

# TABLE OF CONTENTS

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## Chapter - 1 : Introduction to Software Project Management (SPM)

(1 - 1) to (1 - 26)

1.1 Project.....	1 - 2
1.2 Software Project Management.....	1 - 2
1.3 Need of Software Project Management.....	1 - 2
1.4 Advantages of Software Project Management.....	1 - 3
1.5 Project Manager .....	1 - 3
1.6 Role of a Project Manager .....	1 - 3
1.7 Responsibilities of a Project Manager .....	1 - 4
1.8 Software Project Vs Other Types of Projects.....	1 - 4
1.9 Contract Management and Technical Project Management .....	1 - 5
1.10 Activities Covered by SPM .....	1 - 6
1.11 Software Project Plans.....	1 - 9
1.12 Types of Project Plans.....	1 - 11
1.13 Methods and Methodologies .....	1 - 11
1.14 Categorizing Software Projects.....	1 - 14
1.15 Project Charter.....	1 - 14
1.16 Stake Holders .....	1 - 16
1.17 Setting Objectives .....	1 - 18
1.18 Project Success and Failure.....	1 - 19
1.19 Management Control.....	1 - 21
1.20 Project Management Life Cycle .....	1 - 22
1.21 Traditional Vs Modern Project Management Practices.....	1 - 24

---

**Chapter - 2 : Project Planning****(2 - 1) to (2 - 36)**

2.1	Project Planning : Meaning .....	2 - 2
2.2	Tasks in Project Planning .....	2 - 2
2.3	Processes of Project Planning .....	2 - 3
2.4	Work Breakdown Structure(WBS) .....	2 - 4
2.4.1	Meaning.....	2 - 4
2.4.2	Levels of a WBS.....	2 - 4
2.4.3	What is Included in a Work Breakdown Structure ?.....	2 - 4
2.4.4	How to Create a Work Breakdown Structure.....	2 - 5
2.4.5	Types of WBS .....	2 - 5
2.4.6	Benefits of WBS Software.....	2 - 7
2.5	Planning Methods .....	2 - 7
2.6	Selecting Project Approach.....	2 - 10
2.7	Software Development Life Cycle, Software Process and Process Models .....	2 - 13
2.7.1	Software Development Life Cycle Process .....	2 - 13
2.7.2	SDLC Cycle.....	2 - 14
2.7.3	Software Development Life Cycle Models.....	2 - 16
2.8	Choice of Process Models .....	2 - 24
2.9	A Generic Project Model.....	2 - 26
2.10	Software Cost Estimation.....	2 - 26
2.11	COCOMO Model .....	2 - 31
2.11.1	Definition and Meaning .....	2 - 31
2.11.2	Types of COCOMO Model.....	2 - 32
2.11.3	Advantages and Disadvantages of COCOMO Model .....	2 - 34
2.12	Budgeting .....	2 - 35

---

**Chapter - 3 : Project Scheduling, Monitoring and Control(3 - 1) to (3 - 40)**

3.1	Project Scheduling .....	3 - 2
-----	--------------------------	-------

---

3.2	Need of Project Scheduling.....	3 - 2
3.3	Benefits of Project Scheduling in Project Management.....	3 - 2
3.4	Scheduling Techniques .....	3 - 3
3.5	CPM, PERT and Gantt Chart .....	3 - 3
3.6	Advantage, Limitation and Differences between PERT and CPM.....	3 - 18
3.7	Automated Tools.....	3 - 20
3.8	Project Status Reporting .....	3 - 22
3.8.1	The Purposes of Project Status Reports .....	3 - 23
3.8.2	Types of Project Status Reports.....	3 - 23
3.8.3	How to Track Project Status .....	3 - 24
3.8.4	Benefits of Project Status Report Templates.....	3 - 25
3.8.5	Challenges with Project Status Reports.....	3 - 26
3.9	Project Metric .....	3 - 26
3.9.1	Key Process and Project Metric Groups .....	3 - 27
3.9.2	Using Project Metrics for Better Reporting .....	3 - 29
3.10	EVA (Earned Value Analysis) .....	3 - 30
3.10.1	Meaning and Definition .....	3 - 30
3.10.2	Features of EVA .....	3 - 31
3.10.3	Need for EVA.....	3 - 31
3.10.4	EVM Measures.....	3 - 32
3.10.5	EVM Benefits .....	3 - 34
3.11	Project Communication Plan and Techniques .....	3 - 34
3.11.1	Project Communication Plan .....	3 - 34
3.11.2	Importance of Project Communication Plan .....	3 - 34
3.11.3	What to Include in Communication Plans .....	3 - 35
3.11.4	Project Communication Techniques.....	3 - 36
3.12	Steps for Process Improvement.....	3 - 37

---

**Chapter - 4 : Risk Management****(4 - 1) to (4 - 10)**

4.1 Concept of Risk .....	4 - 2
4.2 Risk Management .....	4 - 2
4.3 Risk Management Activities.....	4 - 3
4.4 Principle of Risk Management.....	4 - 6
4.5 Effective Risk Management .....	4 - 7
4.6 Risk Categorization - Approach #1.....	4 - 8
4.7 Aids for Risk Identification.....	4 - 9
4.8 Potential Risk Treatment .....	4 - 10
4.9 Risk Components and Drivers .....	4 - 10
4.10 Risk Prioritization .....	4 - 10

---

**Chapter - 5 : Configuration Management****(5 - 1) to (5 - 8)**

5.1 Software Configuration Management.....	5 - 2
5.2 Advantages of SCM .....	5 - 2
5.3 Need for SCM.....	5 - 2
5.4 Baseline.....	5 - 3
5.5 Software Configuration Items.....	5 - 4
5.6 Software Configuration Management Process.....	5 - 4
5.6.1 Identification of Objects in Software Configuration.....	5 - 5
5.6.2 Version Control.....	5 - 5
5.6.3 Change Control .....	5 - 6
5.6.4 Configuration Audit .....	5 - 7
5.6.5 Status Reporting .....	5 - 7
5.7 Goal of Software Configuration Management .....	5 - 7

---

**Chapter - 6 : Quality Assurance****(6 - 1) to (6 - 12)**

6.1 Software Quality Assurance.....	6 - 2
-------------------------------------	-------

---

6.2	Software Quality Assurance Activities .....	6 - 2
6.3	Benefits of Software Quality Assurance (SQA) .....	6 - 5
6.4	Software Qualities.....	6 - 5
6.5	Software Quality Standards - ISO Standards for Software Organization....	6 - 7
6.6	Capability Maturity Model (CMM).....	6 - 9
6.7	Comparison between ISO 9000 and SEI - CMM.....	6 - 10
6.8	Other Standards.....	6 - 12

---

**Chapter - 7 : Software Re-engineering**

(7 - 1) to (7 - 12)

7.1 Software Maintenance and Software Maintenance Problem.....	7 - 2
7.1.1 Software Maintenance .....	7 - 2
7.1.2 Types of Software Maintenance Services Categories.....	7 - 2
7.1.3 Need of Software Maintenance.....	7 - 3
7.1.4 Software Maintenance Process .....	7 - 3
7.1.5 Software Maintenance Problem.....	7 - 5
7.2 Software Re-engineering .....	7 - 5
7.2.1 Meaning and Objectives of Re-engineering .....	7 - 5
7.2.2 The Need of Software Re-engineering .....	7 - 6
7.2.3 Re-engineering Cost Factors.....	7 - 7
7.2.4 Advantages of Re-engineering.....	7 - 7
7.2.5 Disadvantages of Re-engineering .....	7 - 7
7.3 Business Process Re-engineering.....	7 - 7
7.3.1 Definition and Meaning .....	7 - 7
7.3.2 Need of Business Process Re-engineering.....	7 - 8
7.3.3 Steps Involved in Business Process Re-engineering .....	7 - 8
7.3.4 Benefits of Business Process Re-engineering .....	7 - 9
7.3.5 Principles of Business Process Re-engineering.....	7 - 10
7.3.6 BPR Example .....	7 - 10
7.4 Software Re-engineering Process Model.....	7 - 11

7.5 Technical Problem of Re-engineering.....	7 - 12
--	--------

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<b>Chapter - 8 : Project Closure</b>	<b>(8 - 1) to (8 - 8)</b>
8.1 Project Closure Analysis.....	8 - 2
8.1.1 Meaning.....	8 - 2
8.1.2 The Role of Closure Analysis.....	8 - 2
8.1.3 Importance of Closing a Project.....	8 - 2
8.1.4 Project Closure Report.....	8 - 3
8.1.5 Need to Develop a Project Closure Analysis and Project Closure Report.....	8 - 3
8.1.6 Objective of Closure Analysis Report.....	8 - 4
8.1.7 Elements in Closure Analysis Report .....	8 - 4
8.2 Case Study of Software Company's Project Closure Analysis Report.....	8 - 7
8.2.1 Examples of Project Closing Oversight .....	8 - 7
8.2.2 Impact of Project Closing Oversight .....	8 - 8

# 1

# Introduction to Software Project Management (SPM)

## Syllabus

Rationale, Software Projects Vs other types of Projects, Contract Management and Technical Project Management, Activities Covered by SPM, Plans, Methods and Methodologies, Categorizing Software Projects, Project Charter, Stakeholders, Setting Objectives, Project Success and Failure, Management Control, Project Management Life Cycle, Traditional versus Modern Project Management Practices.

## Contents

- 1.1 Project
- 1.2 Software Project Management
- 1.3 Need of Software Project Management
- 1.4 Advantages of Software Project Management
- 1.5 Project Manager
- 1.6 Role of a Project Manager
- 1.7 Responsibilities of a Project Manager
- 1.8 Software Project Vs Other Types of Projects
- 1.9 Contract Management and Technical Project Management
- 1.10 Activities Covered by SPM
- 1.11 Software Project Plans
- 1.12 Types of Project Plans
- 1.13 Methods and Methodologies
- 1.14 Categorizing Software Projects
- 1.15 Project Charter
- 1.16 Stake Holders
- 1.17 Setting Objectives
- 1.18 Project Success and Failure
- 1.19 Management Control
- 1.20 Project Management Life Cycle
- 1.21 Traditional Vs Modern Project Management Practices

## 1.1 Project

- A project is a group of tasks that need to complete to reach a clear result. A project also defines as a set of inputs and outputs which are required to achieve a goal. Projects can vary from simple to difficult and can be operated by one person or a hundred.
- Projects usually described and approved by a project manager or team executive. They go beyond their expectations and objects, and it's up to the team to handle logistics and complete the project on time. For good project development, some teams split the project into specific tasks so they can manage responsibility and utilize team strengths.

## 1.2 Software Project Management

- Software project management is an art and discipline of planning and supervising software projects. It is a sub - discipline of software project management in which software projects planned, implemented, monitored and controlled.
- It is a procedure of managing, allocating and timing resources to develop computer software that fulfills requirements.
- In software project management, the client and the developers need to know the length, period and cost of the project.

## 1.3 Need of Software Project Management

- Software is said to be an intangible product. Software development is a kind of all new stream in world business and there's very little experience in building software products. Most software products are tailor made to fit client's requirements. The most important is that the underlying technology changes and advances so frequently and rapidly that experience of one product may not be applied to the other one. All such business and environmental constraints bring risk in software development hence it is essential to manage software projects efficiently.



Fig. 1.3.1

- The image above shows triple constraints for software projects. It is an essential part of software organization to deliver quality product, keeping the cost within client's budget constraint and deliver the project as per scheduled. There are several factors, both internal and external, which may impact this triple constraint triangle. Any of three factor can severely impact the other two.
- Therefore, software project management is essential to incorporate user requirements along with budget and time constraints.

## **1.4 Advantages of Software Project Management**

- It helps in planning of software development.
- Implementation of software development is made easy.
- Monitoring and controlling are aspects of software project management.
- It overall manages to save time and cost for software development.

## **1.5 Project Manager**

- A project manager is a character who has the overall responsibility for the planning, design, execution, monitoring, controlling and closure of a project. A project manager represents an essential role in the achievement of the projects.
- A project manager is a character who is responsible for giving decisions, both large and small projects. The project manager is used to manage the risk and minimize uncertainty. Every decision the project manager makes must directly profit their project.

## **1.6 Role of a Project Manager**

### **1. Leader**

- A project manager must lead his team and should provide them direction to make them understand what is expected from all of them.

### **2. Medium**

- The project manager is a medium between his clients and his team. He must coordinate and transfer all the appropriate information from the clients to his team and report to the senior management.

### **3. Mentor**

- He should be there to guide his team at each step and make sure that the team has an attachment. He provides a recommendation to his team and points them in the right direction.

## 1.7 Responsibilities of a Project Manager

### Managing People

- Act as project leader
- Liaison with stakeholders
- Managing human resources
- Setting up reporting hierarchy etc.

### Managing Project

- Defining and setting up project scope
- Managing project management activities
- Monitoring progress and performance
- Risk analysis at every phase
- Take necessary step to avoid or come out of problems
- Act as project spokesperson.

## 1.8 Software Project Vs Other Types of Projects

Sr. No	Feature	Software Project	Ordinary Project
1.	Tangible	Not tangible	It is tangible
2.	End product	Not clearly defined	Very clearly defined
3.	Production	No fixed production plan, difficult to monitor and track	Fixed production plan which can be tracked
4.	Productivity	Productivity varies greatly with change in technology or worker	Productivity does not vary much
5.	Project methodology	Varies widely based on project	Typically standard
6.	Management methodology	Managing a software project is more managing interpersonal communication and less administration	It is more about maintaining schedule and good administration

Sr. No	Feature	Software Project	Ordinary Project
7.	Transfer of ownership	The transfer of software is tricky as the organisation doesn't own the hardware which runs the software	Transfer is easy as the company own the project till it hands over
8.	Multitasking	Difficult to multitask the resources	Production resources can be used for multiple projects
9.	Personalisation	It is very easy to change product as per customer requirement at any time	Can be personalized to a certain extent, but difficult in the middle of the project
10.	Leadership	Software projects need leaders and managers, not just administrators.	A capable administrator is enough to run an ordinary project.

## 1.9 Contract Management and Technical Project Management

### Technical project management

- All project managers must possess organizational process, leadership capability, and communication skills to be successful. When it comes to IT projects, you can add technological knowledge and expertise to the equation. Technical project management is a unique branch of the field that comes with its own challenges and opportunities.
- Technical project management is the process of managing IT or IT - related projects. Technical project managers are critical to the conception, development, and execution of these projects. In addition to understanding the technical content of the project, they must handle all the duties normally ascribed to project managers, such as :
  - Planning
  - Scheduling and timeline maintenance
  - Execution
  - Managing the budget
  - Communication with stakeholders
  - Ongoing maintenance.
- Anyone interested in technical project management will need to balance a high level of technical capability with soft skills such as leadership, time management, and big - picture thinking.

**Special skills are needed for technical project management**

- Anyone in technical project management will need to have some training and experience in hardware and software installation, upgrades, and internal and external site maintenance. Experience in the development and rollout of new websites, upgrades, and features would be helpful. Familiarity with popular and relevant technologies, applied methodologies, and development models within the organization's context are also critical to a technical project manager's success.

 **Contract management**

- Contract management, as name suggests, is a management that mainly focuses on management of contract between two or many parties and to ensure that all parties meet their respective objectives more effectively and efficiently.
- "Contract management" as an activity is the process of managing contracts, deliverables, deadlines, and contract terms and conditions while ensuring customer satisfaction. Public agencies and private companies know that the purchasing process does not end when the contract is awarded.
- Effective post-award contract management is essential to the seamless acceptance of supplies and services. Contract management impacts many areas within an organization and can significantly influence its budget, operations, customer service, and public image."

** 1.10 Activities Covered by SPM**

- Software project management consists of many activities, that includes planning of the project, deciding the scope of product, estimation of cost in different terms, scheduling of tasks, etc.
- **The lists of activities are as follows :**
  1. Project planning and tracking
  2. Project resource management
  3. Scope management
  4. Estimation management
  5. Project Risk management
  6. Scheduling management
  7. Project communication management
  8. Configuration management.

**❑ 1. Project planning**

- It is a set of multiple processes, or we can say that it a task that performed before the construction of the product starts.

**❑ 2. Scope management**

- It describes the scope of the project. Scope management is important because it clearly defines what would do and what would not. Scope Management create the project to contain restricted and quantitative tasks, which may merely be documented and successively avoids price and time overrun.

**❑ 3. Estimation management**

- This is not only about cost estimation because whenever we start to develop software, but we also figure out their size (line of code), efforts, time as well as cost.
- If we talk about the size, then line of code depends upon user or software requirement.
- If we talk about effort, we should know about the size of the software, because based on the size we can quickly estimate how big team required to produce the software.
- If we talk about time, when size and efforts are estimated, the time required to develop the software can easily determine.
- And if we talk about cost, it includes all the elements such as :
  - Size of software
  - Quality
  - Hardware
  - Communication
  - Training
  - Additional software and tools
  - Skilled manpower.

**❑ 4. Scheduling management**

- Scheduling management in software refers to all the activities to complete in the specified order and within time slotted to each activity. Project managers define multiple tasks and arrange them keeping various factors in mind.

**For scheduling, it is compulsory -**

- Find out multiple tasks and correlate them.
- Divide time into units.

- Assign the respective number of work - units for every job.
- Calculate the total time from start to finish.
- Breakdown the project into modules.

## □ 5. Project resource management

- In software Development, all the elements are referred to as resources for the project. It can be a human resource, productive tools, and libraries.
- Resource management includes :
  - Create a project team and assign responsibilities to every team member
  - Developing a resource plan is derived from the project plan.
  - Adjustment of resources.

## □ 6. Project risk management

- Project risk management consists of all the activities like identification, analyzing and preparing the plan for predictable and unpredictable risk in the project.
- Several points show the risks in the project :
  - The experienced team leaves the project, and the new team joins it.
  - Changes in requirement.
  - Change in technologies and the environment.
  - Market competition.

## □ 7. Project communication management

- Communication is an essential factor in the success of the project. It is a bridge between client, organization, team members and as well as other stakeholders of the project such as hardware suppliers.
- From the planning to closure, communication plays a vital role. In all the phases, communication must be clear and understood. Miscommunication can create a big blunder in the project.

## □ 8. Project configuration management

- Configuration management is about to control the changes in software like requirements, design, and development of the product.
- The Primary goal is to increase productivity with fewer errors.

- Some reasons show the need for configuration management :
  - Several people work on software that is continually update.
  - Help to build coordination among suppliers.
  - Changes in requirement, budget, schedule need to accommodate.
  - Software should run on multiple systems.
- Tasks perform in configuration management :
  - Identification
  - Baseline
  - Change control
  - Configuration status accounting
  - Configuration audits and reviews

#### □ People involved in configuration management

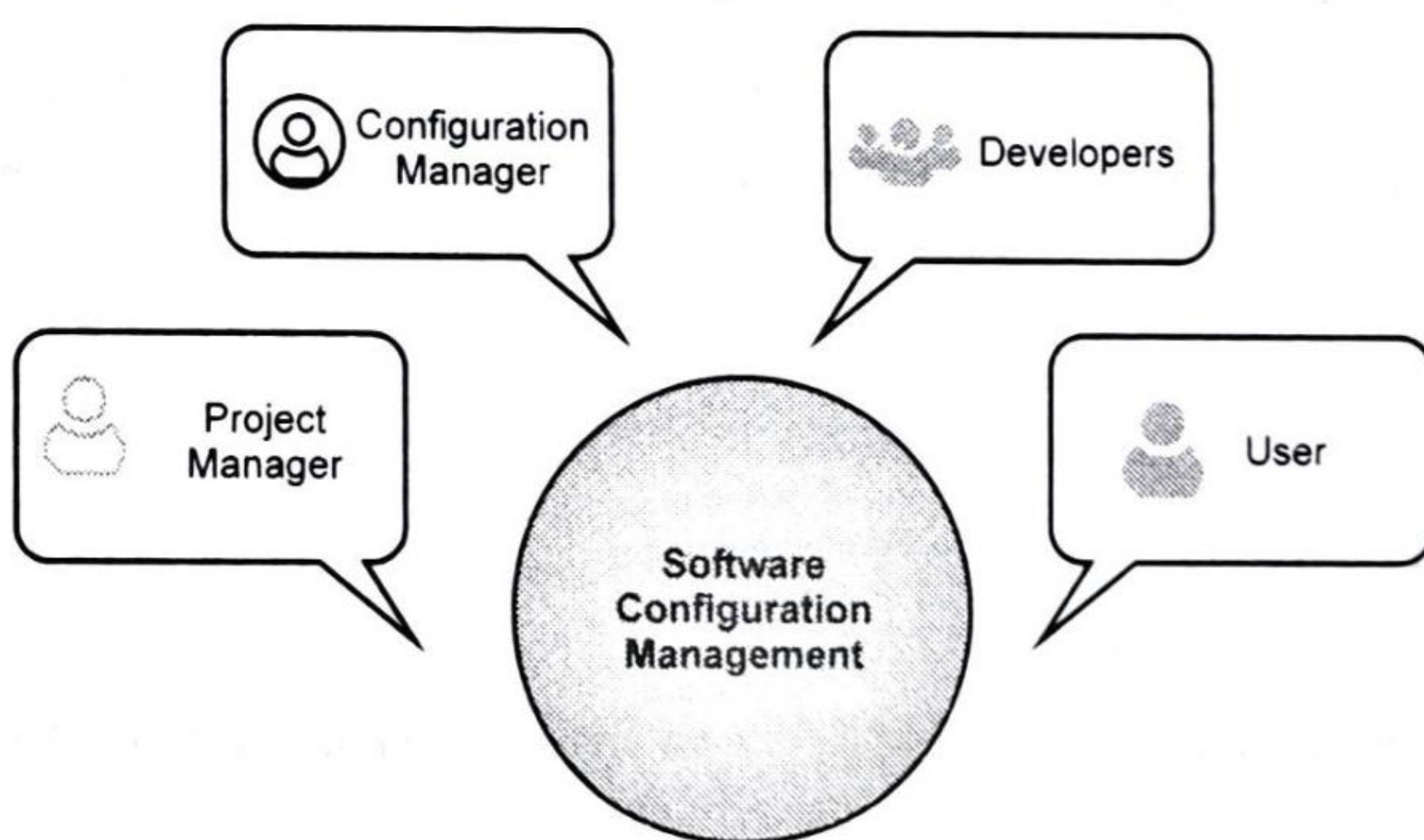


Fig. 1.10.1

#### 1.11 Software Project Plans

- A project plan stores the outcome of project planning. It provides information about the end date, milestones, activities, and deliverables of the project. In addition, it describes the responsibilities of the project management team and the resources required for the project. It also includes the description of hardware and software (such as compilers and interfaces) and lists the methods and standards to be used. These methods and standards include algorithms, tools, review techniques, design language, programming language, and testing techniques.

- A project plan helps a project manager to understand, monitor, and control the development of software project. This plan is used as a means of communication between the users and project management team. **There are various advantages associated with a project plan, some of which are listed below.**
  - It ensures that software is developed according to the user requirements, objectives, and scope of the project.
  - It identifies the role of each project management team member involved in the project.
  - It monitors the progress of the project according to the project plan.
  - It determines the available resources and the activities to be performed during software development.
  - It provides an overview to management about the costs of the software project, which are estimated during project planning.

Note that there are differences in the contents of two project plans depending on the kind of project and user requirements. **A typical project plan is divided into the following sections.**

- **Introduction :** Describes the objectives of the project and provides information about the constraints that affect the software project.
- **Project organization :** Describes the responsibilities assigned to the project management team members for completing the project.
- **Risk analysis :** Describes the risks that can possibly arise during software development as well as explains how to assess and reduce the effect of risks.
- **Resource requirements :** Specifies the hardware and software required to carry out the software project. Cost estimation is done according to these resource requirements.
- **Work breakdown :** Describes the activities into which the project is divided. It also describes the milestones and deliverables of the project activities.
- **Project schedule :** Specifies the dependencies of activities on each other. Based on this, the time required by the project management team members to complete the project activities is estimated.

## 1.12 Types of Project Plans

Plan	Description
Quality plan	Describes the quality procedures and standards that will be used in project.
Validation plan	Describes the approach, resources and schedule used for system validation.
Configuration management plan	Describe the configuration management procedures and structures to be used.
Maintenance plan	Predicts the maintenance requirements, costs and efforts.
Staff development plan	Describes how the skills and experience of the project team members will be developed.

## 1.13 Methods and Methodologies

- In order to achieve goals and planned results within a defined schedule and a budget, a manager uses a project. Regardless of which field or which trade, there are assortments of methodologies to help managers at every stage of a project from the initiation to implementation to the closure. In this tutorial, we will try to discuss the most commonly used project management methodologies.
- A methodology is a model, which project managers employ for the design, planning, implementation and achievement of their project objectives. There are different project management methodologies to benefit different projects.
- For example, there is a specific methodology, which NASA uses to build a space station while the Navy employs a different methodology to build submarines. Hence, there are different project management methodologies that cater to the needs of different projects spanned across different business domains.

### Project Methodologies

- Following are the most frequently used project management methodologies in the project management practice :

#### 1. Adaptive Project Framework

- In this methodology, the project scope is a variable. Additionally, the time and the cost are constants for the project. Therefore, during the project execution, the project scope is adjusted in order to get the maximum business value from the project.

**❑ 2. Agile Software Development**

- Agile software development methodology is for a project that needs extreme agility in requirements. The key features of agile are its short - termed delivery cycles (sprints), agile requirements, dynamic team culture, less restrictive project control and emphasis on real - time communication.

**❑ 3. Crystal Methods**

- In crystal method, the project processes are given a low priority. Instead of the processes, this method focuses more on team communication, team member skills, people and interaction. Crystal methods come under agile category.

**❑ 4. Dynamic Systems Development Model (DSDM)**

- This is the successor of Rapid Application Development (RAD) methodology. This is also a subset of agile software development methodology and boasts about the training and documents support this methodology has. This method emphasizes more on the active user involvement during the project life cycle.

**❑ 5. Extreme Programming (XP)**

- Lowering the cost of requirement changes is the main objective of extreme programming. XP emphasizes on fine scale feedback, continuous process, shared understanding and programmer welfare. In XP, there is no detailed requirements specification or software architecture built.

**❑ 6. Feature Driven Development (FDD)**

- This methodology is more focused on simple and well - defined processes, short iterative and feature driven delivery cycles. All the planning and execution in this project type take place based on the features.

**❑ 7. Information Technology Infrastructure Library (ITIL)**

- This methodology is a collection of best practices in project management. ITIL covers a broad aspect of project management which starts from the organizational management level.

**❑ 8. Joint Application Development (JAD)**

- Involving the client from the early stages with the project tasks is emphasized by this methodology. The project team and the client hold JAD sessions collaboratively in order to get the contribution from the client. These JAD sessions take place during the entire project life cycle.

**❑ 9. Lean Development (LD)**

- Lean development focuses on developing change - tolerance software. In this method, satisfying the customer comes as the highest priority. The team is motivated to provide the highest value for the money paid by the customer.

**❑ 10 PRINCE2**

- PRINCE2 takes a process - based approach to project management. This methodology is based on eight high - level processes.

**❑ 11. Rapid Application Development (RAD)**

- This methodology focuses on developing products faster with higher quality. When it comes to gathering requirements, it uses the workshop method. Prototyping is used for getting clear requirements and reuse the software components to accelerate the development timelines.
- In this method, all types of internal communications are considered informal.

**❑ 12. Rational Unified Process (RUP)**

- RUP tries to capture all the positive aspects of modern software development methodologies and offer them in one package. This is one of the first project management methodologies that suggested an iterative approach to software development.

**❑ 13. Scrum**

- This is an agile methodology. The main goal of this methodology is to improve team productivity dramatically by removing every possible burden. Scrum projects are managed by a scrum master.

**❑ 14. Spiral**

- Spiral methodology is the extended waterfall model with prototyping. This method is used instead of using the waterfall model for large projects.

**❑ 15. Systems Development Life Cycle (SDLC)**

- This is a conceptual model used in software development projects. In this method, there is a possibility of combining two or more project management methodologies for the best outcome. SDLC also heavily emphasizes on the use of documentation and has strict guidelines on it.

## 16. Waterfall (Traditional)

- This is the legacy model for software development projects. This methodology has been in practice for decades before the new methodologies were introduced. In this model, development life cycle has fixed phases and linear timelines. This model is not capable of addressing the challenges in the modern software development domain.

# 1.14 Categorizing Software Projects

## 1. Compulsory vs voluntary systems (projects)

- Compulsory systems are the systems which the staff of an organisation have to use if they want to do a task.
- Voluntary systems are the systems which are voluntarily used by the users e.g. computer gaming, school project, etc.

## 2. Information vs embedded systems (projects)

- Information systems are used by staff to carry out office processes and tasks e.g. stock control system.
- Embedded systems are used to control machines e.g. a system controlling equipment in a building.

## 3. Objective - based vs product - based systems (projects)

- Project whose requirement is to meet certain objectives which could be met in a number of ways, is objective - based project.
- Project whose requirement is to create a product, the details of which have been specified by the client, is product - based project.

# 1.15 Project Charter

A project charter is a short document that explains the project in clear, concise wording for high level management. Project charters outline the entirety of projects to help teams quickly understand the goals, tasks, timelines, and stakeholders. It is an essential deliverable in any project and one of the first deliverables. The document provides key information about a project, and also provides approval to start the project. Therefore, it serves as a formal announcement that a new approved project is about to commence. Contained also in the project charter is the appointment of the project manager, the person who is overall responsible for the project.

**❑ What does the project charter contain ?**

- When preparing the project charter, utilize the SMART method. Be specific, ensure your goals are Measurable, Attainable, Relevant to the project, and Timely. The project charter includes :
  - Purpose and objectives of the project in clear, concise language.
  - Requirements of the project at a very high level and without much detail.
  - Project description in a paragraph or two that explains the project.
  - Known high-level, major categories of risks for the project.
  - Schedule of events with the start and end dates.
  - Major events or milestones along the path.
  - Budget or summary of how much the project will cost.
  - Requirements from the organization for approval, including what to approve, who will approve, and how to get the approval.
  - Key players or stakeholders in charge of which parts of the project and who will approve the plans to go through.
  - An introduction of the project manager, project sponsor, and their authority level.

**❑ Main components of a project charter**

- A project charter is a living document outlining the issues, targets and framework of a process improvement effort. A charter should have six main components that frame the document. Each of these component helps define the reasons for the project, explains how it improves the business, enumerate what steps are necessary to complete, and identifies the stakeholders responsible for the project. The project charter components are :

- |                      |                  |
|----------------------|------------------|
| 1. Problem statement | 2. Business case |
| 3. Goal statement    | 4. Timeline      |
| 5. Scope             | 6. Team members. |

**❑ The need for and benefits of a project charter**

- The main reason every project needs a project charter at the very start is because without it, there is no proof or official document that an authorized project manager defined and presented a project and gained its approval from stakeholders to proceed. A project charter also provides several benefits :

- Formally authorizes the project to commence
- Creates a common vision and shared understanding of the project
- Empowers the project manager to lead the project
- Identifies the high-level objectives and scope of the project
- Defines what success will look like at the end of the project
- Gains support for the project by announcing it to the whole organization
- Ensures that key stakeholders are aware of the project
- Secures budget and resources for the project
- Serves as the point of reference for the project team.

## 1.16 Stake Holders

- In simple words, anyone having any type of relation / interest in the project is known as **stakeholder**. The term **software project stakeholder** refers to, “a person, group or company that is directly or indirectly involved in the project and who may affect or get affected by the outcome of the project”.

### Stakeholder Identification

- It is the process of identifying a person, group or a company which can affect or get affected by a decision, activity or the outcome of the software project. It is important in order to identify the exact requirements of the project and what various stakeholders are expecting from the project outcome.

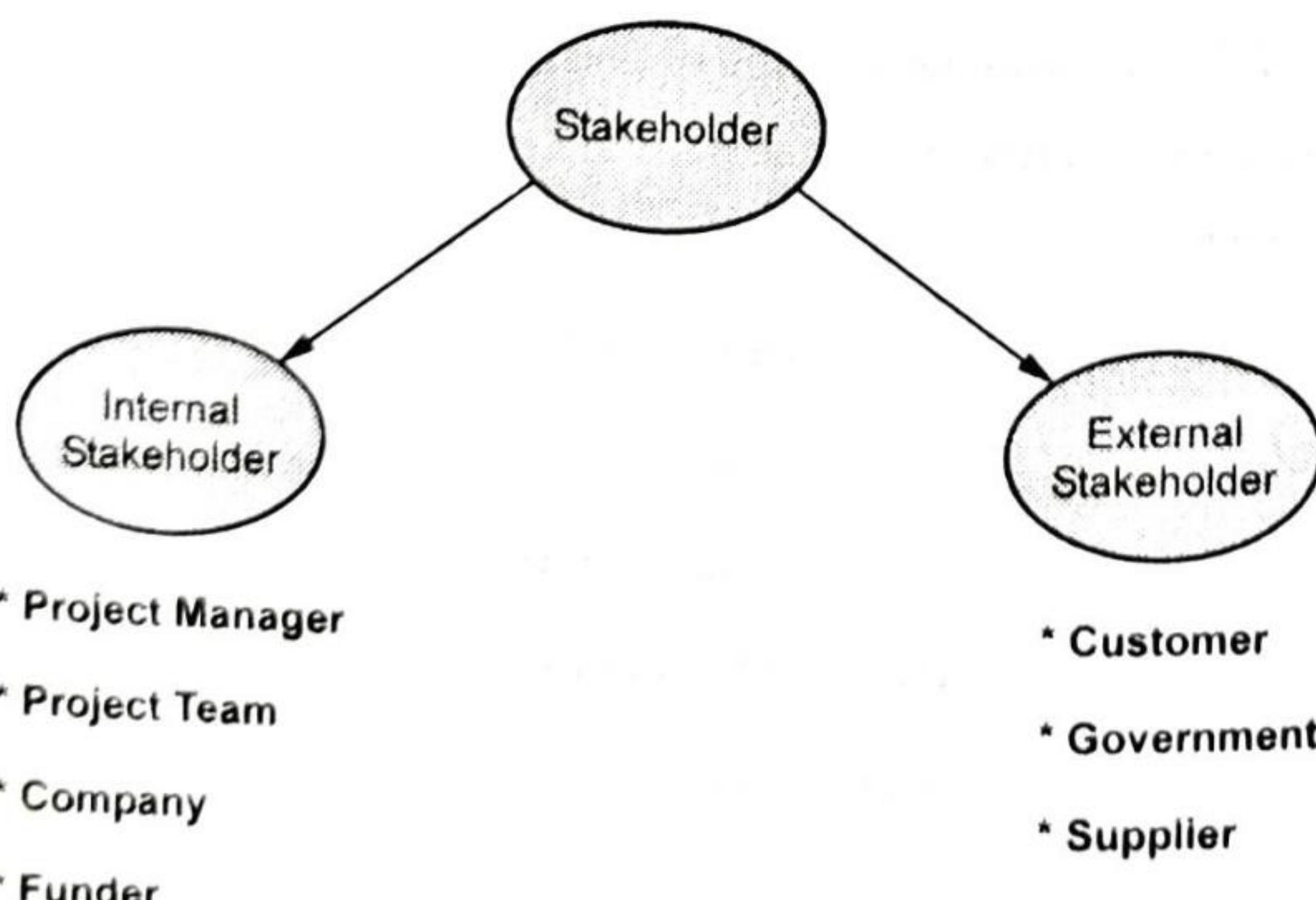


Fig. 1.16.1

## ❑ Type of Stakeholders

1. **Internal Stakeholder** : An internal stakeholder is a person, group or a company that is directly involved in the project. For example,
  - **Project Manager** : Responsible for managing the whole project. Project Manager is generally never involved in producing the end product but he/she controls, monitors and manages the activities involved in the production.
  - **Project Team** : Performs the actual work of the project under the Project Manager including development, testing, etc.
  - **Company** : Organisation who has taken up the project and whose employees are directly involved in the development of the project.
  - **Funders** : Provides funds and resources for the successful completion of the project.
2. **External Stakeholder** : An external stakeholder is the one who is linked indirectly to the project but has significant contribution in the successful completion of the project. For example,
  - **Customer** : Specifies the requirements of the project and helps in the elicitation process of the requirement gathering phase. Customer is the one for whom the project is being developed.
  - **Supplier** : Supplies essential services and equipment for the project.
  - **Government** : Makes policies which helps in better working of the organisation.

## ❑ Examples of stakeholders in a project

- The stakeholders in each particular project will vary depending on the type of project and industry, but here are a few examples of the types of stakeholders in project management you might need to consider :
  - Project manager
  - Team members
  - Managers
  - Resource managers
  - Executives
  - Senior management
  - Company owners

- Investors
- Sponsors
- Financiers (the people, not the cakes)
- Suppliers
- Vendors
- Consultants
- Customers
- End users.

## 1.17 Setting Objectives

- Effective objectives in project management are specific. A specific objective increases the chances of leading to a specific outcome. Therefore objectives shouldn't be vague, such as "to improve customer relations," because they are not measurable. Objectives should show how successful a project has been, for example "to reduce customer complaints by 50 %" would be a good objective. The measure can be, in some cases, a simple yes or no answer, for example, "did we reduce the number of customer complaints by 50 % ?"
- While there may be one major project objective, in pursuing it there may be interim project objectives. In lots of instances, project teams are tasked with achieving a series of objectives in pursuit of the final objective. In many cases, teams can only proceed in a stair step fashion to achieve the desired outcome. If they were to proceed in any other manner, they may not be able to develop the skills or insights along the way that will enable them to progress in a productive manner.

### Objectives can often be set under three headings :

1. **Performance and Quality** : The end result of a project must fit the purpose for which it was intended. At one time, quality was seen as the responsibility of the quality control department. In more recent years the concept of total quality management has come to the fore, with the responsibility for quality shared by all staff from top management downwards.
2. **Budget** : The project must be completed without exceeding the authorised expenditure. Financial sources are not always inexhaustible and a project might be abandoned altogether if funds run out before completion. If that was to happen, the money and effort invested in the project would be forfeited and written off. In extreme cases the project contractor could face ruin. There are many projects where there is no direct profit motive, however it is still important to pay proper attention to the cost budgets, and financial management remains essential.

3. **Time to Completion** : Actual progress has to match or beat planned progress. All significant stages of the project must take place no later than their specified dates, to result in total completion on or before the planned finish date. The timescale objective is extremely important because late completion of a project is not very likely to please the project purchaser or the sponsor.

## 1.18 Project Success and Failure

- Project failure can be defined as a “project that fails to perform a duty or an expected action, non-occurrence or non-performance”
- Whereas project success can be defined as the achievement of something desired, planned or attempted . It is also said that success is an event that accomplishes its intended purpose . Anything short of that is failure.
- Every project has **project goals and objectives**. All projects have a **project schedule**. Finally, **all projects have a budget**. With respect to these four conditions, there are three ways a project can come to completion :
  - **Successfully** - Meaning that the scope, goals, and objectives were met, the project was completed on time, and the project came in at or under budget
  - **Challenged** - Meaning that at least one of the four conditions was not met - either the project was over budget, or it took longer than expected, or the scope, goals, and objectives were somehow compromised.
  - **Failed** - A **failed project** is one that was either given up on or cancelled.

### The Bad News - Failed Project Characteristics

- Starting with the “bad news” first, there are ten primary factors that are found in failed projects. These characteristics include :
  1. The requirements list was incomplete.
  2. The stakeholders were not involved.
  3. There weren’t enough resources to complete the project.
  4. The expectations for what could reasonably be created during the project were too high.
  5. The support from above wasn’t strong enough.
  6. The requirements for the project kept changing.
  7. The project wasn’t well planned.

- 8. There was no longer a need for the project.
- 9. There wasn't enough management involved.
- 10. Those involved did not have the skills required to complete the project.
- Often, these items are easily correctable or avoided with a little foresight. Make sure that you take the time to properly plan your project to avoid finding any of these characteristics during your project's execution.

### Not Much Better News...Challenged Projects

- Recall that challenged projects are those that are completed, but did not go exactly as planned. While challenged projects share some characteristics with failed projects, they are distinct enough to require their own category. Here are five characteristics inherent in projects that were challenged at completion.
  - 1. Stakeholder involvement was low or non - existent.
  - 2. Objectives and goals were not clearly stated.
  - 3. Objectives, goals, and scope kept changing.
  - 4. The management was not supportive of the project.
  - 5. The team lacked the technical know - how.
- As you can see, these five items are also mirrored in the failed project characteristics. It is vital that you keep your stakeholders involved during the project process. Likewise, make sure your team members have received adequate training. Finally, keep your scope statement from expanding, be absolutely clear about your objectives, and ensure the commitment of all involved to the completion of a successful project.

### Now for the Sunshine : Successful Project Characteristics

- It would make sense that successful objects have characteristics that are opposite of those held by challenged and failed projects, but what exactly are those characteristics? Here are the top five :
  - 1. Stakeholders and end-users are involved with the project process.
  - 2. Management is committed strongly to the project and is involved with the project.
  - 3. The scope, goals and objectives of the project are clearly stated, outlined, and have a clear action plan.
  - 4. The team and project manager have taken the time to carefully plan the project.
  - 5. The team and stakeholders have expectations that reflect reality.

- There you have it a simple way to define success and failure of a project in project management. By implementing characteristics of successful projects, you can avoid the pain and cost of failed projects.

## 1.19 Management Control

- Management control describes the means by which the actions of individuals or groups within an organization are constrained to perform certain actions while avoiding other actions in an effort to achieve organizational goals. Management control falls into two broad categories regulative and normative controls but within these categories are several types.

Regulative Controls	Normative Controls
Bureaucratic Controls	Team Norms
Financial Controls	Organizational Cultural Norms
Quality Controls	

- The following section addresses regulative controls including bureaucratic controls, financial controls, and quality controls. The second section addresses normative controls including team norms and organization cultural norms.

### Regulative controls

- Regulative controls stem from standing policies and standard operating procedures, leading some to criticize regulative controls as outdated and counter-productive. As organizations have become more flexible in recent years by flattening organizational hierarchies, expanding organizational boundaries to include suppliers in inventory management and customers in new product development, forging cooperative alliances with competitors, and developing virtual organizations in which employees are geographically dispersed and may meet only a few time each year, critics point out that regulative controls may prevent rather than promote goal attainment.

Type of Regulative Control	Definition	Example
Bureaucratic controls	Policies and operating procedures	Employee handbook
Financial controls	Key financial targets	Return on investment
Quality controls	Acceptable levels of product or process variation	Defects per million

### □ Normative controls

- Rather than relying on written policies and procedures as in regulative controls, normative controls govern employee and managerial behavior through generally accepted patterns of action. One way to think of normative controls is in terms how certain behaviors are appropriate and others are less appropriate.

Type of Normative Control	Definition	Example
Team Norms	Informal team rules and responsibilities	Task delegation based on team member expertise
Organizational Cultural Norms	Shared organizational values, beliefs, and rituals	Collaboration may be valued more than individual "stars"

## BOOK 1.20 Project Management Life Cycle

- The project management life cycle is a series of activities that are necessary to fulfill project goals or objectives. These activities may go by different names, depending on the methodology, but tend to be similar in nature. The PMI refers to them as “process groups”, and categorizes the project management life cycle as follows :

### □ Four phases of project management life cycle

- **Initiation** : Nature and scope of the project

The **initiation phase** is the very first phase of the **project management life cycle**. During this phase, a project manager must develop a business case for the project. Whether they undertake a feasibility study or establish a project charter, making sure the rest of the team understands the importance of the project is key. During this phase, a project team is appointed.

- **Planning** : Time, cost, resources and scheduling :

As you may have already guessed, a lot of planning takes place during this phase. Depending on the specifics of your project, you may need to complete all (or just a few) of the following :

- Project plan
- Resource plan
- Financial plan
- Quality plan

- Risk plan
  - Acceptance plan
  - Communications plan
  - Procurement plan.
- **Execution :** Processes used to complete the project :

Two things happen during the execution phase. 1) deliverables are built, and 2) the project is monitored and controlled. In some cases, this means going through time management procedures step - by - step, and in others it could mean performing a risk assessment so you can identify any risks you could expect throughout the life of the project. Depending on your project, you may need to perform all (or just a handful) of the following :

- Time management
  - Cost management
  - Quality management
  - Change management
  - Risk management
  - Issue management
  - Procurement management
  - Acceptance management
  - Communications management.
- **Closure :** Formal end of project :

The closing phase signifies **what is project management**. During this phase, project managers are expected to tie up any loose ends, and perform any project closure activities. Once the project is closed, the project manager should review the project completion with their team. During this review, the benefits and objectives should be measured, the project spend should be compared to the budget, and final deliverables should be assessed. At this time, you should be able to identify key project achievements and milestones, document any lessons learned for future projects and communicate the success of the project to stakeholders and executives.

## 1.21 Traditional Vs Modern Project Management Practices

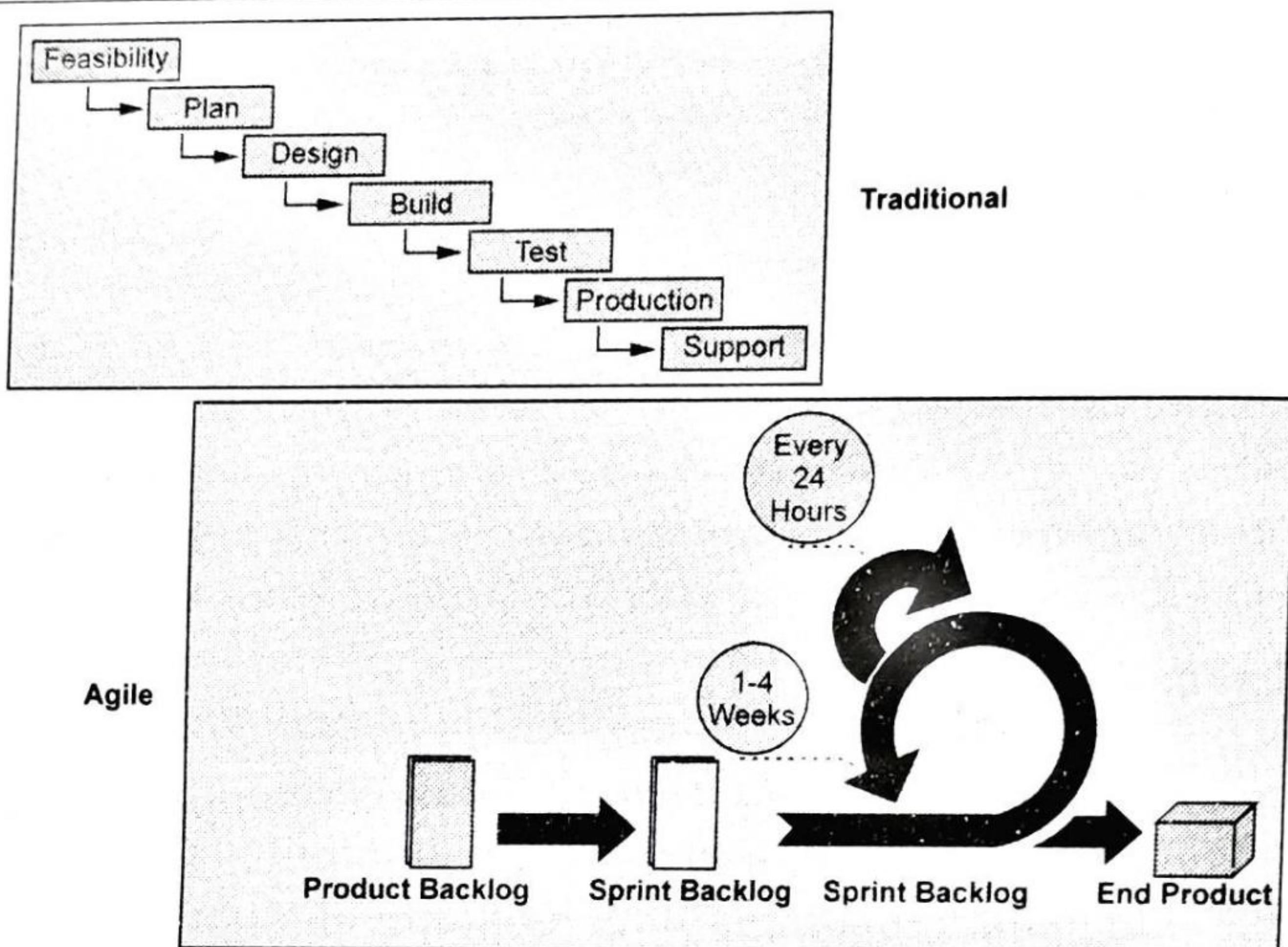


Fig. 1.21.1

### Traditional Project Management

- The traditional project management (waterfall) approach is linear where all the phases of a process occur in sequence. Its concept depends on predictable tools and experience. Each and every project follows the same life cycle which includes the stages such as feasibility, planning, designing, building, testing, production, and support, as shown in the Fig. 1.21.1.
- The entire project is planned upfront without any scope for changing requirements. This approach assumes that time and cost are variables and requirements are fixed. The rigidity of this method is the reason why it is not meant for large projects and leaves no scope for changing the requirements once the project development starts.

### Benefits of traditional methodology

- Clearly defined objectives
- Controllable processes
- Clear documentation
- More accountability.

## ❑ Agile (Modern) Project Management

- When a traditional system focuses on upfront planning where factors like cost, scope, and time are given importance, **Agile management** gives prominence to teamwork, customer collaboration, and flexibility. It is an iterative approach that focuses more on incorporating customer feedback and continuous releases with every iteration of a software development project.
- The basic concept behind agile software development is that it delves into evolving changes and collaborative effort to bring out results rather than a predefined process. Adaptive planning is perhaps the top feature of agile and one that makes it a favorite among project managers, worldwide.
- **Scrum and Kanban** are two of the most widely used agile frameworks. They are very well known for encouraging decision - making and preventing time consumption on variables that are bound to change. It stresses customer satisfaction and uses available teams to fast - track software development at every stage.

## ❑ Benefits of agile project management

- Flexible prioritization
- Early and predictable delivery
- Predictable costs and schedules
- Improves quality
- More transparency

The table below shows the major differences between agile project management and traditional project management.

Characteristics	Traditional project management	Agile project management
Organizational structure	Linear	Iterative
Project scale	Large - scale	Small and medium scale
Development model	Life cycle model	Evolutionary delivery mode
User requirements	Clearly defined before coding or implementation	Interactive input
Client involvement	Low	High

Characteristics	Traditional project management	Agile project management
Restart cost	High	Low
Development process	Life cycle model	Evolutionary delivery model
Development model	Fixed	Easily changeable
Testing	Once coding is done	Every iteration
Architecture	Creates current and predictable requirements	Creates current requirements
Requirements	Standard and known in advance	Emergent with rapid changes

