An Introduction

To

Software Project Management

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Outline of talk

In this introduction the main questions to be addressed will be:

- What is software project management? Is it really different from 'ordinary' project management?
- How do you know when a project has been successful? For example, do the expectations of the customer/client match those of the developers?

What is management?

management is *achieving goals in a way that makes the best use of all resources*

This involves the following activities:

- Planning – It is the basic function of management. "Planning is deciding in advance - what to do, when to do & how to do. It bridges the gap from where we are & where we want to be". "deciding what is to be done"
- Organizing – It is the process of bringing together physical, financial and human resources and developing productive relationship amongst them for achievement of organizational goals. "making arrangements"
- Staffing – It is the function of manning the organization structure and keeping it manned. Manpower, training"selecting the right people for the job"
- Directing – Supervision, Motivation, Leadership, Communication. "giving instructions"

What is management?
(continued)

- Controlling –The purpose of controlling is to ensure that everything occurs in conformities with the standards.
- Monitoring – checking on progress
- Innovating – coming up with solutions when problems emerge
- Representing – liaising with clients, users, developers and other stakeholders

What is a project?

A **project** is a temporary effort to create a unique product or service. Projects usually include constraints and risks regarding cost, schedule or performance outcome.

A **project** is Planned set of interrelated tasks to be executed over a fixed period and within certain cost and other limitations.

What is Project Management?

- **Project Management** is the discipline of planning, organizing, motivating, and controlling resources to achieve specific goals

- **Project management** is a methodical approach to planning and guiding **project** processes from start to finish**.**

Why Project Management?

- Better control of financial, physical, and human resources
- Improved customer relations
- Shorter development times
- Lower costs
- Higher quality and increased reliability
- Improved productivity
- Better internal coordination

Characteristics of projects

- Non-routine
- Planned
- Aiming at a specific target
- Work carried out for a customer
- Involving several specialismes
- Made up of several different phases
- Constrained by time and resources
- Large and/or complex

Management approaches

- Traditional culture, managers think and employee do what they are told, the role of the manager in a traditional management model is to solve problems at the top level
- Quality culture, managers are coaches of the team they do:
  - communicate the vision, mission, and goals
  - Provide resources
  - Remove barriers
  - Seek employee input and feedback
  - Build trust
  - Provide training
  - Reward and recognize performance

Software project versus others

Are *software* projects really different from other projects?

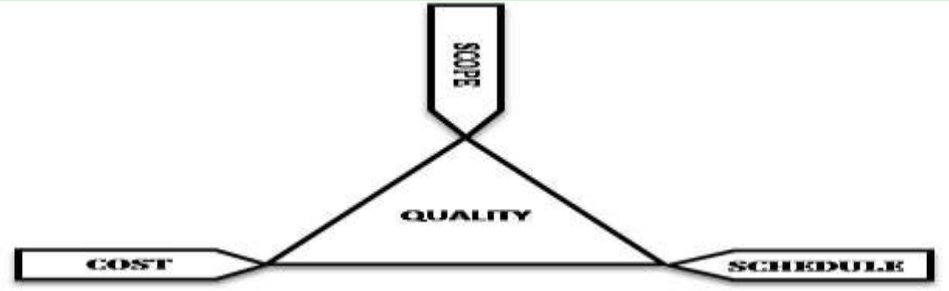
- Invisibility, progress in software project is not immediately visible.
- Complexity.
- Conformity, software system has to conform to the requirement of human clients.
- Flexibility, one strength of software is its flexible and easy to change.

Categories of Software projects

- Information system project, system interface with organization, registration system.
- Embedded system (process control), system interface with a machine, control the air conditioning equipment in a building.

PM at it's Most Basic…

- Key **project management** responsibilities include
  - creating clear and realistic project objectives,
  - building project requirements
  - managing the triple constraint for projects, which is cost, time, and scope
- The Triple Constraint
  - The scope constraint refers to what must be done to produce the project's end result
  - The time constraint refers to the amount of time available to complete a **project**?
  - The cost constraint refers to the budgeted amount available for the **project**
- It is the project manager's duty to balance these three often competing goals



Management Styles

- Situational management, is a method whereby the current state of the organization determines what operational procedures will be implemented to achieve desired outcomes. ***Situational management*** emphasizes a very adaptive management style.

- Change management, is a systematic approach to dealing with **change**, both from the perspective of an organization and on the individual level.

  To define **Change Management**, you could say that it is about managing this transition from the old position to the new one.

  C**hange management** has at least three different aspects, including: adapting to change, controlling change, and implementing change

Suggested Skills for Project Managers

- Project managers need a wide variety of skills.
  - Comfortable with change
  - Understand the organizations they work in
  - Able to lead teams to accomplish project goals
  - Need both "hard" and "soft" skills
    - Hard skills - product knowledge, knowing the various PM tools and techniques
    - Soft skills - being able to work with people

Suggested Skills for Project Managers

- Suggested Skills…
  - Communication skills: Listens, persuades.
  - Organizational skills: Plans, sets goals, analyzes.
  - Team-building skills: Shows empathy, motivates, promotes esprit de corps.
  - Leadership skills: Sets examples, provides vision (big picture), positive, energetic.
  - Coping skills: Flexible, creative, patient, persistent.
  - Technology skills: Experience, project knowledge.

Activities covered by project management

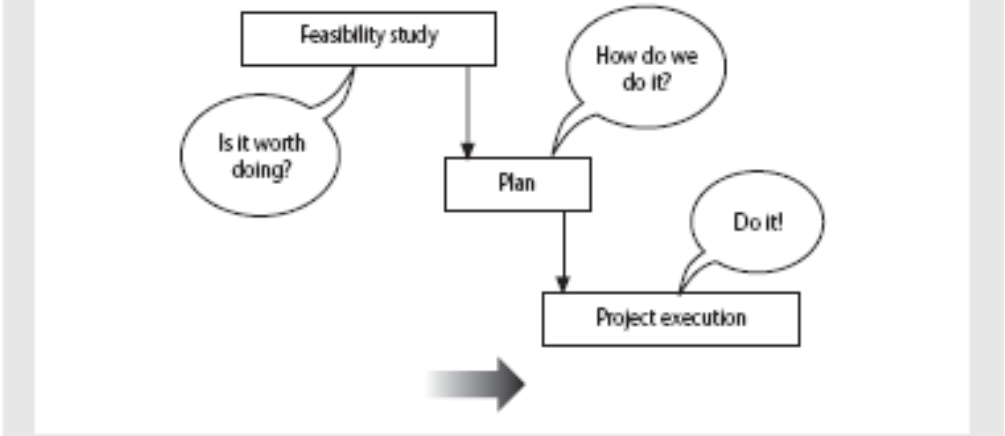


Figure 1.2 The feasibility study/plan/execution cycle

Feasibility study

Is project technically feasible and worthwhile from a business point of view?

Planning

Only done if project is feasible

Execution

Implement plan, but plan may be changed as we go along

The software development life-cycle (ISO 12207)

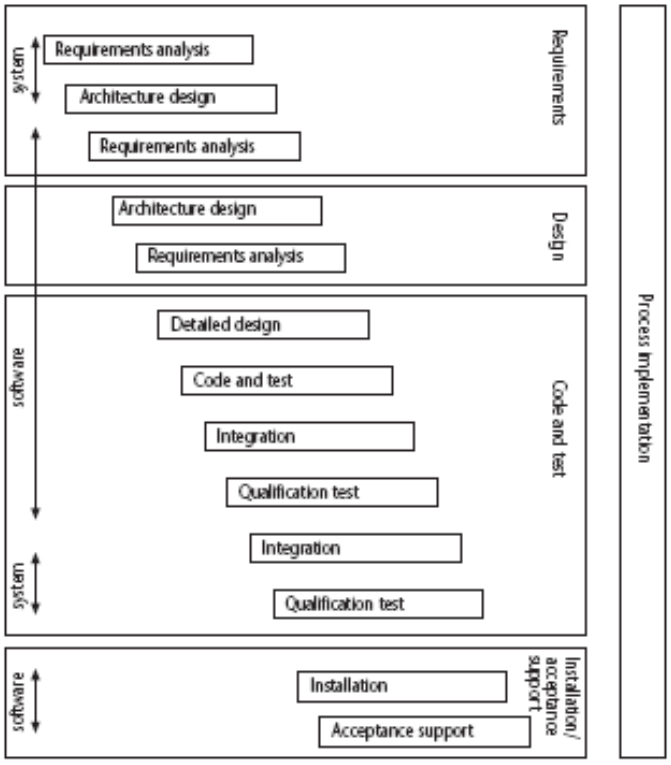


Figure 1.3 The ISO 12207 software development life cycle

ISO 12207 life-cycle

Requirements analysis

- Requirements elicitation: what does the client need?
- Analysis: converting 'customer-facing' requirements into equivalents that developers can understand
- Requirements will cover
  - Functions
  - Quality
  - Resource constraints i.e. costs

ISO 12207 life-cycle

- Architecture design
  - Based on *system requirements*
  - Defines components of system: hardware, software, organizational
  - *Software requirements* will come out of this
- Code and test
  - Of individual components
- Integration
  - Putting the components together

ISO12207 continued

- Qualification testing
  - Testing the *system* (not just the *software*)
- Installation
  - The process of making the system operational
  - Includes setting up standing data, setting system parameters, installing on operational hardware platforms, user training etc
- Acceptance support
  - Including maintenance and enhancement

Problems with software projects

commonly experienced problems (from the manager's point of view)

- poor estimates and plans;
- lack of quality standards and measures;
- lack of guidance about making organizational decisions;
- lack of techniques to make progress visible;
- poor role definition – who does what?
- incorrect success criteria.

Problems with software projects (Another point of view)

- lack of knowledge of application area;
- lack of up-to-date documentation;
- preceding activities not completed on time;
- lack of communication between users and technicians;
- lack of commitment – especially when a project is tied to one person who then moves;
- narrow scope of technical expertise;
- changing statutory requirements;
- changing software environment;
- deadline pressure;
- lack of training

Setting objectives

- Answering the question '*What do we have to do to have a success?'*
- Need for a *project authority*
  - Sets the project scope
  - Allocates/approves costs
- Could be one person - or a group
  - Project Board
  - Project Management Board
  - Steering committee

Objectives

Informally, the objective of a project can be defined by completing the statement:

The project will be regarded as a success if……

Rather like *post-conditions* for the project

Focus on *what* will be put in place, rather than *how* activities will be carried out

Objectives should be SMART

S – specific, that is, concrete and well-defined

M – measurable, that is, satisfaction of the objective can be objectively judged

A – achievable, that is, it is within the power of the individual or group concerned to meet the target

R – relevant, the objective must relevant to the true purpose of the project

T – time constrained: there is defined point in time by which the objective should be achieved

Goals/sub-objectives

These are steps along the way to achieving the objective. Informally, these can be defined by completing the sentence…

Objective X will be achieved

IF the following goals are all achieved

A……

B……

C…… etc

Goals/sub-objectives continued

Often a goal can be allocated to an individual.

Individual may have the capability of achieving goal, but not the objective on their own e.g.

Objective – user satisfaction with software product

Analyst goal – accurate requirements

Developer goal – software that is reliable

Measures of effectiveness

How do we know that the goal or objective has been achieved?

By a practical test, that can be objectively assessed.

e.g. for user satisfaction with software product:

- Repeat business – they buy further products from us
- Number of complaints – if low etc etc

Stakeholders

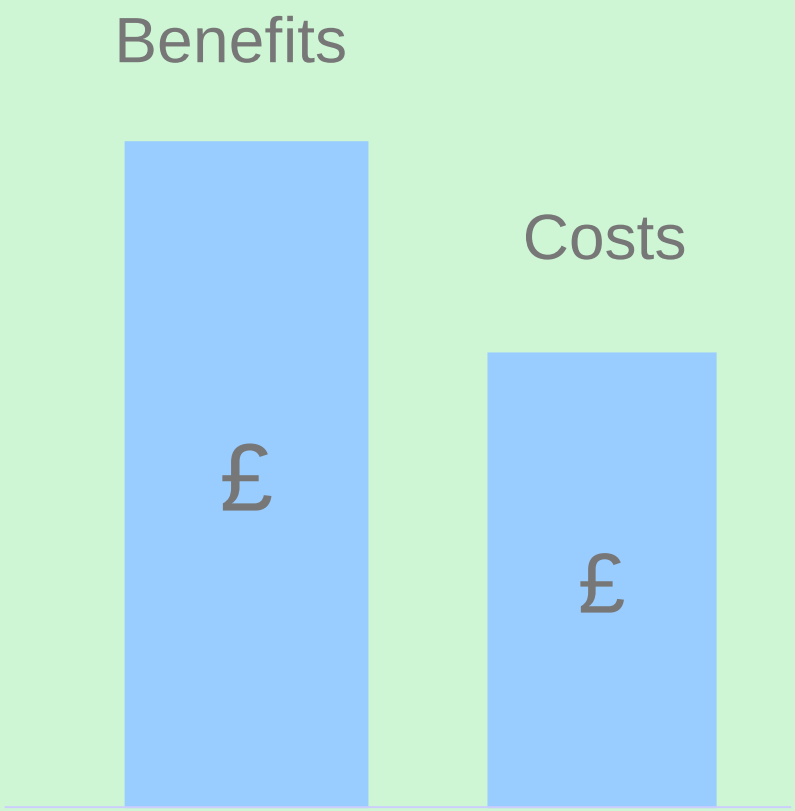
These are people who have a stake or interest in the project

In general, they could be *users/clients* or *developers/implementers*

They could be:

- Within the project team
- Outside the project team, but within the same organization
- Outside both the project team and the organization

The business case



Benefits of delivered project must outweigh costs

Costs include:

- Development
- Operation

Benefits

- Quantifiable
- Non-quantifiable

Management control

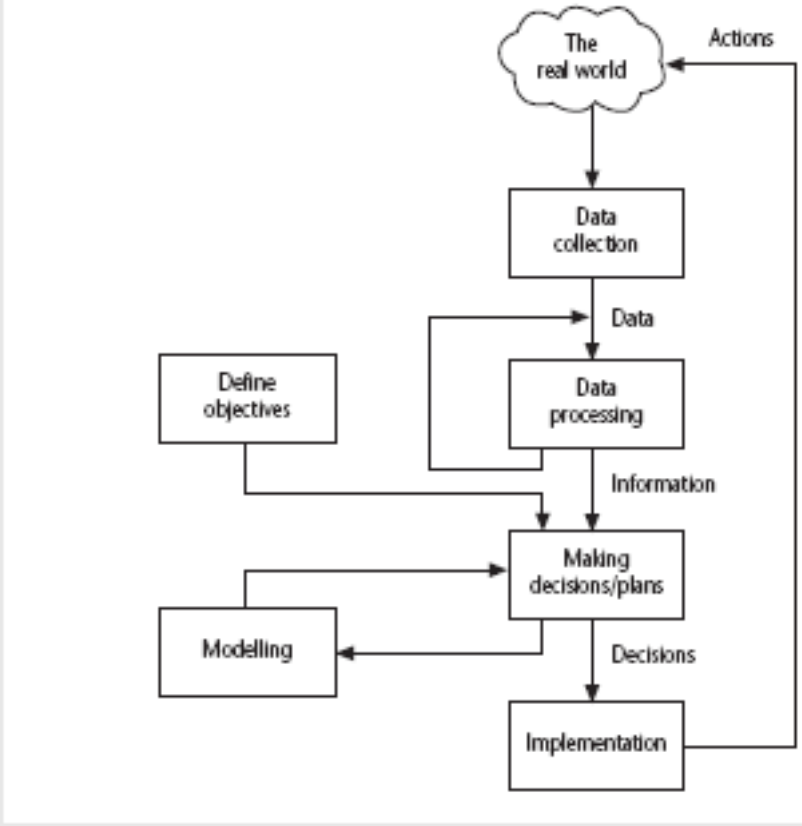


Figure 1.4 The project control cycle.

Management control

Data – the raw details

e.g. *'6,000 documents processed at location X'*

Information – the data is processed to produce something that is meaningful and useful

e.g. 'productivity is 100 documents a day'

Comparison with objectives/goals

e.g. we will not meet target of processing all documents by 31st March

Management control - continued

Modelling – working out the probable outcomes of various decisions

e.g. if we employ two more staff at location X how quickly can we get the documents processed?

Implementation – carrying out the remedial actions that have been decided upon

Effective decision making

- Ability to negotiate and influence the organization and the project management team
- Guidelines:

  - focus on goals to be served
  - follow a decision making process
  - study the environment factors
  - develop personal qualities
  - simulate team creativity
  - anage opportunity

Decision making process

- Define Problem: The problem here is which TV to buy
- Fact Collection: Collect all data related to the different TVs from different showrooms
- Solution Finding: narrow down the TV options. Consider your budget and your needs
- Select Solution: narrow down your choice to select any one.
- Implement Solution: Once you have decided on the TV, go ahead and buy it
- Monitor Solution: See if the TV that you purchased is working for you. Check if all the features that you selected work for you or no

Key points in lecture

- Projects are non-routine - thus uncertain
- The particular problems of projects e.g. lack of visibility
- Clear objectives are essential which can be objectively assessed
- Stuff happens. Not usually possible to keep precisely plan – need for control
- Communicate, communicate, communicate!

Thank You