

# Module 2

## Managing Software Project

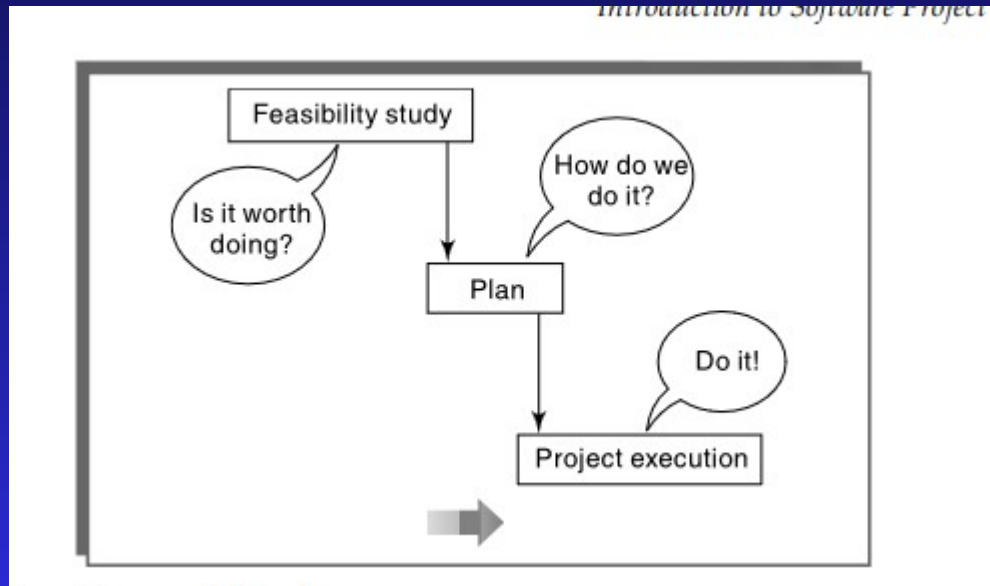
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# Project Management

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- *Software project management* is aimed to ensure that the software is delivered on time, within budget and schedule constraints, and satisfies the requirements of the client.

# Project Management Activities



# Project Management Activities

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**The feasibility study** assesses whether a project is worth starting – that it has a valid business case

**Planning** If the feasibility study indicates that the proposed project appears viable, then project planning can start.

For larger projects, we would not do all our detailed planning at the beginning. We create an outline plan for the whole project and a detailed one for the first stage

# Project Management Activities

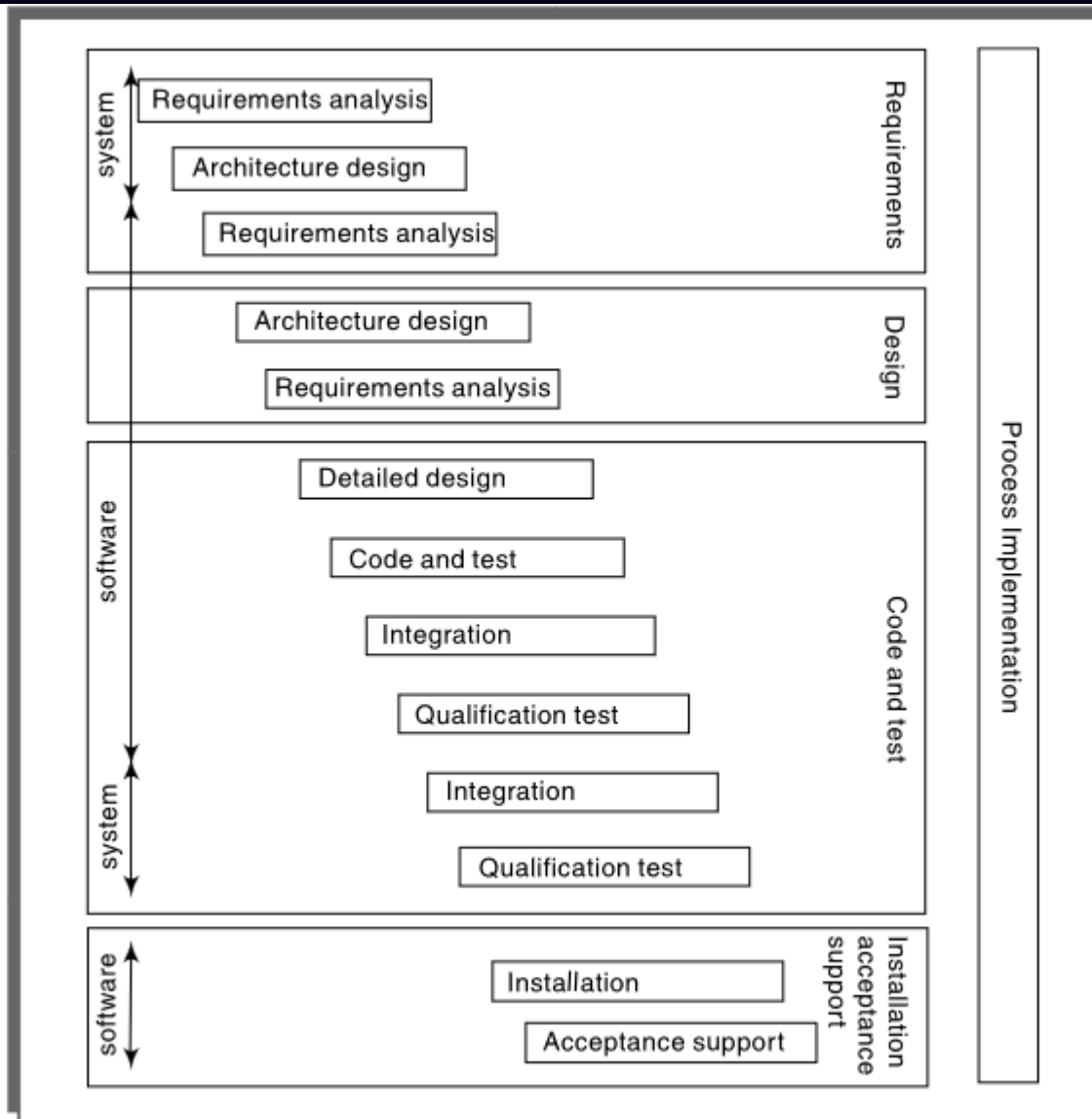
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**Project execution** The project can now be executed. The execution of a project often contains design and implementation sub-phases

# Project Management Activities

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Figure shows the typical sequence of software development activities recommended in the international standard ISO 12207.



**FIGURE 1.3** The ISO 12207 software development life cycle

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**Requirements analysis** starts with requirements gathering which establishes what the potential users and their managers require of the new system.

**Architecture design** The components of the new system that fulfil each requirement have to be identified

**Detailed design** Each software component is made up of a number of software units that can be separately coded and tested. The detailed design of these units is carried out separately



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**Code and test** refers to writing code for each software unit. Initial testing to debug individual software units would be carried out at this stage.

**Integration:** The components are tested together to see if they meet the overall requirements.

**Qualification testing** The system, including the software components, has to be tested carefully to ensure that all the requirements have been fulfilled.

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**Installation** This is the process of making the new system operational. It would include activities such as setting up standing data (for example, the details for employees in a payroll system),

**Acceptance support** This is the resolving of problems with the newly installed system, including the correction of any errors, and implementing agreed extensions and improvements.

# Role of a Project Manager

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The task of the project manager is to guide, monitor and regulate the project from start to finish. Here are some of the operations undertaken by a project manager:

The project manager has to identify the project, decrease it to a collection of manageable activities, get adequate funds and create a squad to do the job.

The project manager has to set the project's ultimate objective and motivate the project squad to finish the project on time.

The project manager must regularly report advancement to all stakeholders.

The project manager must evaluate and monitor and mitigate the hazards to the project.

No project will ever go as scheduled. Project managers need to know how to adapt and handle the transition.

# The Management Spectrum

The management spectrum describes the management of a software project.

The management spectrum focuses on the four P's; people, product, process and project. Here, the manager of the project has to control all these P's to have a smooth flow in the progress of the project and to reach the goal.

The four P's of management spectrum are

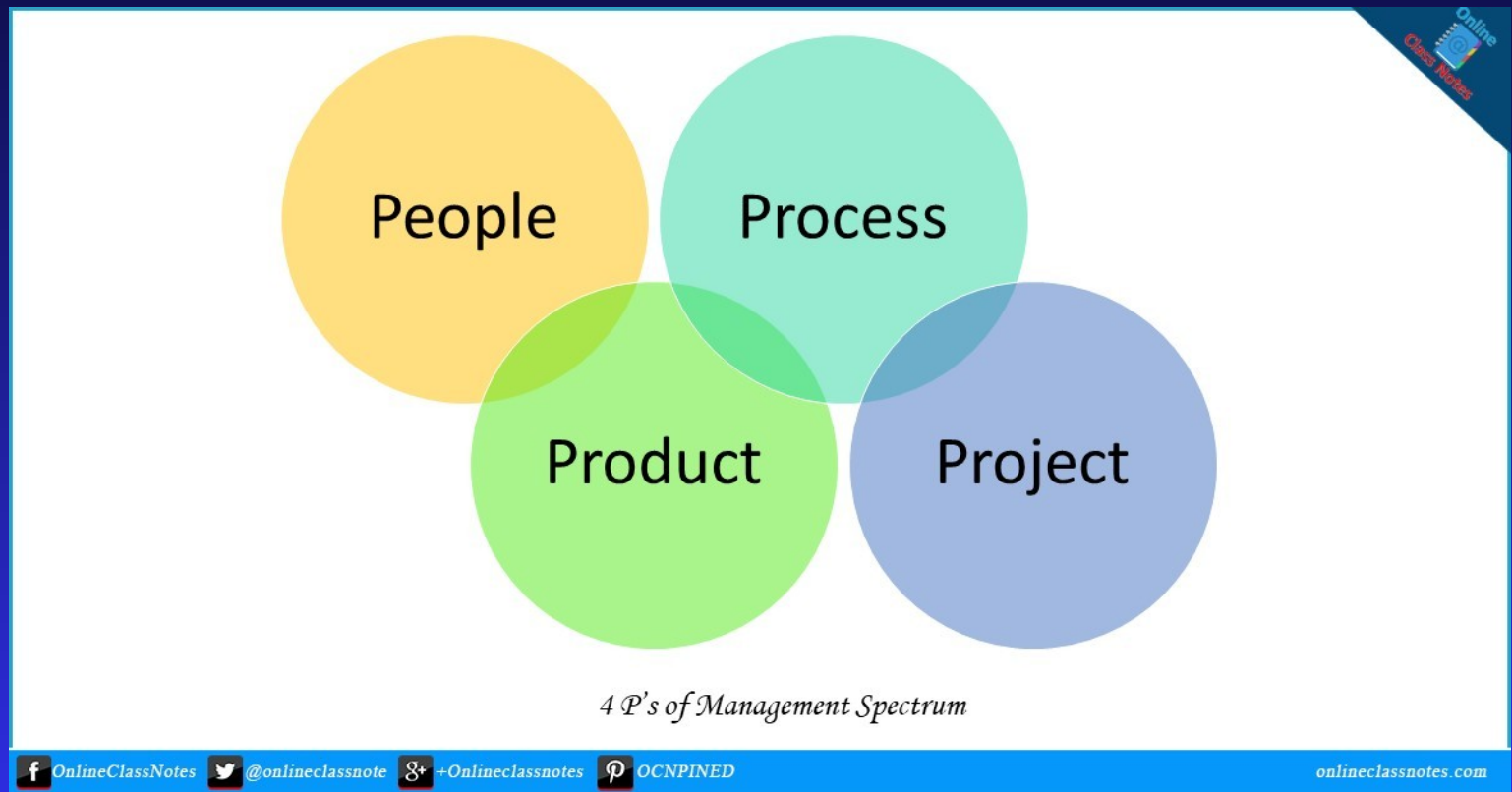
People

Product

Process

Project

# The Project Management Spectrum



# The Management Spectrum

## People

The most important component of a product and its successful implementation is human resources.

In building a proper product, a well-managed team with clear-cut roles defined for each person/team will lead to the success of the product.

We need to have a good team in order to save our time, cost, and effort.

## The Stakeholders

The software process (and every software project) is populated by stakeholders who can be categorized into one of five categories:

1. Senior managers who define the business issues that often have a significant influence on the project.

2. **Project (technical) managers** who must plan, motivate, organize, and control the practitioners who do software work.
3. **Practitioners** who deliver the technical skills that are necessary to engineer a product or application.
4. **Customers** who specify the requirements for the software to be engineered and other stakeholders who have a peripheral interest in the outcome.
5. **End users** who interact with the software once it is released for production use

# The Management Spectrum

## Team Leader

An excellent book of technical leadership, Jerry Weinberg [Wei86] suggests an **MOI** model of leadership:

Motivation. The ability to encourage (by “push or pull”) technical people to produce to their best ability.

Organization. The ability to mold existing processes (or invent new ones) that will enable the initial concept to be translated into a final product.

Ideas or innovation. The ability to encourage people to create and feel creative even when they must work within bounds established for a particular software product or application.



# The Management Spectrum

## **The Product:**

The product is the ultimate goal of the project.

This is any type of software product that has to be developed.

To develop a software product successfully, all the product objectives and scopes should be established, alternative solutions should be considered, and technical and management constraints should be identified beforehand.

Lack of these information it is impossible to define reasonable and accurate estimation of the cost, identify possible risk and define manageable project schedule.

## Software Scope

The first software project management activity is the determination of software scope.

The scope identifies what the product will do and what it will not do, what the end product will contain and what it will not contain.

# The Management Spectrum

## The Process:

- >Project manager and Team members should have a methodology and plan that complete project as per customer requirements
- >Without a clearly defined process, team members will not know what to do and when to carry out project activities.
- >Using the right process will increase the project execution success rate that meets its original goals and objectives.

# The Management Spectrum

>The processes have several steps:

## 6 Phases of the Software Development Life Cycle



# The Management Spectrum

## The Project:

The project is the complete software project that includes requirement analysis, development, delivery, maintenance and updates. The project manager of a project or sub-project is responsible for managing the people, product and process.

In an excellent paper on software projects, John Reel [Ree99] defines 10 signs that indicate that the project is in failure:

1. Software people don't understand their customer's needs.
2. The product scope is poorly defined.
3. Changes are managed poorly.
4. The chosen technology changes.

# The Management Spectrum

5. Business needs change .

6 .Deadlines are unrealistic.

7. Users are resistant.

8. Sponsorship is lost .

9. The project team lacks people with appropriate skills.

10. Managers [and practitioners] avoid best practices and lessons learned.

# The Management Spectrum

How does a manager act to avoid the problems just noted:

**Start on the right foot.** This is accomplished by working hard (very hard) to understand the problem that is to be solved and then setting realistic objectives and expectations for everyone who will be involved in the project.

**Maintain momentum:** Many projects get off to a good start and then slowly disintegrate. The team should emphasize quality in every task it performs, and senior management should do everything possible to stay out of the team's way.

# The Management Spectrum

**Track progress.** For a software project, progress is tracked as work products (e.g., models, source code, sets of test cases) are produced and approved (using technical reviews) as part of a quality assurance activity.

**Make smart decisions.** In essence, the decisions of the project manager and the software team should be to “keep it simple

**Conduct a postmortem analysis.** Establish a consistent mechanism for extracting lessons learned for each project. Evaluate the planned and actual schedules, collect and analyze software project metrics, get feedback from team members and customers, and record findings in written form



# Why Is Project Management Important?

## 1. Strategic Alignment

Project management is important because it ensures what is being delivered, is right, and will deliver real value against the business opportunity.

## 2 Leadership

Project management is important because it brings leadership and direction to projects.

## 3. Clear Focus & Objectives

Project management is important because it ensures there's a proper plan for executing on strategic goals

# Why Is Project Management Important?

## **3. Clear Focus & Objectives**

Project management is important because it ensures there's a proper plan for executing on strategic goals

## **4. Realistic Project Planning**

Project management is important because it ensures proper expectations are set around what can be delivered, by when, and for how much.

## **5. Risk Management**

Project management is important because it ensures risks are properly managed and mitigated against to avoid becoming issues.

## **6. Orderly Process**

Project management is important because it ensure the right people do the right things,at the right time – it ensures proper project management process is followed throughout the project life cycle.

## **7. Continuous Oversight**

Project management is important because it ensures a project's progress is tracked and reported properly.

## **8. Subject Matter Expertise**

Project management is important because someone needs to be able to understand if everyone's doing what they should.

## **9. Managing and Learning from Success and Failure**

Project management is important because it learns from the successes and failures of the past.

# Software projects versus other types of project

Invisibility -When a physical artifact such as a bridge or road is being constructed the progress being made can actually be seen. With software, progress is not immediately visible.

Complexity -software products contain more complexity than other engineered artefacts.

# Software projects versus other types of project

**Flexibility-** The ease with which software can be changed is usually seen as one of its strengths. The software systems are likely to be subject to a high degree of change.

**Conformity–**

Software developers have to conform to the requirement of human clients. It is not just that individuals can be inconsistent.

# Some ways of categorizing projects

- Compulsory versus voluntary users
- Information systems versus embedded systems
  - objective-based versus product-base
- Outsourced projects

- Voluntary systems :Here it is difficult to get precise requirements from potential users as we could with a business system such as computer games .

- Compulsory systems: In workplaces there are systems that staff have to use if they want to do something, such as recording a sale.

- Information systems(Enable staff to carry out office processes) :. A stock control system would be an information system

Embedded systems(-which controls machine) An embedded, or process control, system might control the air conditioning equipment in a building.



- Objective-based versus product-based-Project may be distinguished by whether their aim is to produce a product or meet certain objectives.

With objective-based projects, a general objective or problem is defined, and there are several different ways in which that objective could be reached. The project team have freedom to select what appears to be the most appropriate approach.

With product-based projects, the product is already very strictly defined and the development team's job is to implement the specification with which they have been presented.

Out-sourced: while developing a large project sometimes it makes good commercial sense for a company to outsource some parts of its work to another companies

# Stakeholders

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

- Internal to the project team This means that they will be under the direct managerial control of the project leader.
- External to the project team but within the same organization: For example, the project leader might need the assistance of the users to carry out systems testing. Here the commitment of the people involved has to be negotiated.
- External to both the project team and the organization External stakeholders may be customers (or users) who will benefit from the system that the project implements.

# Setting objectives

Among all these stakeholders are those who actually own the project. They control the financing of the project.

They also set the objectives of the project. The objectives should define what the project team must achieve for project success.

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

# Setting objectives

R—relevant, the objective must be relevant to the true purpose of the project

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

# The Business Case

A business case is developed during the early stages of a project and outlines the why, what, how, and who necessary to decide if it is worthwhile continuing a project.

One of the first things you need to know when starting a new project are the benefits of the proposed business change and how to communicate those benefits to the business.

The business case, which is first developed during the project initiation phase, has much more detail and should be reviewed by the project sponsor and key stakeholders before being accepted, rejected,, deferred, or revised.

## **Why you need a business case**

Preparing the business case involves an assessment of:

Business problem or opportunity

Benefits

Risk

Costs including investment appraisal

Technical solutions

Timescale

Impact on operations

Organizational capability to deliver the project outcomes

# The Business Case

Project Business Case Example			
Project Name	Sales Team IVR Telephone System		
Project Sponsor	Head of Sales	Project Manager	Name of project manager
Date of Project Approval	3rd March	Last Revision Date	3rd March
Contribution to Business Strategy	Our strategy is to project best in industry customer service, and the current situation does not reflect this. The new IVR system will ensure all calls are answered in a timely manner. It will also ensure that calls are delt with efficiently. These two facts align this project to the company strategy.		
Options Considered	Options considered included: 1. Adding additional staff to sales team 2. Having a dedicated team for our best customers 3. An IVR system (selected)		
Benefits	1. Increased sales - currently estimated we lose 4% of all sales calls due to current issues. 2. Happier customers - we estimate new customer satisfaction will increase by 10%. 3. Improved LTV - lifetime value of customers will increase by 5% due to the two points above		
Timescales	Initial analysis shows that the system will take approximately 3-4 months to implement.		
Costs	IVR software = \$35,000 Project Management = \$30,000 Software team of 3 for 3 months = \$90,000  Total estimated cost = \$155,000		
Expected Return on Investment	Year 1 = \$0 Year 2 = \$120,000 Year 3 = \$180,000 as LTV begins to be felt.		
Risks	Right now the project looks pretty straightforward but there are still some unknowns surrounding implementation. There is also the risk that the project doesn't meet the sales team or customers needs. For this reason it is recommended to involve the sales team closely.		

# Project Success and Failure

- The project plan should be designed to ensure project success by preserving business case for the project.
- We can distinguish between project objectives and business objectives.  
The project objectives are the targets that the team is expected to achieve
- In case of software project, they can usually be summarized as delivering



- **1 The agreed functionality**
- **2 to the required level of quality**
- **3 on time**
- **4 within budget**

**the project could meet these targets but the application once delivered could fail to meet the business case. A computer game could be delivered on time and within budget, but might then not sell**

- **A commercial website used for online sale could be created successfully, but customers might not use it to buy product, because they could buy the goods more cheaply elsewhere**
- **We have seen that in business terms it can generally be said that a project is a success if the value of benefits exceed the cost.**

# MANAGENT ACTIVITIES

- Planning-Deciding what is to be done
- Organizing-making arrangements
- Staffing-selecting the right people for the job
- Directing-giving instructions
- Monitoring-checking on progress
- Controlling-taking action to remedy holds up
- Innovating-comming up with new solutions
- Representing-cooprrate with clients,users,developers,suppliers and other stakeholders

# MANAGEMENT CONTROL

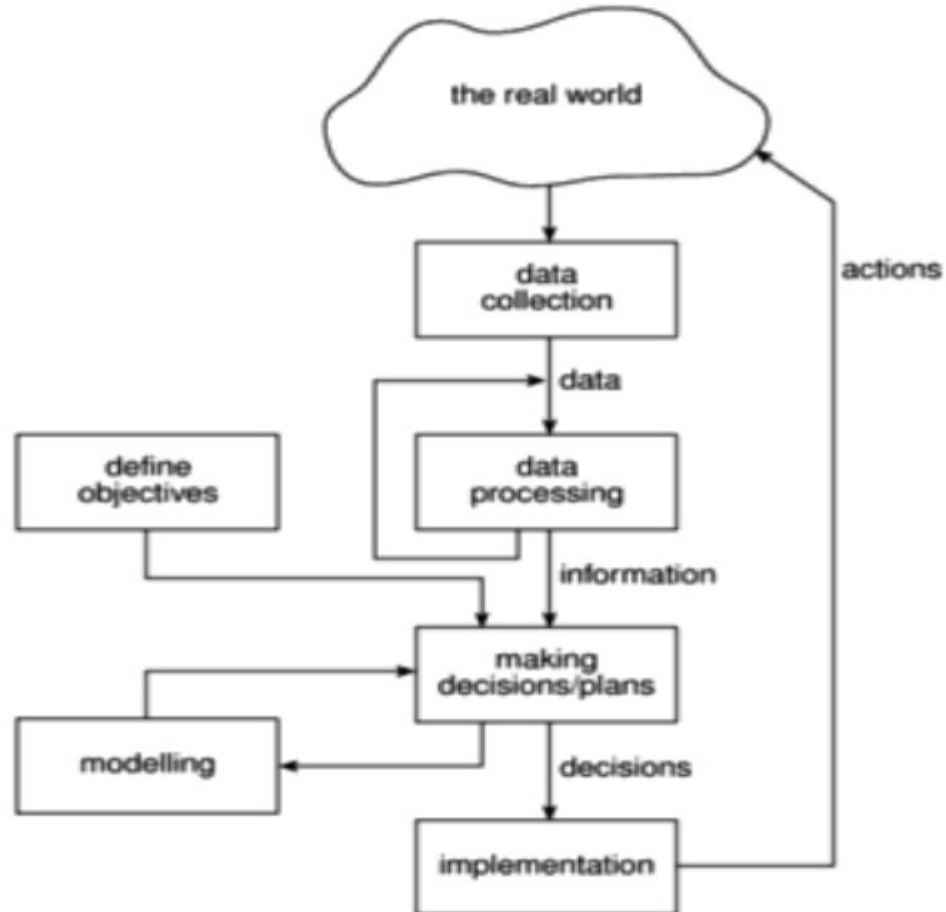


Figure 1.2 The project control cycle.

# Traditional vs Modern Project Management

Planning Incremental Delivery:

The traditional long-term planning has given way to adaptive short-term planning.

Instead of making a long-term project completion plan, the project manager now plans all incremental deliveries with evolving functionalities.

# Traditional vs Modern Project Management

Quality Management :Of late, customer awareness about product quality has increased significantly.

Tasks associated with quality management have become an important responsibility of the project manager.

The key responsibilities of a project manager now include assessment of project progress and tracking the quality of all intermediate artifacts.

# Traditional vs Modern Project Management

Change Management : Earlier, when the requirements were signed off by the customer, any changes to the requirements were rarely entertained.

Now , the project manager plays a key role in product base lining and version control. This has made change management a crucial responsibility of the project manager