

PROJECT MANAGEMENT VT 2013

SUMMARY OF LECTURES & HARVEY MAYLORS' PROJECT MANAGEMENT

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CHAPTER 1 - INTRODUCTION

Basic definitions of a project

- A project is a **temporary** quest undertaken to create a **unique product or service**.
- A project is a management environment that is created for the purpose of **delivering one or more business products according to a specified business case**.
- A project is a temporary organisation that is needed to produce a unique and predefined outcome or result at a **given time using predetermined resources**.

“There is nothing more difficult to take in hand, more perilous to conduct or more uncertain in its success than to take the lead in the introduction of a new order of things.”

Niccolo Machiavelli (1469 – 1527)

Projects characteristics

1. Unique – Aspects of uniqueness

- Exact project not been done before, it has a degree of novelty
- Many aspects of the project have been done before

2. Temporary

- Project has a beginning and an end.
- Team finishes when project finishes.
- Funding goes with project.

3. Focused

- The task of the project is to deliver a particular products, service or result.
- *Mission focused* - Deliver benefits.

4. Emergence

- Detailed requirements of the project may not be known in advance.
- Project manage has to deal with uncertainty.

5. Uncertainty

- Covers all of the environmental conditions in which a projects has to operate. I.e. uncertainty about costs of people or materials or how long time a completely new task will take.
- Project manage has to deal with uncertainty.

6. Change

- Impacts people delivering.
- Impacts people and organisations being delivered to.

7. Social construction

- Doesn't behave like a machine.
- Involves people and organisations.

8. Integration

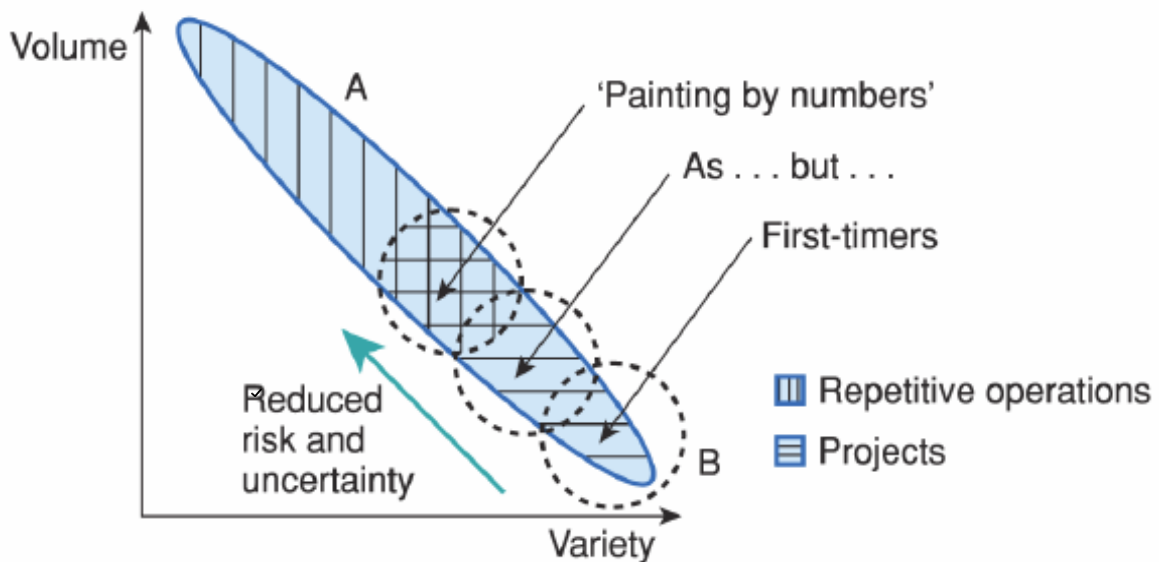
- Requires interlinking of activities.
- Requires knowledge and resources to be brought together in a process.

Organising to deliver a projects as a process

Further description of a project comes from analysing the system of delivery, including considerations of how activities in the projects were identified, planned and executed, and how issues such as change and uncertainty were handled by the project team.

- **Volume** – The quantity of throughput for that process. High for i.e. a petrochemical plant and low for i.e. a chauffeur service.
- **Variety** - is the number of different variations of process possible. A petrochemical plant have low flexibility, a chauffeur service may have high flexibility to respond to the needs of different passengers.

Normally a inverse relationship between volume and variety as show in the picture.



- **First-timers** – The traditional projects management areas with low-volume, high variety processes, where the notion of uniqueness dominates. I.e. the first moon landing.
- **As..but..** – Projects where there is some similarity to previous work, in terms of either the process followed or the product being delivered. “that is, *as* the job we did last time, *but* with the following differences.
- **Painting by numbers** – Projects where the process and outcome is well known in advance.

Project management challenges

Current issues

- **‘Ready, fire, aim’**
 - Project started without clear objectives.
 - Whatever you hit, call it the target.
 - This approach is not associated with any great success.
 - But setting your own targets is the easiest method for the manager.
- **‘It’s all in my head’**
 - The project manager will set out with all the information in the head.
 - May work for very small projects.
 - The results will soon tell if there are problems or if the scale of the project escalates. – Needs structure and systems
- **‘We work in a nanosecond environment, we don’t have time to do this stuff’**
 - I.e. fast moving e-commerce firms in the late 1990.
 - The lack of good project management may have done a large impact on this projects.
- **‘Project management – we have a procedure for that’**
 - Having procedures and documents for projects provides a highly structured approach is favoured in some industries.
 - The result is high levels of documentation.
 - A challenge for a project manager is to deal with the high degree of formalisations and try to create creativity in the projects and for the people working on it.
- **‘It’s all just common sense, isn’t it?’**
 - This statement usually just shows that things about which little or nothing is known appear obvious.
- **‘I’ve got the badge, therefore I am a project manager’**
 - The card-carrying project management expert
- **‘We’ve done this lots of times before. It never worked then, why should it this time?’**
 - Experienced project workers showing the bitterness that comes with the application of many different approaches, only to be regularly confronted with the same result – projects running late, over budget or delivering less than required of them.
- **‘It won’t work here!’**
 - New methods must overcome this often-heard rejection of anything new as it was “not invited here, therefore is cannot be of any relevance to us”.

CHAPTER 2 –STRUCTURE AND FRAMEWORKS

5 Cs

The environment in which projects operate may be summaries by the 5 C:

1. Context

- The external general influences on the organisation in which the projects is taking place.

2. Complexity

- The level of difficulty or complication of a piece of work called “a project”.
- Simplest ideas exploited first, “barriers to entry” increasing technology rate rising

3. Completeness

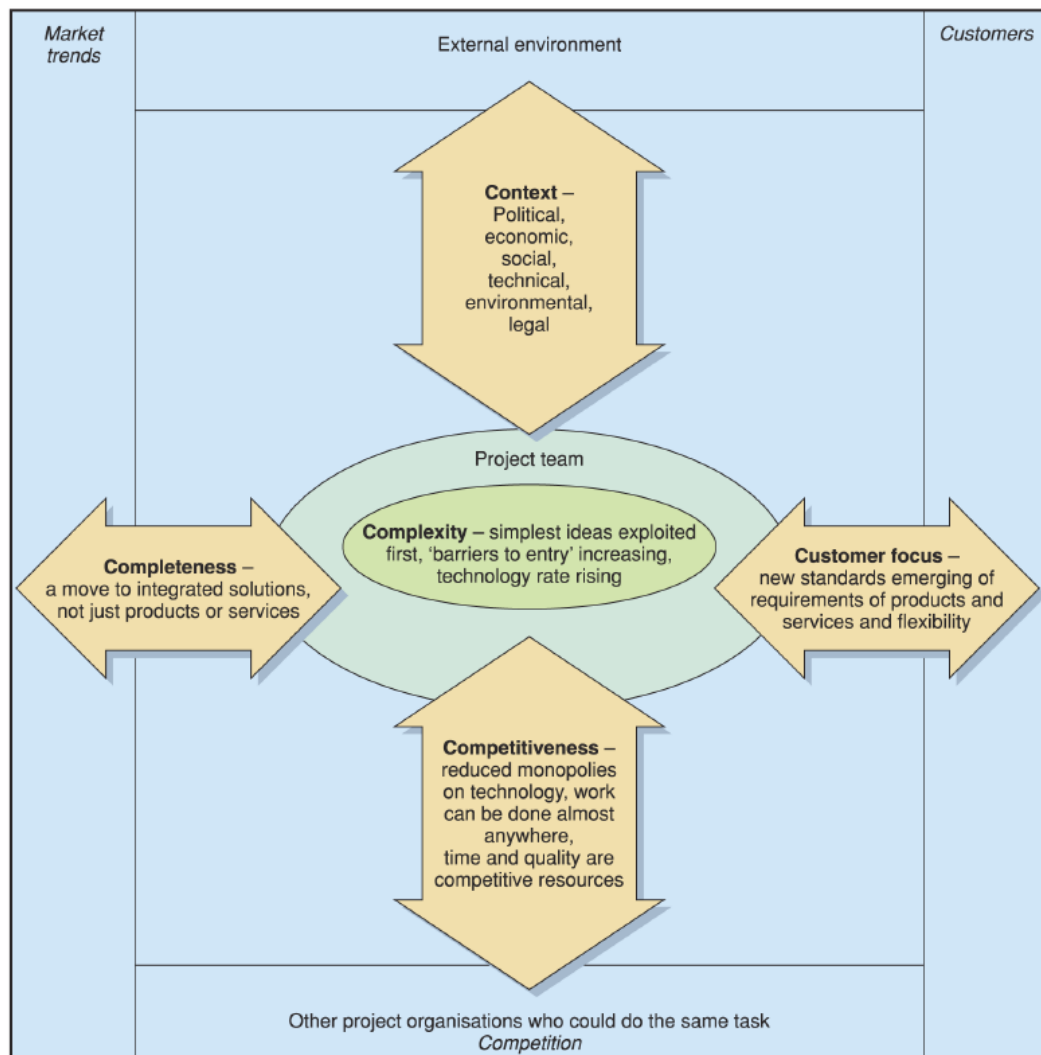
- How much of the end requirement of a project will deliver.
- A move to integrate solutions, not just products or services.

4. Competitiveness

- How many other organisations will be competing to deliver that work?
- Reduced monopolies on technology.
- Work can be done almost anywhere.
- Time and quality are competitive resources.

5. Customer focus

- The expectation that customers will have their needs met by the project.
- New standards emerging of requirements of products and services and flexibility.



The Project Context described by PESTEL:

- **Political influence**
 - I.e. a government make a change in policy that may have a significant impact for what government does, what it funds.
- **Economic**
 - The influence of general and local economics.
 - I.e. challenges in recruiting staff.
- **Social**
 - The influence of social changes on the project environment.
 - I.e. on methods of communication.
- **Technical**
 - Changes in technology will changes the viability of some projects and create needs for others.
- **Environmental**
 - An assessment of environmental impacts is mandated for many projects now as a part of emerging interests in corporate social responsibility.
- **Legal**
 - If new laws and regulations emerge.

Project complexity – The 7-S

1. **Strategy**
 - The high-level requirements of the projects for all areas and the means to achieve them.
2. **Structure**
 - The organisational arrangement of human resources that will be used to carry out and control the projects.
3. **Systems**
 - They “way we work”.
 - The methods for work to be designed, monitored and controlled.
4. **Staff**
 - The selection, recruitment, management and leadership of those working on the project.
5. **Skills**
 - The management and technical tools available to the projects manager and the staff, and how these are developed.
6. **Style/culture**
 - The underling way of working and inter-relating within the work team or organisation.
 - Part of the “soft-side” of management.
7. **Stakeholders**
 - Individuals and groups with an interest in the projects process or outcome.

“I had six honest serving men, they taught me all I knew. Their names were What and Where and When, and Why and How and Who.”

Rudyard Kipling

The project process

Continuously improving the system: the 4-D model

The hedgehog syndrome: The hedgehogs continue to walk over roads and be run over since no one give them feedback. The same mistakes are repeated again and again in projects. Unless there is an opportunity to develop the project's processes and provide feedback to the organisations, the knowledge is lost.

A project can be structured into four phases:

1. Define the project

- Determine what the project is about, its reason for existence and its intentions.
- Explore the possibilities and find alternatives to the problem.
- **Key issues:** Project and organisation strategy, goal definitions.
- *What is to be done?*
- *Why is it to be done?*

2. Design the project process

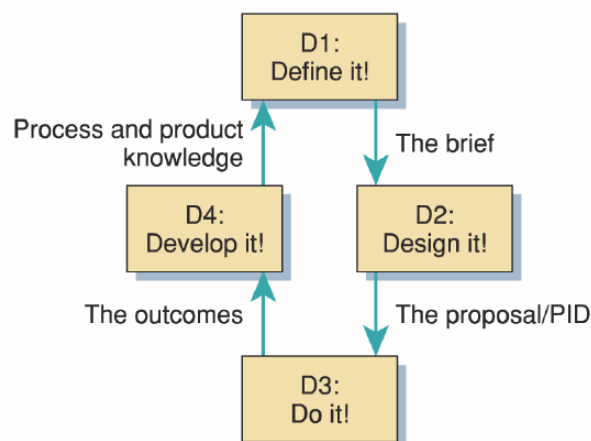
- Construct models to show how the needs will be developed, evaluate these to determine the optimum process for the task and minimise the risk.
- **Key issues:** Modelling and planning, estimation, resource analysis, conflict resolutions and justification.
- *How will it be done?*
- *Who will be involved in each part?*
- *When can it start and finish?*

3. Do it! Or Deliver the project

- Carry out the project in line with the models or plans generated.
- **Key issues:** Organisation, control, leadership, decision-making and problem-solving.
- *How should the projects be managed on a day-today basis?*

4. Develop the process

- Improve the products and processes in the light of the experiences gained from the project.
- **Key issues:** Assessment of process and outcome of the project, evaluation, change for the future.
- *How can the process be continually improved?*



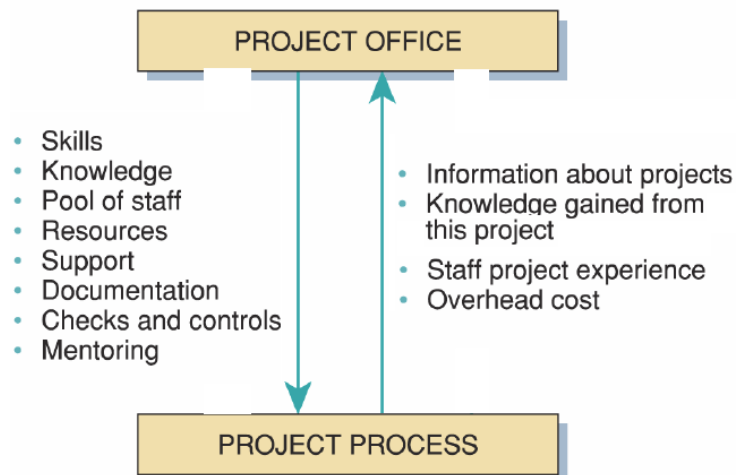
CHAPTER 3 – PROJECTS AND ORGANISATIONS

Project roles and governance

Many organizations use project offices to assist in all aspects of the management of project work. PMO (Project Management Office) provides recognition of the importance of project's activities, and in particular the need for project management professionals to run projects. The office provides a central facility with the skills and knowledge of how to run projects processes.

The office provides:

- Key project staff as
 - Projects manager
 - Project planners
 - Accountants
- Resources
 - Any planning software
- Support (Support role):
 - Training individuals
 - Mentoring individuals
- Also:
 - Checks and control on the project's process



PMO Roles:

- **Monitoring and control of projects performance**
 - Report status to upper management.
 - Monitor and control projects performance.
- **Development of projects management capabilities and methodologies**
 - Promote projects management within organization.
 - Develop competency of personnel, including training.
- **Multi-projects management**
 - Coordinate between projects.
 - Identify, select and prioritise new projects.
- **Strategic management**
 - Provide advice to senior management.
 - Participate in strategic planning.
- **Organizational learning**
 - Monitor and control performance of PMO.

Portfolios and programmes

Programme management

- It is the **layer of co-ordination between projects** to ensure that high-level benefits are realised.
- It is an (organisational) framework for grouping existing or defining new projects, and for focusing all the activities required to **achieve a set of major benefits**. The projects are managed in a co-ordinated way, either to achieve a common goal, or to extract **benefits which would otherwise not be realised if they were managed independently**.
- At one level, programmes can be considered simply as “big projects”. Some consider it as “management of multiple projects”.
- Programme management can also be viewed as means of management gaining greater control of the activity of the organisation.

Portfolios and programmes

“Managing projects is like juggling three balls. Managing programmes (portfolios, multi-projects) is like managing a troop of jugglers all juggling three balls and swapping balls from time to time.”

[G Reiss, 1996]

- A portfolio of projects is projects taking place at one point in time.

CHAPTER 4 – STAKEHOLDERS, STRATEGY AND SUCCESS

Stakeholders: success and failure

Most often referred causes of failure:

1. Lack of user involvement.
2. Lack of management support.
3. Unrealistic user expectations.
4. Failing to recognise the real requirements of a key customer group.
5. Failing to gain a shared understanding of the outcome.

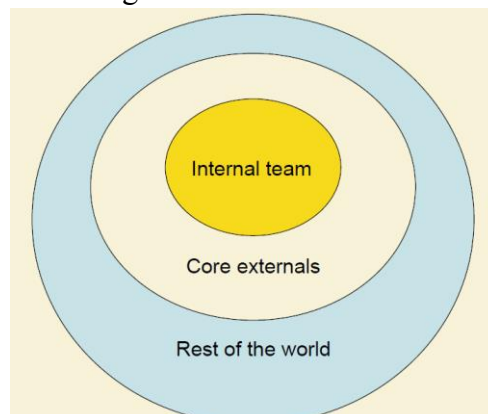
Is it possible to satisfy all stakeholders all of the time?

Stakeholders

- A party with an interest in the project process or outcome.
- More than one person or one group is likely.
- Presenting the project manager with the challenge of resolving split and conflicting requirements.

Who are the stakeholders?

- Who might be effected positively or negatively?
- Who are the representatives of those likely to be effected?
- Who is likely to mobilise for or against what is intended?
- Who can make what is intended more effective through their participation or less effective through non-participation or outright opposition?
- Who can contribute to financial and technical resources?
- Whose behaviour has to change for the effort to succeed?



- **External stakeholders** are people outside the project team or the organization, i.e. customers, or sponsors.
- **Internal stakeholders** are those associated with the process, i.e. members of the projects team.
- **Rest of the world** is about making sure that no new individuals or groups unintentionally become core to the project's success without appropriate changes being made to the projects.

What do the stakeholders want?

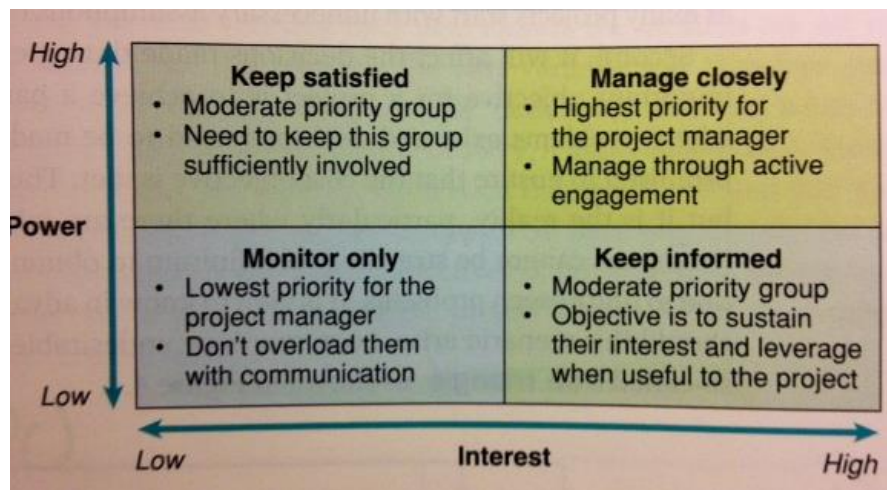
- Short time
- High quality
- Work in a good environment
- Secrecy about the projects
- Low cost
- Success

Stakeholder landscape

You can't please all of the people, all of the time...

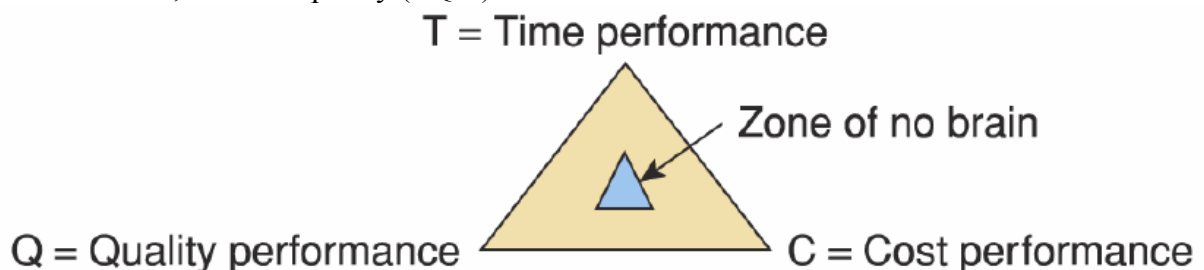
- Who are they?
- What do they want?
- What influence is this going to have on the project process or outcome?

Mapping these factors in **Stakeholder landscape** provide a basic mean of making sense of projects requirements and provides a rough guide to how “manage” particular groups.



Managing strategic choices

In business, there are strategic choices to be made. You have to decide how to make trade-offs between time, cost and quality (TQM).



The iron triangle is a model of the constraints of project management. It is a graphic aid where the three attributes show on the corners of the triangle to show opposition. It is useful to help with intentionally choosing project biases, or analysing the goals of a project. It is often used to illustrate that project management success is measured by the project team's ability to manage the project, so that the expected results are produced while managing time and cost.

CHAPTER 5 – INITIAL PLANNING

A project may begin in different ways:

- Inspiration
- Response to need
- Exploration of an issue
- A necessary part of a larger program

Models of planning

Concept development I NPD

Input:

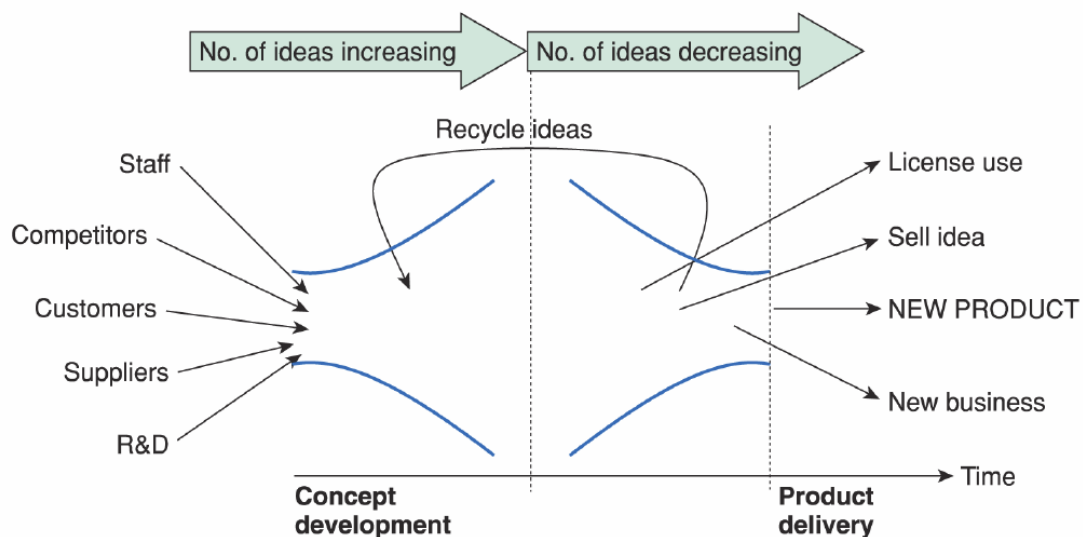
- R&D
- Suppliers
- Customers
- Competitors
- Staff

Screening:

- Marketing assessments of the ideas – *Which one are attractive to the market?*
- Financial evaluation – *return the investment.*
- Strategic – *Does this product fit with our current mission?*
- Technical – *Is it technical possible to develop and deliver?*

Output

- A new product, service or solution to the problem.
- Licensing.
- Selling the idea.
- Starting new business to exploit an idea.

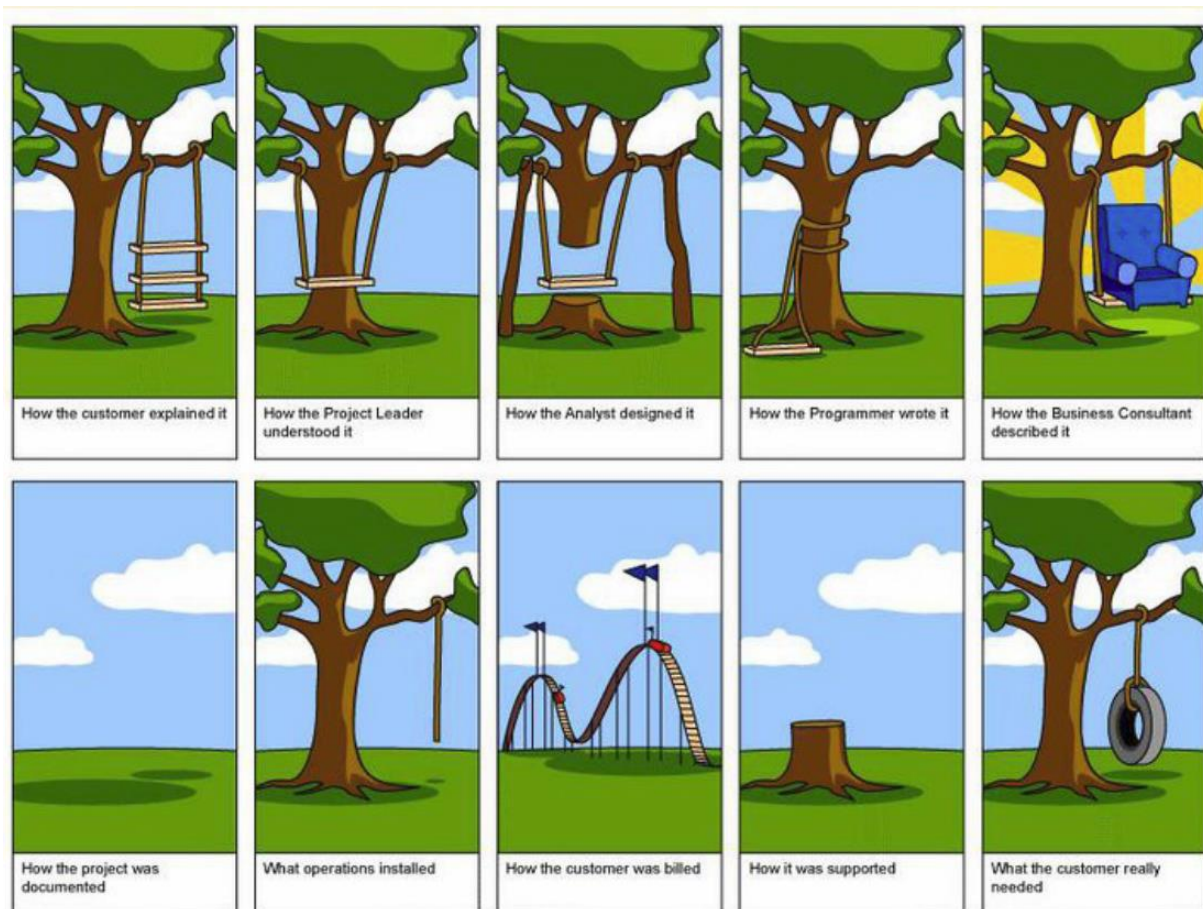


Scope management

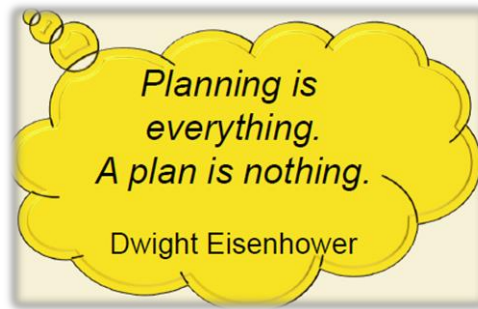
- All parties to the project must agree what it is that the project will do.
- Scope may be let loose early on to allow creativity.
- At the end of the definition phase a statement of scope needs to be written, agreed and signed off.
- **A scope plan: What is to be done and what is excluded!**

Beware product scope creep

- Discrete changes are made.
- The end product no longer resembles the original concept.
- Often results in disappointment.



The planning process



To call projects planning a “process” could imply that there is a well-defined route for the planner to take. Planning is a process that involves consumption of resources – it has costs associated with it.

Costs of the planning process

- Labour (time).
- Associated expenses, i.e. travels.
- Planning tools – may include computer assistance.
- Cost of preparing formal written plan, i.e. typing etc.

Benefits of the planning process

- Avoids costs of chaos of unplanned activity.
- Provides a basis for evaluation – “filtering”.
- Identifies problems in advance.

Output of planning – a working tool or straitjacket?

As a working tool

- Plans help decision-making and guides future activities.
- Plans should change as circumstances changes.
- Planning facilitates an insight into what may happen

As a straitjacket

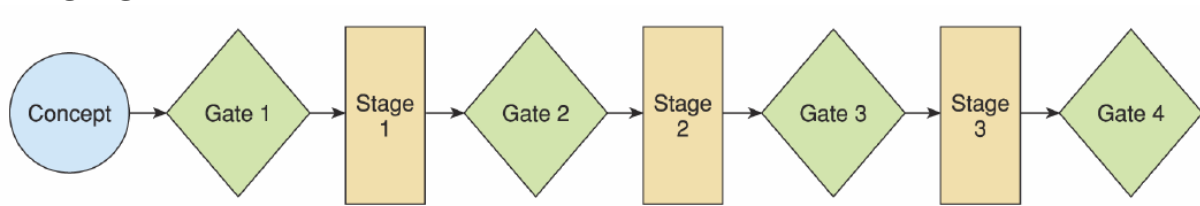
- Cannot change if there is problems.

The PID

Doing a project for a external clients may involve that the customer provides a project initiation document, **PID**.

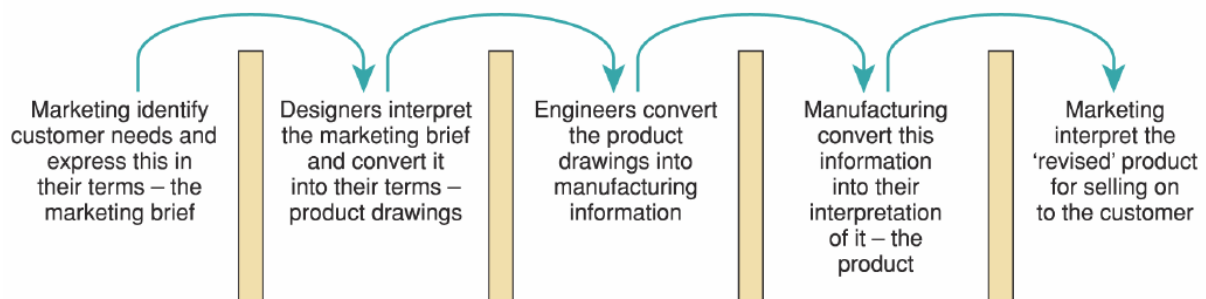
- **The project brief** – statement of the requirements so far.
- **Project team management structure** – who is to be involved and the governance.
- **Job descriptions** – roles of each team member.
- **The project approach** – how the requirements in the brief will be delivered.
- **The project plan** – basic steps to make sure that the requirements are delivered.
- **The business case** – a basic time plan showing major activities, their sequence and duration.
- **A risk log** – a list of major risk identified and actions how to minimise them.
- **Project controls** – how will you know that the project is going to deliver what it has promised.
- **A communication plan** – what will be communicated to what stakeholders and when.

Stage-gate



- Divide project into phases/stages.
- Gates between phases give opportunity to review progress.
- Lay down criteria for passing to the next phase in advance.
- You do not have to wait until it is too late to find out about eventual problems.

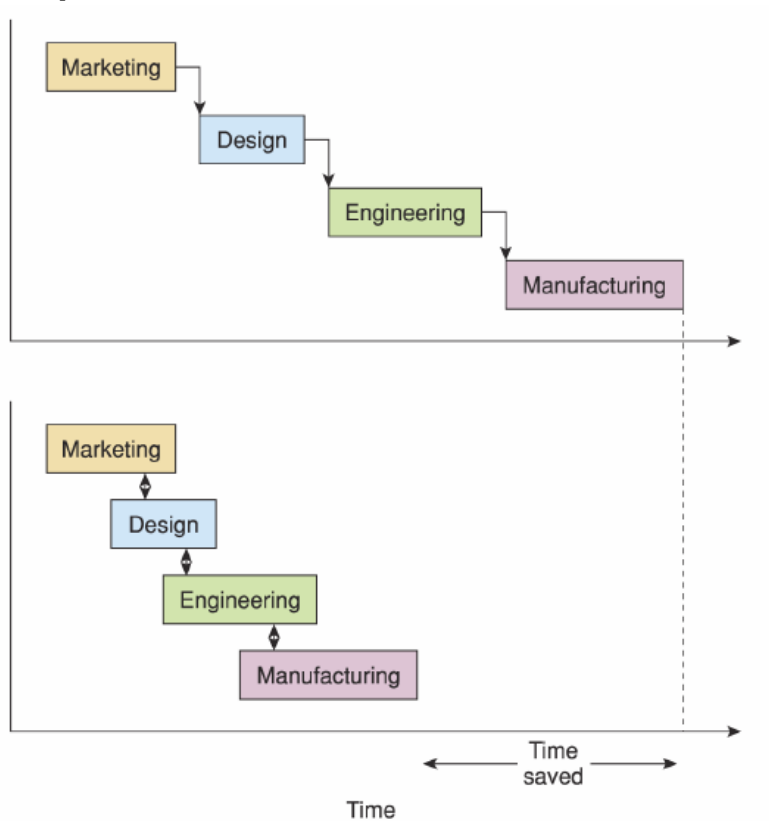
Conventional approach



Where different groups are involved in different stages of a project, it is often seen that people focus on their part of the project only, with no focus at the outcome as a whole. This has some drawbacks:

1. The message or customer's specification is interpreted by different people at each stage of the process.
2. Due to the constant process revision that is required, engineering changes are often made very late in the development process.

Sequential vs. Concurrent



The arrangement of product development into a process stream, with all the necessary parties involved at all stages to prevent the cycle of work and rework for ideas, has the natural effect of allowing activities to run alongside on another (concurrently) as opposes to one after the other (sequentially).

The benefits for concurrent is:

- Reduces project time
- Reduced project cost

Disadvantages

- Increases overheads
- Cost of co-location

CHAPTER 6 – TIME PLANNING

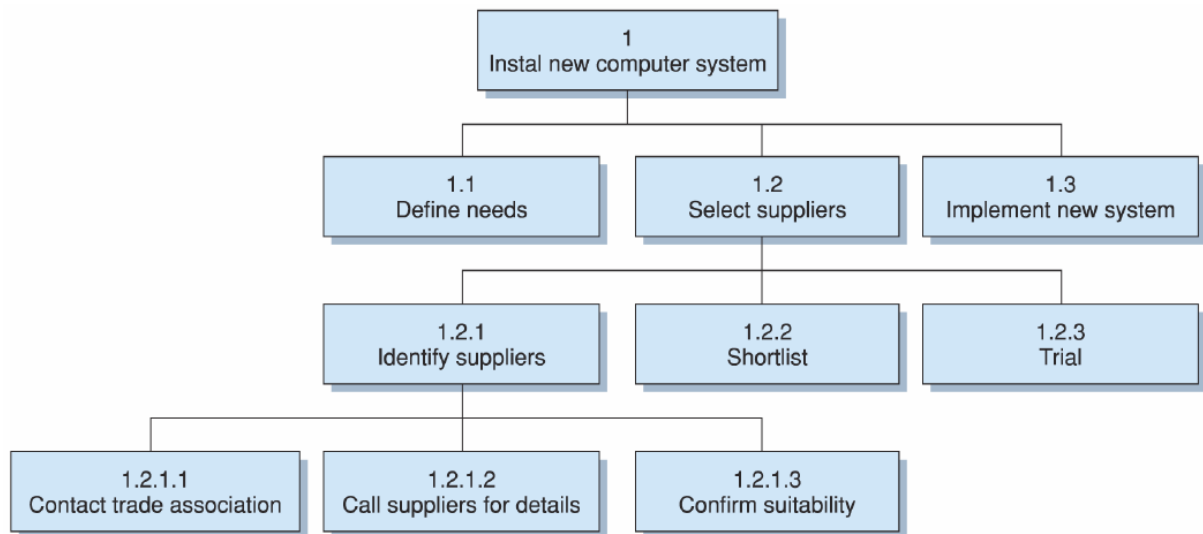
‘Planning is an unnatural process. It is much more satisfying to do something and the nicest thing about not planning is that failure comes as a complete surprise rather than being preceded by a long period of worry and depression’

[Sir John Harvey c1800]

The Work breakdown structure - WBS

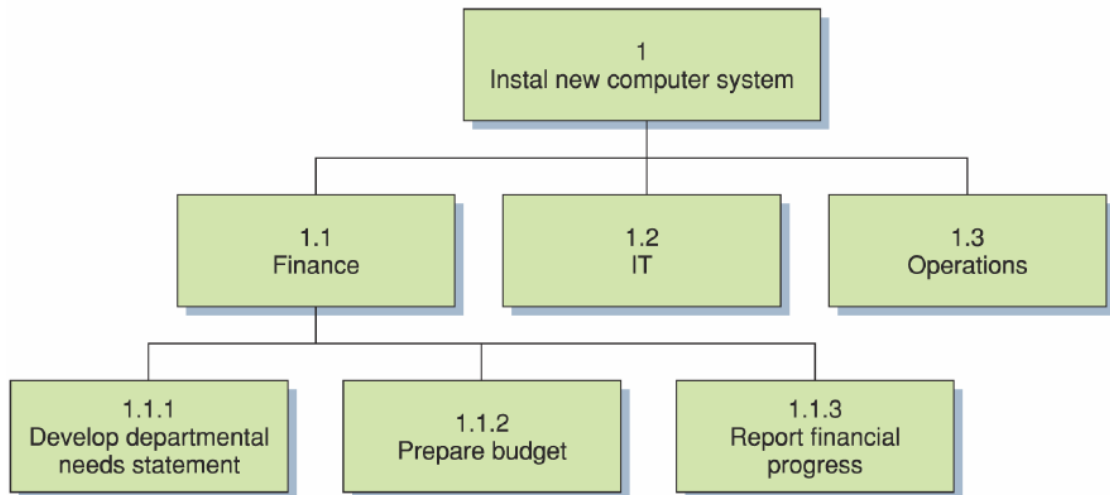
- Deconstruction of a project (chunk the elephant) into comprehensible or manageable units.
- Gives people responsibility for each manageable part.
- Facilitates financial control, individual parts can have their consumption of resources tracked.
- Bottom level will be a list of work packages
- The role of WBS is to create linked, hierarchical series of activities, which are independent units, but at the same time still part of the whole, and here lies the major problems with WBS:
 - Whatever type of structure you choose there are unavoidable conflicts.

Work breakdown



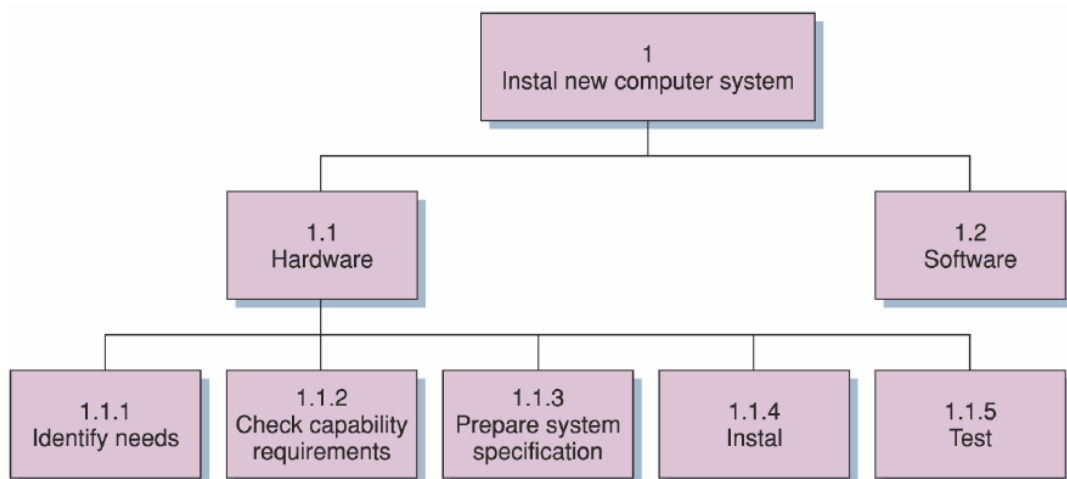
Functional breakdown

- Projects is divided into its functional areas.



Physical breakdown

- Physical groups



A few words on planning

- No plan will survive its first encounter with the enemy.
- You can't create a plan based on what you know today. But you have to.
- You can make a team member promise unrealistic deadlines, but you can't make him/her keep them.
- If you don't plan for it, it will not happen.

Constructing a time plan

- *How long will it take to complete the project?*
- *How precise do you need to be? – rough or detailed*
- *How long did it take last time?*
- *What could cause significant delay? – Any pitfalls?*
- *What other tasks might get in the way?*

The projects manager's role in the estimation process will vary from the collection of estimates from other people in the preparation of the proposal to the provision of detailed financial cost.

Estimates are guesses

- Beware treating these numbers in a scientific way.
- Estimation continues through the project lifecycle.
- The nearer the completion, the more certainty about time, resources and costs.

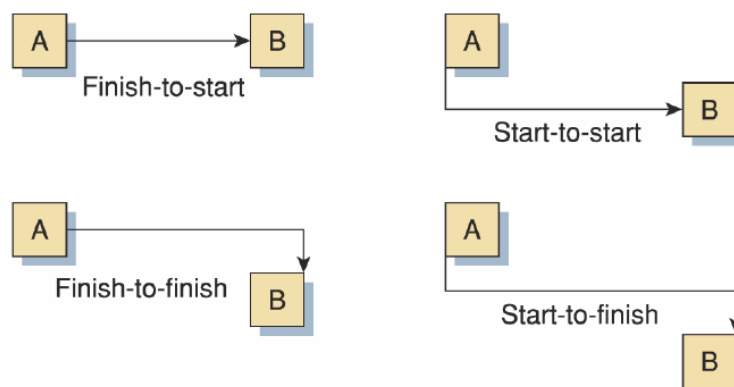
Activity-on-node diagrams and critical path analysis

Using A-o-N technique, the construction of the projects plan combine breakdown structure to identify all the constitutes activities, the sequence in which the need to be performed, and the estimated function for each activity. If the logic of the project can be identified, the project manager can develop a diagram to represent it, allowing better analysis of the activities.

Task dependency

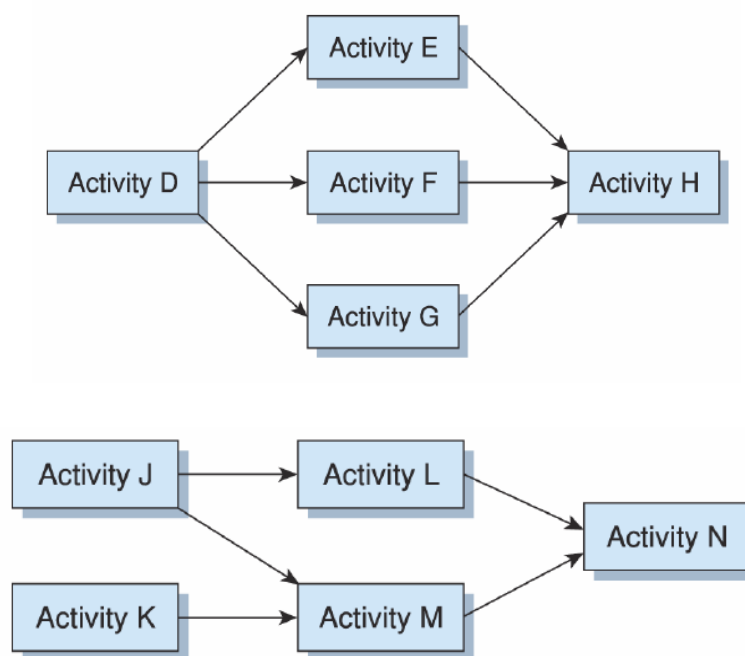


Logical activity linkages



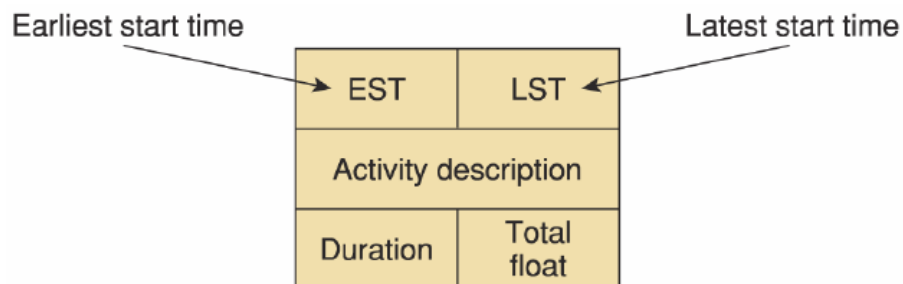
Multiple dependencies

- The project has multiple activities that need to be completed before another task can start.



Activity L is dependent on activity J but activity M is dependent on both activities J and K.

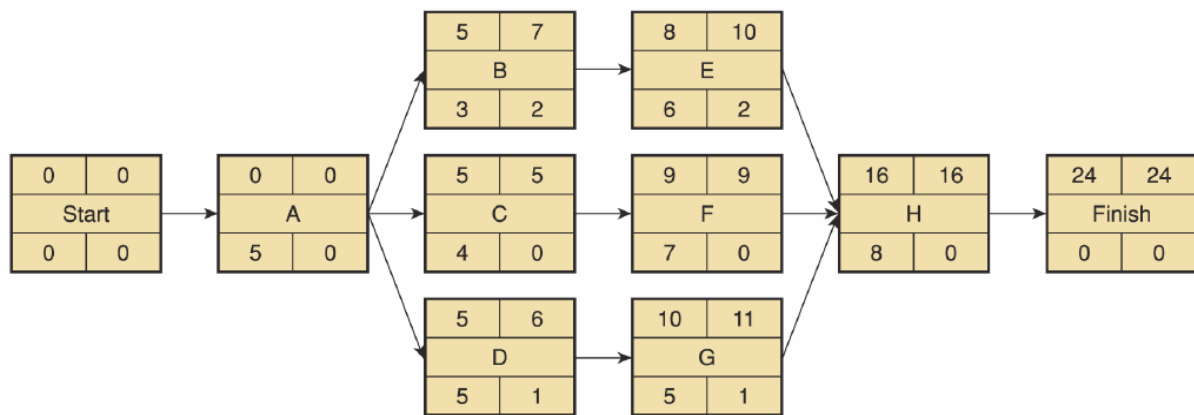
Activity notation



- Earliest start time (EST)** – determined by activities preceding the event and is the earliest time at which the activity on this node can start.
- Latest start time (LST)** – is the same or later than EST and is the latest time which all the previous activities need to have been completed to prevent the whole project being held up.
- Total **float** – the difference between the LST and the EST.



Activity network and the critical path



Critical path

- The path through the activities which takes the longest – the longest sequence of dependent activities that need to be complete in order for the project as a whole to finish.

The forward pass

- The forward pass determines the ESTs and starts at the left-hand side of the diagram, with EST for the first activity. This is zero. The next activity, A, cannot start until this has finished, and so EST for A is the EST for the start plus duration (0) + zero.
- Activity H cannot start until all three preceding activities have been complete – in this case at time 16 (the latest of the ESTs)

The reverse pass

- The reverse pass starts from the end of the network and assigns the LSTs for each activity. The LST at the finish is assumed to be the same as the LST for that activity with the meaning that we want the project to be completed as soon as possible. The LST for H is the LST for the finish minus the duration of H. That is, it is the latest time that H could start without delaying the entire project. This is $24 - 8 = 16$
- Where there are **no float** the activity is **critical** and any delay in this activity will delay the project as whole. Knowing the critical path has significant implications for project manager.

Constructing a time plan

Scheduling

- Knowing when activities will be carried out.
- Amount of work (hours, days) required.
- Resources.
- Capability – ability and limitations.
- Capacity – volume.
- Calendar – when available.
- Time plan.

The Gantt chart

The purpose of the Gant Chart is to illustrate the relationship between the activities and time.

- Establishes a level of logic
- Time goes from left to right
- Activities arranged top to bottom in order of occurrence
- *Viewing the forward schedule*
 - Start at a given date and follow forward to determine the end date
- *Viewing the backward schedule*
 - Look at required completion date and work back to find start date

Using Gantt charts

- **Positives**
 - Communicates the plan
 - Easy to construct
 - Readily understood
 - Good for static environments
 - Widely used
 - Graphical interface for most project planning software
- **Limitations**
 - Does not help in optimising resource allocation
 - Perceived as a ‘statement of reality’

CHAPTER 7 – RETHINKING TIME PLANING: THE CRITICAL CHAIH APPROACH

Limitations of current approaches

Projects that run late, over budget or fail to meet key needs of their stakeholders cause considerable problems for business and individuals. The causes can be:

- Methods or their application or both are at fault
- Uncertainties related to the process (how) or the outcome (what)
- Responses to uncertainty
- Methods are not sufficiently robust

Problems with current approaches

1. **Estimates** – all goals are based on estimates, and estimates are guesses.
2. **Safety margin** – Estimates generally include a safety margin according to worst experiences. If safety margin are added for every task this do not help the project in achieving on-time completion.
3. **Latest start time** – If non critical tasks are started at latest start time they may turn into critical tasks
4. **A delay is passed on** to then next stage.
5. **The PM is notified too late to impact.**
6. **Student syndrome** – despite giving slack people start at the latest start time, the extra time is wasted at the front end.
7. **Multitasking-** The effect is to increase the lead-time for all projects.

The estimating process

- Expected task time: 2 days
- Effect of multitasking: +1 day
- Interruptions: +1 day
- Other problems: +0,5 day
- The 2-day activity is now 4,5
- Rounded up to 5, just in case.....

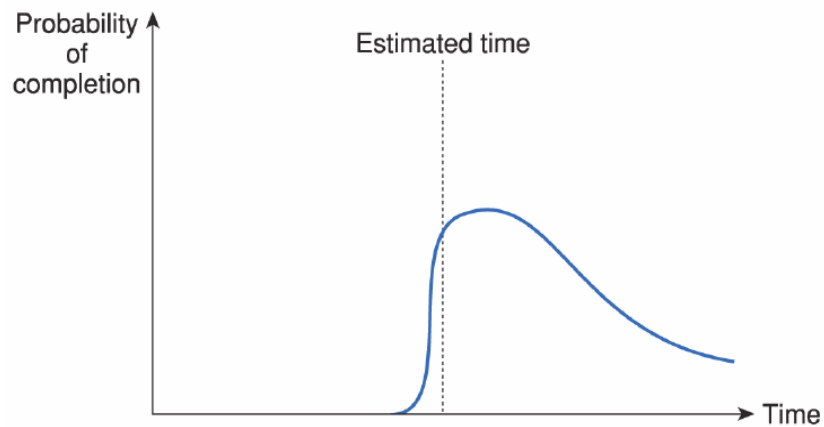
Are people poor estimators?

- **Parkinson's Law** – an activity will expand to fill the time available.
- **Student Syndrome** – Even if giving extra time people tend to start and latest possible start time. If something unexpected happens:
 - Recovery/buffer time has already been used

Consequences

- The chances of early completion are very low.
- If the work is finished early it will not be announced
 - Opportunity to “polish the product”
 - Do not want to get extra job
 - Shorter time will become “the expected time” for “next task”

Activity completion profile – shows that the chance of early completion of an activity to be very low:



Managing by constraints

The theory of constraints (TOC)

The importance of the constraints is that they determine the ability of the system to do work and thereby earn income. Focus on throughput.

Stages of TOC

- 1. Identify the constraint – the critical path and the critical resources.**
- 2. Exploit the constraint.**
- 3. Subordinate everything else to the constraint.**
- 4. Elevate the constraint.**
- 5. Go back and find new constraints, repeating the process.**

1. Identify the constraint

- What is stopping the project being carried out faster?
 - The critical path of the project
 - The availability of resources
 - Dates that are fixed into the schedule and cannot be moved
 - Behaviours and policies

2. Exploit the constraint.

- Exploiting means that anything that prevents that part of the system performing to its maximum potential is to be removed.

3. Subordinate everything else to the constraint.

- Make the constraint the point around which schedules are based and ignore local efficiencies that do not consider the system as a whole. Activity completion should not be the measure – project completion should be.

4. Elevate the constraint.

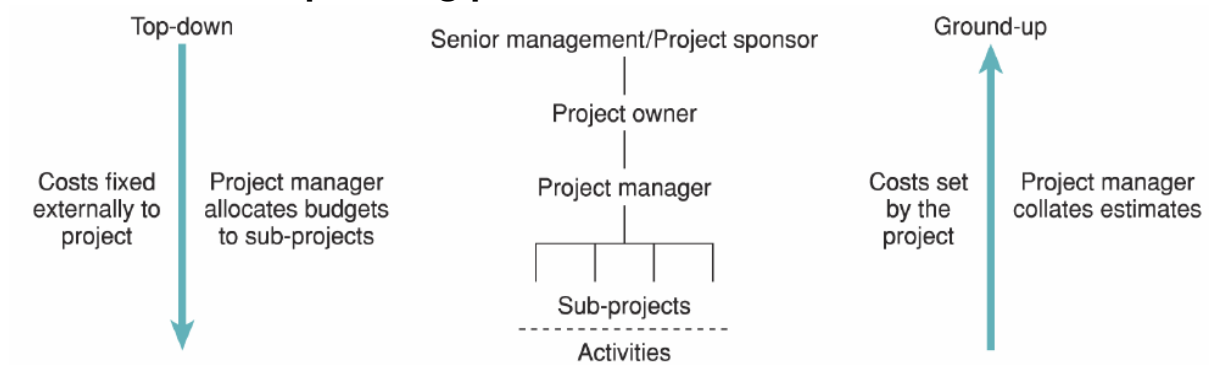
- Elevating the constraint means increasing the flow through that part of the system – removing it as a constraint.

5. Go back and find new constraints, repeating the process.

- Project manager will need to check progress and recognise where constraints change.

CHAPTER 8 – COST AND BENEFIT PLANNING

Basics of a cost planning process



Approaches to costing:

- **Top-down costing**
 - You are allocated a certain amount of money to complete the projects activities and this has to be split between the sub-projects.
 - Involves the allocation of the costs to the sub-activities.
- **Ground-up costing**
 - The estimates of each level in the work breakdown structure are compiled and added together by each level of supervision in the project hierarchy.
 - The advantages is that the estimates are prepared by the people who will carry out the activities.

Estimating techniques

- **Parametric estimating**
 - Break down in WBS to units that can be estimated.
 - I.e. hours of contact for a training programme.
 - Provides a means to estimate costs form knowledge of the work being undertaken and can be used at different levels in the product breakdown.
- **As...but...s**
 - Experience of similar projects
- **Forecasts**
 - Best guess
- **Wishful thinking**
 - *Optimism bias*. Being over-optimistic in how much can be achieved in a project and how much or little it will cost.
 - *Improper use of estimates*.
 - The original request is changed
 - The latest version of the work is far more involved than you had been led to believe and it is too late to change the figures.
 - *Failure to be systematic about planning*
 - People give an unqualified estimate to get the request off their desk.
- The best techniques are still only estimates.
- Errors at this stage can be multiplied many times.

Business case

*‘The justification for undertaking a project, in terms of evaluating the benefits, cost and risk of alternative options and the rationale for the preferred solution. **Its purpose is to obtain management commitment and approval** for investment in the project. The business case is owned by the sponsor.’*

(APM)

Financial appraisal (evaluation)

The return will at least exceed the amount spent. This return or payback can be analysed in a number of ways to determine feasibility or net benefit:

- **Payback**
 - Simply considers the cash flow of costs and benefits.
 - Compare the income that will be generated with the initial investment.
- **Discounted cash flow**
 - Considers the “time value” of cash flows.
 - A comparison between the value of the return of an investment and the value of the same sum of money if it had been deposited in a bank account at a given rate of interest for the same period.
- **Net present value**
 - Net present value = present value of benefits – present value of costs
 - All values considered in today’s terms are called the present value.

Factoring for optimism bias

Understated costs + overstated benefits + understated environmental impact + overstated economic impact = project approval

Benefits realisation analysis

KPMG survey suggests:

- 75% of the projects had no business case.
- 75% of the 25% failed to meet the targets included in the business case.
- Simply adding together the benefits of all projects in a programme will not give the best overall picture, projects rarely act in isolation.
- Projects are frequently subject to overstated benefits.

CHAPTER 9 - QUALITY AND STAKEHOLDER SATISFACTION

The nature of satisfaction

Satisfaction = perception – expectation

- the perception (of what has been received)
- the expectation (of what was to be received)

That is, the satisfaction is determined by the difference between how the projects is perceived or viewed by a stakeholder and how they expect it to perform.

Maister's first law

- Greatest cause of dissatisfaction is the creation of unrealistic expectations.

Communications planning

A common technique for communications management centres on the use of a table to identify the nature of communications (**what will be told to whom and in what format**), the timing and who is responsible for doing it.

- Keeping stakeholders in the loop is a vital part of quality planning
- Beware e-mail overload

Communications plan

| <i>Stakeholder</i> | <i>Communication</i> | <i>Timing</i> | <i>Format</i> | <i>Distribution</i> | <i>Person responsible</i> |
|---------------------|------------------------|-------------------------------|---------------|------------------------|---------------------------|
| Project sponsor | Monthly | Week 1 each month | Short report | E-mail | Project manager |
| Accounts department | Monthly spend schedule | 2 weeks before start of month | Short budget | E-mail | Administrator |
| Client department | Monthly | Week 1 each month | 1-page report | E-mail and noticeboard | Liaison officer |

CHAPTER 10 – RISK AND OPPORTUNITIES MANAGEMENT

The nature of risk management

- **‘Known knowns’**
 - The things we know we know.
 - Form the basis of planning.
- **‘Known unknowns’**
 - Those things that we know are uncertain.
 - I.e. uncertainty how long a particular task will take.
- **‘Unknown unknowns’**
 - Those things that come out from the blue and we could not have known about
 - Are not known in advance

Definitions of risk:

- The possibility of suffering harm or loss.

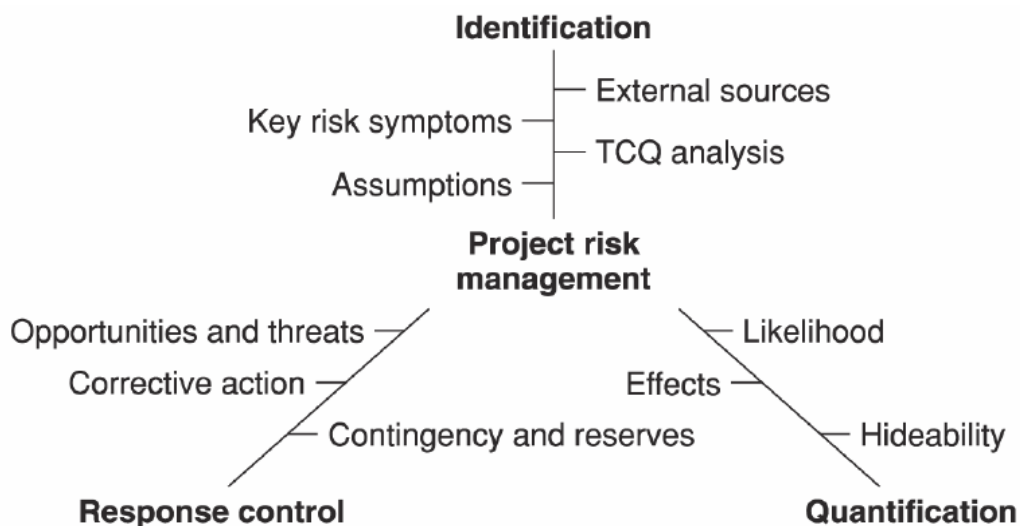
Risk management

“Project management is about accepting and living with risks and uncertainties. If you can’t handle it, you should do something else for a living.”

Framework for risk management

Three main areas:

1. **Identification**
2. **Quantification**
3. **Response control (mitigation)**



1. Identification

- The process of predicting the key risk outcomes – indicators that something is going wrong in a project.
- a. Aspects to consider (*not sure if they should be places here*)
 - Time – the critical path or critical chain.
 - Cost – the estimates have uncertainty of all our processes.
 - Health and safety
 - Legal

How to identify risks

- By brainstorming
- By consultation activities
 - Seek the wider stakeholder views
 - Seek the view of experts
- Refer to the WBS
- Look to time, cost and quality plans

2. Quantification

3. Response control (mitigation)

- Having identified the risk elements to be managed, some procedures are required to ensure that either the likelihood is reduced of that event occurring or the effects managed or mitigated in some way.
- **Consider**
 - *Corrective action*
 - Identification and elimination of the causes of a problem, thus preventing their recurrence
 - *Contingencies and reserves*
 - A company may set up a reserve for contingencies when it is performing well to guard against the risk that it may eventually perform poorly.
 - *Outsourcing the risk to contractors, experts or insurance*

Questions to be asked

- *Can we minimize or eliminate the risk?*
- *Can we reduce likelihood?*
- *Can we impact the consequences?*
- *What are the warnings?*
- *Optional plans?*
- *Who will be affected?*
- *What can we do today, and what must wait?*
- *Who needs to be informed?*
- Everything is risk management!
- Risk analysis must be revisited throughout the project.
- The risk analysis resides with the project.

Qualitative approaches

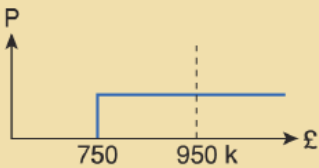
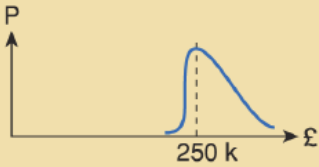
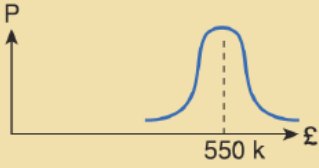
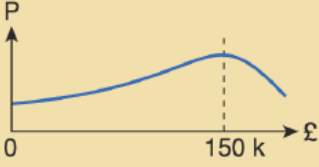
The majority of risk management activities are based on qualitative data. That is by gathering people's perceptions of the levels of risk involved in a particular activity, some assessment is made of the ranking of that risk for the project. Typically, this will assess the likelihood or probability of that risk occurring, and its impact or severity.

Failure mode effect analysis (FMEA). This considers the elements of each activity or path through the activities. These are likelihood, severity and hideability. This is because it is often noted that the reasons for failure of projects are not the mainstream risks that were identified during analysis but ones that have emerged because their progress, for instance, was not visible. This actor measures how easy it would be for one party of the project to conceal the fact that things were going very wrong with part of the project.

| <i>Activity</i> | <i>Severity</i> | <i>Hideability</i> | <i>Likelihood</i> | <i>RPN</i> |
|--|-----------------|--------------------|-------------------|------------|
| Development carried out by contractors | 8 | 9 | 2 | 144 |
| Development carried out in-house | 8 | 2 | 7 | 112 |

Monte Carlo simulation

Monte Carlo methods are a broad class of computational algorithms that rely on repeated random sampling to obtain numerical results i.e. by running simulations many times over in order to calculate those same probabilities heuristically just like actually playing and recording your results in a real casino situation: hence the name.

| Activity/cost-centre | Cost/income | Distribution |
|-----------------------------|--------------------|--|
| Revenue | £950 000 |  |
| Materials cost | – £250 000 |  |
| Labour cost | – £550 000 |  |
| Profit | = £150 000 |  |

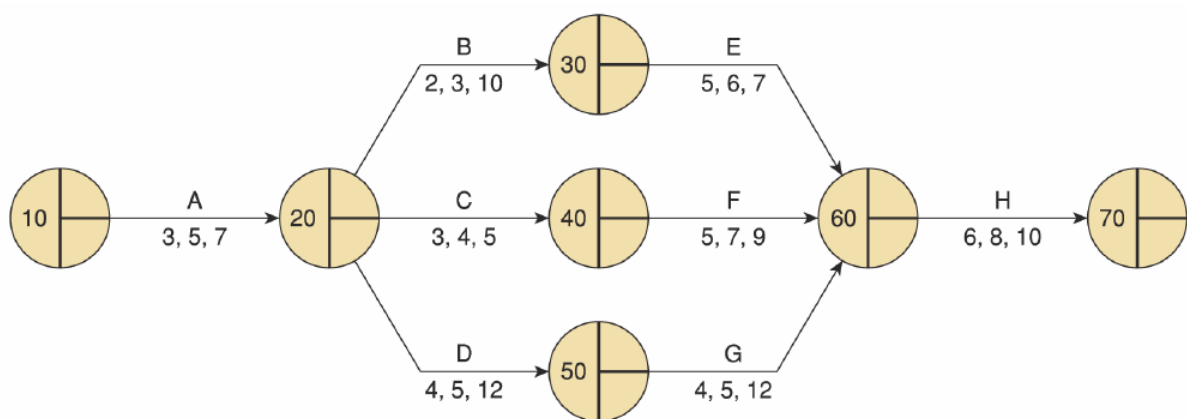
PERT – Programme evaluation and review technique

The technique is intended to deal with the likelihood that the single value given as the estimated time for completion of activities is going to have a degree of error associated with it. Instead of taking single time, three time estimates for each activity are required:

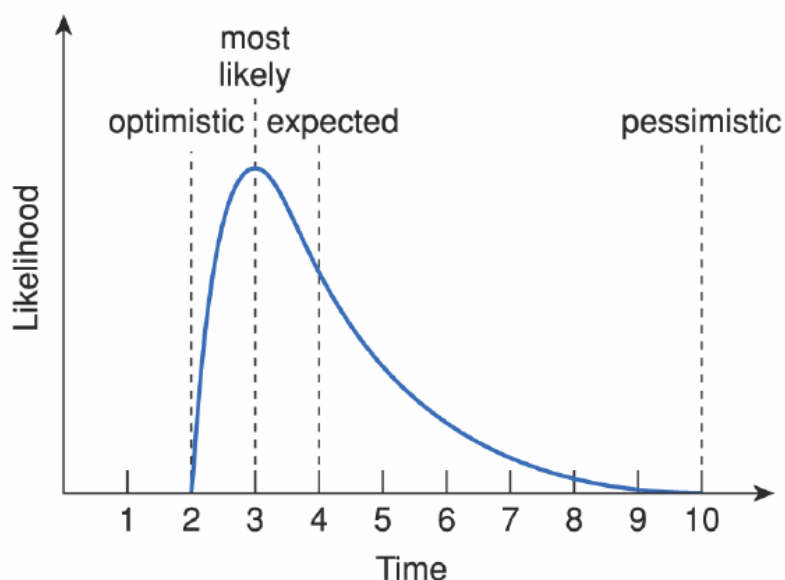
- *Optimistic time* – how long the activity would take if the conditions were ideal.
- *Most probable time* – time if conditions were normal.
- *Pessimistic time* – how long the activity would take if a lot of things would go wrong.

The use of PERT in practise

- Contingencies, that is, having identified the most risky elements of the projects, to put some actions in place to make sure that the risk is minimised.



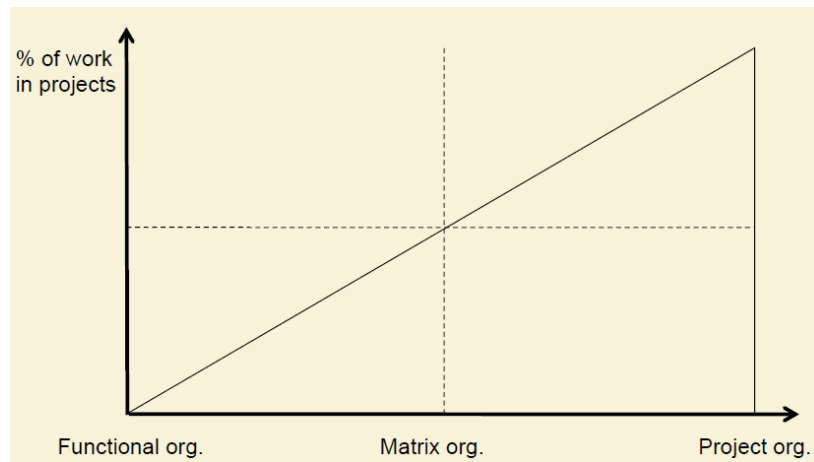
Network showing optimistic, most probable and pessimistic times.



Distribution of estimated times for an activity

CHAPTER 11 – PROJECT ORGANISATION: STRUCTURES AND TEAMS

Functional, project or matrix?



The pure project organisation

- **Advantages**
 - The labour is highly flexible.
 - The main company only has to administer the employment of its own staff.
- **Disadvantages**
 - The project team is only temporary and have no commitment to its success.
 - When there is a boom in a particular area in an industry, there is a shortage of labour.

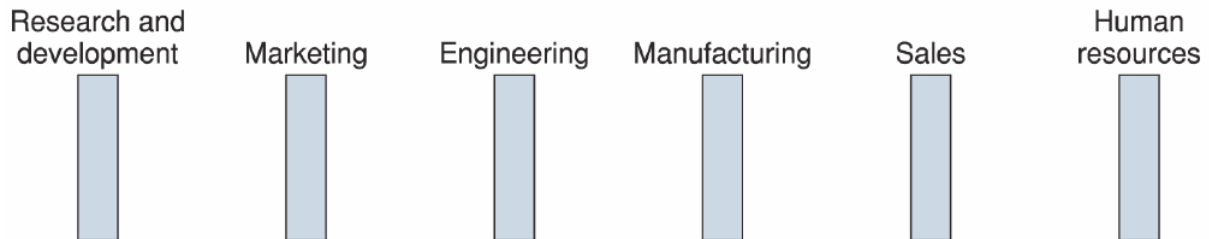
Matrix management

Matrix management was invented as a way of achieving some of the benefits of the project organisation without the disadvantages. There are three situations where a matrix management structure is appropriate:

1. Where there is more than one orientation of the activities of the operation.
2. Where there is the need to process simultaneously large amounts of information.
3. Where there is need to share resources.

Teams

Large organisations have for a long time been organised by grouping all the specialism into “chimneys” or “silos”. The notion is that, by grouping all the specialism together, the arrangement is very efficient, as when you need that function to be performed there is an obvious resource to draw on. Career paths are well defined and basic administration systems are geared to this way of working.



One single function will rarely provide a customer’s entire need or want. To do this requires cross-functional activity, i.e. the linking of the activities of more than one functional area.

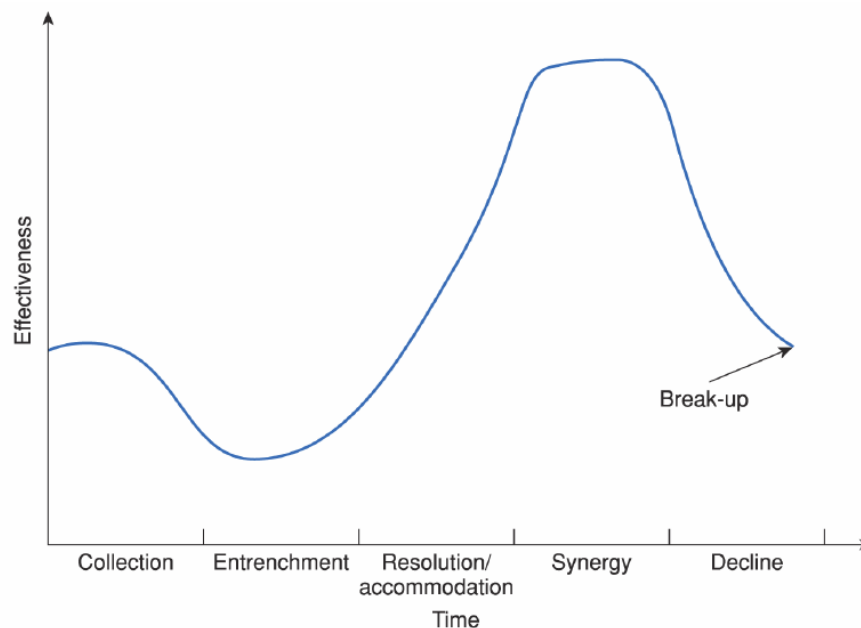
Teamwork

- A group is simply a collection of individuals who have a common theme.
- Team
 - A team is a collection of people with a common goal.
 - The output of the group is greater than the sum of the outputs of the individuals.
 - A greater range of options can be considered by exploiting differences in individual thought processes.
 - Decision-making by the team is likely to be better.
 - A team can be more open to taking risks.
 - Have a higher overall level of motivation.
 - A team may better support for the individuals within the team.

Team lifecycle

Stages of development

- **Collection**
 - The bringing together of individuals into a group with a collective task or problem to solve.
 - Member have a degree of eagerness and initial enthusiasm.
 - Use this phase to establish themselves and find what is expected of them.
- **Entrenchment**
 - Member begins to find out where each person stand on various issues.
 - This phase can be very destructive and is generally fairly unproductive.
- **Resolution**
 - The disagreements begin to be resolved, and characteristics such as mutual trust, harmony, self-esteem and confidence are seen.
 - Move to being more productive
- **Synergy**
 - The peak of effectiveness of the team
 - Shared leadership
 - Motivation to complete the task
- **Decline**
 - Effectiveness starts to drop – this can be through the nature of the task being undertaken not changing or the focus of the activities being allowed to move towards a social group.
- **Break-up**
 - Before the group is finished with the task or when it is finished.












Effectiveness of team lifecycle

Team roles (M. Belbin)

People are categorised by the individual's personalities and their behaviour. Belbin says there are six factors:

1. **Personality**
2. **Mental abilities**
3. **Current values and motivations**
4. **Filed constraints** – those rules and procedures that affect behaviour from the environment in which you are working.
5. **Experience** – prior events which have left varying degrees of impression on the individual.
6. **Role-learning** – the ease with which an individual can take on one of the roles listed below, but which is not their natural role.

The nine team roles

| | Role | Description | Weaknesses |
|---|------------------------------|---|--|
|  | Plant | Creative, imaginative, unorthodox. Solves difficult problems | Ignore details. Too preoccupied to communicate effectively. |
|  | Resource Investigator | Enthusiastic, communicative. Explores opportunities. Develop contacts. | Overoptimistic. Loses interest once initial enthusiasm has passed. |
|  | Coordinator | Mature, confident. Clarifies goals, delegates well. | Can be seen as manipulative. Delegate personal work. |
|  | Shaper | Challenging, dynamic, thrives on pressure. | Can provoke others. Hurts people's feelings. |
|  | Monitor Evaluator | Sober, strategic and discerning. Sees all options. Judges accurately. | Lacks drive and ability to inspire others. Overly critical. |
|  | Teamworker | Cooperative. Listens, builds. | Can be easily influenced |
|  | Implementer | Disciplined, reliable, conservative and efficient. Turns ideas into practical actions | Somewhat inflexible. |
|  | Completer Finisher | Delivers on time. | Reluctant to delegate. |
|  | Specialist | Single-minded, self-starting, dedicated. | Overlooks the big picture. |

Team roles (M. Belbin)

| Action | Social | Thinker |
|---|---|--|
| Completer Finisher | Co-ordinator | Monitor Evaluator |
|  |  |  |
| Implementer | Resource Investigator | Plant |
|  |  |  |
| Shaper | Teamworker | Specialist |
|  |  |  |

CHAPTER 12 – MANAGEMENT AND LEADERSHIP IN PROJECTS

Leading and managing

Management – the technical discipline of applying and administering authority over others which is given through the formalised structure arrangement of the organisation.

- The quality of obtaining results from others through personal influence
- The traits approach
 - ‘Leaders are born and not made’
- Skills and attributes
 - Teachable, providing the individual wants to learn
- Intelligence
 - Cannot be taught but rarely seen as a constraint on success
- Further research
 - No single recipe for success

“The four Ps”

One of the major effects of poor performance in management is stress. While a certain amount of pressure is beneficial and leads to enhanced performance as an individual rises to a challenge, the negative side is stress.

- **P**lan your way out
- **P**ace yourself
- **P**amper/reward yourself on accomplishments
- **P**iss yourself laughing

SMART

To improve time management set goals and targets for short-, medium- and long-term objectives. The goals should be:

- **S** – Specific and written down
- **M** – Measurable
- **A** – Achievable (must be physically possible)
- **R** – Realistic (for yourself to achieve this)
- **T** – Time-framed

CHAPTER 13 - CONTROL

The concept of control

A project runs late, is over budget, does not deliver to requirements

- Question: *How did this happen?*
- Answer: Very gradually
 - Days being lost and money spent, not in one large block but in small amounts. These amounts gradually add up and over the life of most projects will provide significant problems.

How to deal with it?

- Based on easy and simple measures that reflect the objectives of the project
- Basic requirements are:
 - 1. Defining characteristics of importance**
 - Have to prioritise (often time, cost and quality)
 - 2. Defining limits to their variation**
 - Health and safety = Zero tolerance
 - Accept that it always is going to be some variation.
 - 3. Measurement of those characteristics**
 - Somewhere between finding out too late to take action and permanently harassing people to find out how they are progressing lies a position that will satisfy both the needs of control and the needs of the project team to keep the work.
 - 4. Making progress visible & Feedback of performance to the team**
 - I.e. Andon lights above machines in a factory that would indicate where there was a problem and continuous monitoring and display of the quantity of output relative to the day's target.
 - 5. Instituting corrective action where required**
 - *What to do about it?*
 - An important principle of control shows itself: you can only manage the future - what has happened is history.

Earned Value

For complex projects where warning of problems and an ability to predict final costs and times at completions is required. Brings together time and cost performance into a monetary quantity.

Process:

1. Set the budget
2. Measure progress for each activity
3. Compare actual with planned
4. Calculate: for cost and time

Tasks and budget

| Activity | Time | Budget |
|----------|----------|----------|
| 1 | 1 week | €5000 |
| 2 | 1 week | €8000 |
| 3 | 1 week | €7000 |
| 4 | 1 week | €12 000 |
| 5 | 1 week | €14 000 |
| 6 | 1 week | €10 000 |
| 7 | 1 week | €13 000 |
| 8 | 1 week | €11 000 |
| 9 | 1 week | €16 000 |
| 10 | 1 week | €4000 |
| TOTAL | 10 weeks | €100 000 |

Earned Value

What is the progress at week 5?

- What has been spent? Actual spend is £36 000
- What has been completed? Activities 1 to 4

What should have been spent?

- Activities 1 to 5 should be complete; therefore planned spend should be $£5000 + 8000 + 7000 + 12000 + 14000 = £46\ 000$

What is the earned value?

- Activities 1 to 4 are complete; therefore earned value is $£5000 + 8000 + 7000 + 12000 = £32\ 000$

Variances

What are the **variances**?

- *Cost variance* = earned value less actual spend = $£32000 - 36000 = -£4000$
- *Schedule variance* = earned value less planned spend = $32000 - 46000 = -£14000$

What is the **performance**?

- *Cost performance indicator* = earned value/actual spend = $32/36 = 0.889$
- *Schedule performance indicator* = earned value/planned spend = $32/46 = 0.696$

Prediction

What is the effect on the project if nothing is changed?

- Estimated cost at completion = Original budget/cost performance indicator = $£100\ 000/0.889 = £112\ 500$
- Estimated time of completion = Original time estimate/schedule performance indicator = $10\ \text{weeks}/0.696 = 14.4\ \text{weeks}$

Visual control

If you can see it you can monitor it?

- The Gantt Chart
- Traffic lights

The construction project has on great advantage in terms of control – you can see what is happening.

CHAPTER 14 – THE SUPPLY CHAIN

- Today most goods and services are a product of a supply chain
 - A project is only as good as the weakest part of the process
- Similarly a large proportion of project work
- Resulting in a recent trend to outsource (to external firms) major parts of the work
- Relationships developed between parties in the supply chain are vital to survival

Purchasing and contracts

The ‘five rights’

These are interdependent characteristic of a supplier or contractor depending on their ability to deliver:

1. **Right quantity**
 - The quantity of goods or services is determined from the schedules drawn up with the plans.
2. **Right quality** of good or services is determined through:
 - Trial supply of good or services
 - Prior reputation
 - Certification or assessment of a supplier’s quality system
3. **Right price**
 - The best suppliers may not be the cheapest one.
4. **Right time and place**
 - Giving suppliers the longest possible time in which to fulfil an order is going to be beneficial to both parties in the long term.
5. **Right supplier**
 - Being the right supplier clearly has dependence on the other four categories.

Contracts

1. **Public purchase contracts** (Central government, purchase/lease of goods or services)
2. Bids may be treated as ‘sealed’ or ‘open’
3. The information in the bids should be fed into the planning stage
4. **Standard terms and conditions**
5. **Penalty clauses** – used to encourage suppliers to do what they said that why would do.
6. **Bonds and insurances** – for projects going wrong.
7. **Retention money** – If task are not finished but are not delaying the project a customer still want to retain some money.
8. **Stage payments** – In order for suppliers to stay floating financially they get money at different stages.
9. Letters of intent

CHAPTER 15 – PROBLEM-SOLVING AND DECISION-MAKING

Definition of a problem

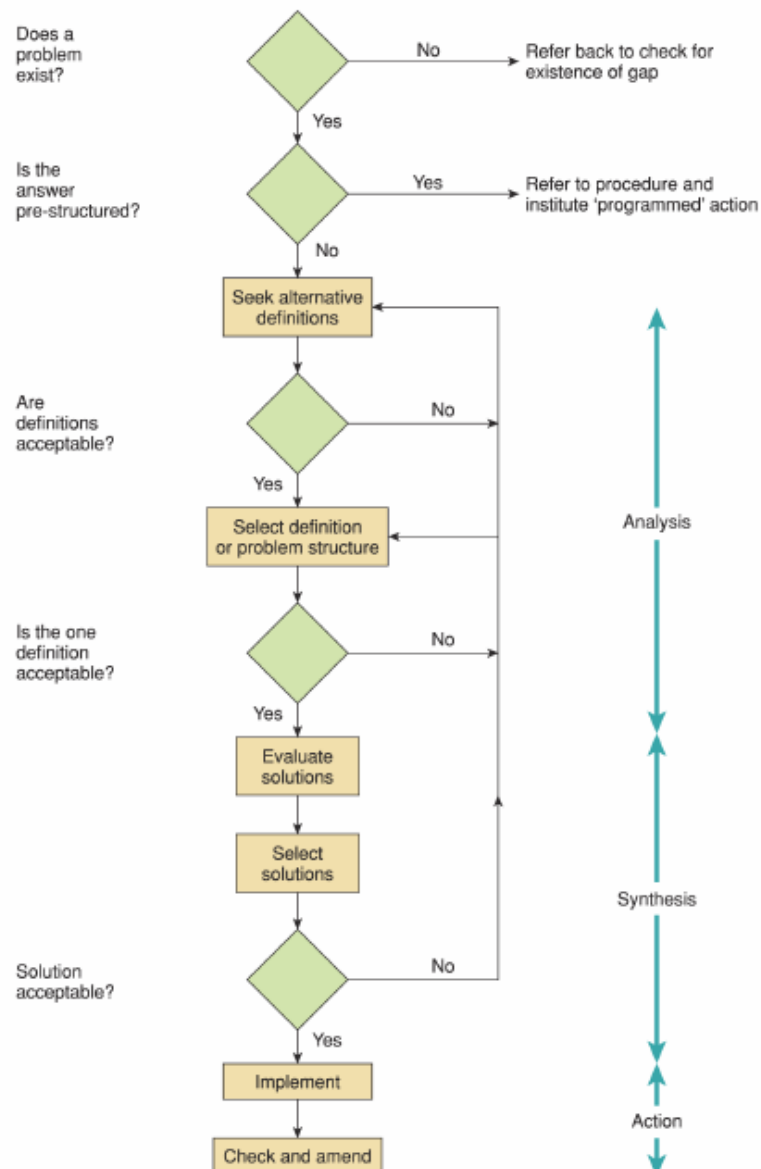
‘The gap between an actual situation or the perception of it and the required or expected situation’

The nature of the problem

The nature of the problem determines the point of departure for the manager.

- Requires an immediate reaction
- Response to a crisis
- Emerging problem
- Response to opportunity
- Strategy formation

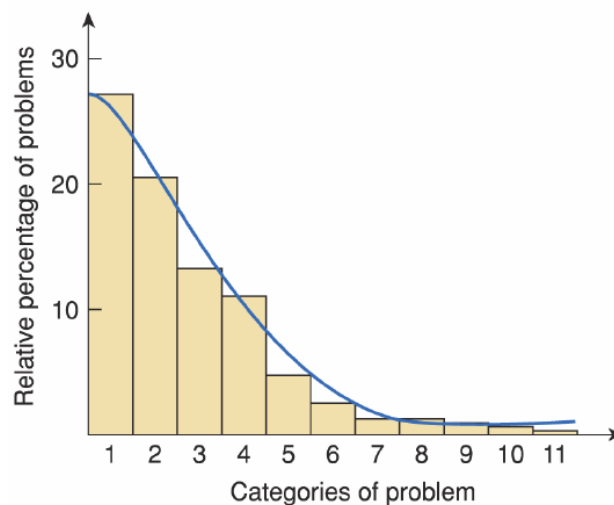
SYSTEMATIC PROBLEM-SOLVING MODELL



Problem-solving tools

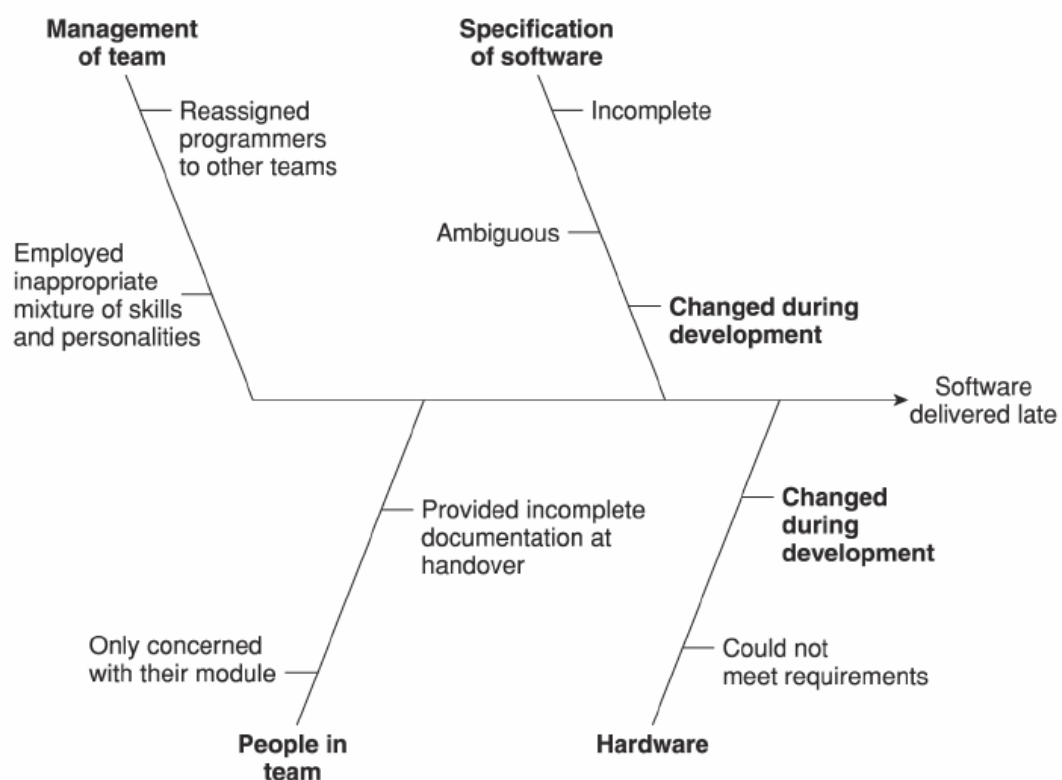
Pareto analysis

- This is **80/20 "rule"**
 - Many companies find out that 80 % of their profits are generated by 20 % of their products or services.
 - The Pareto principle applied to problem-solving means that part of the initial analysis is to discover which **20 % of causes are causing 80 % of the problems.**
 - The effort can be put on finding solutions to the major factors.
 - Over time the 80 % of problems has been removed, but the principle is still valid.

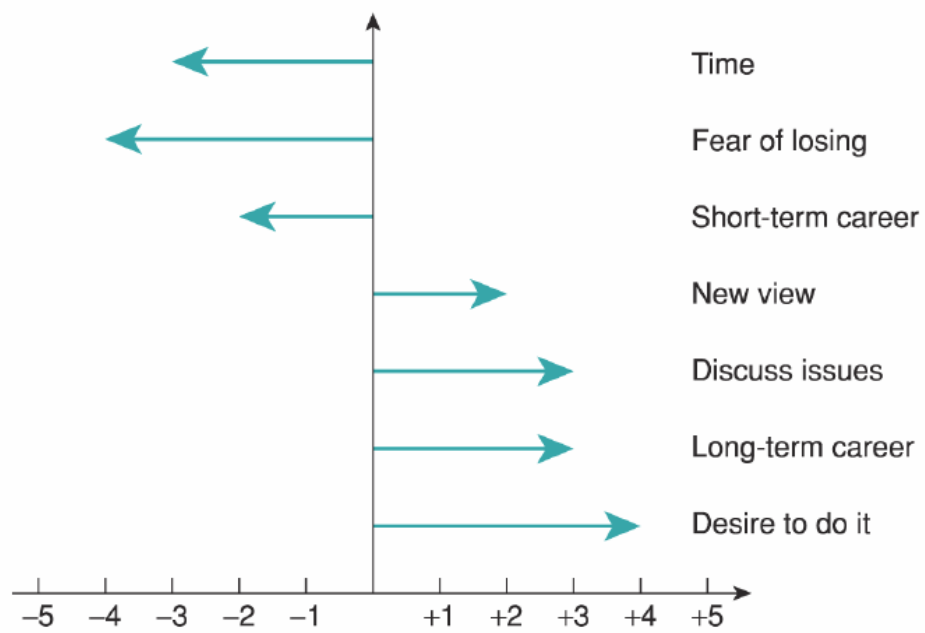


Ishikawa/fishbone diagram

Can help to structure a problem and guide a team into seeking further information about the nature of the system under consideration.



Decision support



Force-field analysis examines the strength of different influences on a decision.

CHAPTER 16 – PROJECT COMPLETION AND REVIEW

“We don’t carry out ‘lessons learned reviews’ at the end of projects now. We carry out ‘lessons identified reviews’. We know we don’t learn”

Documentation

The least exciting part of project.....

Purpose

- **Evidence** that the project has been completed in a proper manner.
- **Guidance** to the customer on the operation and maintenance of the item provided.
- **Future work** on a similar project to have a good starting point – **knowledge** of what is done in this project

And: If documentation is left to the end of the project much may be lost, as staff are already reassigned to other activities.

Project reviews

Immediate post-mortem on activities

- Rapid feedback on individual performance
- Rapid feedback on systems
- Provides a case history
- The reviewer needs to know context and challenges

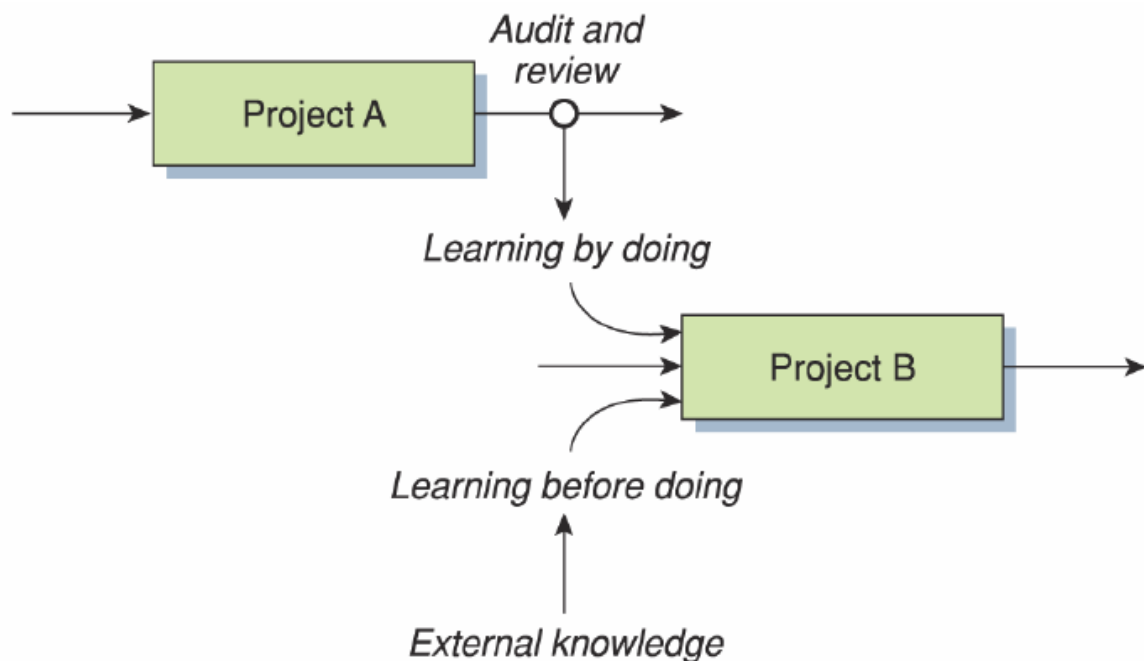
Learning

Learning before doing – the role of external knowledge

- Ensuring that the necessary knowledge and skills are available in advance of their need in a project.
- The main sources of external knowledge are through training and education, and the use of consultants.
- **Training** needs to have a relatively immediate application if it is to be worthwhile.
- The **consultants** within the projects environment can i.e. have following roles:
 - *Integrator* – providing an overall project management service.
 - *Knowledge provider* in one or more specific areas or techniques.
 - *Resource provider* – doing tasks.
 - *Trainer* – Train the members.

Learning by doing – the role of audit and review

- Those elements that can be learned from previous activities.
- Is difficult to manage in practise.
- The process itself requires
 - A reason to exist
 - Time
 - Information
 - Resources
 - Credibility
- The main goal is to ensure continuous improvement



CHAPTER 17 – IMPROVING PROJECT PERFORMANCE

- 92% of CEOs say: *“We are world class at project management”*
- 2% of CEOs are told: *“By our assessment, you are world class at project management”*

Characterising project organisations

- **Group 1 – the flatliners**
 - Despite good intentions to improve no or little progress.
 - Repeat mistakes.
 - Performance stay flat over time.
- **Group 2 – the improvers**
 - Some improvement are put in place.
 - Performance show some increase over time.
- **Group 3 – the wannabes’**
 - Follow the book to attempt to catch up with the best.
- **Group 4 – the world-class performers**
 - Sets a ever-increasing standard for performance.

Agile

“We are uncovering better ways of developing software by doing it and helping others do it.”

Through this work we have come to value:

- **Individuals and interactions** over process and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

The key challenge for software development was the balance of discipline and the need to be able to respond to change – in both the needs of end-users and the emergent capabilities of software products.

I do not know what this is:

