Software Project Management

Main Scopes of SPM

1. Project Evaluation
2. Project Planning
3. Software effort estimation
4. Activity planning
5. Risk Management
6. Resource allocation
7. Managing contracts
8. Managing people
9. Monitoring and control
10. Software quality

Introduction to SPM

Objectives:

- Define the scopes of SPM
- Understand what project managers worry about
- Define the phases of a software project
- Explain the factors of management
- Be conscious of that a project needs elaborative planning, supervision and control
- Identify stakeholders and their objectives
- Define the criteria of success

Why is SPM important?

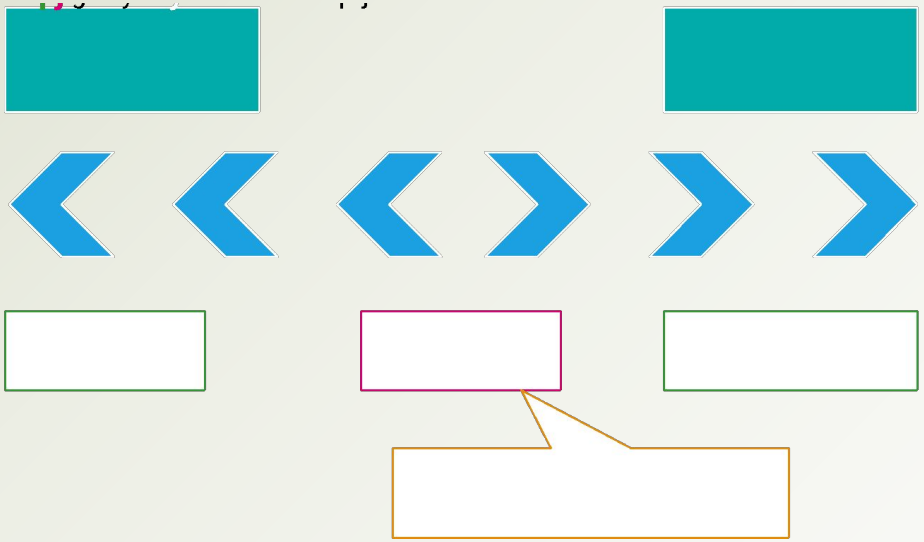
- Without SPM, teams and clients are exposed to chaotic management, unclear objectives, a lack of resources, unrealistic planning, high risk, poor quality project deliverables, projects going over budget and delivered late
- Project management creates and enables happy, motivated teams who know their work matters, so do their best work. And that project management enabled team ensures the right stuff is delivered; stuff that delivers real return on investment, and that makes happy clients.

What is a project?

- In dictionary definition, it emphases on

-----*Being planned activity*

  - Routine: one knows exactly what to do
  - Exploratory: full of uncertainties and risks



What is a project?

- The characteristics distinguish projects:
  - non-routine tasks are involved;
  - planning is required;
  - specific objectives are to be met or a specified product is to be created;
  - the project has a predetermined time span;
  - work is carried out for someone other than yourself;
  - work involves several specialism;
  - people are formed into a temporary work group to carry out the task ;
  - work is carried out in several phases;
  - the resources that are available for use on the project are constrained;
  - the project is large or complex.

The more any of these factors apply to a task, the more difficult that task will be.

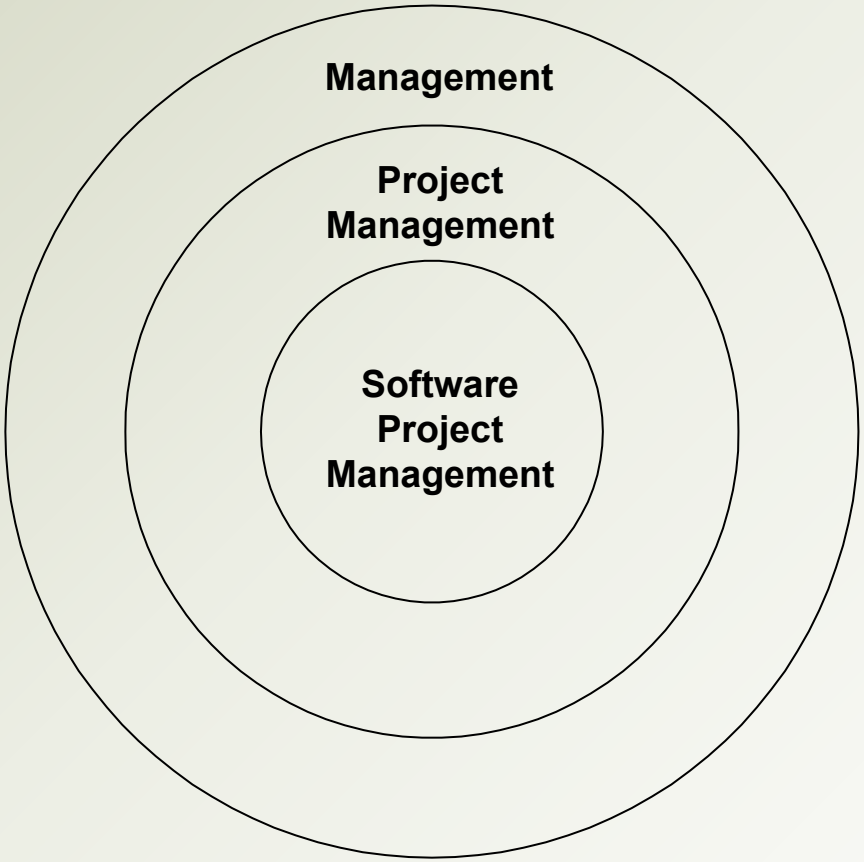
Drill

Consider the following:

- Producing an edition of a newspaper.
- Putting a robot vehicle on Mars to search for life
- getting married
- a research project for HCI
- A SPM assignment given by the teacher
- writing a OS for a mobile
- installing new version of MS Office
- Investigating reasons for problems in a computer system.

Which of these are real Projects?

Software Project Management



SPM

- It is a sub-discipline of project management in which software projects are planned, implemented, monitored and controlled

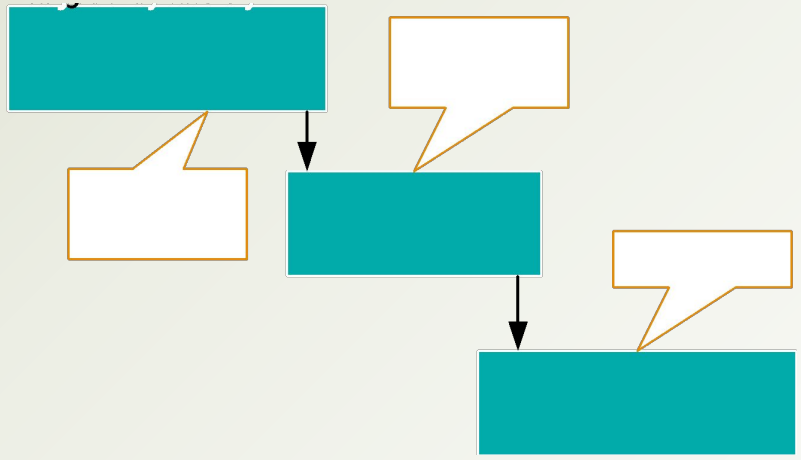
Software prj vs. other types of prj

- Invisibility: With software, progress is not immediately visible
- Complexity: Per dollar, software products contain more complexity than other engineered artefacts
- Conformity: Software developers have to conform to the requirements of human clients
- Flexibility: Software systems are particularly subject to change

ICT Project – Information and Communication Technology Project

Activities covered by SPM

- *A software project is not only concerned with the actual writing of software. In fact, where a software application is bought in "of the shelf", there may be no software writing as such, but this is still fundamentally a software project because so many of the other activities associated with software will still be present.*



Three successive processes

Activities covered by SPM

- 1. The feasibility study: assesses whether a project is worth starting – that it has a valid business case.
- 2. Planning: If the feasibility study indicates that the prospective project appears viable, then project planning can start.
- 3. Project execution: The execution of a project often contains design and implementation sub-phases.
  - *Design is making decisions about the form of the products to be created.*
  - *Planning details the activities to be carried out to create these products.*
    - E.g., Activities recommended in the international standard ISO 12207

Activities Covered by SPM

- The Feasibility Study
  - Assesses whether a project is worth starting
  - Information is gathered about the requirements of the proposed application and this process can be complex and difficult.
  - Developmental and operational costs are estimated
  - Benefits of new systems will be estimated

Activities Covered by SPM

- Planning
  - If feasibility study indicates the project as worthy, planning starts
  - Normally a complete detailed plan is created for smaller projects.
  - For larger projects, an outline plan for whole project and a detailed one for the first stage will be created.

Activities Covered by SPM

- Project Execution
  - Execution often contains design and implementation sub phases.
  - Design is making desicions about the form of the products to be created.
  - External appearance of the software, UI.
  - Plan details the activities to be carried out to create the products.

Plans, methods and methodologies

- Activity: test a component
- Methods:

- ✔ Analyze the requirements
- ✔ Devise and write test cases
- ✔ Create test scripts and expected results
- ✔ Compare the actual results and the expected ones

Real activates:

- ✔ Its start and end dates
- ✔ Who will carry it out
- ✔ What tools and materials

- A plan takes the method and convert it to real activities, identifying for each activity
- Groups of methods or techniques are often grouped into methodologies such as object-oriented design

Categorizing software projects

- Information systems vs. embedded systems
  - Office system vs. machine control system
- Compulsory vs voluntary users

  Systems in workplaces for staff vs voluntary users of the Apps or games
- New product from scratch vs Off-the-shelf
- Software Product vs Services
- Outsourced Project
- Object-driven development

Stakeholders

The people who have a stake or interest in the project

- Internal to the project team
- External to the project team but within the same organization
- External to both the project team and the organization

Identify them early for setting up better communication channels

Setting Objectives

- Well defined objectives required.
- Project Authority needs to be identified.
- Project authority is held by steering committee

Sub-objectives and goals

SMART

S: Specific

M:Measurable

A:Achievable

R:Relevant

T:Time constrained

Setting objectives

- Objectives focus on the desired outcomes of the project rather than the task within it.
- SMART principles
  - Specific: Effective objectives are concrete and well defined
  - Measurable: measures of effectiveness which tell us how successful the project has been
  - Achievable: within the power of the individual or group
  - Relevant: must be relevant to the true purpose of the project
  - Time constrained: should be a defined point in time by which the objective should have been achieved

Business Case

- Feasibility Study – Cost-Benefit Analysis
- Ensure Intactness of Business Case, For Example
  - Development costs are not allowed to rise to a level which threatens to exceed the value of benefits
  - Features of the system are not reduced to a level that the expected benefits cannot be realized
  - Delivery date is not delayed so that there is an unacceptable loss of benefits

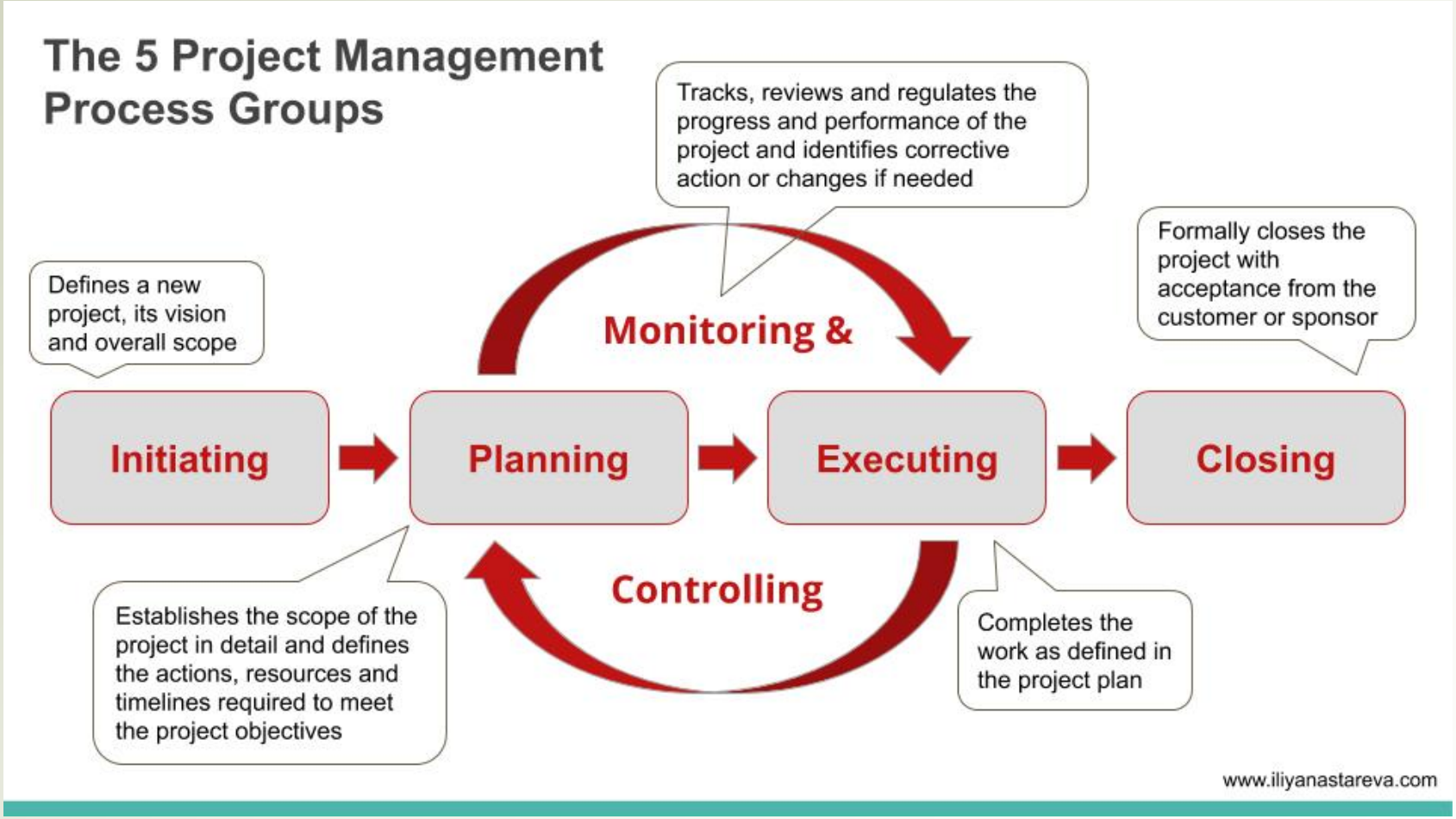
Project success and failure

- The project plan should be designed to ensure project success
- Project success can usually be summarized and delivering:
  - the agreed functionality
  - To the required level of quality
  - on time
  - within budget
- Project success vs. business success

What is management

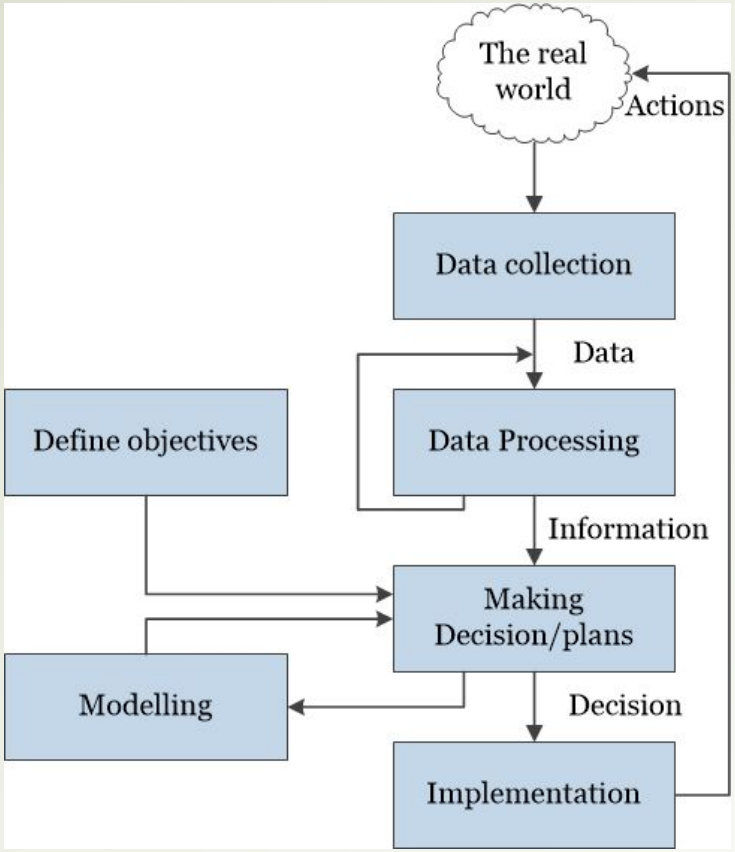
- Management involves the following activities:
  - planning – deciding what is to be done;
  - organizing – making arrangement;
  - staffing – selecting the right people for the job;
  - directing – giving instructions;
  - monitoring – checking on progress;
  - controlling – taking action to remedy hold-ups;
  - innovating – coming up with new solutions;
  - representing- liaising with clients, users, developer, suppliers and other stakeholders.

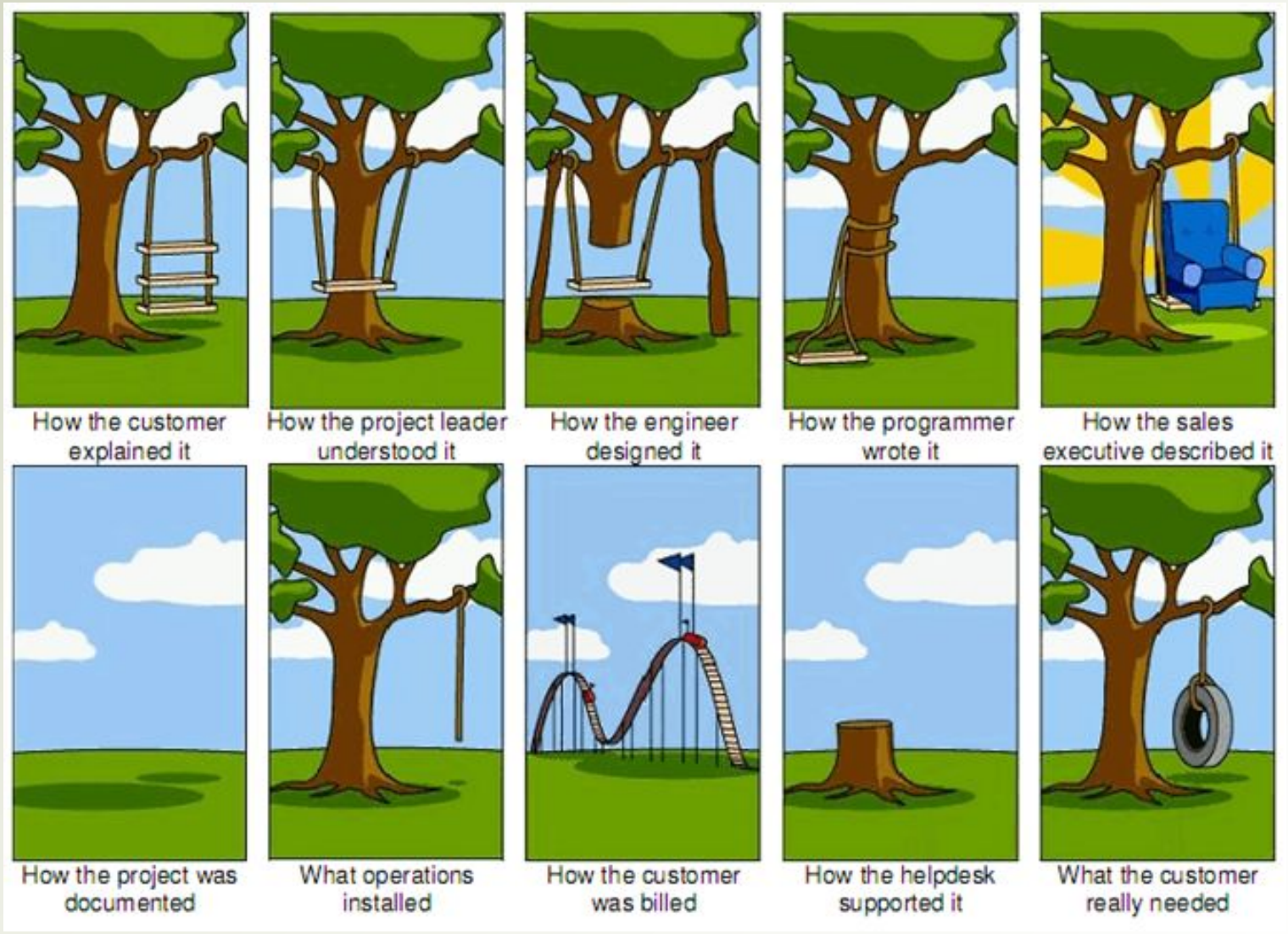
Principal Project Management Processes



Management control

- Management, in general, involves setting objectives for a system and then monitoring the performance of the system.




How the customer explained it
How the project leader understood it
How the engineer designed it
How the programmer wrote it
How the sales executive described it
How the project was documented
What operations installed
How the customer was billed
How the helpdesk supported it
What the customer really needed

Problems with Software Projects

- 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 (Continued)

- Inadequate specification of work
- Management ignorance of IT
- Lack of knowledge of application area
- Lack of standards
- Lack of up-to-date documentation
- Preceding activities not completed on time – including late delivery of equipment
- Lack of communication between users and technicians
- Lack of communication leading to duplication of work

Problems with Software Projects (Continued)

- 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 quality control
- Remote management
- Lack of training

Advantages

- Using project management techniques provides advantages, such as
  - Better control of financial, physical, and human resources
  - Improved customer relations
  - Shorter development times
  - Lower costs and improved productivity
  - Higher quality and increased reliability
  - Higher profit margins
  - Better internal coordination
  - Positive impact on meeting strategic goal
  - Higher worker morale

Conclusion

- Projects are by definition non-routine and therefore more uncertain than normal undertakings
- Software projects are similar to other projects but have some attributes that present particular difficulties, e.g. the relative invisibility of many of their products.
- A key factor in project success is having clear objectives. Different stakeholders in a project, however, are likely to have different objectives. This points to the need for a recognized overall project authority.
- For objectives to the effective there must be practical ways of testing that the objectives have been met.
- Where projects involve many different people, effective channels of information have to be established. Having objective measures of success helps unambiguous communication between the various parties to a project.

Drill :Case Study(Q1)

- Brightmouth college is a higher education institution which is used to be managed by a local government authority but has now become autonomous. Its payroll is still administered by the local authority. The authority now charges the college for this service. The college management are of the opinion that it would be cheaper to buy an “off-the-shelf” payroll package and do the payroll processing themselves. What would be the main stages of the project to convert to independent payroll processing by the college? Bearing in mind that an off-the-shelf package is to be used, how would this project differ from one where the software was to be written from scratch?

Drill (Q2)

- Assume that a software house has been asked to carry out a feasibility study to develop the payroll package for brightmouth college. The software house plans to develop the software by customizing one of its existing products. What are the main steps through which the project manager of the organization would carry out the feasibility study?

Drill (Q3)

- Would an operating system on a computer be an informative system or an embedded system?
- Would the project, to implement an independent payroll system at the brightmouth college, be an objective-driven project or a product driven project?

- Exercise: Paul Duggan is the manager of a software development section. On Tuesday at 10.00a.m. he and his fellow section heads have a meeting with their group manager about the staffing requirements for the coming year. Paul has already drafted a document 'bidding' for staff. This is based on the work planned for his section for the next year. The document is discussed at the meeting. At 2.00 p.m. Paul has a meeting with his senior staff about an important project his section is undertaking. One of the programming staff has just had a road accident and will be in hospital for some time. It is decided that the project can be kept on schedule by transferring another team member from less urgent work to this project. A temporary replacement is to be brought in to do the less urgent work but this may take a week or so to arrange. Paul has to phone both the human resources manager about getting a replacement and the user for whom the less urgent work is being done, explaining why it is likely to be delayed. Identify which of the eight management responsibilities listed above Paul was responding to at different points during his day.

- https://www.youtube.com/watch?v=x1POqDjbqmU