Practical Software Project Management

Design and track execution models, and manage dependencies, changes, and project issues

Abhi Basu Thakur

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Dedicated to

I dedicate this book to my beloved family, friends, and colleagues. Your unwavering love, support, and belief in me have been a constant source of strength. Without your encouragement and collaboration, this endeavor would not have been possible. You have stood by me through thick and thin, and for that, I am deeply grateful.

About the Author

Abhi Basu Thakur is currently working as a Director of Software Engineering at NetApp India Ltd. Prior to that, Abhi has worked in Philips India Ltd and Wipro Technologies in various software development roles. He has around 27 years of experience in software development and has led many projects in embedded software development, mobile software development, and enterprise infrastructure management software. He has led teams of 50+ engineers and has developed products from the ground up. He has worked with teams across the globe. Also he has directly interacted with many fortune 500 customers who use the products and helped in building solution for their environments. He has completed his Bachelor's in Electronics and Telecommunications Engineering from Jadavpur University, followed by a Master's in Computer Science from BITs Pilani and an Executive General Management Program from IIM Bangalore. He has a passion towards working on new technologies and have 15 plus years of experience in project management.

About the Reviewers

- **Sangeetha Govindarajan** is a seasoned product management leader with a strong focus on digital transformation, innovation, and enterprise tools. She has over 14 years of experience working with global tech companies such as Walmart, Amazon, T-Mobile, and Microsoft. Sangeetha specializes in product strategy and scaling solutions, utilizing platforms like Atlassian, JIRA, Confluence, and GenAI. As a technical reviewer, Sangeetha has contributed her expertise to journals, research papers, and books in the technical and product management space. Her passion lies in refining content that covers cutting-edge developments in digital products and enterprise solutions. An avid reader and mentor, she is deeply involved in the product management community, supporting the next generation of product leaders through her reviews and mentorship efforts.

- **Shalini** is a Senior Technical Product Manager with over a decade of experience delivering enterprise-scale technology solutions across Logistics, SaaS, and e-commerce. Her professional journey spans entrepreneurial ventures, mid-sized tech firms, and industry giants like Amazon and Walmart. She has led high-impact initiatives in supply chain automation, platform modernization, in-cab technologies, and digital transformation, driving innovation through a strong blend of technical expertise and product strategy. Her core competencies include API design, systems thinking, stakeholder alignment, development of scalable products, and go-to-market strategy that improve operational efficiency and customer experience.

  Her ability to navigate complex ecosystems and align cross-functional teams has made her a trusted product leader in both agile startup environments and structured enterprise settings. Beyond her corporate contributions, she is a published author, keynote speaker, and dedicated mentor, passionate about enabling the next generation of product professionals. She actively contributes to the product management community and serves as a technical reviewer for books related to technology, leadership, and product development.

- **Dinesh Dakshinamoorthy** is a Senior Technical Product Manager with a strong background in building innovative, scalable solutions across supply chain, logistics, and data-driven product domains. At Amazon, he has led end-to-end

product development initiatives, from vision and roadmap definition to go-to-market strategy, while working closely with engineering, operations, and business stakeholders. He combines deep technical understanding with a passion for simplifying complex workflows, driving automation, and enabling data-informed decision-making. He is known for his strategic mindset, collaborative approach, and customer-obsessed problem-solving. In addition to his core role, Dinesh actively mentors aspiring product managers and enjoys contributing to thought leadership through technical writing and industry engagement.

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Preface

Software project management is a challenging job. To deliver a software project requires good project management skills, understanding the technicalities of what is being developed, managing a team of individuals and motivating them for project success.

Comprising nineteen insightful chapters, this book covers a wide range of topics essential for understanding the intricacies of project management for a software development project. We start with how the teams in a software organization are organized. From there, we delve into how a project is initiated, how estimation and planning is managed, how the team has to be organized in order to execute the projects.

Chapter 5, Requirement Analysis, focuses on requirement analysis, followed by project kickoff and how to manage the architecture and design phase.

Chapter 9, Tracking Execution, talks about how the projects are tracked when execution is going on. Dependency and change management in projects are discussed in Chapter 10, Dependency and Change Management.

Issues raised in the project, and how to track those are discussed in Chapter 11, Issue Tracking: Probably the easiest of the things for a project manager. This is followed by security compliance, CI/CD delivery. Also, in the later chapters, it is discussed which reports project managers should be aware of. This will be followed by post-project reviews. Another important aspect which is discussed in the last chapter is appraisals for the team. How appraisal needs to be done, and how the team needs to be kept motivated, is discussed in this chapter.

This book is designed to cater to all software developers, would be software project managers and program managers, people who project managers and program managers. If the person is related to a software development project and wants to know how project management works, then this book will help in that purpose. Software developers will understand how project management works and can orient their work accordingly.

Through practical examples, comprehensive explanations, and a structured approach, this book aims to equip readers with a solid understanding of project management. Whether you are a novice or an experienced learner, I hope this book will serve as a valuable resource in your journey of exploring the foundations of software project management.

Chapter 1:Overview of Software Project Management- we'll be discussing in the upcoming chapter. We will delve into the various types of software development projects, exploring the differences and unique aspects of each. Additionally, we'll compare program management to project management, highlighting the distinct roles and responsibilities within these areas.

We will also cover organizational hierarchies and how they impact roles and responsibilities, as well as the variations that can occur within different teams and projects. This chapter will provide a comprehensive understanding of these critical aspects, which will be essential for our project's success.

Chapter 2: Initiating a Software Project- This introductory chapter provides an overview. Firstly, we will discuss the initiation of the project, outlining the fundamental steps required to get things started on the right foot. Next, we will explore the various gates in software development, which serve as crucial checkpoints to ensure our progress aligns with our goals and standards. Finally, we will focus on resource planning and allocation, a vital aspect that will help us manage our resources efficiently and effectively.

Chapter 3: Estimations and Planning- This chapter will focus on the ways to estimate and plan for a project. Estimations are most of the time approximate; in that case, how to use the estimates has been discussed. Also, how to use the data to plan for projects and what tools are available at hand to plan have been discussed in the chapter.

Chapter 4: Team Management, Organizing Your Team- Team Management: This chapter will discuss about how to organize the team, what are the different skill sets needed, how to organize the team. What should a manager look out for, what are the dos and don'ts? How to keep the team motivated.

Chapter 5: Requirement Analysis- This chapter will describe the requirements and the role of the project manager in requirement analysis. What to one be careful about in requirement analysis? What is the role of the project manager in requirement analysis? What are the different tools that can be used for requirement analysis?

Chapter 6: Architecture and Design Phase- This chapter describes how to manage the architecture and design phase in a software development project. What are the templates for architecture and design documents, and what is the role of the project manager in the architecture and design phase is discussed in this chapter.

Chapter 7: Project Kickoffs- How to do the project Kickoff. What are the topics to cover for Project Kickoff? Managers need to set targets for the team that are realistic and should help the team to reach those targets in a finite amount of time. The team will not be aware of the time. What should be the goal of the team that should be set during project kickoffs?

Chapter 8: Designing Execution- Design the project for successful execution. This is about how the execution model should be designed in order to be successful. Be ready to analyze at every point of the project and ready to change.

Chapter 9: Tracking Execution- How to track a project's progress. When the project starts running, it becomes hard to track. By the time, we understand, probably crucial moments have passed, and we will be setup for disasters. So it is very important to track the progress and do the analysis.

Chapter 10: Dependency and Change Management- How to track dependencies. What tools to use? Dependencies will most likely not come on time. It is not the ideal situation always. Also changes will come almost come all the time because of customer requirements or something urgent. It is important to park the current work and handle these changes.

Chapter 11: Issue Tracking - How to track the issues which has been filed in the project internally by the team. How to track the issues which has been filed by the customers and other teams within the organization.

Chapter 12: Documentation- One of the key aspects of a product or service is good documentation. A product may not be able explain everything thru the UI, Some features may be difficult to understand. Limitations, configurations are best explained via the documentation. Customers will question the feature if something is missing.

Chapter 13: Delivery- Post-project is done, delivery is the last milestone of the development cycle. This chapter will describe what are the different ways to deliver the project. How on device software delivery, on prem software delivery, how saas delivery will have to be managed.

Chapter 14: Security of the Product- Security is a very important aspect of the product nowadays. With the increasing ability to share data via wi-fi, Bluetooth products are vulnerable to hackers attacking the system. Hence it is very important to plan, estimate and execute for security issues.

Chapter 15: QA and Automation- QA and automation are one of the most important factors in a software development project. They ensure that the product developed is of very good quality. If the product is not of good quality, customers will not use the product for a long time. QA and automation team should ensure consistent quality in terms of functionality, better usability of the product.

Chapter 16: Continuous Integration and Delivery- Continuous integration and delivery is the process of continuously integrating and delivering. Not all products are delivered like this. In cases where it is not possible to deliver like this, the process prepares the builds

continuously and keeps them ready. In cases where it is possible to deliver the builds continuously, the CI/CD process can be quite handy along with QA automation.

Chapter 17: Metrics to Gather and Tools- Different metrics to gather and tools. Metrics provide insight into the projects. The chapter provides a list of metrics that can be gathered at different stages of the project. If these metrics are gathered, then it will help to provide visibility into the project at any stage.

Chapter 18: Post Project Review- Continuous improvement for the team, technology needs to be harnessed.. How do trainings need to be planned? How do the technical trainings need to be planned? Teams are initially immature. Maturity improves with time, but does not increase in a day

Chapter 19: Appraisals- Appraisals are an integral process of software development teams which normally happens at the end of the year. The team members are appraised based on their performance. Managers play the most important role for their team members. Gathering metrics for decision making, and how to come to a conclusion regarding the rating of the person is discussed in the chapter.

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Chapter 1
Overview of Software Project Management

Introduction

One of the key reasons for successfully executing a software project is software project management. Good management can lead to better execution, quality, timely delivery, and motivated team members. On the other hand, mismanagement can lead to delays in delivery, demotivated team members, attrition of team members, etc. There are many variables while executing a project. This is similar to a mathematical equation having many variables. If these variables are not managed well, the project can run out of control. Also, there has to be continuous feedback through different reports, like test cases run, percentage of test cases, number of user stories done, and velocity of the team, to understand the state of the project. Without proper monitoring, managers will not know where the project stands. This chapter gives an overview of the different types of projects that a project manager can encounter, the hierarchies of an organization, and the roles and responsibilities of different people. Many organizations will have different names for these roles, but they can be mapped to the roles described here from the responsibilities they execute. Many organizations do not have these roles, and some people play multiple roles. This way, sometimes things may get done, and sometimes they may not. Also, what happens if that person playing multiple roles leaves the organization? It is extremely difficult to get people on the team who will pull everything through. The idea is that everyone plays a small part in the project and gets it done. Everything that needs to be done for the project is in this book.

Structure

In this chapter, we will discuss the following topics:

- Types of software development projects
- Program vs. project
- Roles and responsibilities
- Importance of the SDLC process

Objectives

After studying this unit, you should be able to understand how different project teams are organized and how they synchronize amongst themselves for the smooth execution of the project.

There are many aspects of project management that a manager needs to take care of. Some of these are defined via the **software development lifecycle** (**SDLC**) process for software development. Requirement analysis, estimation, planning, architecture and design, testing, automation, documentation, release, and post-release support are the different aspects of the SDLC. In the subsequent chapters, the topics mentioned in the previous chapters will be discussed. Managers will get an overview of what to expect and how to take care of various situations while the project is being executed. It will help to improve the overall execution of the project.

It has to be remembered that people are executing the project. These ambitious sets of people in the team have growth in mind: making more than their current remuneration, getting tasks challenging their skills, having a benign work culture, job safety, and good management. As we have heard, employees leave because of their managers, it is paramount that employees are cared for well. In countries like the USA and Japan, employees tend to stick to a company for a long time, while in countries like India, employees tend to have much less stickiness to a particular organization and are always on the move. The reason is that India has seen rapid growth in software development jobs, presenting new opportunities with a concentration of software jobs, mainly in Bengaluru, Gurgaon, and Hyderabad. Thus, it does not require relocating to a different location. Also, talented individuals do not guarantee a successful project execution since these engineers can work differently. A good project manager binds all the engineers and cross-functional teams to a common goal, which is the project's success.

Types of software development projects

There can be different types of software development projects; it can be either done in-house or outsourced to other companies.

Software development happens in two different types of organizations:

- Services organizations
- Product development organizations

Some of the domains of software development projects are as follows:

- ERP software development
- IT infrastructure
- Embedded software development
- Automotive software development
- Aerospace software development
- Mobile application software development

The ways these projects can be executed are as follows:

- In-house development with its own set of engineering
- In-house development with the contractor. Project management is done in-house.
- In-house co-development with a contracting team.
- Outsourcing the entire development to a contracting team.
- Outsourcing part of the development and keeping the core part of the development in-house.

The model of development depends on what is suitable for the organization. The following factors determine which model to follow:

- Cost is a major factor for decision-making.
- Expertise is not always available in-house.
- Time available for development.
- Maintenance versus development from the ground up.

Program vs. project

Each program can be very large, and it may not be possible to execute the program by a single monolithic team. Normally, the program is broken down into smaller components, each managed by a team. This team is fully responsible for delivering the program. A project manager's scope is limited to the part of the program the individual executes. However, a shrewd project manager normally has a high level of knowledge of what is happening in the program. This is to anticipate any risks and upcoming challenges in the program. A program comprises many teams, and the roles and responsibilities of the managers are discussed in the next section.

For example, let us say an e-commerce website development project is getting done. The entire program of website development can be managed by a program manager. Now,

the e-commerce website has many components. For example, shopping cart, catalogue management, supplier onboarding, billing, inventory, and many more. Each of these can be handled by different project managers. Or maybe 2-3 projects are handled by a single manager. The program manager helps to coordinate and synchronize different project managers and teams.

Roles and responsibilities

The roles and responsibilities of a team are as follows:

- **Project manager:** A project manager is responsible for executing the project within time and with quality. They should be able to keep their motivation high. A project manager may be managing a software or a hardware team.
- **Program manager:** A program manager executes the overall program. Normally, they coordinate across different teams and make sure the program succeeds. They have weekly team meetings and send signals to the higher management regarding the program's health.
- **IT manager:** IT managers make sure that the systems running the software components are available and running. They ensure that the systems are being monitored and take corrective actions.
- **QA manager:** A manager who is responsible for testing the system. There can be one or many QA managers in the system. They ensure that the product delivered is of good quality.
- **Documentation:** Documentation is primarily for products that are external and consumer-facing. If the product is made for another team, the development team can create the documentation and pass it on to the other team.
- **Support:** The project manager can take on the role of a support manager, or the support manager can be someone from the support team.

Refer to the following figure:

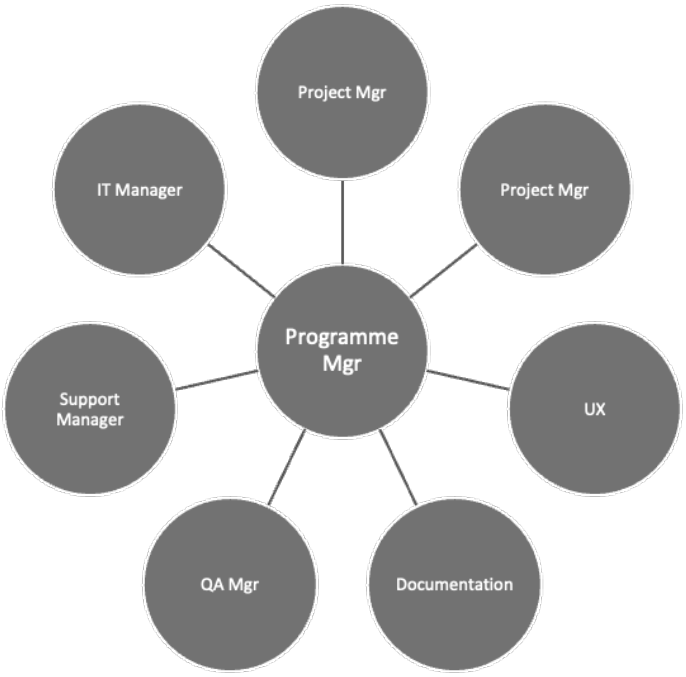

Figure 1.1: *Functional team composition*

The formula for reporting hierarchy in engineering is shown in *Table 1.1*:

Roles	Number of people	Role
Manager	8-10	Project execution, engineering team management
Senior manager	16-20	Project execution, managing 1 or 2 managers. Engineering team management
Director/ Deputy General Manager/ Program Manager	40-50	Project execution, managing 2 or more senior managers, resource balancing across multiple teams, setting priorities for the team.
Sr. Director/ General Manager/ Sr. Program Manager	80-100	Coordination across different directors, moving teams across, resourcing, visualizing future priorities.
Associate VP/BU Head/Group Manager	200-300	Typically, a business unit owner. Owns P&L of that particular unit. Usually works with the CFO
VP/ Organization Head/ Group Head	400-600	An organization head. Typically an organization looking into a particular domain.