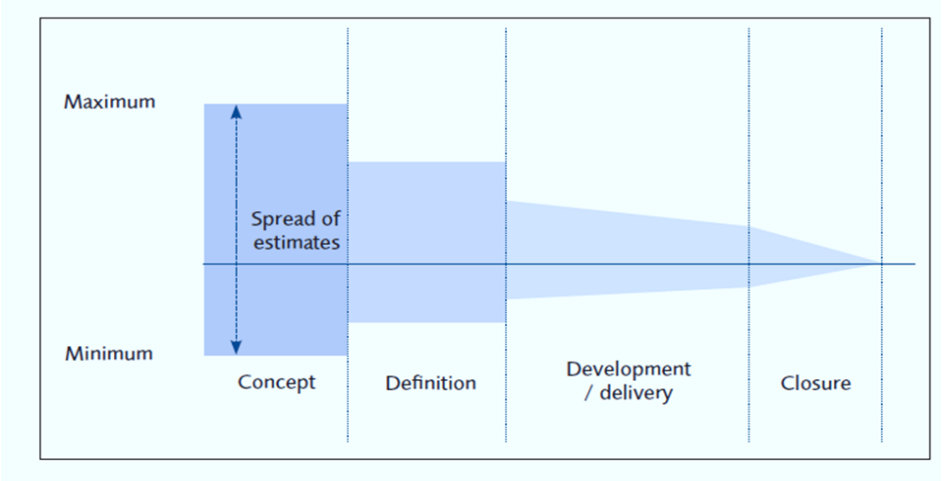


Figure 7.7: Estimating funnel
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Estimates can be refined at the end of each phase and the difference between the maximum and minimum reduced. There are three main methods of estimating:

1. **Analogous (comparative)**
2. **Parametric**
3. **Analytical (Bottom Up)**
4. **Delphi**

Analogous (Comparative) estimating uses historical data from similar projects to provide estimates for the project. Past estimates are scaled according to size, scope and complexity to produce new estimates. Comparative estimating is most appropriate when data is available from a number of projects of similar work. This is more likely to be carried out in the concept phase.

Parametric estimating uses mathematical models or formulae to produce project estimates based on input parameters. It is usually based on historical data, i.e. known time and costs taken to produce a single deliverable. This is then multiplied to estimate totals. Typically used in statistical modelling and often used by quantity surveyors. This can be carried out in the deployment (implementation phase) as the number of units needed would be more identified.

Analytical or (Bottom Up) estimating uses a detailed specification to estimate time and cost for each component of the work. Typically uses the work breakdown structure and the work packages to estimate total costs. The aim is for accuracy to be within 5%. Once agreed contingencies can be applied. This type of estimation would be more appropriate during the definition phase as planning the outputs in the deployment phase becomes clearer.

Delphi can be used throughout the project lifecycle. Individual group members, who are tasked with providing the estimates, do this in privacy, away from each other and submit

their independent views to a central person who facilitates the exercise. The facilitator then reviews the information and provides a summary report to each member of the group, they may consult with **Subject Matter Experts to ensure the estimates provided are accurate** enough to make a sound decision. The group then feedback additional data to build the final estimate. Once the facilitator is satisfied that all possibilities have been considered, the exercise is then closed, and the output becomes the agreed estimate. This would be an appropriate practice where an issue or risk with current outputs have been identified.

Change Control

> **'The process through which all requests to change the approved baseline of a project, programme or portfolio are captured, evaluated and then approved, rejected or deferred.' APM BoK, 2019**

Projects by their very nature are all about change and delivering change. They themselves are also impacted by changing business circumstances for the duration of the project lifecycle. Also, clients or sponsors may make changes to requirements. Whatever the change it needs to be assessed before any change can be made to the baselined plans scope, and business case – see figure 7.1. Change Control is the process by which changes are identified and evaluated and then a decision made as to approve, reject or defer. Changes may arise from main areas:

1. Legal/statutory changes in Law
2. Errors or omissions from original plans
3. Development of new project requirements or techniques

Changes are referred to as variations. These variations can encourage "scope creep" where over time projects keep growing leading to failure. Therefore, changes to projects must be assessed in terms of their likely impact on:

- Time
- Cost
- Scope
- Performance
- Quality
- Business Case and continued viability.

Excessive change requests can be indication of poor planning and consultation, however that is not to say that each change request should not be carefully considered and approved to ensure success. Therefore, projects must have a formal process that is effective for change control. The project manager is responsible for ensuring that the process is in place, it is utilised and communicated to the Team.

Change Control Process – Six Steps

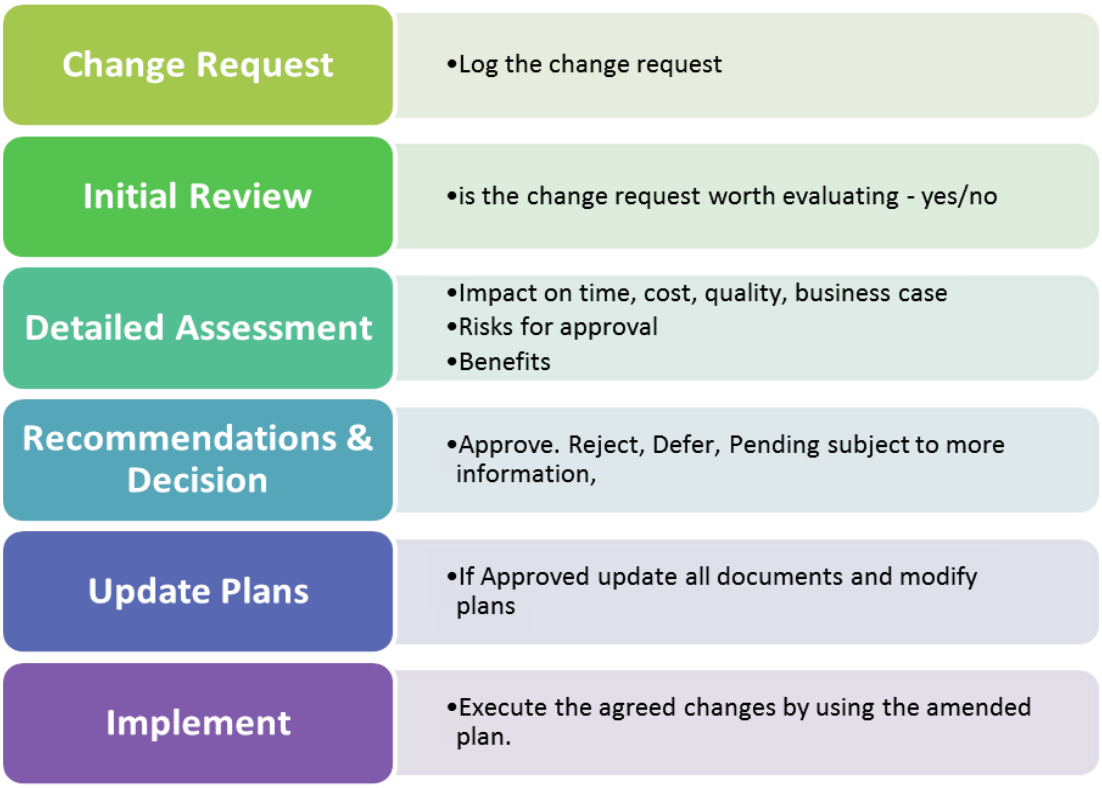


Figure 7.8: Six Step Change Control Process

Figure 7.8 outlines the Change Control Process step by step. When a change request is submitted it is important for the initial review to involve:

- relevant stakeholders
- project team
- project sponsor

Impact must be assessed against:

- the project
- Business as Usual
- Other projects

Approves changes must be documented and effectively communicated to the relevant parties.

Step by Step Change Control Process

1. **Change requests** must be made in writing in the appropriate standard form/ template. The request is logged onto the Change Control System.
2. **A person/owner is assigned** to manage the change control process (not the change itself)
3. An **initial review** will indicate if the change is worth further investigation to prioritise it.
4. If the answer to 3. is "yes" then the **impact analysis and assessment** is carried out and a report prepared.
5. The person(s) can be the Project Board/sponsor or sub-committee will make the **decision** based on findings of the report presented to **Approve, Reject, Defer, Pending** further investigations/information/conditions.
6. If approved, then all documentation and relevant **plans are updated**. If rejected or other actions are required, then the Requestor of the Change is informed formally.
7. The **change is executed.**
8. The Change Log is updated.

Change Control

Advantages	Disadvantages
Project scope is managed and control exerted over baselined plans	Continuous assessments of impact causes delays and used to stall the project or decision
Formal processes ensure accurate record keeping and adherence	Process itself require resources to manage and maintain
Considered adjustments ensure impact of the change on the project has been given due consideration	Can cause friction between clients and project manager where the client see this as stalling tactic
Stakeholders are kept informed of changes and their reasons – the project deliverables at the end therefore are more likely to be accepted	The process can be viewed as additional layers of bureaucracy and therefore may be ignored.

Change Freeze

In some circumstances it is appropriate to 'freeze' change. No further changes will be considered at this point in time. This is usually when the project is nearing completion and further changes could put the project at risk or jeopardise the business case/ benefits.

Change Request Form

Change requests must be formally submitted using a formal template as shown below:

Change Request Form		
Project:	**Requestor:** **Authorised:** **Date:**	**Plan:** **Reference No.** **Version:** **CR Logged: ☐ Initials:** **Date:**
Description of change:		
Products/Deliverables affected:		
Reasons for change:		
Impact on Cost:		
Impact on Schedules:		
Impact on Business Case:		
Impact on Quality:		
Perceived Risks of Change:		
Consequence of no change:		
Any other supporting comments:		
Decision: **☐ Approve** **☐ Reject** **☐ Defer** **☐ Pending**	**Reasons:**	**Conditions**
Change Control Log:	**Updated: ☐** **Initials:**	**Date:**
Signature(s): **Date:**		

Once the process is completed the Change Control Log or Register is updated on the Change Control System indicating its status, outcomes and impact on documents and plans. This system and change control is an important part of the audit trails and any inspections. It is also an indication of effective project management.

Change Control will also result in configuration of project and therefore it is linked to Configuration Management.

Configuration Management

'Configuration management encompasses the technical and administrative activities concerned with the creation, maintenance, controlled change and quality control of the scope of work' APM BoK, 2019

The configuration of a project is made up of the physical components and documents that are developed during a project life cycle. Control Management of these *configuration items* (or assets) is essential if the final deliverables are to be delivered to the agreed specification and to customer requirements. A project's assets might include physical components, hardware, software, specifications, design drawings, etc.; the totality of these items is known as *Configuration* of the project. As stated, these include plans and documents.

Products, plans, designs all undergo changes and additions. Changes to one configuration item may impact on another or others. Therefore, we need to control and manage these knock-on effects. Controlling the configuration during the project will ensure an audit trail and integrity of the final product(s).

Configuration Management Process

The Configuration Management consists of five main activities: **(PICSA)**

1. Configuration **Planning:** establishes the procedures, tools, roles & responsibilities for Configuration Management.
2. Configuration **Identification:** each project deliverable is broken down into individual *configuration items* and given a *unique identification number.*
3. Configuration **Control:** this process maintains version control of all baselined configuration items and the interrelationship between items. Any changes are only executed by authorised people. Storage of configuration items must be kept secure and access restricted.
4. **Status Accounting:** The current *status and version* of each item must be recorded and monitored. Any changes must be documented to enable tracking of an item's status during its design and development. Project Managers may use a register of '*assets'* to ensure that their present status is clearly visible (this register is sometimes known as a *product status accoun*t).
5. **Audit:** The audit is carried out at phase gates or at handover to demonstrate that the products produced conform to specification and all procedures have been followed. The current product is aligned to current configuration item status.

The **Configuration Management System** is supported by four key documents:

1. **Configuration Item Record:** This status where the item is kept, current status, dependencies on other items, cross reference to other information, change history (version control).
2. **Product Description:** A comprehensive product specification.
3. **Configuration Status:** Historical record of all changes and additions to the baselined configuration.
4. **Audit Records:** Records of all audit reports carried out and any supporting documentation.

Relationship between Configuration Management and Change Control

The Configuration Management System must be totally aligned with Change Control as shown in Figure 7.9. This alignment between the two ensures consistency and allows changes to be accurately recorded thus reducing misunderstandings and conflict over agreed specifications of the final products and deliverables.

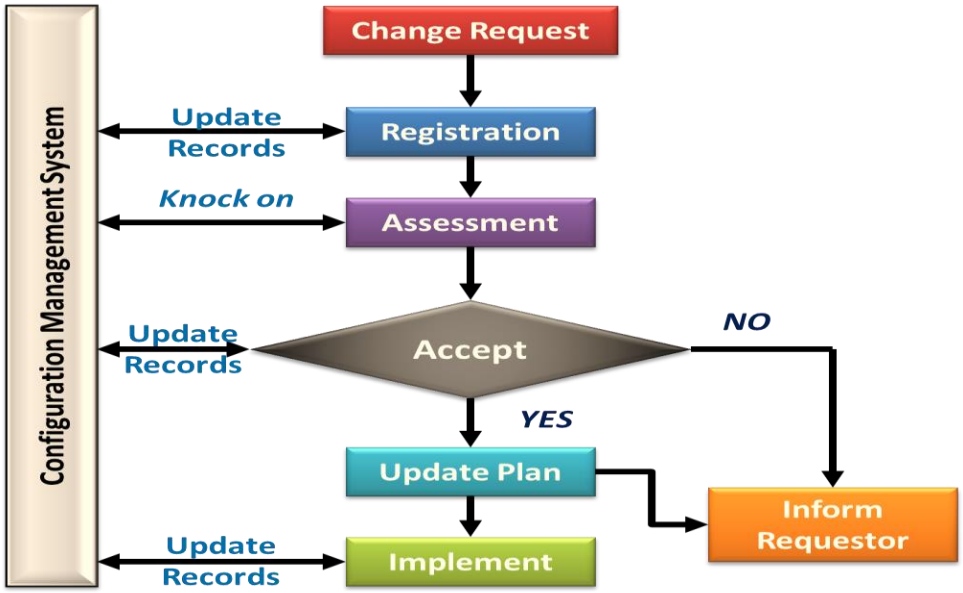


Figure 7.9: Configuration Management and Change Control

For complex projects like IT hardware and software development, or production of the next hybrid car, many configurations of a product are likely. In such projects, the importance of the CMS dictates that dedicated roles should take responsibility for it. Certain dedicated roles may need to be appointed for effective change control and CMS.

Configuration Management System Roles

Typical roles might include:

- **Configuration librarian:** Ensures that any asset entered into the 'library' conforms to the agreed guidelines of the system. The librarian will also control access to the baselined copies of any live and/or archived configuration items.
- **Configuration administrator:** Supports the process through the administration of formal change requests and the updating of configuration item records and/or the product status account.
- **Configuration item owner:** Has primary responsibility for any single configuration item and may be responsible for the approval and implementation of any approved changes.
- **Configuration Manager**: Who is responsible for the organisation's configuration management process, team members who need to adhere to the process, etc.
- **Project manager:** Ensures that a process is in place and is ultimately held accountable for the product deliverables conforming to the latest specification (including the implementation of any agreed changes)
- **Quality Assurance (QA):** QA (usually part of the **Project Office**) may support the entire process and help in the creation and management of a Configuration Management Database (CMDB). Another key role of QA could be the auditing of selected projects to ensure that the correct versions of the project assets are being used.

Exercises

1. Explain the term Scope Management (including outputs, outcomes, and benefits)
2. Explain how to manage scope through Requirements Management Process
3. Explain the reasons for and benefits of re-estimating through the project life cycle and the concept of the estimating funnel
4. Describe three estimating techniques for a project
5. Define the relationship between change control, configuration management and scope management.
6. Describe the activities in the Configuration Management Process.

Section 8

Scheduling and Resource Management

Learning Objectives

- **Describe ways to create and maintain a schedule (including critical path, and Gantt charts)**
- **Differentiate between critical path and critical chain as scheduling techniques**
- **Describe how resources are categorised and allocated to a linear life cycle and iterative life cycle schedule**
- **Differentiate between resource smoothing and resource levelling**
- **Differentiate between cost planning for iterative life cycles and cost planning for linear and iterative life cycles**

Learning Outcomes	APM BoK Reference
8	4.2.5, 4.2.6, 4.2.7

Scheduling

Scheduling is two-fold:

1. **Time Scheduling, and**
2. **Resource Scheduling.**

1. Time Scheduling

> **'A collection of techniques used to develop and present schedules that show when work will be performed.' APM BoK, 2019**

Project Planning breaks down the Business Case into meaningful action plans that are used to deliver the products and benefits. We have looked at the deliverables and developed the Product Breakdown Structure and Work Breakdown Structure (Figure 8.1). This allows all parties to understand and visualise the actual tasks that need to be performed and by whom (Organisational Breakdown Structure and Responsibility Accountability Matrix). The next process and the one most associated with project planning is to create the schedule of works and produce a Gantt Chart.

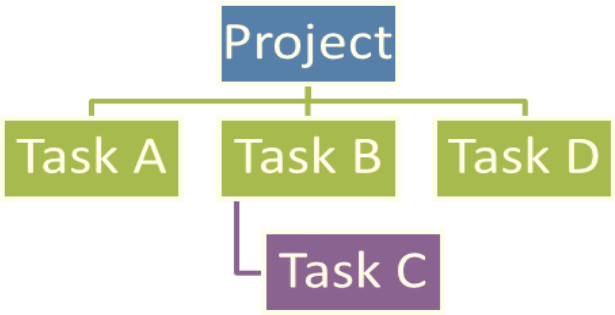


Figure 8.1: Work Breakdown Structure

Project Planning has evolved and uses planning software to create schedules. Most planners go straight to Microsoft Office or other software to input data that creates the Gantt Charts as shown in Figure 8.2.

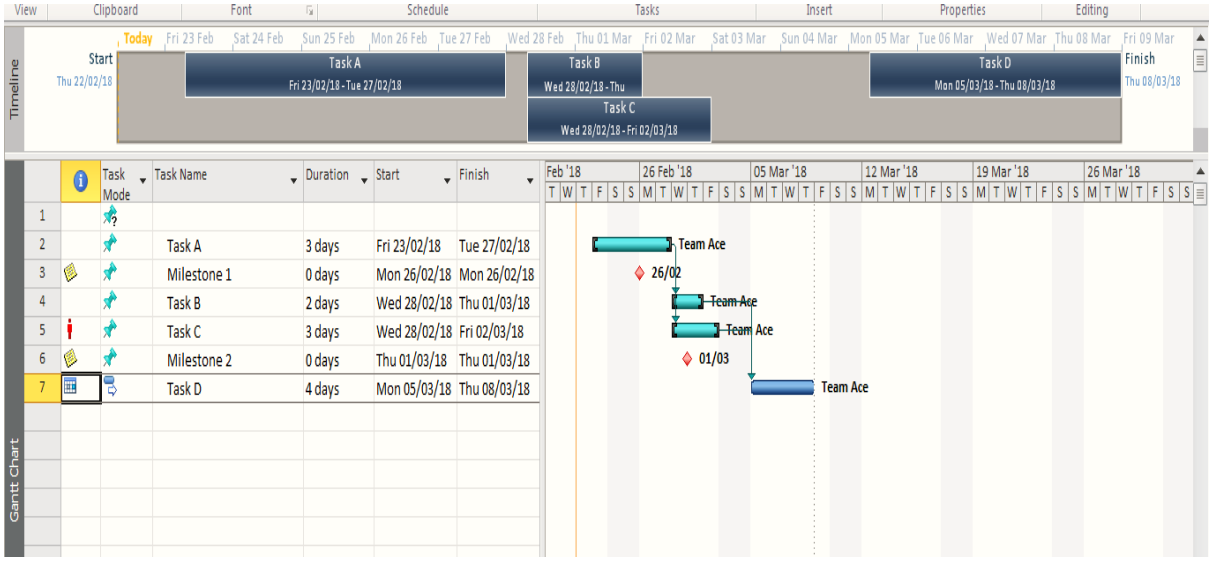


Figure: 8.2: Gantt Chart

The e-Gantt Charts show the relationships between the tasks, their duration, start and finish times as well as milestones in the life cycle of the project. The timeline running across the top with the key tasks highlighted is useful in monitoring and controlling the project. However, the deeper understanding is in the traditional methods of producing Precedence Diagrams.

Precedence Diagramming Method

This method considers the scope and WBS (see Figure 8.1) and puts the tasks into a rational or logic order of work to be performed to maximise the utilisation of resources. The diagram below in Figure 8.3 shows the tasks and the relationship between them with dependencies.

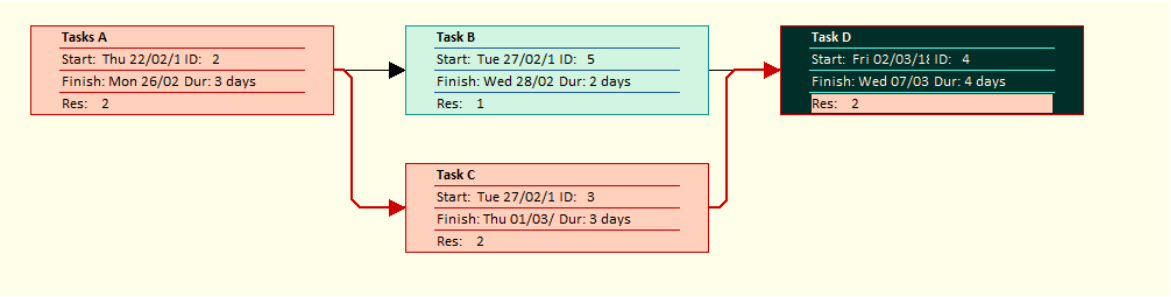


Figure 8.3: Precedence Diagram

This shows that upon completion of Task A we can start Task B and C. Once both are completed, we can start D. It can be seen that Task D cannot start before Task C is complete as it has a longer duration and it needs both tasks to be complete before D can commence. Thus, B and C are preceded by A, and D is preceded by B and C. These tasks are derived from the WBS with each box representing the lowest level of task or work package.

It is worth spending a moment to look at the activity box to see its composition:

- Task Label
- ID number
- Duration
- Start and Finish
- Resources required.

We will revisit this further under node or box conventions later.

Types of Links

The relationship described above finish to start is one of the most commonly used in these diagrams; however, there are other types of links applied to clearly indicate the relationships between preceding tasks. These are shown in Figure 8.4.

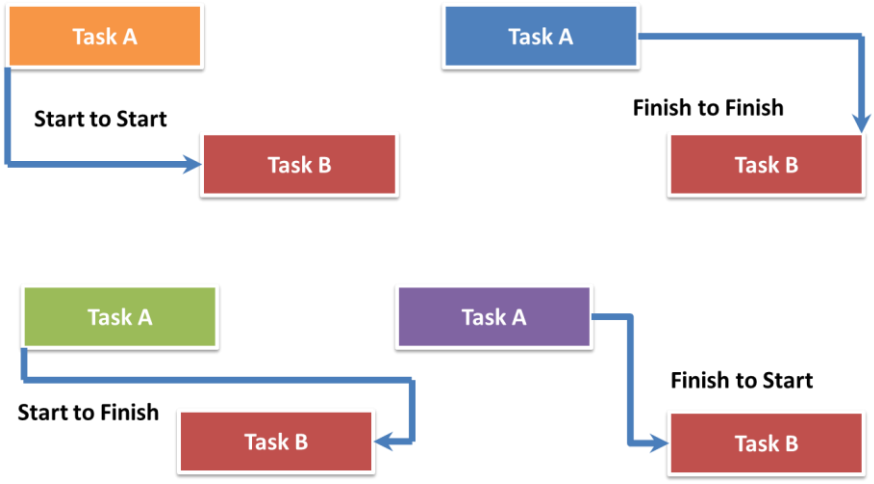


Figure 8.4: Precedence Relationships – types of links

The Scheduling Process

The Critical Path is:

> **'A sequence of activities through a precedence network from start to finish, the sum of whose durations determines the overall duration,' APM BoK, 2019**

The Critical Path Analysis is:

> **'An activity-based scheduling technique that determines the overall duration of the identified work based on estimates and logical dependencies. The method of determining the critical path.' APM BoK, 2019**

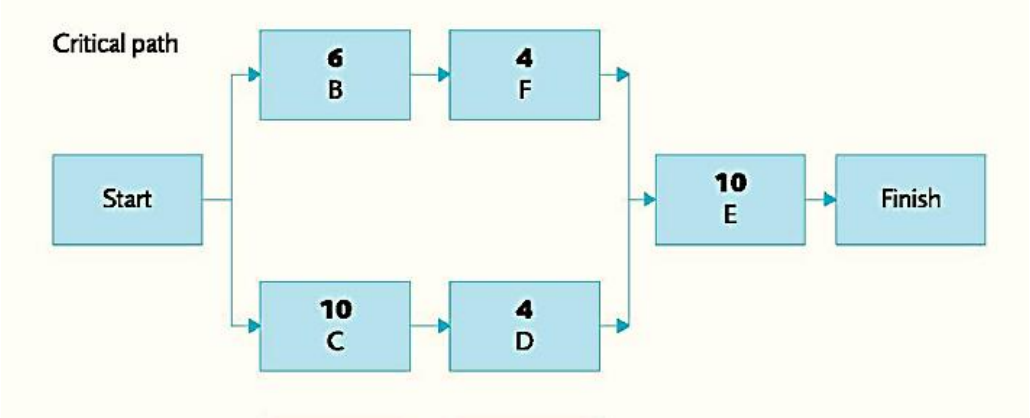
In simple terms it is:

- The longest or shortest path through the schedule
- The path with zero float (see below)
- The set of activities where any delay will affect the whole schedule

A project can have more than one critical path. The Critical Path Analysis is produced by first understanding the sequential order of activities and then planning the appropriate duration days using the following step:

1. **Duration days** – this calculates the overall duration of the network/project. Calculated by using the following formula:
    - **Start day + Duration**
2. **Float** – calculates how much flexibility there is and where in the schedule. This is calculated by using the following formula:
    - **Float** is 'how long an activity can be delayed or extended by without impacting too much on the key deliverables.'
    - ***Types of floats:***
        - **Total Float** – time by which an activity may be delayed or extended without affecting the total project.
        - **Free Float** – time by which an activity may be delayed or extended without affecting the start of any succeeding activity.

Take a look at the example on the next page.

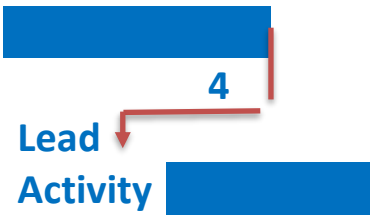


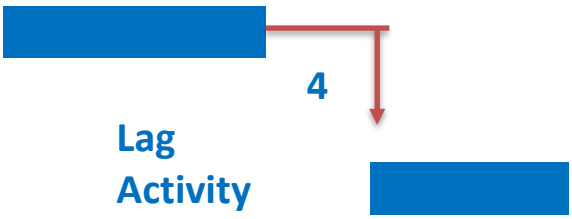
In the example above, you can see that activities B, C, D, F, and E all have duration days added. Activity B & C can be done in parallel, however activity C has a duration of 10 days, and activity B has a duration of 6 days. As activity C has a longer duration, activity B can delay for 1-4 days as the duration is shorter, or it can finish earlier by 1-4 days, so long as it is completed by day 10. However, activity F, will have to start after activity C. It must wait for the preceding activity's completion. Activity F however, is not dependent on activity C. But, because it is scheduled to run in parallel with activity D, it would be best practice to stick to the schedule (depending on the nature of the activity, you may be able to get it completed sooner as activity B has the option of starting on day 1 or on day 4). Activity E, however, must ensure that activities D and F are complete before it can begin.

If any of these activities delay, this will cause an impact to the schedule. Based on the figure above, you can see there is no float or free time between the activities other than B and F, and from the time between the start and activity B. Where there is no float, that is where you will identify the critical path.

Lags and Leads

Lags are the delays between activities or tasks scheduled. Whereas ***leads are used to accelerate activities*** where the dependent task can start before the preceding task.





Network Diagrams

Before creating a network diagram, it is important to understand the node or box conventions.

Below is a worked example using the following project information:

Activity/ Task	Duration	Dependency
A	15	NONE
B	10	A
C	8	A
D	4	A
E	3	D
F	7	B,C,E

The data in the above table is used to produce a *network diagram* as Figure 8.5.

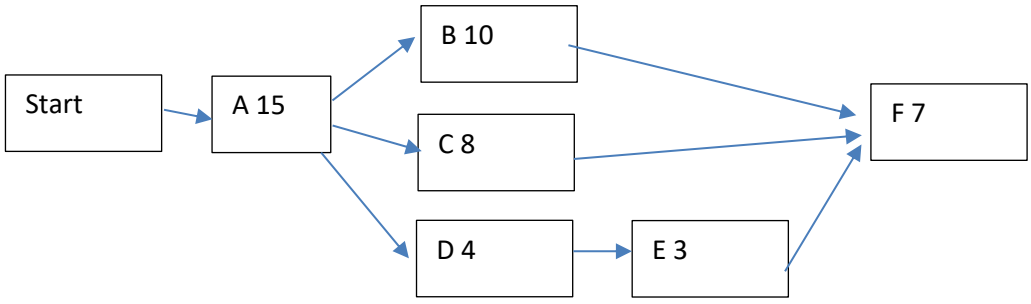
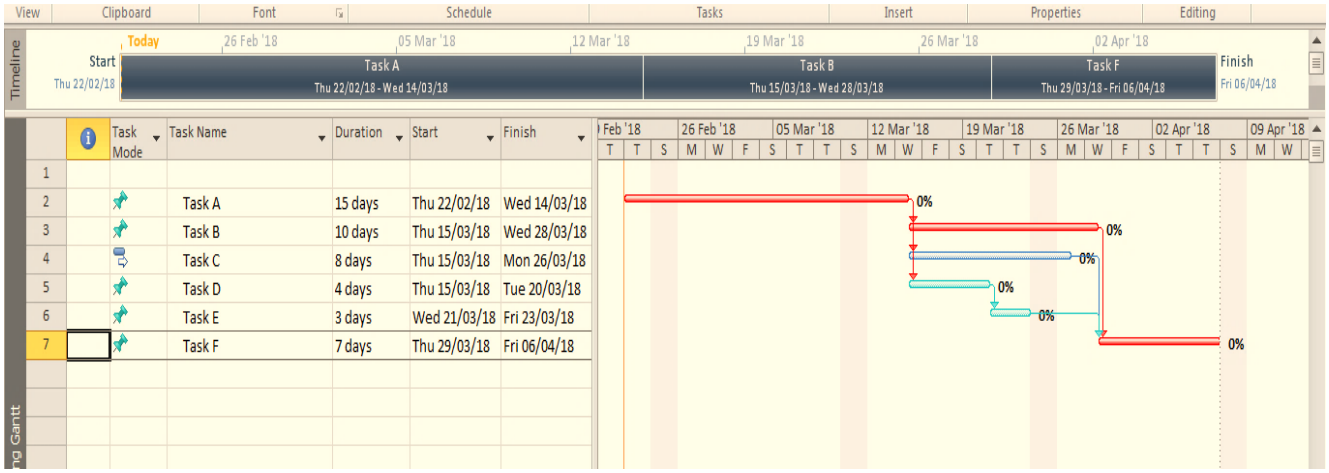


Figure 8.5: Network Diagram worked example

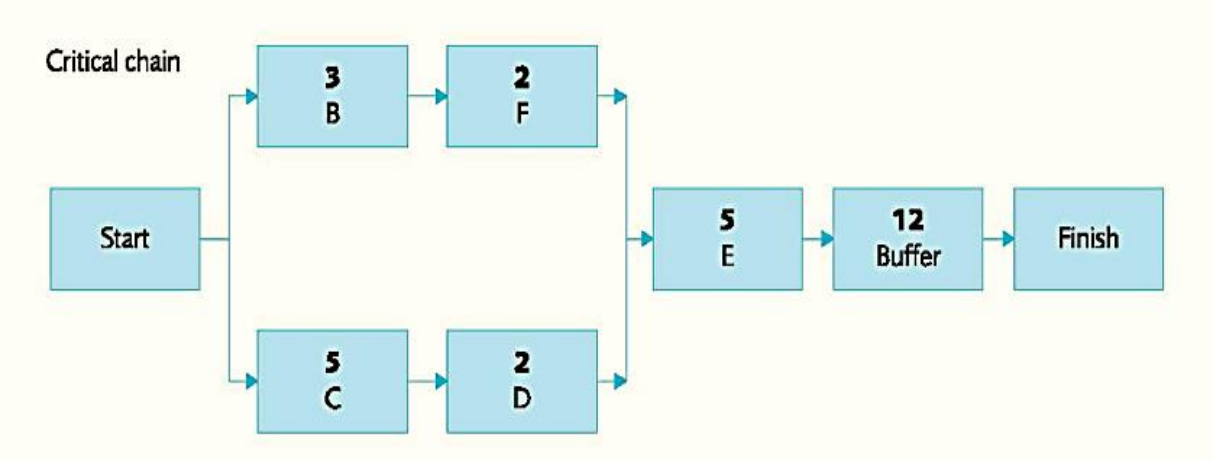
Below the Critical Path is clearly identified as A, B and F using the Gantt Chart software in Figure 8.6.



Critical Chain

The critical chain is also known as the **"resource critical path".** This means that instead of identifying the order of activities and identifying float. **It focuses on the amount of resources needed (labour and non-labour) of the project**. When the amount of resources are estimated for an activity, there are various details that influences how that activity will be performed, its final duration, and the effect on successor activities.

The way to calculate the critical chain is to look at each duration of the activity and reduce it by 50%. This will create a time contingency. The next part is to take the 50% you took away from the activity and add it to a buffer. See the diagram below:



The buffer is used to ensure that if there are issue that occur with the schedule, you have **contingency of resources** to deploy to those particular activities where the delay has occurred. It also provides stakeholders information on financial savings on resources if the entire or part of the buffer is not used.

Developing the WBS and Gantt Charts inevitably raises questions such as 'who is responsible for the tasks?' and 'how many people are needed to complete the various tasks?' which will mean we need to think of the number and type of people resources needed through the project life cycle, as well as when and how they are deployed . Therefore, Scheduling is closely linked to Resource Management. This process has already begun with the creation of WBS and OBS/RAM. Figures 8.2 and 8.3 indicate resources required for the different tasks.

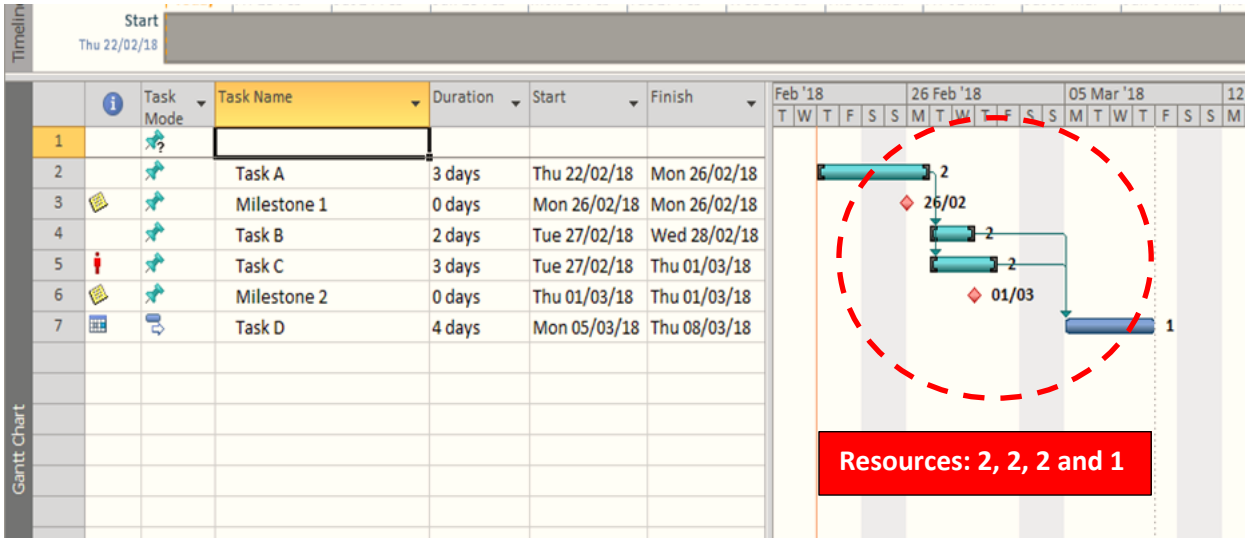


Figure 8.7: Resource allocation on project

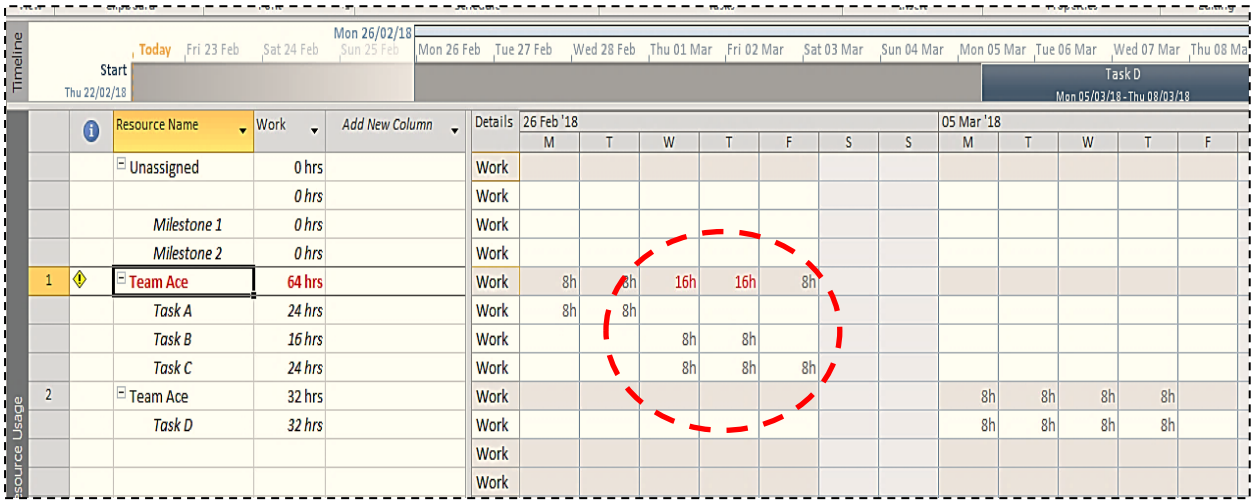


Figure 8.8: Resource issues on project

Figure 8.7 demonstrates how MS Project is being applied to create schedules and allocate resources to the individual tasks. This process also allows you to see any potential issues as seen in Figure 8.8 where during tasks B and C the projected allocation is over the availability. This means decisions need to be taken either get more resources, pay overtime or extend time. This is covered later in **levelling and smoothing**.

Gantt Charts

Gantt charts are the most common way of presenting a project schedule. The have the following feature:

- Timeline showing the project calendar indicating the duration
- Tasks are positioned to show earliest start time and any float
- Shows predecessors and dependencies between tasks with logical connections
- Tasks can be labelled with who is responsible for it (resources)

- Can indicate milestones
- Shows the critical path

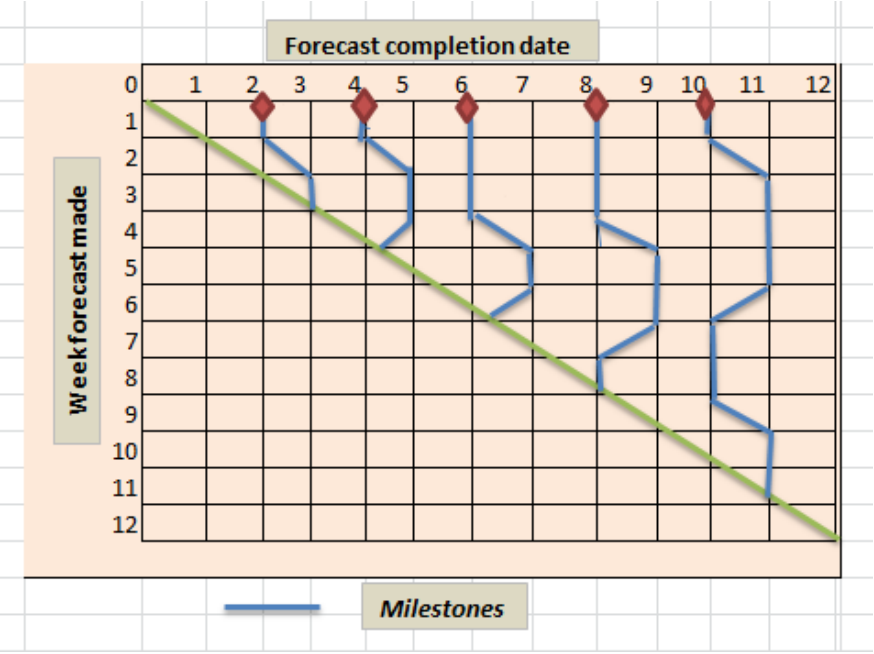
Figures 8.6 and 8.7 shows the Gantt Chart and Network Diagram showing the same information of the project effectively.

Milestones

Milestones provide markers along the project schedule. They demonstrate significant achievements (objectives/goals) across the project and are used to mark key events on the schedule. Milestones and planning for milestones are used by project managers to control performance and indicate project phases/stages / deliverables. Milestones are also used for:

- Visibility and reporting
- Focussing management attention
- Contractual payments to suppliers
- Release of funds for the next phase/ stage.

Project progress over time can be tracked by plotting the milestones on a chart so the project manager can see the current status as well as the historical trends of progress and achievement. See below:



2. Resource Scheduling and Resource Management

> **'Resource scheduling is a collection of techniques used to calculate the resources required to deliver the work and when they will be required.' APM BoK, 2019**

Resources in project management is usually a reference to **people, however it is inclusive of finance, materials, equipment,** etc. that are required by the project for implementation and successful completion. There are two main **types of resources**:

1. **Consumable, and**
2. **Re-usable.**

Consumable (replenishable) resources are raw materials and money. **Reusables** are resources that are no longer needed but can be used elsewhere. For example, people, machines, tools, etc.

Definition

> **'The process of capturing, assessing and justifying stakeholders' wants and needs.' APM BoK, 2019**

To deliver the project successfully project managers need to deploy effective resource management tools and techniques. They need to consider the context of the project as well as the operating environment. The acquisition of external resources is normally done through a procurement process. This involves a selection of a supplier for goods and services in the form of an agreed contract. If the resources are selected from an internal source than usually a service level agreement or terms of reference will be put in place for the supplying department or function. The deployment and utilisation of resources will be an on-going process throughout the project life cycle.

Resource Scheduling Process

The resource scheduling process is as follows:

1. **Allocation** – amount of resources needed;
2. **Aggregation** – intervals of resource requirement (daily, weekly, monthly). Create histogram and **S Curve**;
3. **Scheduling** – **Levelling and smoothing resources across the project life cycle**

Resource Allocation

Activity	Duration	Resource Needed per Task
A	1	3
B	4	2
C	2	4
D	10	3
E	7	6
F	5	5
G	5	2
	Time constraint	Resource constraint = 11

Worked example of resource allocation using the data in the table:

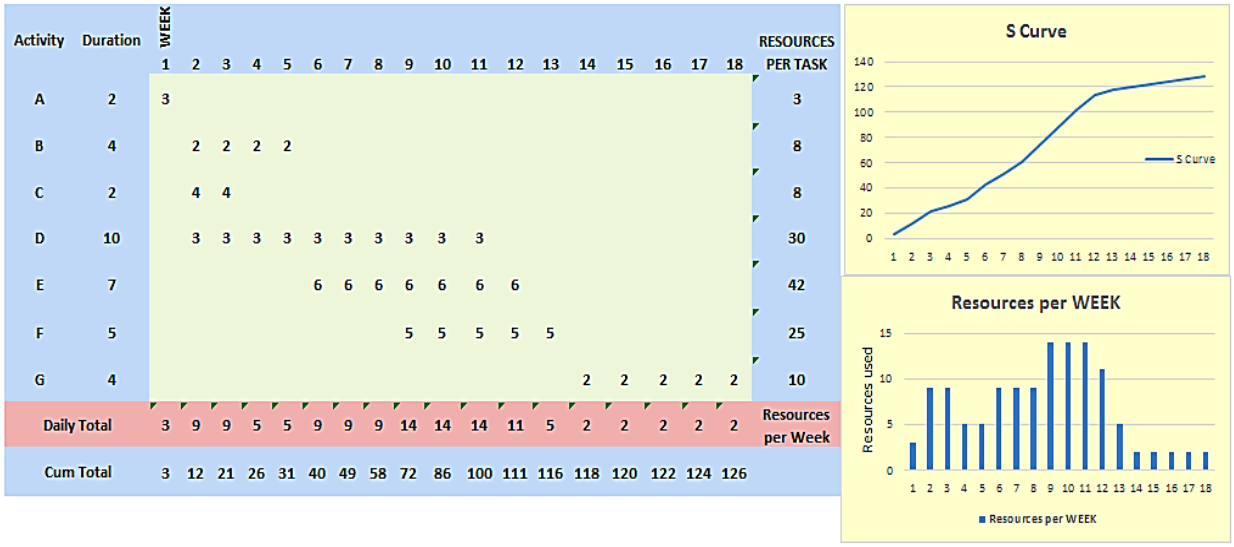


Figure 8.9: Resource Allocation

The data is used to allocate the resources and develop a histogram that allows project managers to visualise the data for decision making. In Figure 8.9 we can see the peaks and troughs of the allocation of resources. Questions such as is this the most efficient deployment of the resources? And are there any constraints? Smoothing and levelling techniques allows PM to respond to these questions.

Resource Smoothing and Levelling

The deployment of resources at the right time, right place, in the right number to avoid wastage and delays is effectively what resource management is. There are two methods for achieving this:

1. **Smoothing (time limited)** – when schedules are created, they are created on the basis that **infinite resources** are available (the default position in planning processes).
2. **Levelling (Resource limited)** – when schedules are planned for they assume there is **no time constraint** (the default position in planning processes) and tasks will be completed on the earliest time resources become available.

Smoothing

This is used when time is more important than cost. **The objective is to deliver the work within the fixed timescale.** This may involve reducing the duration of activities by adding resources. For example, on certain activities, the project manager may add more working hours on the activities within the schedule to meet the deadline. Alternatively, the project manager may decide to use redundant resources from another activity and deploy those resources for the activity that needs more resource power. Again, this shows that cost is not the issue here, but time.

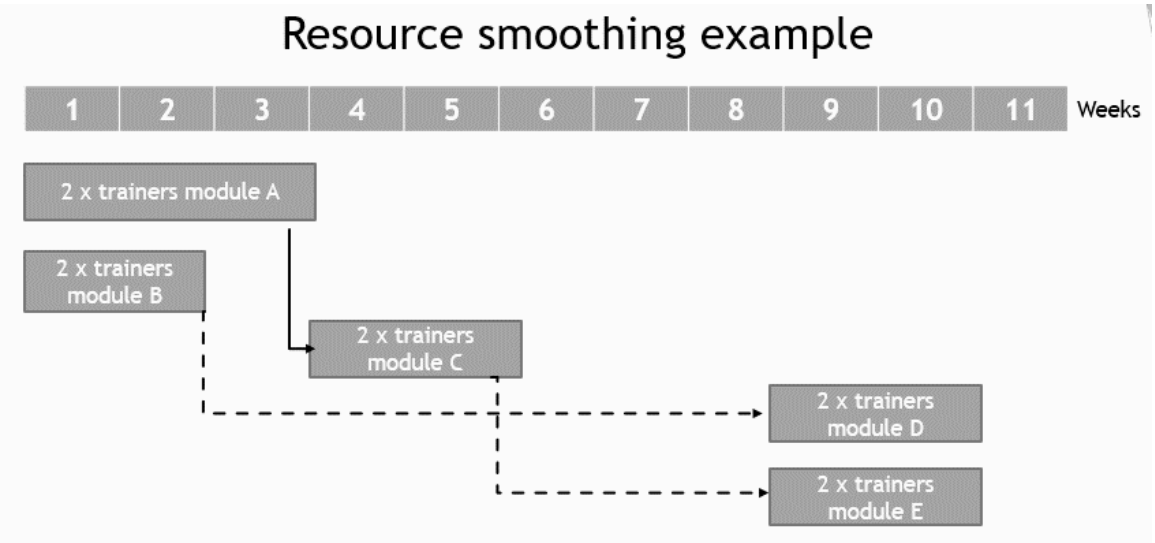


Figure 8.11: Resource issue

- In this example we have an 11-week project to deliver the 5 modules
- The plan has built in redundancy and has flexibility with time in terms of module delivery
- There is some float built into the plan as indicated by the dotted lines
- There may be a concern that there could be resource issues arising, so the project decides to smooth its resources to avoid those peaks occurring at the beginning and the end and make use of the troughs in the middle
- The project decides it's a good idea to try and utilise no more than 2 or 3 trainers at any one time

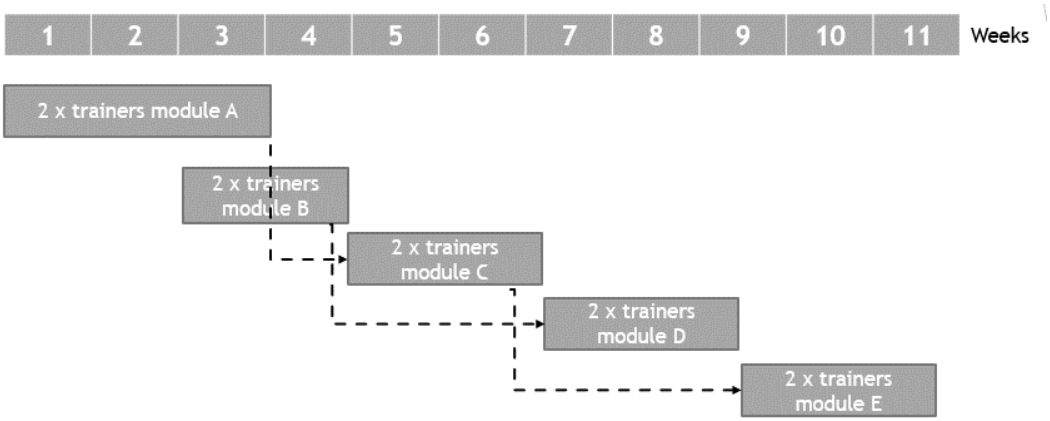


Figure 8.10: Resource Smoothing solution

- By resource smoothing, the project made use of the floats and have spread the resources
- Floats may change or even disappear completely during this activity
- Peaks and troughs have been minimised, allowing for flexibility with resources
- We now only have 1 peak where 4 trainers are being used at one time during week 3
- Trainers have been freed up to allow for contingency and flexibility across the project
- The project remained within its 11-week delivery schedule
- The network diagrams may develop as a result of smoothing or levelling activities

Levelling

This is where the time can be flexed. This means that if there is a resource limitation then there is an option to **extend the time** of the project. Please see the example below which shows a resource issue:

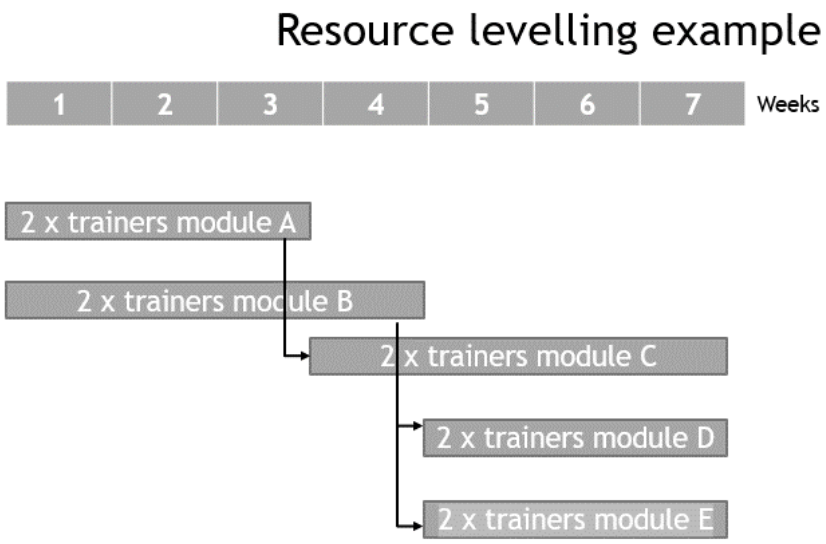


Figure 8.11: Resource issue

- A training project is proposed and is requested to last for 7 weeks, comprising of 5 different modules, each requiring 2 trainers. Some modules are dependent on others being completed first.
- Module A and B have no dependencies so can begin at the same time
- Module A is to be completed before C
- Module B is to be completed before D and E
- An initial plan was drafted, as shown in the timeline above
- It was then identified that the project can only get access to 4 x trainers, this creates a resource limitation

Let's see how resource levelling helps with this:

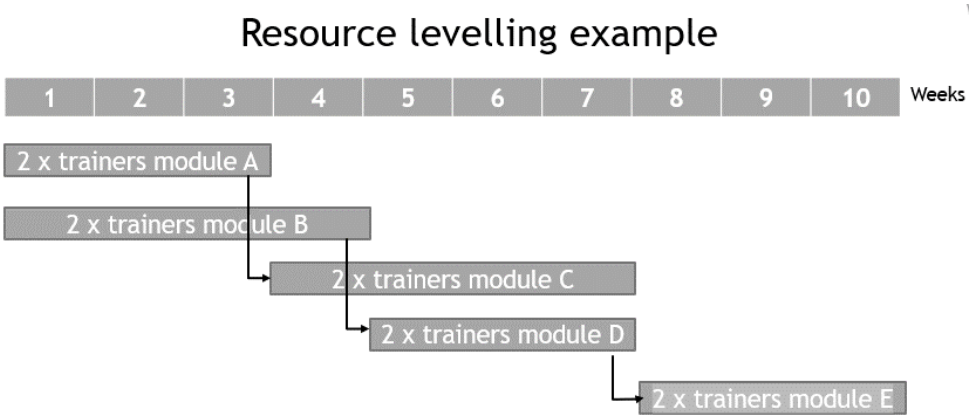
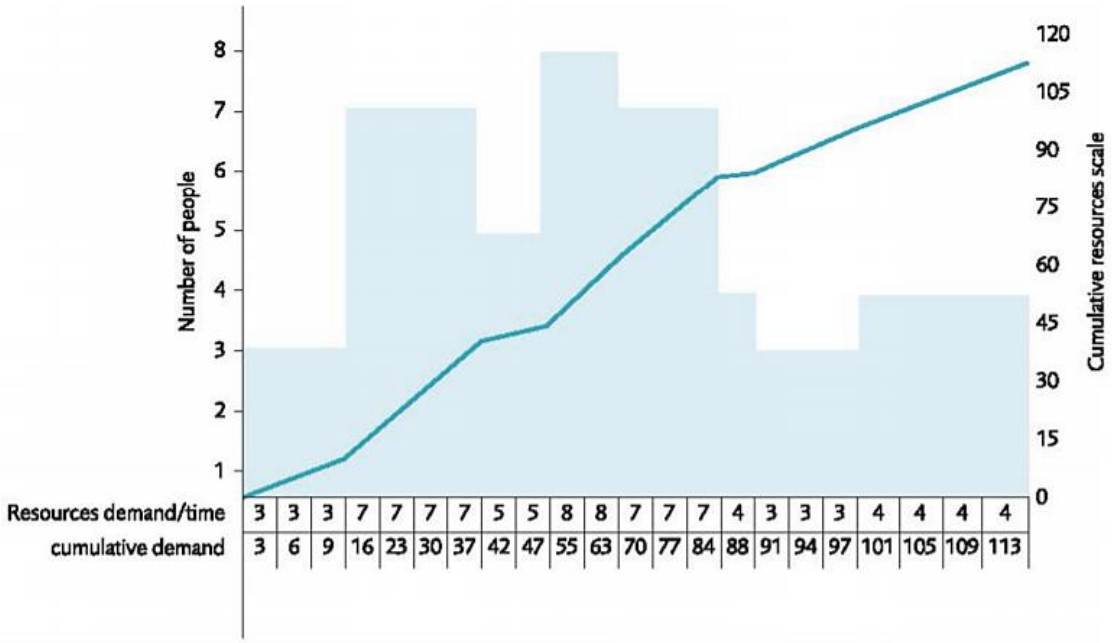


Figure 8.12: Resource Levelling solution

- Resource levelling was used to adjust the tasks and resources to make it work
- The outcome in this example is that the project will be extended to last for 10 weeks
- In this example the customer was happy with the extension and the project was confirmed and planning was completed for a 10-week training project
- Notice that there is no float, task E was previously dependant on task B but due to resource issues and levelling, it is now dependant on completion of task D, to release two trainers.

Cumulative Curve



Resources demand/time	3	3	3	7	7	7	7	5	5	8	8	7	7	7	4	3	3	3	4	4	4	4
cumulative demand	3	6	9	16	23	30	37	42	47	55	63	70	77	84	88	91	94	97	101	105	109	113

A cumulative curve represents the distribution of grouped data on a graph. In this example, plotting the forecast of optimising resources can support the management of the project. This will help with budgeting and planning. The above figure is an example of how we can show our resources over time using histograms and curve lines on graphs, bar charts or Gantt charts.

The resource demand row shows our estimation of how much resource is required. The cumulative row shows the added total of this resources used over time. A histogram is also shown, and the curve line shows the total used over time. This can support in budgeting forecasts and control

Software Tools

Software tools for effective project management are a vital tool for planning, monitoring and control as well as decision making. There are advantages and drawbacks:

Advantages	Drawbacks
Reiterative planning	Long learning curve for learning various elements of the systems as they become more and more sophisticated
Plans updating is easier	Difficult to see what software is doing
Integration with resource planning and earned value	Users only apply or use a fractional of the functionality, tools and techniques of the systems
Electronic storage system - access, storage and security	Can lead to a false sense of security as most software forecasts assume tasks are on target even though there has been earlier slippage
Reporting is easier	Cost of software and IT systems
Automatic calculation for critical path and floats	Errors in one part of planning will set of errors in others, e.g. scheduling to resourcing to risk
Simulation capability – models, risk, plans	For large complex projects, interaction between tasks can be difficult to follow and understand as to why the system has produced the results or outputs it has
Easy to compare Baseline plans against current status	Security of IT systems – access, hacking etc.
Calendar planning – working and non-working days	

Exercises

1. Explain the process of creating and maintaining a schedule
2. Explain categories and types of resources (such as human resources, consumable and re-useable equipment, materials, space)
3. Differentiate between resource smoothing and levelling

Section 9

Financial Cost Management, and Earned Value Management (link to resource does not reflect terminology APM 7th Edition however the principle and calculations are the same)

Learning Outcomes:

- **Define Budget and Cost control**
- **Explain what is meant by budgeting and cost management**
- **Define Earned Value Management**
- **Describe the advantages and disadvantages of EVM**
- **Understand EV Calculations and analyse data.**

PMQ Learning Outcomes	APM BoK Reference
6	4.3.1

Project Budget and Cost management

Project Budget and Cost Management is the effective estimating of costs of the work packages over time, to calculate the total cost of the project so that we can monitor and control it over the baselined plans. **The schedule, resource plans and budgets are the basis of cost control and Earned Value Management (EVM).**

Project Budget

The budget identifies the ***planned expenditure*** of the project and is used as a **baseline** against which ***actual expenditure*** and ***predicted costs*** of the work are reported. By allocating costs to activities as we have seen in section 8 (Schedule and Resource Management), a profile of expenditure is formed. **There are three main components of a P3 budget** (Figure 9.1):

- The base cost (of the project, programme, or portfolio)
- Contingency (known)
- Management Reserve (unknown).

The base cost has 4 main categories:

1. **Fixed Costs** – do not vary and not dependent on the level of goods or services being produced – e.g. machinery, equipment etc.
2. **Variable costs** – rise directly in proportion to the size, duration, and volume of output e.g. staff, raw materials, etc.
3. **Direct costs** (1+2) – those cost that are directly attributed to the project as above.
4. **Indirect Costs** – part of the host organisation's overheads; shared across the functions/projects/programmes, e.g. cost of buildings, management overheads, etc.

The relationship between project budget and the cost categories can be seen in the cost breakdown structure shown in section 8., i.e., people resources, machinery, tools etc.

The cost estimate should also include an allowance for contingency and risk as illustrated below.

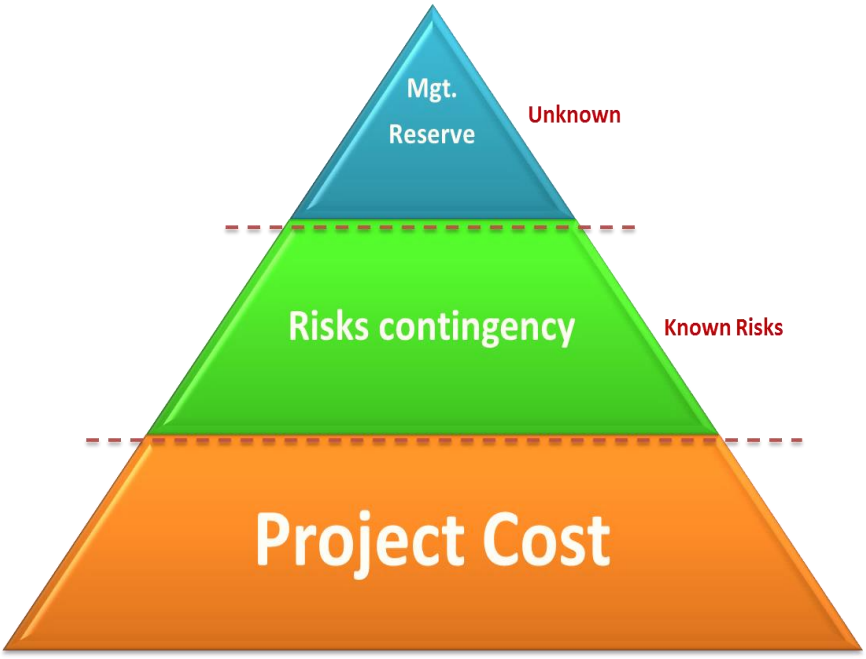


Figure 9.1 Components of Project Cost

Budget Approval

The project budget is calculated by the project manager, based on cost estimates (WBS). This is then approved by the project board or sponsor, who may delegate control to the project manager one stage or phase at a time. The budget then is allocated to the project team as per the Work Breakdown Structure. Budgets are controlled at the work package level and 'rolled up' for reporting purposes in accordance with the Cost Breakdown Structure. Any deviations from the budget are managed and escalated as agreed.

Cash flow

Cash flow concerns the flow of money in (budget) and out (expenditure) of the project in such a way as to minimise the carrying cost of the financing for the project. For any project or organisation, it is important to forecast and manage cash flow to ensure cash is available when needed.

Cost Accruals

Cost accrual is for things that have been purchased but payment has not been made. Delaying payment improves cash flow.

Revenues

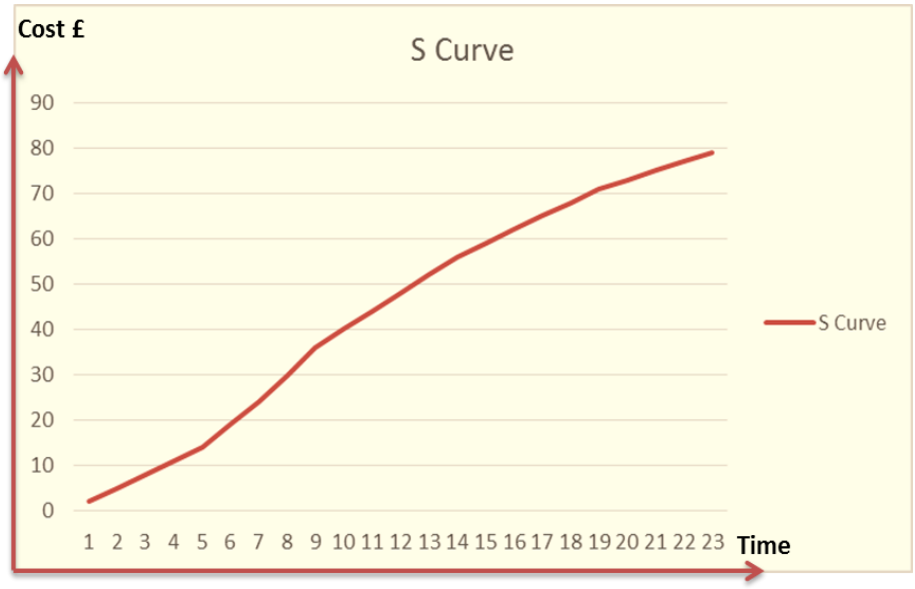
Revenues can also be accrued. Sales are recognised (i.e., counted towards profit) when they are made, rather than when cash is received. **Cash flow is not the same as Profit/Loss**.

Cost Management

Cost management is the monitoring and controlling of the costs against the budget that requires recording and monitoring of:

- **Committed expenditure** – orders placed, and money taken from budget to cover the orders
- **Accrual costs** – work has been done but payment has not yet been made
- **Actual expenditure** – payment has already been made
- **Forecast out-turns costs** – the total of actual expenditure, accruals, commitments and the estimate of the costs to complete the work to the end of the project.

Once all the activities have been scheduled, we can calculate the planned spend for each period and plot the cumulative cost over time. This is known as the S-Curve, as shown below. It provides us with a budget baseline against which we can monitor progress.



This is the foundation for Earned Value Management.

Effective Cost Management

Effective cost management allows cash flow to be developed and decisions taken against actual expenditure and any deviations**. Performance** is *reviewed* at regular intervals to assess cost performance in the light of scope of work and schedule. *Trends can be identified* by

comparing actual against budgets agreed. Trends can also be extended into forecasts, allowing the project manager to take ***corrective action*** to minimise adverse deviations and variances. Changes to the budget can only take place through ***formal change control***.

It is the responsibility of the project manager to ensure that all project costs are monitored and controlled. Regular reporting to the project sponsor and the team allows for effective cost management.

Benefits of Budgeting and Cost Management

- Easier to gain approval and raise capital/funding
- Increases the confidence of the sponsor/ board
- Allows for early indication of potential cost over-spend and therefore early intervention to control expenditure action to be taken
- Allows for effective management of contingency funds
- Increases the likelihood of achieving the benefits of the business case and return on investment.

Earned Value Management

Definition

> **'A project control process, based on a structured approach to planning, cost collection and performance measurement. It facilitates the integration of project scope, time and cost objectives and the establishment of a baseline plan of performance measurement.' APM BoK, 2019**

Earned Value can be defined as the **value** placed on a product that has been delivered, or belongs to a project, that **cannot** be taken away (at a particular point in the project). It is the value added following the investment of resources. For example, a housing development project has completed phases 1 and 2. These are ready to be occupied or sold even though the project still has phases 3 and 4 to completion. Phases 1 and 2 will start to generate income and this would have been factored in. At this point in time we would be interested in the Earned Value.

Why Use Earned Value Management

EVM is a key tool for measuring project performance using earned value as key factor in determining progress. Therefore, EVM can support management by:

- Enabling an objective measure of project status
- Providing a basis for estimating final costs
- Forecasting when the project will be complete
- Supporting effective deployment of resources

- Providing a means for managing and controlling change
- Providing visibility of outputs and achievement
- Providing accountability in the decision-making process
- Allowing debate and detailed analysis of current status against the plan.

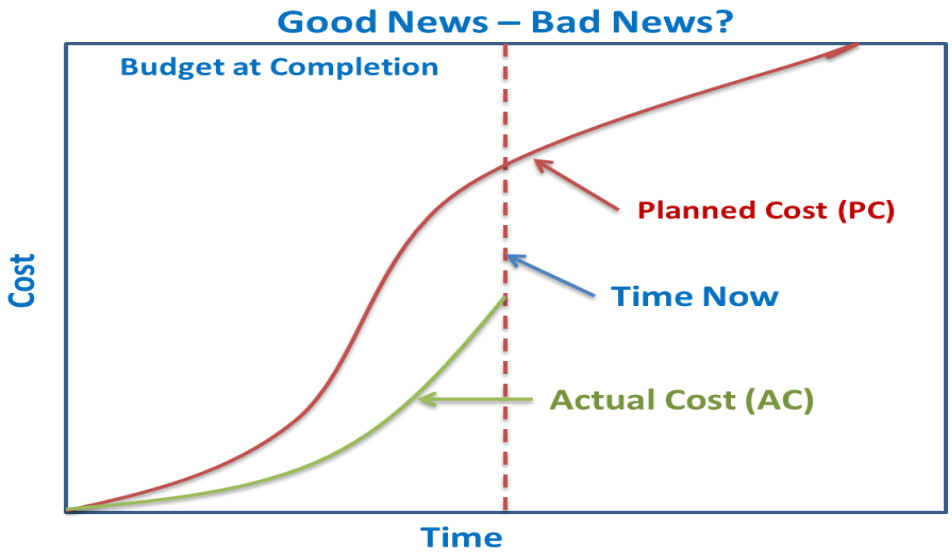


Figure 9.2: Earned Value

APM terminology check:

PC = BCWS – Budgeted Cost of the Work Scheduled (at that time)

AC = ACWP – Actual Cost of Work Performed (at that time)

EV = BCWP – Budgeted Cost of the Work Performed (% work completed x Budget at Completion)

Figure 9.2 shows that the work done had a planned cost of 'x' amount; the actual cost is showing below the planned cost – is this good news or bad news at this point in time?

Worked example

A builder has been commissioned to build a garden wall that is 2 metres high and 21 metres long. It will take 10 working days to complete, and we pay the builder £200 per day.

- The budget at completion is £2000
- The planned completion is 10 working days (2 weeks)

After the first week we find that the wall is 2 metre high and 7 metres long. It is clear that the wall is behind schedule. We have paid the builder £900 of the budget, with less than 50%

completion. In this case it is easy to spot the problem (albeit on subjective basis). Earned Value provides the tools to actually calculate the impact.

By calculating the amount finished 7m against the total amount of 21m, we can see that 33% of the wall is complete. This cannot be taken away and belongs to us. So earned value (BCWP) is 33% X the budget (£2000) = £660. The BCWP of our project at this point in time is £660 even though we have spent £900 to build it and 50% of the schedule getting it done.

In the above example we clearly have an issue in that we are behind schedule and the builder needs to complete **14 metres** of wall to bring the project in on time and on budget. Experience is telling us that we are likely to go over budget and over schedule by at least another week. If this is true, the project manager needs to make decisions as to how the project can be delivered to planned cost and schedule. On large complex projects with many work packages, these simple principles can help us to track progress.

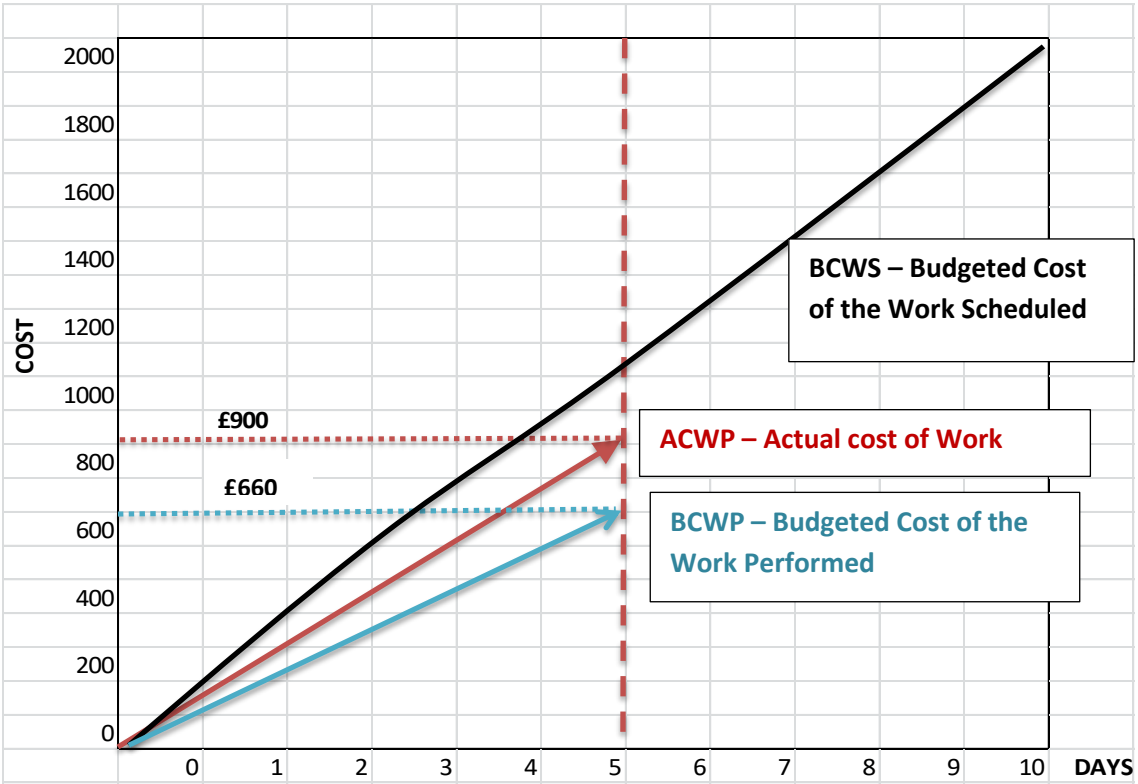


Figure 9.3 Earned Value of worked example

Earned Value Analysis

Using the above worked example we can analyse the situation further to investigate what has happened. Figure 9.3 illustrates the EV that we have paid 50% of the costs for only 33% of the work done. By doing some further calculations we can begin to see what has happened.

We can calculate the Schedule Variance (SV)

SV = BCWP (Earned value) – Planned Value* **660 – 1000 = -£340**

*the terms Planned Cost and Planned value are used interchangeably.

This means that we have failed to carry out £300 worth of work. Note the units of SV are cost NOT time.

We can also calculate Cost Variance (CV)

CV = BCWP (Earned value) – Actual Cost 660 - 900 = -£240

Both are negative figures indicating that the project is behind schedule and over budget.

Performance Indices

Furthermore, we calculate performance ratios to indicate project performance:

Cost Performance Index (CPI)

(Cost Efficiency) = BCWP (EV) ÷ ACWP = 660 ÷ 900 = 0.73 which is less than 1

Schedule Performance Index

(SPI) = BCWP (EV) ÷ BCWS = 660 ÷ 1000 = 0.66 which is again, less than 1.

Values ≤ 1 indicate the project is over budget and late.

Values ≥ 1 indicate the project is under budget and early.

Forecasting Cost

These calculations can be used to forecast final project outcome.

Budget at completion (BAC) is the project budget or 'Total Planned Budget'

There are **two different assumptions used to calculate Estimate Cost at Completion (EAC)**

Assumption 1 assumes everything will be done according to the plan from now on. We apply the formula:

EAC = BAC – CV

Assumption 2 assumes that the **remainder of the project will carry on the same average efficiency** so far. In this case we apply the current cost efficiency to the whole project by dividing by the cost-performance index (CPI).

Estimate at Cost of Completion (EAC) = BAC ÷ CPI

Forecasting Time

Forecasting time is not as straightforward as forecasting cost.

Assumption 1: Estimated Completion Date (ECD) = Current Planned Date + Slippage

10 + 1.5 = 11.5 days (ECD)

Again, this assumes that future work will be on track, but the issue is how to calculate slippage in terms of time when Schedule Variance is measured in money. The answer is that we use the earned value graph to convert money to time as shown in Figure 9.4.

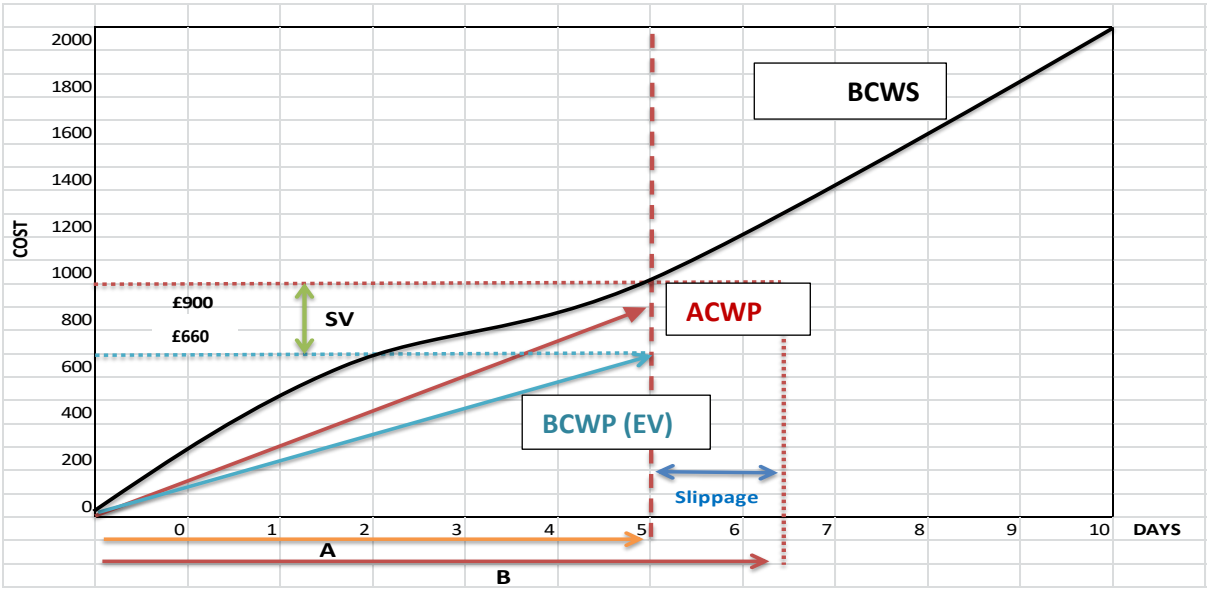


Figure 9.4 Calculating Slippage

Assumption 2: Estimated Completion Date = Original Duration ÷ SPI

This assumes that again all remaining work will have the same SPI. This method will only give the correct result if the planned end date has not already been exceeded. This is because at the end of a project Earned Value approaches Planned Value and thus SPI approaches 1 regardless of performance. The **Earned Value can never exceed the Planned Value** because once EV reaches PV then the work is complete.

To overcome this, we calculate a new SPI called SPI (time) = A÷B as shown in figure

Then the Estimated Completion Date = Original Duration ÷ SPI (time).

For the exam you will not need to calculate the data, However, you will need to understand how to interpret the information shown and therefore knowledge of the calculation and formulas are necessary.

Forecasting using EVM is not using SPI and CPI to look back, but rather using them to look forward. You can use them to report that, if the project continues to work at this efficiency rate, then it will be completed by 'x' time and 'y' is how much it will cost.

Advantages and Disadvantages of EVM

Advantages	Disadvantages
Focuses on work done not just money/ time	**Techniques take a holistic view of the project and may mask under performance in areas of the project**
Measures the whole project rather than concentrating on the critical path	**Method relies on accurate metrics and data**
Measures the efficiency of work in progress	**Requires considerable effort and organisation**
Allows forecasting the project using different assumptions	**EVM does not into account that the project may be on time and budget but still fail to deliver the correct quality**
Provides an indication of likely variances	**There is a considerable lack of understanding beyond the project community.**
Facilitates trend analysis	
The need to measure actual progress ensures tighter controls	

EVM Terminology

Budgeted Cost of Work Scheduled (Planned Value or Cost) = BCWS

Actual Cost of Work Performed (at that specific time) = ACWP

Budgeted Cost of Work Performed (Earned Value) = BCWP (EV)

Estimate at Completion = EAC

Calculating formulas

Budgeted Cost of Work Performed (EV) = % complete x BCWP

Schedule Variance (SV) = BCWP (EV) – BCWS

Cost Variance (CV) = BCWP (EV) – ACWP

Cost Performance Index (CPI) = BCWP (EV) ÷ ACWP

Schedule Performance Index (SPI) = BCWP (EV) ÷ BCWS

Exercises

1. Explain what is meant by Budgeting and Cost Control.
2. Describe the advantages and disadvantages of Earned Value Management
3. Explain the meaning of the following terms:
    a. Budgeted Cost of Work Performed (Earned Value)
    b. Cost Performance Index (CPI)
4. Perform the following calculations for the following case study:
   On a 14-day project with a budget of £10,000 (BAC), it is found that only 20% of the work is completed on day 8.
    a) What is the BCWP (EV)?
    b) Of the 8 days, the ACWP was £4k. Calculate the Cost Variance (CV)?
    c) Calculate the Schedule Performance Index
    d) What is the forecasted planned end date of completion based on the Schedule Performance Index
5. Explain what is meant by budgeting and cost control
6. Look at the following situation and **explain 3 reasons why** it is as it is and what can be done to reach optimum performance:

Month	**SPI**	**CPI**
1	0.92	1.00
2	0.89	1.02
3	0.78	1.15
4	0.77	1.11

Answer to Question 3

a) BCWP (EV) = % work completed at that time x budget at completion = £2k
b) CV = BCWP – ACWP = £2k - £4k = - £2k – this means we have overspent
c) SPI = BCWP ÷ BCWS = 2k / 3k = 0.66 or 66% - this means we are behind schedule
d) Forecasted project completion date = OD÷SPI = 14 days X SPI 0.66 = 21.21 days (a further week delay)

Answer to Question 6

Examples of three reasons to explain the data:

- There may have been a shortage of resources which is why they are behind schedule and underspending.
- Teams working on work packages may not be working as much as they should which shows they are behind schedule and therefore the underspend is reflecting on the lack of work.
- There may be a delay on the project which shows lack of progress on the schedule as well as an underspend.

An example of a reason to solve these issues: The PM could use the underspent budget to allocate more resource to get back on track with the schedule.

Section 10

Project Procurement Management and Negotiation

Learning Outcomes

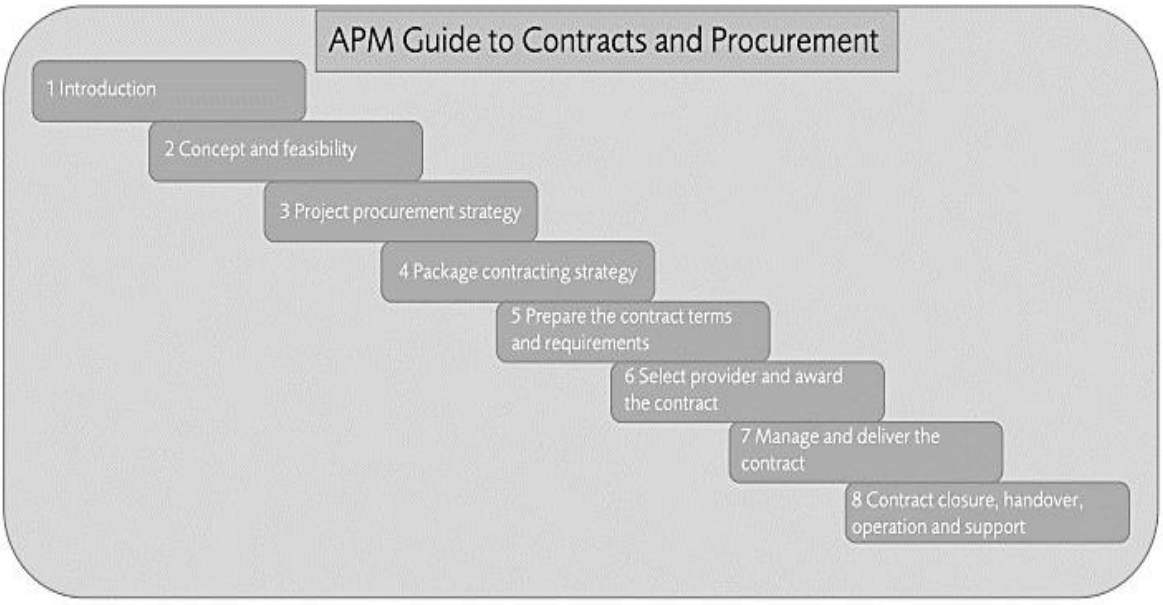
- Explain the purpose, typical content and importance of a procurement strategy
- Differentiate between different methods of supplier reimbursement (including fixed price, cost plus fee, per unit quantity, and target cost)
- Differentiate between different contractual relationships
- Explain a supplier selection process
- Explain how to conduct different negotiations (ZOPA, BATNA, win-win))

Learning Outcomes	APM BoK Reference
4, 9	2.1.4, 3.3.2, 4.2.1, 4.3.1

Definition

Procurement Strategy

> **'The high-level approach for securing the goods and services required from external suppliers to satisfy project, programme and portfolio needs.' APM BoK, 2019**



APM Guide to Contracts & Procurement, 2017

A major part of ***procurement*** is to ensure that there is a robust ***Procurement (acquisition) strategy and process*** in place that sets out how to acquire and manage the goods and services needed by the project plan (PMP). The following factors need to be considered for the **Procurement Strategy**:

- To make or buy
- To appoint one single supplier, deploy a range of multiple suppliers or use an integrated supplier. This will involve a procurement process and criteria for appointment
- Terms and conditions of contract for suppliers – types of contracts
- Methods of reimbursement
- Contractual relationships
- Supplier selection

Definitions in Procurement

Contract: an agreement between two parties that is legally binding.

Contractor: a person or company who has been contracted to provide goods and services to the project.

Supplier: Any organisation including contractors and consultants that supplies goods and services to customers

Contracts and Terms

Various contractual arrangements can be made which would best serve the project:

- **One comprehensive contract** with a single supplier
- A sequence of contracts with multiple suppliers, playing to their respective strengths
- **Parallel contracts** – a series of contracts with different individuals
- **Prime and Subcontracts** – a contract that honours another's obligations.

Also, attention needs to be paid to conditions that must be agreed, which might include:

- Intellectual property rights
- Confidentiality
- Dispute resolution process
- Contract payment methods
- Penalties.

Types of Contracts

- Cost plus fee
- Target Cost (Cost Plus Incentive Fee)
- Firm Fixed Price
- Per Unit quantity

Cost Plus Fee

In this type of contract:

- The supplier will add a percentage fee to the goods supplied. i.e., administration fees
- It is a high risk to the customer as they may not know what the final cost will be after the work has been completed

Regardless of work completed, there is a **standard fee** in this type of contract.

Target Cost (Cost Plus Incentive Fee)

This type of contract:

- Contract costs are reimbursed as before but instead of a percentage mark-up, there is an **incentive fee that is linked to a target**
- If the project comes in on target, the incentive fee will be paid
- As a variation, the incentive fee may vary depending on over- or under-achievement of the target, according to an agreed formula

There is motivation on the seller to control costs and thereby share the risk and benefits with the buyer.

Fixed Firm Price

In this type of contract:

- The seller provides the goods and services at a price which is fixed to a variable such as exchange rates, raw material price increases, etc.
- This is high risk to the supplier because if the work is done over time, prices of materials may go up, but they have agreed a rate with the client. This may mean not make any money from the customer after completing the work.
- Suitable for projects with detailed specification (scope) and possibly a shorter projects to avoid risk on inflation on materials.

Per Unit Quantity

In this type of contract:

- This type of contract is effectively a **'pay as you go'** type of contract. Each unit is charged at a rate (normally fixed or firm pricing).
- This is suitable for projects where the work to be done or resources required are uncertain at the time of the bid, and the client rather than call off as required.
- The supplier has an incentive to achieve each unit of work as cash flow is more favourable when payment is made for each unit of work.
- High risk to the customer because it the number of units may not be known.

Contractual Relationships

Contractual relationships vary in nature as we have seen depending on the types on contracts agreed. The key question is "**how would you like engage with the supplier?".** Some of the common relationships are as follows:

1. **Comprehensive Contract (Turnkey)** – this is where the supplier undertakes to provide a total solution for which the buyer can literally take delivery and 'turn the key' and switch on.
2. **Parallel Contract** – The client will have two or suppliers working in parallel if the activities are not dependent of each other.
3. **Sequential Contract** – The client will have one supplier working on the first stage and will not get the other supplier until they are ready for the next stage. Suppliers will be contracted in sequence of stages, where needed.
4. **Prime and Sub Contract** – The client will hire a prime contractor, however the prime will have other sub-contractors that can work on other parts of the project to meet the objectives of the requirements.

Procurement Process

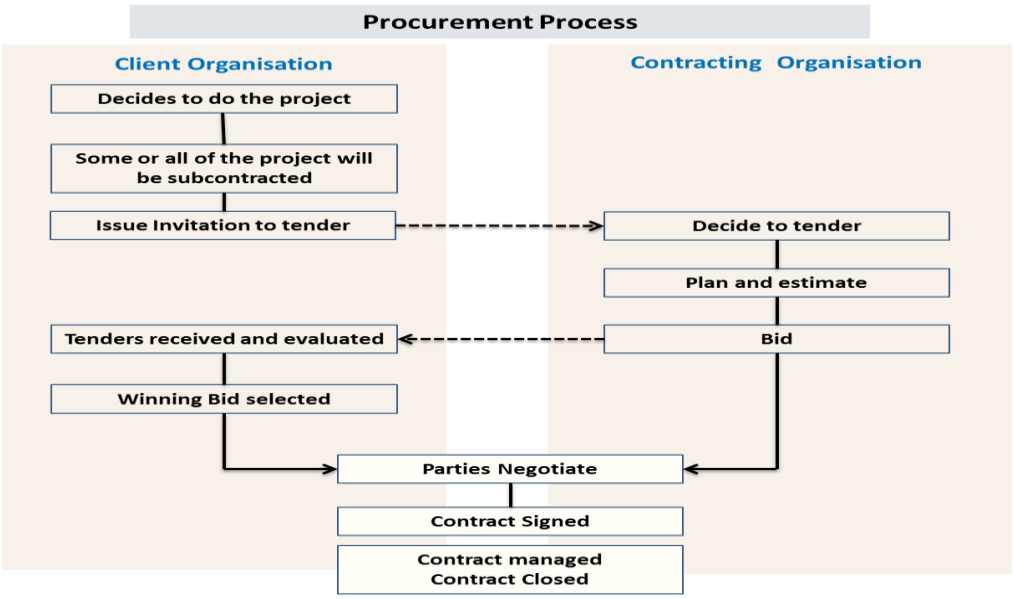


Figure 10.1 Procurement Management Process

Figure 10.1 outlines the **procurement (Supplier) selection process**. Formal processes are important to ensure objective selection of suppliers, transparency, and fairness. There may be a pre-qualification stage in which basic criteria are outlined before a detailed bid is submitted. In the **Pre-Qualification** stage key background checks may be done as follows:

- Financial status
- Industry background and knowledge
- Delivery capability
- Quality systems
- Relevant experience
- Quality of previous work

During the procurement process:

- Depth of planning in tender document
- Are costs and schedules realistic and competitive?
- Product life cycle costs
- Type of contract
- Quality Specifications
- Working Relationship between supplier and buyer
- Management - experience, training, competencies, leadership

Supplier Evaluation

- **Organisation** – size, maturity, quality systems
- **Financial** – history, credit checks, commitments
- **Experience** – project type, industry knowledge, resources
- **Management** – leadership, project teams, training and development
- **Performance** – cost, time, safety risk, customer relationships

This is not an exhaustive list of criteria against which to select suppliers; indeed the criteria are very much dependent on the nature of the project, type of relationship, and contract to be entered into. The key to success will be the negotiating ability of the project manager to get the best possible terms for the project. This requires excellent negotiation skills.

Negotiation

Project Managers are required to negotiate on many issues and this is a key skill. For example, negotiations often encompass:

- Time, cost, quality considerations, scope requirements and technical project issues.
- Team members, project sponsor, resource providers, end users, contractor and suppliers.

Negotiations can be formal and informal; however, the process within project management involves constant informal negotiations with all project stakeholders. These negotiations are often part of normal conversations and involve no pre-planning.

Successful Negotiations

Good negotiations have successful outcomes that:

- Enhance and maintain good relationships
- Increase the mutual understanding of the affected parties:
    - Motivation
    - Needs
    - Requirements
- Recognise the importance and value of each relationship

Good negotiations exhibit:

- Ability to set goals and limits/ boundaries
- Emotional control
- Excellent interpersonal and communication skills
- Skill in conducting negotiations and collaboration
- Closure with all parties satisfied.

Negotiation falls into two main categories – collaborative and competitive. The latter focuses on getting the best deal possible regardless of needs and interests of the other party – the win/lose or 'zero-sum' scenario. Collaboration focuses on a win/win scenario where negotiations attempt to give all parties all or most of what they want.

Negotiation process

These **five steps** are an important part of the process in negotiations. Each stage building on the previous one, ensures a rational approach to formal negotiations.

Step 1: Plan

This involves:

- Establishing objectives in consultation with key stakeholders – MoSCoW
- Finding out what is tradable
- Establishing authority limits
- Researching information, collating and analysing – consider options
- Evaluating power positions – who needs the agreement most?
- Preparing people involved in the negotiation process and their respective roles
- Assessing levels of formality
- Adopting a strategy – problem solving, contending, compromising, etc.
- Determining levels of investment needed – time and people

Step 2: Discuss

This involves:

- Face to face first time meeting of parties
- Establish rapport
- Ground rules for negotiation
- Set agenda

- Check positions and understanding
- Form a firm base for negotiation

Step 3: Propose

This involves:

- Opening position/ offer is placed on the table
- Indication of range of negotiation – flexibility
- Any commitments or concessions made
- Checking position and understanding of both parties
- Areas of agreement/disagreement to start the bargaining process

Step 4: Bargain

This involves:

- Core part of the negotiation process, which can be lengthy
- Two rules:
    - Link issues – 'if you do *this*, we can do *that…'*
    - Do not make concessions without getting something in return
- Tactics:
    - Price
    - Deadline – time
    - Fairness/reasonableness
    - Extreme demands
    - Good guy/ bad guy
    - Ultimatum
    - Broken record – repeat, repeat, repeat!
    - Budget limit
    - Future carrot
    - Surprise element
    - Violins
    - Control
    - Silence

Step 5.1: Agree

This involves:

- Recording and reviewing the agreement.
- Prepare contract of agreement
- Signature by both parties

Step 5.2: Review

- The outcome is communicated to all parties
- Incorporated in the PMP
- Review for any lessons learned.

With the **APM there are three terms** that include all of the above. These are called the following:

BATNA – Best Alternative to a Negotiated Agreement

ZOPA – Zone of Possible Agreement

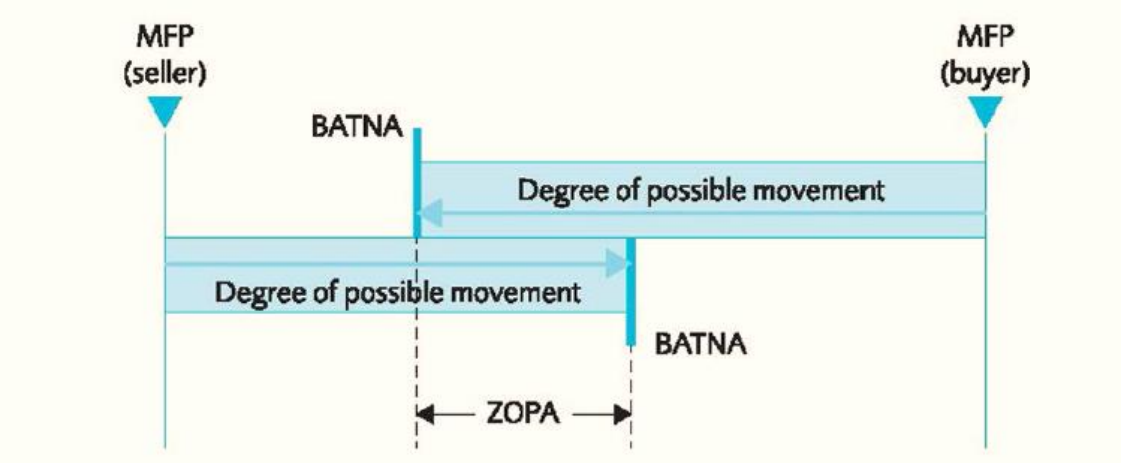
Win-Win Situation – which include concessions

Where a seller is trying to sell their product, the buyer ultimately wants to ensure they are buying the item of the best price. For example, the Seller is trying to sell a new smartphone and the phone company (buyer) will not buy it for the full asking price, they will want a negotiated deal.

With **BATNA**, each of these parties will be in their most favourable position (MFP) to begin with. However, to achieve a deal they will need to start a professional bargain (for which respectable limitations are set to the lowest each party can go to).

How much is the seller willing to give? How much is the buyer willing to pay?

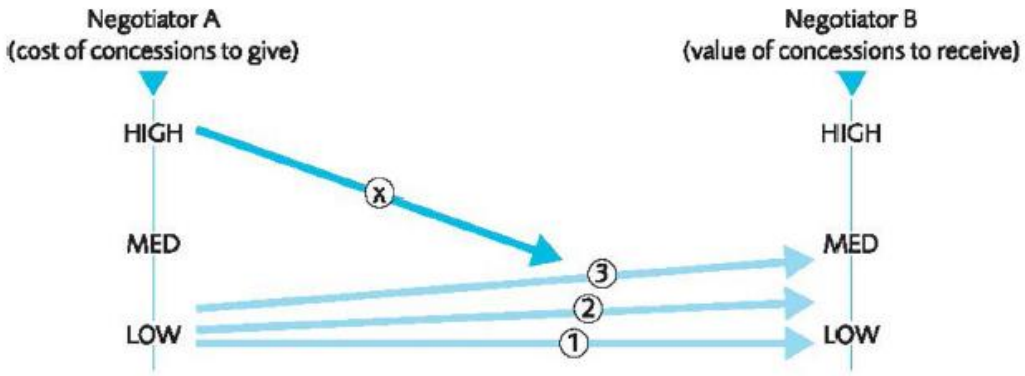
As they start to make these adjustments, they begin to offer the **Best Alternative to a Negotiated Agreement (BATNA)**. As they being to agree on some of these terms, a Zone of Possible Agreement is achieved. Please see the diagram below:



Note that the point of final agreement could occur anywhere within the **ZOPA** area. It does not always have to meet in the middle. The important factor is that each party should feel positive about how the relationship has developed and the levels of trust that have been created. This is where a 'win-win' outcome is a result of the negotiation.

Concessions are also known as 'trade-offs' where one or more parties to a negotiation engage in a process of making an agreement. This may be done willingly or unwillingly. Concessions are also important in order to achieve these ‘win win’ situations.

To achieve this ‘win win’ situation it is important that Negotiator A, does not offer concessions that are of high value at an extremely low cost. The aim of this is to start with items that are low cost and low value and build up from that points so that Negotiator A is not at a total loss which may result in a ‘win lose’ situation. See the diagram below:



Exercises:

1. Explain the purpose of Procurement Strategy and its typical contents
2. Distinguish between different supplier reimbursement contracts
3. Explain the differences between different contractual relationships
4. Explain the supplier selection process
5. Explain the following terms: ZOPA, BATNA, Win-Win

Section 11

Risk and Issue Management

Learning Objectives

- **Explain each stage in a risk management process (such as identification, analysis, response, and closure)**
- **Compare risks as a threat and opportunity**
- **Explain proactive and reactive responses to risk (such as avoid, reduce, transfer or accept and exploit, enhance, share and reject)**
- **Explain the benefits of risk management**
- **Explain the key aspects of issue management**

Learning Objective	APM BoK Reference
10	4.2.2, 4.2.3, 4.3.3

Definition

Risk in project management is defined as:

> **'The potential of situation or event to impact on the achievement of specific objectives.'**

Risk analysis and management is defined as:

> **'A process that allows individual risk events and overall risk to be understood and managed proactively, optimising success by minimising threats and maximising opportunities.' APM BoK, 2019**

Should a risk occur then it may impact on time, cost and the scope of the project. Therefore to maximise opportunities for success risk should be proactively identified and managed over the project life cycle.

Risk Management Plan

The Risk Management Plan details how risk or opportunity (resulting from the risk event) will be handled using processes. *The Risk Management Plan is high level and does NOT consider individual risks*. The Risk Plan content is as follows:

- The methodology and data sources
- Roles and Responsibilities
- Budgeting for Risk
- Timing: when the risk assessment will be carried out
- Qualitative and Quantitative scoring methods

- Risk Thresholds
- Reporting format
- How risks will be tracked – monitoring.

Risk Management Terminology

Risk event
An uncertain event or set of circumstances that would, if it occurred, have an effect on the achievement of one or more objectives.

Risk Probability
The probability or chance of the risk event occurring given the context of the project

Risk Impact
The likely impact of the risk event on the project and its deliverables

Inherent Risk
Identified risk with *choosing particular action*, for example selecting particular known supplier

Residual Risk
Resulting from taking a particular action, for example risk resulting from changing suppliers during the project

Secondary Risk
Created by the response to another risk. For example, we may decide to mitigate an urgent flood risk by raising the Thames barrier, but a more severe flooding risk may arise upriver as a result.

Risk analysis
An assessment and synthesis of risk events to gain an understanding of their individual significance and their combined impact on objectives.

Risk appetite
The tendency of an individual or group to take risk in a given situation.

Risk attitude
The response of an individual or group to a given uncertain situation.

Risk context
Describes the institutional and individual environment, attitudes and behaviours that affect the way risk arises and the way it should be managed.

Risk efficiency
The principle of risk-taking to achieve the minimum level of exposure to risk for a given level of expected return.

Risk register
A document listing identified risk events and their corresponding planned responses.

Risk response
An action or set of actions to reduce the probability or impact of a threat, or to increase the probability or impact of an opportunity.

Risk techniques
Used to identify, assess and plan responses to individual risks and overall risk.

Risk Management Process

Having outlined the Risk Management plan, the Risk Management Process (see Figure 7.1) seeks to identify all significant risks and put in a plan of action as to how they will be managed. The purpose of this process is to eliminate or minimise threats and maximise any opportunities. The process for Risk Management is as follows:

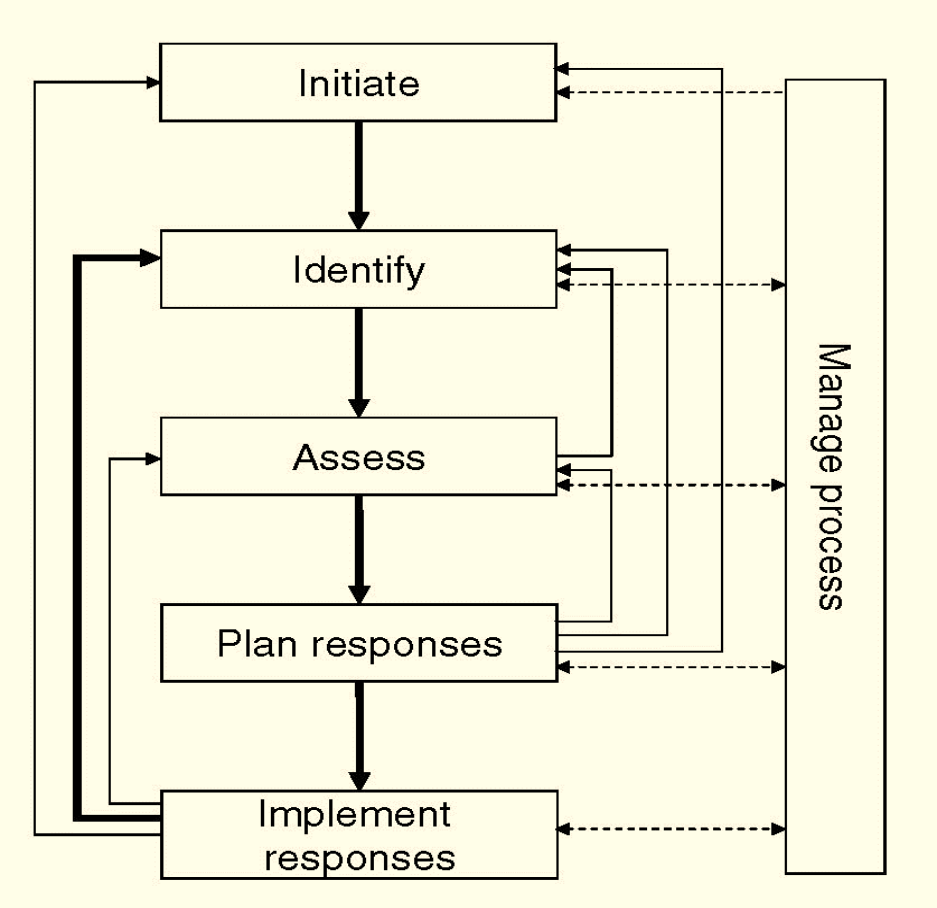


Figure 11.1: Risk Management Process
Source: Reproduced from the APM PRAM Guide with kind permission of APM

Each stage involves the undertaking of certain processes to generate the Risk Management Plan to be used by the project manager as part of the overall project plan. The steps are shown in Figure 11.1.

Initiate – This process considers the project context, goals and objectives to understand its nature, size, scope and complexity (***Project Definition***); secondly it focuses on the risk management process on the specific requirements of the project, i.e. its deliverables, quality standards, and benefits given the ***project environment***.

Identify – using a variety of tools and techniques this step is to identify risk events:

- Brainstorming
- Interviews
- Questionnaires
- Surveys
- Assumption Analysis
- SWOT Analysis
- Workshops
- Involvement of internal experts within the Team
- Involvement of external experts – professionals/ consultants
- Data from previous projects
- Post Project Reviews – Lessons Learned

Risk Assessment – Assess Risks in terms of probability and impact. The assessment will then determine priority of managing the risk event should it occur. To do this the Probability and Impact Grid is often applied:

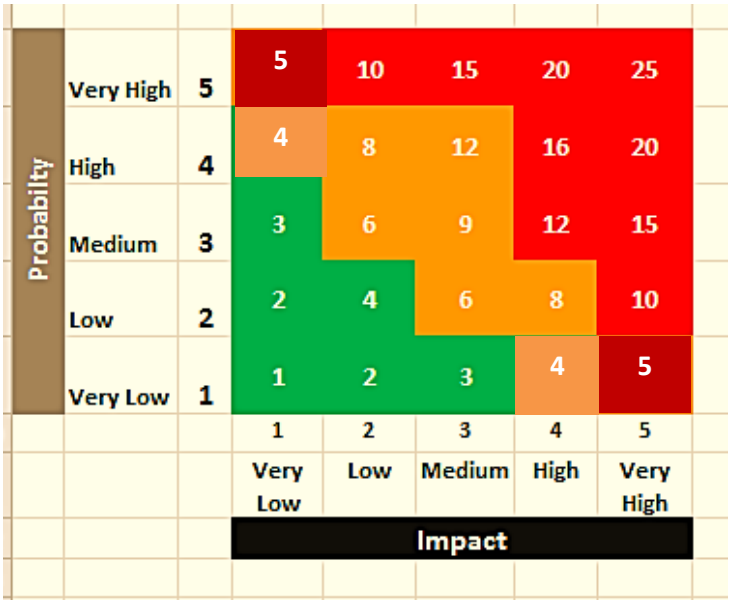


Figure 11.2: Probability Impact Grid

The PI grid (Figure 11.2) considers the **Severity or Exposure to risk** where:

P = probability
I = Impact, and
S = Severity.

We can then calculate:

Severity =P X I

Qualitative analysis are usually presented as Low, Medium or High, whereas **quantitative** representation is usually in the form of percentages.

There are other techniques that can be applied such as brute force (e.g. Monte Carlo) methods or Decision Tree Analysis.

Following the assessment, you would create a Risk Register that would allocate responsibility for the risk and the strategy deployed for mitigating it. This is discussed later in this section.

Risk Responses

There are five common risk responses following the assessment if it is a **Risk or Opportunity**:

Threats	Opportunities
Avoid – avoid the risk and eliminate uncertainty by not doing something, or doing it in a different way	**Exploit** – exploit the risk, eliminating the uncertainty by doing something or doing it in a different way
Reduce – cannot avoid, too large to accept so action steps to reduce probability and/ or impact	**Enhance** – take steps to increase the probability and impact of the opportunity event
Transfer – Transfer liability or ownership of a risk to someone else such as a client or sub-contractor or 3rd party i.e. insurance or back to back contracts	**Share** – If resources are not available for the opportunity, share it with a client, sub-contractor or third party
Accept – take it on board and accept the consequences. The severity/ probability of the risk do not justify great effort in managing it.	**Reject** – do nothing, wait and see what happens
Contingency – Have an alternative plan at hand to implement if the risk occurs – usually means further costs will be incurred so a budget is attached to the contingency plan.	

Implementing Risk Responses

Each risk that has been identified and has a planned response must be proactively managed by the person assigned to manage it. This involves formal active regular reviews because:

- Circumstances and contexts change in business
- Risk mature into problems (issues)
- Original probability and impact assessments may change
- New risks may arise that were not originally identified
- Project **scope** changes may give rise to new risk opportunities.

The key tool for managing risk is the **Risk Register**:

Project:			RISK REGISTER					Reference No.		Prepared by:	
			Probability			Impact		Date:			
RISK ID.	Description	WBS ID	High	Medium	Low	Cost	Time	Response Strategy	Risk Status	Risk owner	Review Date:

The risk register must be regularly reviewed and updated to ensure the plan and strategies remain appropriate and current. The overall 'Risk Status' is reported as part of the project reporting process as defined by the Risk Management Plan and the Communication Plan.

Risk Ownership

The Project Manager is responsible for ensuring that an effective risk management process is in place and the team as aware of their responsibilities within. The project manager will allocate risk management to the best person suited to dealing with it. **The Project sponsor is responsible for ensuring the risk management framework is developed and implemented in accordance with organisation policies and processes**. *Business related risks are usually owned by the project sponsor and/or the Project board.*

It is the responsibility of all stakeholders involved in the project team delivery to work together and in partnership, be proactive and communicate regularly on progress and issues relating to it. The *Risk Register* is an excellent tool for this which would highlight ownership, any constraints, costs, time frames, strategy, and reporting.

Benefits of Risk Management

Effective project management and governance will deliver good risk management that will lead to significant 'hard and soft' benefits according to the APM PRAM Guide (2004) that include:

	'Hard' Benefits		'Soft' Benefits
H1	Enables better informed and more believable plans, schedules and budgets	S1	Improves corporate experience and general communication
H2	Increases the likelihood of a project adhering to its schedules and budgets	S2	Leads to a common understanding and improved team spirit
H3	Leads to the use of the most suitable type of contract	S3	Helps distinguish between good luck/good management and bad luck/bad management
H4	Allows a more meaningful assessment of contingencies	S4	Helps develop the ability of staff to assess risks
H5	Discourages the acceptance of financially unsound projects	S5	Focuses project management attention on the real and most important issues
H6	Contributes to the build-up of statistical information to assist in better management of future projects	S6	Facilitates greater risk-taking, thus increasing the benefits gained
H7	Enables a more objective comparison of alternatives	S7	Demonstrates a responsible approach to customers
H8	Identifies, and allocates responsibility to, the best risk owner	S8	Provides a fresh view of the personnel issues in a project

The list of benefits ensure that risk assessment and risk management plans lead to greater project understanding and update stakeholders with key information about the scope and complexity of the project and its inherent risks. This should lead to more objective decision making that discourages unsound or risky investments in projects. It also increases stakeholder confidence in project management leading to greater commitment.

Drawbacks of Risk Management

Risk Management can be resource intensive (**increased overhead**). The effort and cost that goes into other planning processes such as scope, cost management, or scheduling is no different in Risk Management. However, there is a key difference that risk events may never occur and even if they might – 'they won't happen to me!'

When there is a big investment in Risk Management it leads to **visibility of the risk events**, i.e. they are highlighting or showing risks we did not want to know. This means we will need to invest in reducing the risk OR accept that the project may take longer and cost more or not do it at all.

Issue Management

Definition

An issue is:

'A problem that is now or is about to breach delegated tolerances for work on a project or programme. Issues require support from the sponsor to agree a resolution' APM BoK, 2019

An issue can be defined with a bit more clarity as *'a problem that has arisen requiring immediate attention'*. However, for the purposes of the exam it is best to stick to the APM definition.

An *Issue is something that **has happened**, there is no uncertainty and the problem needs to be resolved.* Just to clarify further it is more than a problem, where a *problem is something dealt with by the project manager on a day-to-day basis*. It is **not a risk**, which is **something uncertain that has not happened yet.**

Issue Management Process

It is important to manage issues through a formal process to ensure their effective management. The process for Issue Management is:

Issues are active problems that need action* and therefore easily identified by themselves. The next step is to *assess their impact on the project to ensure understanding and *log* the issue. This is then formally *escalated for resolution* with may be the **involvement of the**

Project Sponsor/ Board. The Board may *appoint ownership* to someone with authority to take decisions. Whilst resolution takes place the project manager will *monitor the issue(s)* to ensure that it has not changed or grown. Once decisions have been implemented and issue(s) resolved the issue is *formally closed* and the Issue Log or Register updated.

Issue Log or Register

The Issue Log or Register is used to track and monitor progress of resolution of the issue from Identification to Resolution and Closure. It is recommended that only one entry per issue is recorded, as multiple issue entries will start taking on a form of a larger issue than intended and give the impression of ineffective project management. Issues and Risk Registers are very similar; therefore, some organisations may combine these into a single register.

Common Failures of Issue Management

When issue management fails, this is often due to some basic things not being done:

- Failure to record issues
- Risks recorded as issues
- Identifying day to day problems as issues
- Failure to escalate in time
- Failure to escalate further – i.e. beyond the Project Manager or Team.

The **importance of Issue Management** is that issues which remain unresolved are likely to cause conflict and lead to multiple further issues, leading to project failure. Furthermore 'aging issues' left unaddressed can seriously damage the reputation of all involved in the project. Issues should be resolved by the most appropriate stakeholder.

Exercises

1. Explain each step in a Risk Management process
2. Compare the responses to risk in terms of risk as a threat or opportunity
3. Explain the benefits of project risk management
4. Differentiate risks from issues
5. Explain the benefits of risk and issue management

Section 12

Quality Management

Learning Objectives

- **Explain what is meant by quality planning**
- **Differentiate between quality assurance and quality control**

Learning Objective	APM BoK Reference
12	3.6, 3.6.2

Definition

Quality is **'The fitness for purpose or the degree of conformance of the outputs of a process or the process itself to requirements.' APM BoK, 2019**

Quality Management and quality standards are part of the project management 'iron triangle' as something that must be delivered upon and monitored and controlled throughout the project life cycle. It is about ensuring we deliver to client satisfaction and deliver a quality product that is acceptable to all the stakeholders. As this means different things to different people it must be clearly defined and form part of the scope of the project and business case. Therefore, quality requirements need to expressed in measurable terms and be specific. For example the glass bottle must be able to hold a litre of liquid and have a secure top; the Bluetooth speak must have the latest connectivity features, weigh no more than 1lbs, ergonomic trendy design (appealing to the 11-25 year population) and available in 5 bright colours; or the lamp stand must be silver, 2m in height, made from light aluminium (sturdy), trendy up market design.

Elements of Quality Management

Diagram: Elements of Quality Control from Starting Out in Project Management, 3rd edition. Copyright APM

The **four elements of Quality Management** are:

1. **Quality Planning**
2. **Quality Assurance**
3. **Quality Control**
4. **Continuous Improvement.**

1 **Quality Planning** is defined as:

'Quality planning, involves the preparation of a quality management plan that describes the processes and metrics that will be used.' APM BoK, 2019

Quality planning involves the preparation of the **Quality Management Plan** that outlines the processes and metrics to be applied to ensure project success and acceptance by the stakeholders. The QMP needs to be agreed by the key stakeholders to ensure that their requirements and expectations are identified. The processes adopted should reflect the brand, values and reputation of the organisation. Furthermore, this requires the involvement of the project team, so they understand the requirements and standards of outputs. So quality management is a planned activity not something that is applied afterwards by audit or inspection. The **contents of the QMP will include**:

- Organisational philosophy/policy towards Quality
- Project deliverables and associated technical specifications.
- Quality standards – ISO9000
- Quality Assurance processes

    - Quality systems – policy and procedures to be used
- Quality control processes
    - Quality Reviews, Audits and Inspections
    - Reporting.
- Project Roles & Responsibilities
- Legal regulations & compliance

2 **Quality Assurance** is providing the confidence that the quality systems are being followed and will satisfy the stakeholders and any relevant quality standards. The following are part of quality assurance:

- Project Audits - internal
- Quality Audits – ISO9000/1 (BS5750) – external compliance
- Financial Audits – can be both internal and external
- Technical Audits – can be both internal standards but external regulation compliance.

3 **Quality Control** '**consists of inspection, measurement and testing to verify that the project outputs meet acceptance criteria defined during quality planning' APM BoK, 2019**

Quality control involves testing products to ensure that they are fit for purpose and conform to relevant standards. This process or system will also identify remedies or ways to correct deviations from specifications or performance. In other words, quality control activities determine whether acceptance criteria have been met. The Acceptance Criteria must be:

- Clearly defined
- **SMART**
- Logically related to the deliverables (WBS/ Work Packages)
- Reviewed throughout the life cycle of the project.

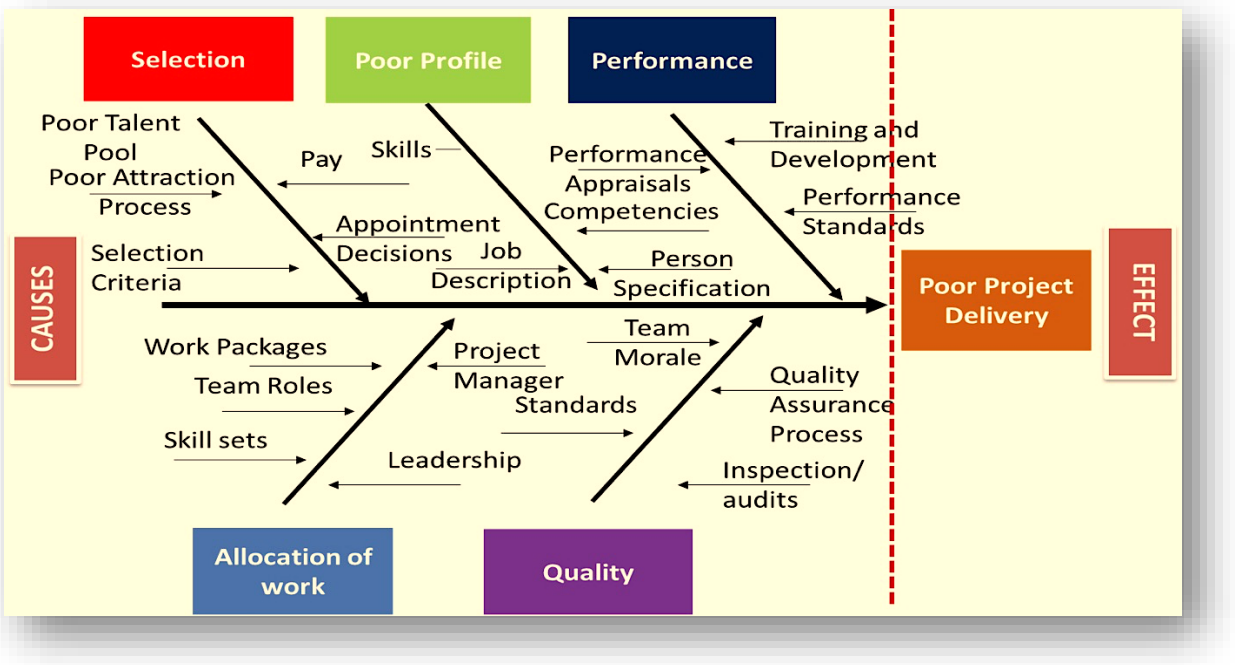
Quality Control Techniques

There are a range of quality control techniques both analytical and non-analytical. These include:

- Inspections
- Testing
- Observations
- Metrics
- Ishikawa (Cause and Effect/ Fishbone) diagrams
- Pareto Analysis (80/20 Rule)
- Control Charts (also known as 'run charts' or 'x-bar charts')

Ishikawa (Fishbone) Diagram

The Ishikawa or Fishbone diagram allows the impact of key causes and effects on the project to be visualised. An example is provided below of poor project delivery due to certain causes that include selection and appointment decisions, poor competencies, lack of performance management, low team morale and possible leadership issues (team leadership competence). Ishikawa diagrams work best with multiple inputs from the affected members of the project team – they are an ideal brainstorming tool.



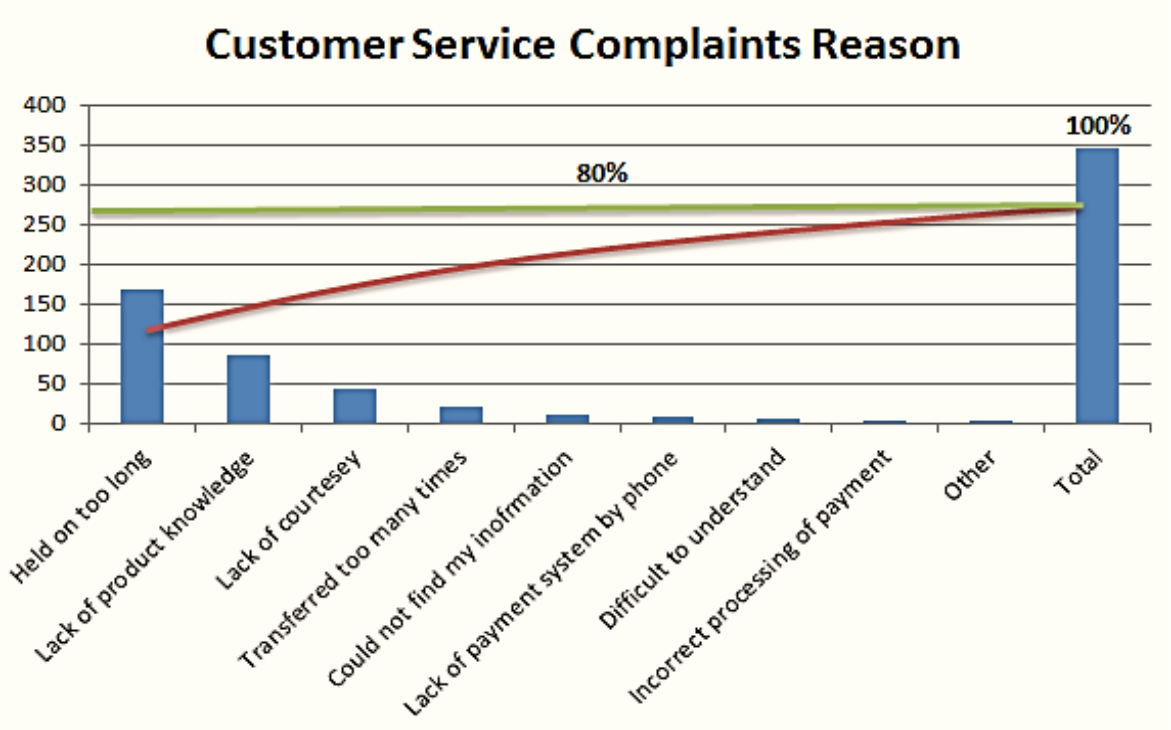
Pareto Chart (80/20 Rule)

Pareto Analysis, also known as the Pareto principle or 80/20 rule, assumes that the large majority of problems (80%) are determined by a few important causes (20%). Examples include:

- 80% of failures arise from 20% of possible causes
- 80% of staff turnover arises from the poorest 20% of management decisions
- 80% of project delays arise from 20% of the subcontractors

The Pareto principle, which has been validated innumerable times in many different problem contexts, is therefore that 20% of causes are responsible for 80% of the problems.

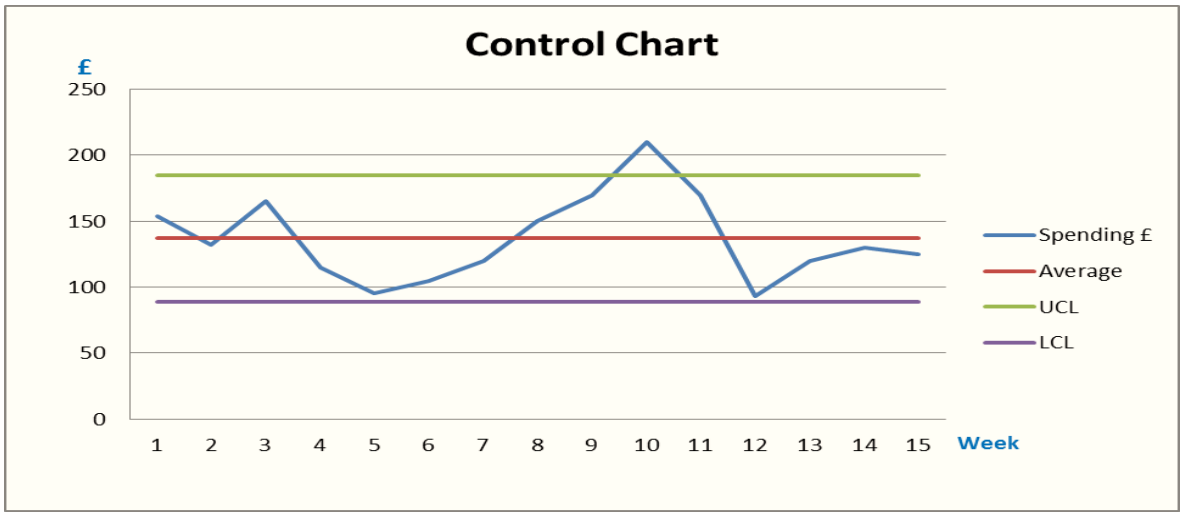
The results can be illustrated graphically. This shows the number of customer care complaints received and how 20% of the complaints are in the first quartile.



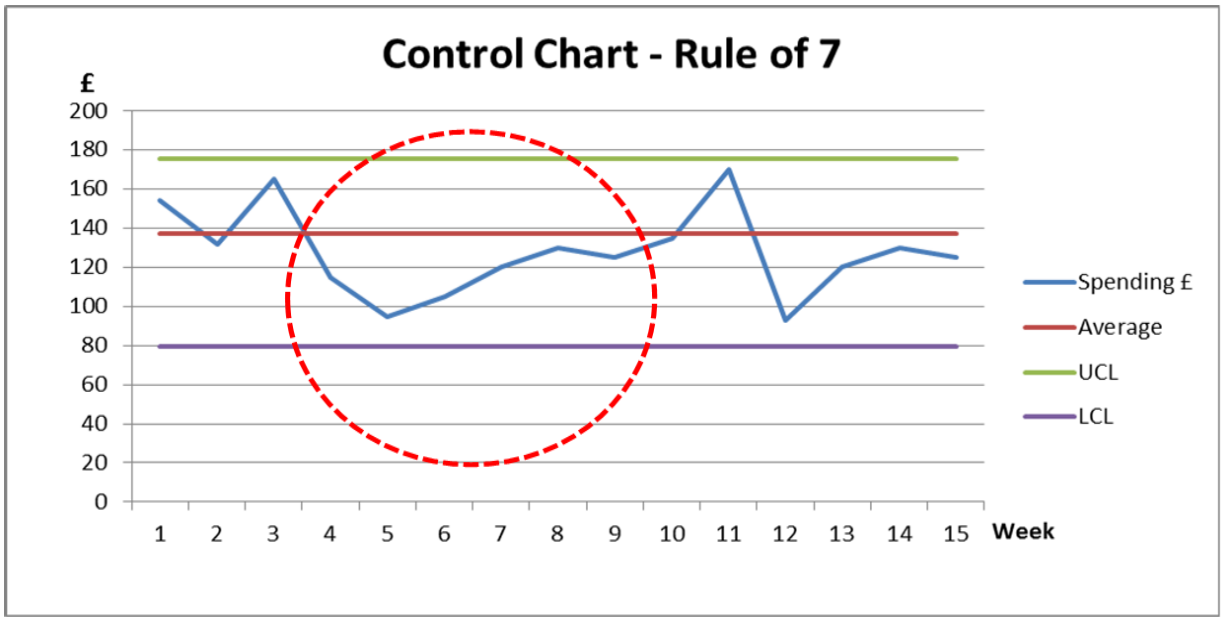
Control Charts

A control chart is a useful tool for investigating how processes or other data changes over time. The chart consists of four lines -- the data, a straight line representing the **mean (average), as well as an upper control limit and a lower control limit – known as 3σ (three sigma) control limits**. Sigma is simply another term for standard deviation, taken from the mathematical notation for standard deviation which is the Greek letter lower-case sigma ('σ'). There also may be **assignable causes** for the deviations / occurrences due to external factors such as:

- IT problems
- Labour problem (capacity/ capability)
- Poor Materials.



Then there is the Rule of Seven, as a rule of thumb, should seven or more observations in a row occur on the same side of the mean (even though they may be within the control limits), the process should be investigated to see if there is an assignable cause. This is useful in repeated activities or processes.



Quality Control in Work Packages

The **Work Package** is the formal method of communicating the work, its scope and quality standards expected. The **Work Package also includes**:

- Specifications for tasks and outputs
- Specific processes to be adhered to
- Change Control and Configuration Management (version control of plans and documents) processes
- Acceptance Criteria for sign-off.

Cost of Quality

Cost of conformance to quality	Cost of Non-conformance
Training	Defective outputs
Defined Standards ISO9000/1 (BS5750)	Complaints
Policies/Processes	Product recalls – rework
Plans and documents	Poor morale
Inspections and verification	Loss of future business
Testing	Warranty costs incurred
Audits	Project failure
Reviews and Evaluations	Damage to brand/ reputation

Continuous Improvement – Kaizen in Japanese is the philosophy of making improvements continuously. It is the responsibility of both management and workers alike for quality. Information provided by audits, reviews, lessons learnt drivers for improvement to deliver on project effectiveness and efficiency. The P3 maturity models are examples of this to embed project maturity in organisations.

> **'Continuous improvement** is the generic term used by organisations to describe how information provided by quality assurance and quality control processes is used to drive improvements in efficiency and effectiveness.'

Difference Between Quality Control and Assurance – quality control is concerned with making sure the project team does the appropriate things to deliver the quality of the products whilst *assurance is making sure that the project is following agreed processes and procedures specified in the Quality Management Plan*. Quality control is a project team activity whilst quality assurance is done by external bodies.

Benefits of Quality Management

What is the cost of not doing quality? Quality is about standards, something being fit for purpose, acceptable in the eyes of the client/ customer, efficiency, increased profits and pride of the project team. The benefits include:

- Getting it 'right first time'
- Reputation
- Encourages innovation, structured and objective thinking
- Reduces defects and wastage
- Reduces costs
- Increases profitability
- Improves client and customer satisfaction
- Increases loyalty
- Reduces risk and uncertainty
- Improves team output and morale

Role of Project Manager

- Communicate quality standards to project team and all relevant parties
- Provide training to reinforce standards and ensure capability
- Ensure that QMP is approved and agreed
- Ensure control systems are in place
- Ensure everyone in the team is aware of their roles and responsibilities regarding quality
- Monitor and control quality products, deliverables and processes

- Act upon any recommendations from reviews and audits and communicate these to team
- Ensure effective change control mechanisms are in place, used and monitored.

Quality Management is something that all parties are responsible for not just managers.

Exercises

1. Define Quality and Quality Management
2. Explain the Quality Management Plan and its purpose.
3. What is the difference between Quality Control and Quality Assurance?
4. List five benefits of Quality Management
5. Explain the purpose of Quality Planning
6. Why is Continuous Improvement important?

Section 13

Project Leadership and Teams

Learning Objectives

- **Explain how leadership impacts on team performance and motivation (using models such as Maslow, Herzberg and McGregor)**
- **Explain why it may be necessary to change leadership styles to effectively support the management of a project**
- **Describe the characteristics and benefits of effective teams and teamwork**
- **Explain factors which impact on the leadership of virtual teams**
- **Explain factors which influence the creation, development and leadership of teams (using models such as Belbin, Margerison-McCann, Myers-Briggs, Hackman, Tuckman, Katzenbach and Smith)**

Learning Objective	APM BoK Reference
5	3.2.1, 3.2.2, 3.2.3, 3.2.4

Definition

'The ability to establish vision and direction, to influence and align others towards a common purpose, and to empower and inspire people to achieve success.' APM BoK, 2019

Project Leadership

Project leadership involves planning, managing, organising, motivating, and directing. These skills and competencies are vital ingredients for success in delivering projects successfully. **Qualities of leadership include:**

- Delivering Project goals and objectives
- Setting Goals and Targets
- Facilitating excellent performance
- Recognising and rewarding achievements
- Timely feedback
- Communicating effectively with key stakeholders and managing relationships
- Supporting and motivating the Project Team
- Managing conflicts and facilitating good relationships
- Empowering and inspiring people to use their talents to perform beyond expectations.

To provide effective leadership project managers need:

- Have excellent interpersonal skills
- Generate trust and be ethical
- Manage change resistance
- Protect the team from outside interference
- Be excellent decision makers
- Use different leadership styles adaptably.

Leadership Styles

McGregor's Theory X and Y

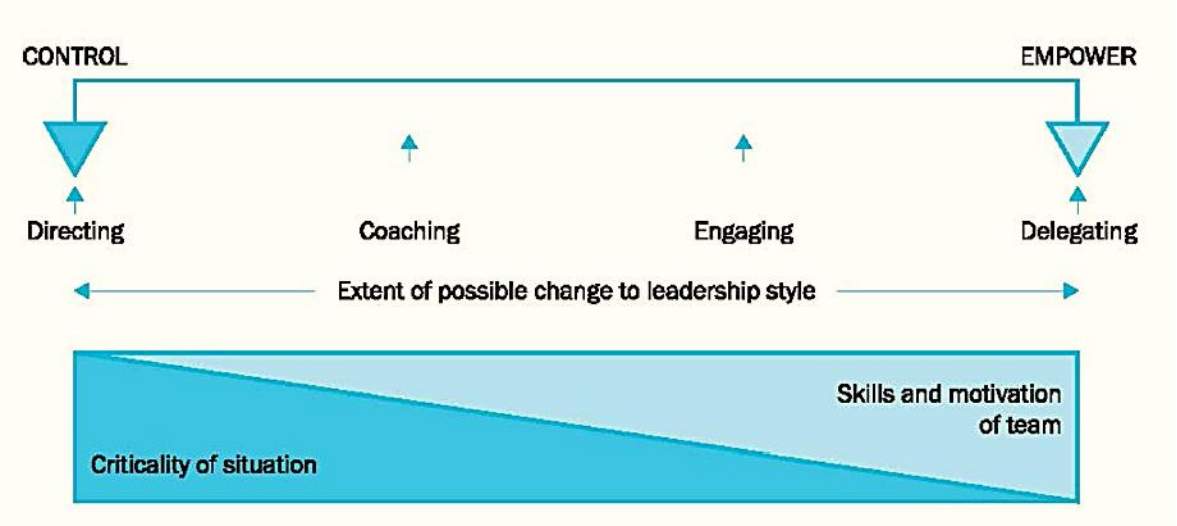
In his 1960 book *The Human Side of Enterprise*, Douglas McGregor states there two main leadership styles – Autocratic (X) and democratic (Y):

- *Theory X Autocratic style* directs and tells people what how to do carry out their work without much consultation or involvement in decision making.
- *Theory Y Democratic style* involves people in the decision-making process, collaborating to find the best ways to do the work and get the best results.

Both have their advantages and disadvantages. In reality it depends on the context of the project work and expectations of the project team. Most leaders will adopt a flexible leadership style and move between the two as circumstances change.

Hersey and Blanchard (1969, 1982) – developed the *Situational Leadership style model*. Leader can adopt different styles according to the situation:

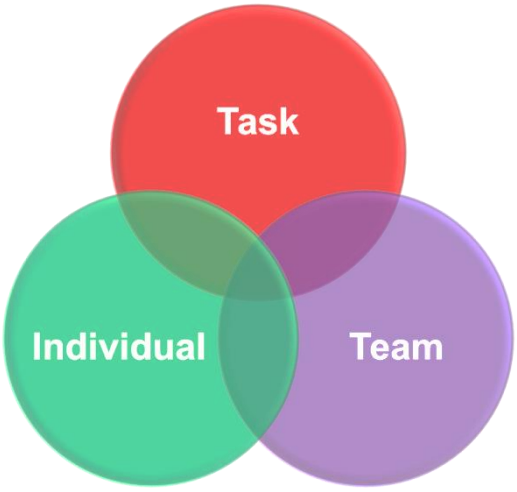
1. **Directing** – roles and tasks are defined by the leader. Directs and supervises them closely. Communication is one way.
2. **Coaching** – leader defines the roles and tasks. Coaches and empowers people but supervises them closely.
3. **Engaging** – leader facilitates the work but day to day control is with the people.
4. **Delegating** – leader sets the direction and allows people to decide how the work will be done with leader retaining accountability.



1 and 2 styles have more concern for the task (*Directive Behaviour*), whereas 3 and 4 is people focused (*Supportive Behaviour*).

Action Centred Leadership

John Adair developed the Action Centred Leadership model. This model suggests that an effective project leader should consider the project from three perspectives:



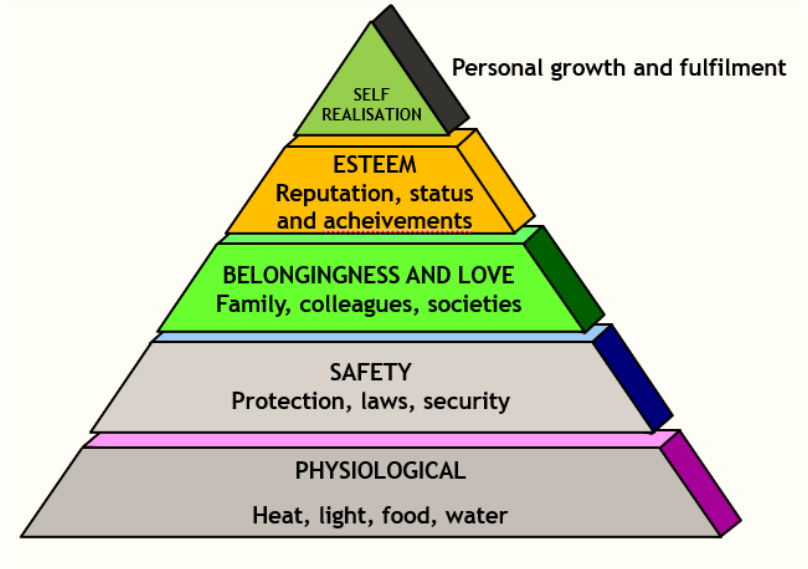
Developed in the 1960s at the Royal Military Academy, Sandhurst by John Adair, this practical model has stood the test of time. It works on the simple premise that good leaders/managers should be able to control and balance three distinct areas: Task, Individual, and Team simultaneously. In project management this is a vital skill to possess.

Motivation

The key to success for any leader or manager, regardless of industry or profession, is motivation – creating a motivated team that delivers success and empowering teams to aspire

to high performance. There are many motivation models and theories. Two influential ones are *Maslow's hierarchy of needs and Herzberg's hygiene theory*.

Maslow begins with the universal assumption that each person has wants and needs. These needs are what drives an individual and motivates them in their lives at different stages. Should these needs not be met they will remain unmet or a driver for achievement. As a general model of motivation, Maslow's hierarchy is no longer used by psychologists. However, in the narrower frame of reference provided by the workplace, it is still found to be valid and useful.



Herzberg developed the Two Factor theory of motivation based on Hygiene and Motivators. Examples of Hygiene factors include:

- Working conditions
- Salary
- Quality of management
- Company policies
- Relationship with supervisor and peers
- Status
- Security

These he interpreted as 'dissatisfiers' – in that people cited these as casing them unhappiness in the workplace but did not particularly notice when these factors were acceptable. By contrast, the 'satisfiers' included:

- Achievement
- Recognition
- The work itself
- Responsibility

- Advancement
- Growth.

Interestingly salary as a motivator was way down the list and seen as a short-term motivator.

If project leaders can understand these models and apply them to their teams then they may be able to understand the wants and needs of their teams and what really motivates them to get the best possible performance from them.

Effective Project Teams

'A project is only as good as its project team!' You can have great plans however if the team lacks expertise, experience, and capabilities, the project will lead to failure or a poorly managed/ delivered project.

Definition

> **'A team consists of a group of people, committed to a common goal that no one individual can achieve alone. The focus of teams and teamwork is on mutual accountability and performance.' APM BoK, 2019**

Characteristics of Effective Teams

Effective, high-performing effective teams have certain common characteristics:

- Work together towards **common goals** and objectives
- Understand their **roles and responsibilities** and that of their colleagues
- **Participate in decision making** and are proactive
- **Focused on end results** and demonstrate **high levels of commitment**
- They support each other and **problem solve** together
- Trust is high and **risks are shared**
- They are self-motivated and have **high team morale**
- Generate ideas and work together positively
- Have a good blend of roles (Belbin), skills and experience, and help each other develop.

These characteristics are important to understand for the project manager as areas of deficiency will need to be developed.

Project Team

The project context is unique to project teams where their focus is the project goals and deliverables. These are communicated in detail by the project manager, and their respective roles and assigned work form the basis of their work objectives and performance

measurement. The success of the project is determined by the success and acceptance criteria which will be communicated to the team by the project manager.

Team Roles

Models such as **Belbin and Margerison-McCann** demonstrate how different personalities work together to form an effective team. Each personality has its areas of strengths and development. Within the team, one person's strengths can balance another's weaknesses; therefore, people will perform better in a team where they are given a role that plays to their strengths.

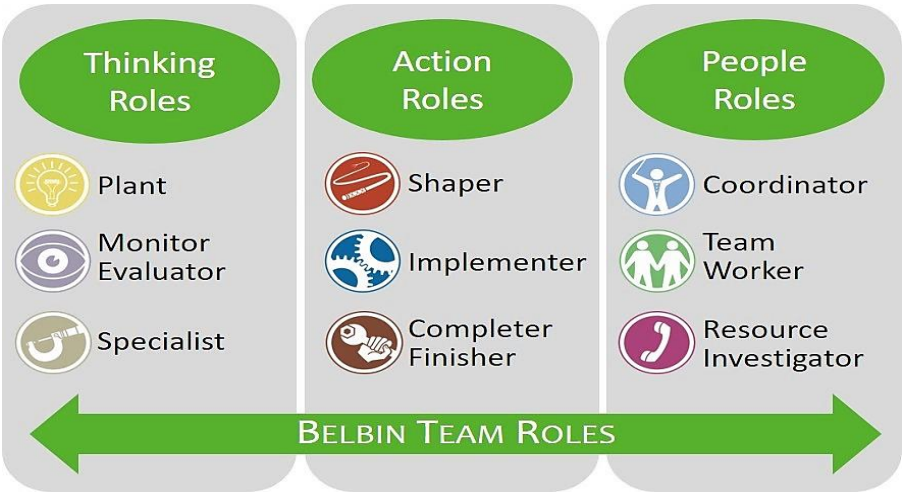
Dr. Meredith Belbin in 1981 suggested 8 set of roles that can provide good balance and increase the likelihood of success in teams when they are present. These later increased to 9 roles and are described below.

Type	Role	*Typical features*	Positive qualities	Allowable weakness
1. Coordinator	**CO**	*Confident, brings people together*	Able to get others to working to a shared aim, confident, mature	Can be manipulative, offload work.
2. Implementer	**IM**	*Calm, self-confident, controlled*	Systematic, common sense, loyal structured, reliable, dependable, practicable, efficient	Inflexible, slow to respond to change
3. Shaper	**SH**	*Motivated, driven and competitive*	Motivated, energetic, achievement-driven, assertive, competitive	Easily provoked, can offend others
4. Plant	**PL**	*Individualistic, serious minded, unorthodox*	Innovative, inventive, creative, original, imaginative, unorthodox, problem solving	Poor communicator
5. Resource Investigator	**RI**	*Extroverted, enthusiastic, curious, communicative*	Quick, good communicator, networker, outgoing, affable, seeks and find options, negotiator	Over optimistic, loses interest

6. Monitor Evaluator	**ME**	*Critical thinker unemotional, serious.*	Serious, prudent, critical thinker, analytical	Slow to respond, lacks inspiration or the ability to motivate others
7. Team Worker	**TW**	*Socially oriented, rather mild, sensitive*	Supportive, sociable, flexible, adaptable, perspective, listener, calming influence, mediator	Indecisive at moments of crisis
8. Completer Finisher	**CF**	*Painstaking, orderly, conscientious, anxious*	Attention to detail, accurate, high standards, quality orientated, delivers to schedule	A tendency to worry about small things. A reluctance to 'let go'
9. Specialist	**SP**	*Technical expert, high levels of specialist knowledge, focused on achieving high levels of professional standards*	Technical expert, highly focused capability & knowledge, driven by professional standards, and dedication to personal subject area	Lack of interest outside their specialist area

Each role represents particular strengths if present within a project team. If it is not present, it may fall to others to play that role to bring balance to it.

Below Belbin illustrates the **Balanced Team through three main roles** – Thinking, Action and People. The project manager can use this to assess if the team is balanced and where the gaps are.



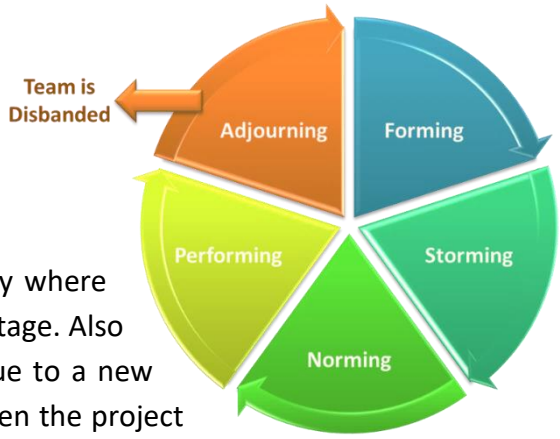
High performing teams will evolve together as a group and grow in trust and confidence. They will display the following characteristics:

- Focused on common goals
- Members will problem solve and be supportive
- High levels of engagement & trust
- Willingness to make sacrifice personal interests for the greater good.

Team Development

Bruce Tuckman (1965), developed a powerful theory of group development. He stated that there are five distinct stages that each group will go through in its development to form an effective team. These are:

1. **Forming**
2. **Storming**
3. **Norming**
4. **Performing, and**
5. **Adjourning.**



The stages are useful for project managers to identify where their team is and how to get them to the performing stage. Also some teams may fall back into the storming stage due to a new member or working practice being introduced, and then the project manager needs to work to bring them back to performing.

Each stage contributes to building an effective team, it is not the case that all teams will go through each stage in a rational and logical manner as illustrated above, but the stages are useful for identification and management.

Teamwork

Teamwork is a collection of individuals coming together to achieve a common goal or set of objectives. They will come from different backgrounds, with different experiences, skills sets, levels of knowledge, needs and motivations. Even though they are unlikely to know each other, the project manager's challenge will be to build a team and a spirit of teamwork. The ideal project team is one in which individuals co-operate, collaborate, communicate and problem-solve together through the project life cycle.

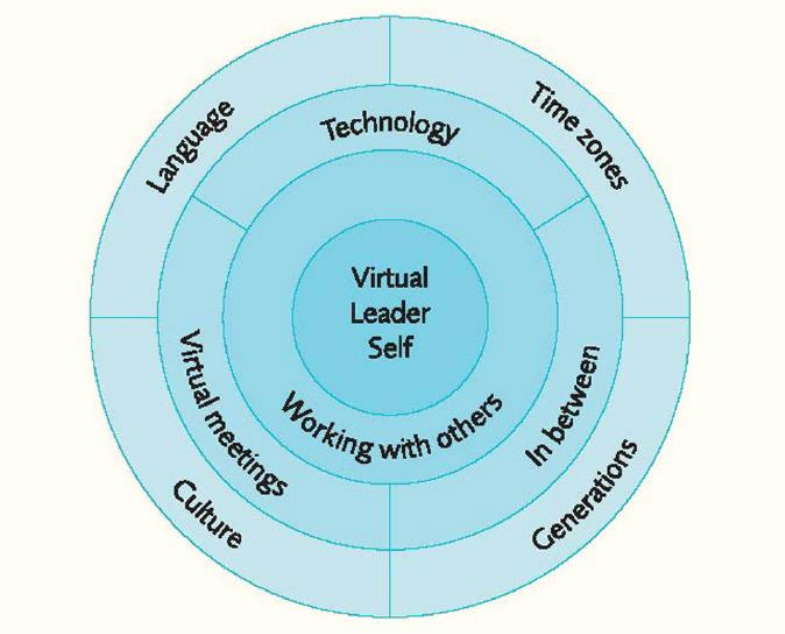
Barriers to Teamwork

Teams consist of different personalities with differing needs, motivations, abilities, and interests. To simply bring strangers together and expect them to form an effective team is a hope rather than a reality. The project manager will need to work hard to get people to commit and co-operate with each other, particularly in a context which is temporary. Therefore, team building and instilling professional behaviour will be high on the agenda for project managers. Poorly performing teams will display:

- Unresponsiveness to issues
- Frustration with each other and project leaders
- A lack of focus on goals – unproductive
- Lack of trust
- Poor communication and have individual agendas
- Lack of participation in meetings and decision making
- Conflicting values and behaviours
- A lack of appreciation for colleagues' feelings, specialism and contribution.

Virtual Teams

In recent times, and as you start to manage teams globally or start remote working. We also need to understand our impact as a virtual team leader. There are many factors that are involved in and factors we need to be aware of. A good exercise would be to reflect on your Virtual Leader Self and look at certain practices you would improve on or maintain. See below the factors that have an impact on virtual teams: What improvements would you make?



Leadership is an art, there is no right and wrong way of leading or motivating but there are ways of getting the best out of people. Displaying integrity, professionalism, respect, trust and honesty is the best way to encourage these values in members of the project team. For all its technical sophistication, Project Management still needs the best people to deliver excellence and nobody can do this all by themselves.

Exercises:

1. Explain the impact of leadership on team performance and motivation using Maslow and Herzberg.
2. Explain the benefits of adapting styles of leadership within projects using Situational Leadership style and Action Centred leadership.
3. Describe Belbin's nine team roles and their significance for project team effectiveness
4. Explain Tuckman's five stages of team development theory and how it is useful for project leaders.
5. Explain factors that can affect a virtual team and how could they be proactively managed.

Section 14

Project Communications and Conflict Management

Learning Objectives

- **Explain the benefits, to a project, of a communication plan**
- **State sources of conflict within a project**
- **Explain ways in which conflict can be addressed (such as Thomas Kilmann Conflict Mode Instrument).**

PMQ Learning Objective	APM BoK Reference
4.	3.1.5, 3.3.1

Definition

Communication - 'The process of exchanging information and confirming there is shared understanding.' APM BoK, 2019

Methods and Channels of Communication

There are many methods of communication that support communication, and each have their advantages and disadvantages. These include:

- **Written** – reports, plans, etc. These are clear, consistent and everyone gets the same message. However, the interpretation can vary, and they are only as good as the author.
- **Electronic** – emails, internet, intranets, etc. – Instant, quick easy and not location dependent, similar to written. However, information overload, and the requirement to manage attention, is becoming a real issue. Always online, but again only as good as the authors.
- **Verbal** – spoken – face to face. Clear, can probe and clarify instantly. However, tone can be easily misunderstood, and recall can be difficult later in time.
- **Body Language** – feelings, expressions are often expressed through our body language, research indicates that as much as 93%. The remaining 7% is though words, gestures, etc.

Media of Communication

Project Managers need to use a range communication channels to be effective in their roles. Some of these are formal (encouraged/preferred by the organisation) others are informal. These include:

• Reports • Plans • Meetings • One to one • Video Conferencing • Newsletters • Contracts • Emails • Letters	• Websites • Intranet • Specifications • Face to face • Social events • Publications • Text messaging • Facebook, Twitter and other social media • Blogs

Project communication

Communication like any organisation needs to be effective and its primary aim is to gain a common understanding. There are various audiences for project communications, including:

- Sponsor
- Project Board
- Project Teams
- Key stakeholders
- Suppliers
- Organisational functions.

These people have different communication needs in terms of:

- Volume
- Content
- Style
- Tone
- Media

To be effective, communication must therefore be tailored to requirements. The Communication Plan supports the project manager in this by:

- Identifying what needs to be communicated, why does it need to happen, what impact should it, when should it happen, where should it happen, what channels are appropriate. Who will benefit from it, who is it from?

Communication Plan

The communication plan is derived from stakeholder analysis which identifies the key audiences and expectations and forms part of the Project Management Plan. The content of the **Communication Management Plan includes:**

- List of key Stakeholder, and contact details – Stakeholder Management Register
- Information required by each stakeholder or group – newsletters, progress reports, etc.
- Source of information – where information comes from – databases etc.
- Format of information – reports, dashboards, etc.
- Frequency and distribution methods – weekly email.

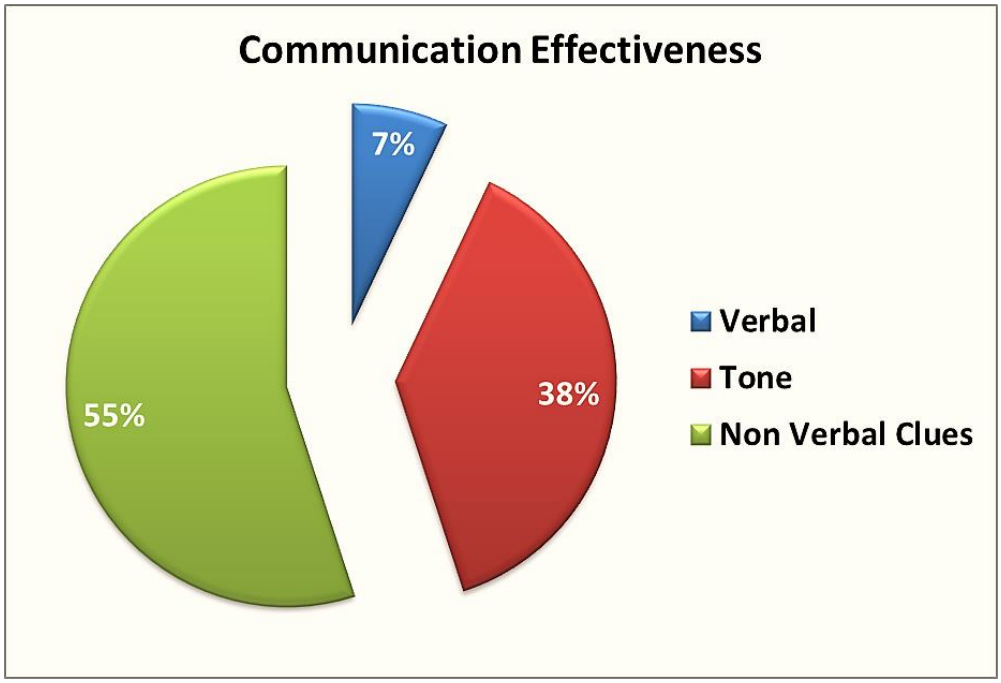
Key: D=Daily W=Weekly M=Monthly Q=Quarterly	**Project Sponsor**	**Programme Manager**	**Project Manager**	**Team Leaders**	**Project Office**	**Project Team**	**Functional Managers**	**Suppliers**	**Community Groups**
Project Plan update	Q	M	W	D	M	D	M	W	M
Risk Report	W	M	W		M				
Project Status	M	M	M	W	M		M		Q
Quality Review Report	Q	Q	W	W	M	W		W	
Project Schedule Update	W	M	W	W	M	D	W	D	M
Progress and Milestone Report	M	M	W	D	M	D	M	W	M

The above register provides an **example of communication to key stakeholders** and the timings. Avoid jargon where possible and ensure that commonly used acronyms are always explained fully to avoid confusion. Referring to Section 5, where we considered at stakeholder management analysis and created the Stakeholder strategy (Grid 2), the output is the Communication Plan together with the engagement strategy (Grid 1).

Barriers to communication are due to many factors these include:

- **Physical** – such as noisy environments, virtual working/team
- **Perception** – individuals' understanding and perception of the same issues or work that needs to be done
- **Systems -processes** – inappropriate or unsuitable operational processes, structures, policies
- **Attitudinal** – attitude towards goals and objectives
- **Organisational** – lack of understanding of how an organisation works
- **Culture/language** – different cultural groups have different perspectives and attitudes to working practices combined with possible language differences
- **Psychological** – personal discomfort, health and safety, welfare elating to work in the project
- **Format of information** – poorly presented information
- **Channels of communication** – too many channels can feel like information overload.

Whilst the above list is presented as barriers the converse can be true: the environment can be positive with low levels of noise, systems that positively support communication, and culture is a strength. Also remember **55% of clues in effective communication is in our body language** not so much in the spoken word or tone – not to say these are not important – they are!



Conflict Resolution

Definition

> **'The process of identifying and addressing differences that if left unmanaged would affect successful completion of objectives.' APM BoK, 2019**

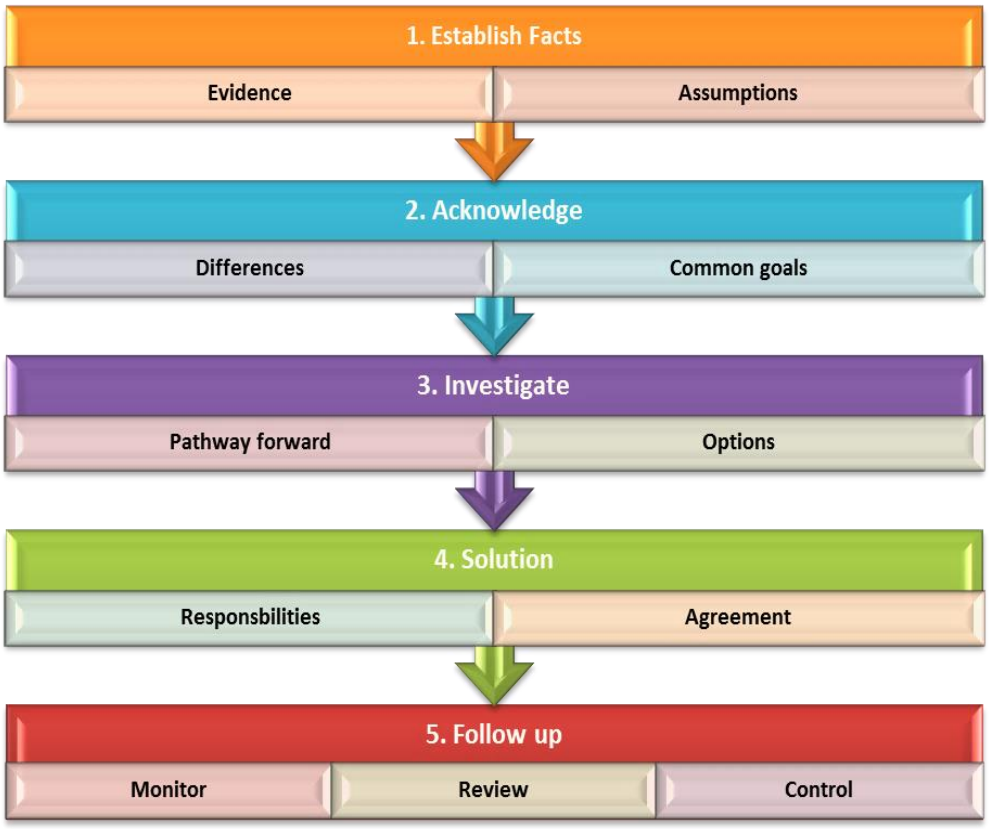
There are many sources of conflict, and to some degree, conflict of some kind is unavoidable. People have different needs and motivations. However, conflict can also be positive. The role of the project manager involves investigations, monitoring and controlling problems, issues and deviations from agreed goals and objectives. This inevitably means there will be tensions within the team as to how best to deliver those goals and objectives – as everyone has opinions and views. At different points in the lifecycle, people will try to exert their viewpoints which may lead to conflict. On the other hand, it could be a good way of being thorough: problem-solving as a team where views and participation in decision making is respected.

Reasons for Conflict

- Differences in views, interpretations and opinions
- New practices and ideas may be uncomfortable for some people (comfort zone)
- Disagreement over a task, objective, decision or action
- Conflicting values
- Assumptions made but not communicated
- Emotion, including stress, passion, anger, fear, envy and excitement
- Status, ego, perceived power, influence, and insecurity
- Uncertainty and too many unknowns
- Miscommunication.

Conflict Management Process

Where agreement is not possible through informal channels, then formal processes are critical to resolve conflict before there is too much escalation. Conflict Management Process:



This process allows project managers to manage emotion and adopt an objective approach to problem solving. The Thomas-Kilmann model (1974) suggests that conflict can be controlled or channelled by management through the adoption of different styles or stances:

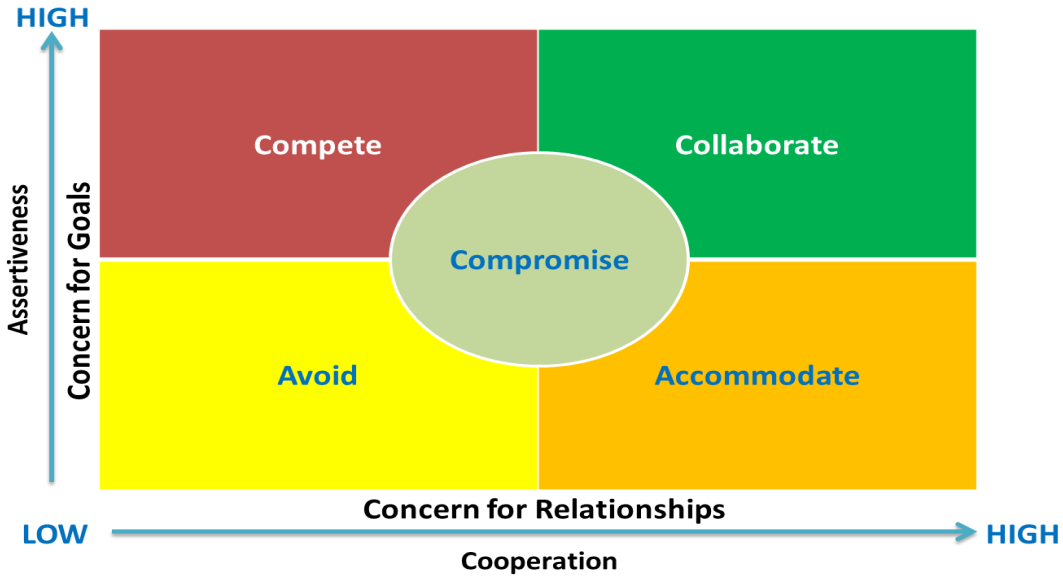


Figure 14.3: Conflict Management Model – Thomas-Kilmann (1974)

This model considers the extent to which people are assertive and willing to cooperate for a solution. The 'collaborate' stance is held as the gold star where people are looking for a

'win/win' solution. This is more ideal than reality - each stance has its strength and weakness and there is no right and wrong here. The ideal stance adopted is dependent on the situation and circumstances, together with the nature of problem or issues.

Compete or Force:

- Here one's own agenda is pursued at the expense of others
- Power and authority is used to force issues through for quick decisions and decisive action
- Solutions are imposed
- The winner sees the solution; the loser will be unhappy
- Relationships are strained and can lead to further conflict
- Useful for unpopular decisions and solutions
- Useful for uncooperative behaviour

Collaborate

- An iterative process when the goals are important for both parties
- Need to problem solve and generate best solution for all – win/win
- To bring together different parties and perspectives
- To satisfy concerns that people have and build relationships
- Concern for people's emotions and to nurture trust.

Avoid

- Issue is trivial and does not need any intervention
- An unassertive and uncooperative stance
- Does not deal with the conflict as the potential for disruption outweighs benefits of resolution
- Allows people time to cool down and regain perspective – postpones an issue
- Withdrawal from a threatening situation
- Seen as a sign of weakness but can be the opposite

Accommodate

- Low level of assertiveness but high level of co-operation
- Act of reasonableness but can be seen as a sign of weakness
- Accommodate with conditions (strength)
- Build relationships and credit
- Allow people to learn from errors or mistakes
- Can be seen as 'owing a favour'

Compromise

- Both parties give up something to reach a solution
- Better to agree than disrupt progress or see project fail
- Parties perceive the greater good – achievement of common goals
- Achieve solutions to complex issues
- Negotiation to the middle ground by exchanging concessions to reach the desired outcomes.

Conflict in the Project Life Cycle

Phase	Conflict
Concept **Business case and strategic Priority**	Project goals and objectives Scope Power struggle between stakeholders Different interpretations Different priorities Budget allocation Timeframes
Definition **Technical solutions and PMP**	Work packages Role allocation Priorities Interpretations Processes
Development **Scheduling issues**	Scheduling and trade-offs Ownership and responsibility Scope creep Tensions between time, cost, quality and performance issues Resources tension and availability Targets and performance Team personalities and performance Style of leadership and management
Handover **Completion pressure**	Pressure to complete creates stress Emotional control Acceptance by client of deliverables Pressure to finish before departure Emotion attached to forthcoming disbanding of the team
Closeout **Post Project Review**	Pressure to attend review and evaluation meetings Performance issues and the natural tensions within those discussions Different interpretations and viewpoints as to what actually happened and how it happened Feedback (even though well meaning) is not accepted and regarded as criticism of person/ performance Poorly managed review and evaluations

Exercises

1. Explain three factors that a project manager should consider when developing a communication plan
2. Explain the importance of effective communication in managing different stakeholders
3. Identify barriers to communication, and the ways in which it can be addressed.
4. Explain a source of conflict within each phase of a linear life cycle and how these can be resolved

APM PMQ Examination Resources

PMQ 3 hour written exam, must answer 10 from 16 questions, 50 marks per question, 55% pass mark.

Watch YouTube clip

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Previous sample paper

Further guidance and support will be provided by your tutor.

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