**PROJECT**

A project is well-defined task, which is a collection of several operations done in order to achieve a specific goal (for example, software development and delivery). A Project can be characterized as:

* Every project may have a unique and distinct goal.
* Project is not routine activity or day-to-day operations.
* Project comes with a start time and end time.
* Project ends when its goal is achieved hence it is a temporary phase in the lifetime of an organization.
* Project needs adequate resources in terms of time, manpower, finance, material and knowledge-bank.

A [project](https://en.wikipedia.org/wiki/Project) is a temporary endeavor (try, work, effort, venture etc.) designed to produce a unique product, service, or result with a defined beginning and end (usually time-constrained, and often constrained by funding or staffing) undertaken to meet unique goals and objectives, typically to bring about beneficial change or added value

**PROJECT ATTRIBUTES**

A project has a unique purpose. Every project should have a well-defined objective

A project is temporary. A project has a definite beginning and a definite end

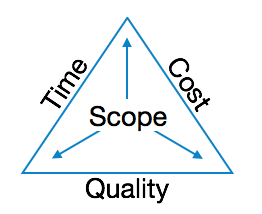
A project is developed using progressive elaboration or in an iterative fashion. Projects are often defined broadly when they begin, and as time passes, the specific details of the project become clearer

A project requires resources, often from various areas. Resources include people, hardware, software, or other assets.

A project should have a primary customer or sponsor. The project sponsor usually provides the direction and funding for the project.

A project involves uncertainty. Because every project is unique, it is sometimes difficult to define the project’s objectives clearly, estimate exactly how long it will take to complete, or determine how much it will cost.

**PROJECT CONSTRAINTS / TRADEOFF TRIANGLE / NEED FOR SPM**



Projects need to be performed and delivered under certain constraints. Traditionally, these constraints have been listed as scope, time, and cost. These are also referred to as the Project Management Triangle, where each side represents a constraint. One side of the triangle cannot be changed without impacting the others. A further refinement of the constraints separates product 'quality' or 'performance' from scope, and turns quality into a fourth constraint.

Basically, the Triple Constraint states that the success of the project is impacted by its budget, deadlines and features. As a manager of that project, you can trade between these three constraints; however, changing the constraints of one means that the other two will suffer to some extent.

The time constraint refers to the amount of time available to complete a project.

The cost constraint refers to the budgeted amount available for the project.

The scope constraint refers to what must be done to produce the project's end result.

These three constraints are often competing constraints:

increased scope typically means increased time and increased cost,

a tight time constraint could mean increased costs and reduced scope, and

a tight budget could mean increased time and reduced scope.

The discipline of project management is about providing the tools and techniques that enable the project team (not just the project manager) to organize their work to meet these constraints.

When you’re managing a project, some variables can change. Others can’t. The Triple Constraint gives you a firm sense of what can and can’t be adjusted throughout the course of the project.

For example, if you’re running behind schedule, you can work to reduce the features of the project. That’s reducing scope. Then you can dedicate more resources to moving the schedule ahead. That’s increasing cost. You can also, if possible, change the due date to give you more time. All these scenarios are applying the Triple Constraint for managing the project.

Another approach to project management is to consider the three constraints as finance, time and human resources. If you need to finish a job in a shorter time, you can allocate more people at the problem, which in turn will raise the cost of the project, unless by doing this task quicker we will reduce costs elsewhere in the project by an equal amount

**MANAGEMENT**

The best definition of Management refers to the optimal way to accomplish tasks and achieve goals, using Planning, Organizing, Staffing, Directing, and Controlling functions or processes

Management (or managing) is the administration of an [organization](https://en.wikipedia.org/wiki/Organization), whether it is a [business](https://en.wikipedia.org/wiki/Business), a [not-for-profit](https://en.wikipedia.org/wiki/Not-for-profit) organization, or government body.

Management includes the activities of setting the [strategy](https://en.wikipedia.org/wiki/Strategic_management) of an [organization](https://en.wikipedia.org/wiki/Organization) and coordinating the efforts of its [employees](https://en.wikipedia.org/wiki/Employee) (or of volunteers) to accomplish its [objectives](https://en.wikipedia.org/wiki/Goal) through the application of available [resources](https://en.wikipedia.org/wiki/Resource_(economics)), such as [financial](https://en.wikipedia.org/wiki/Financial), [natural](https://en.wikipedia.org/wiki/Natural_resources), [technological](https://en.wikipedia.org/wiki/Technological), and [human resources](https://en.wikipedia.org/wiki/Human_resources)

**PROJECT MANAGEMENT**

Project management is defined as the process of steering a project from the start through its lifecycle. The main objective of project management is to complete a project within the established goals of time, budget, and quality.

The primary challenge of project management is to achieve all of the project goals within the given constraints. This information is usually described in project documentation, created at the beginning of the development process. The primary constraints are [scope](https://en.wikipedia.org/wiki/Scope_(project_management)), time, [budget](https://en.wikipedia.org/wiki/Budget).

The secondary challenge is to [optimize](https://en.wikipedia.org/wiki/Operations_research) the [allocation](https://en.wikipedia.org/wiki/Resource_allocation) of necessary inputs and apply them to meet pre-defined objectives.

**Project management** is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.

Project management encompasses all the activities needed to plan and execute a project:

* Deciding what needs to be done
* Estimating costs
* Ensuring there are suitable people to undertake the project
* Defining responsibilities
* Scheduling
* Making arrangements for the work

**PROJECT MANAGEMENT PROCESSES FALL INTO FIVE GROUPS**

1. Initiating

Project managers begin each new project by defining the main objectives of the project, its purpose, and its scope. They also identify key internal and external stakeholders, discuss shared expectations, and gain the required authorization necessary to move a project forward.

Important questions that project managers ask during the initiating phase include:

* Why is the project important?
* What’s the specific problem we’re trying to solve?
* What is the desired outcome?
* What are the project’s success criteria?
* Who are the stakeholders on this project? Who is impacted by, or who impacts, this project?
* What are the requirements and constraints within this project?

2. Planning

Once the charter is approved, project managers work with key stakeholders to create an integrated project plan focused on attaining the outlined goals.

The plan established during this process helps project managers oversee scope, cost, timelines, risk, quality issues, and communications. It is during this phase that project managers will outline key deliverables and milestones and identify the tasks that must be completed to ensure smooth delivery of the project.

3. Executing

In the project execution phase, the project team members are coordinated and guided through proper project communication to get the work done as explained in the approved project management plan.

The project manager’s role is to assign this work and to ensure that tasks are completed as scheduled. The project manager will also typically:

* Protect the team from distractions
* Facilitate issue resolution
* Lead the team in working through project changes

4. Monitoring and Controlling

During the project monitoring and controlling phase, the time, cost, and performance of the project are compared at every stage and necessary adjustments are made to the project activities, resources, and plan to keep things on the right track.

In the monitoring and controlling phase, a project manager’s work includes:

* Monitoring the progress of a project
* Managing the project’s budget
* Ensuring that key milestones are reached
* Comparing actual performance against planned/scheduled performance

5. Closure or Completion

The process of finalizing the project, reviewing the project deliverables, and transitioning them to the business leaders is called the project closure phase.

During this phase, project managers strive to ensure all activities necessary to achieve the final result are completed. During the close of a project, project managers will:

* Work with the client to get formal sign-off that the project is complete
* Release any resources which are no longer required for the project
* Review the work of third-party vendors or partners in order to close their contracts and pay their invoices
* Archive project files for future reference and use

Outputs from this project management phase include approved project results and learnings that can be applied to similar projects in the future

**PROJECT MANAGEMENT KNOWLEDGE DRAWS ON TEN AREAS**

Project Management rules are governed by Project Management Body of Knowledge called [PMBOK](https://www.edureka.co/blog/pmbok-6th-edition-guide/). The 10 Knowledge Areas that have been defined in project management are:

1. **Managing integration:** Projects have all types of activities going on and there is a need to keep the “whole” thing moving collectively – integrating all of the dynamics that take place. Managing integration is about developing the project charter, scope statement, and plan to direct, manage, monitor, and control project change.
2. **Managing scope:** Projects need to have a defined parameter or scope, and this must be broken down and managed through a work breakdown structure or WBS. Managing scope is about planning, definition, WBS creation, verification, and control.
3. **Managing time/schedule:** Projects have a definite beginning and a definite ending date. Therefore, there is a need to manage the budgeted time according to a project schedule.  Managing time/schedule is about definition, sequencing, resource and duration estimating, schedule development, and schedule control.
4. **Managing costs:** Projects consume resources, and therefore, there is a need to manage the investment with the realization of creating value (i.e., the benefits derived exceed the amount spent).  Managing costs is about resource planning, cost estimating, budgeting, and control.
5. **Managing quality:** Projects involve specific deliverables or work products. These deliverables need to meet project objectives and performance standards. Managing quality is about quality planning, quality assurance, and quality control.
6. **Managing human resources:** Projects consist of teams and you need to manage project team(s) during the life cycle of the project. Finding the right people, managing their outputs, and keeping them on schedule is a big part of managing a project. Managing human resources is about human resources planning, hiring, and developing and managing a project team.
7. **Managing communication:** Projects invariably touch lots of people, not just the end users (customers) who benefit directly from the project outcomes. This can include project participants, managers who oversee the project, and external stakeholders who have an interest in the success of the project.  Managing communication is about communications planning, information distribution, performance reporting, and stakeholder management.
8. **Managing risk:** Projects are a discovery-driven process, often uncovering new customer needs and identifying critical issues not previously disclosed. Projects also encounter unexpected events, such as project team members resigning, budgeted resources suddenly changing, the organization becoming unstable, and newer technologies being introduced. There is a real need to properly identify various risks and manage these risks. Managing risk is about risk planning and identification, risk analysis (qualitative and quantitative), risk response (action) planning, and risk monitoring and control.
9. **Managing procurement:** Projects procure the services of outside vendors and contractors, including the purchase of equipment. There is a need to manage how vendors are selected and managed within the project life cycle. Managing procurement is about acquisition and contracting plans, sellers’ responses and selections, contract administration, and contract closure.
10. **Managing stakeholders:** Every project impacts people and organizations and is impacted by people and organizations. Identifying these stakeholders early, and as they arise and change throughout the project, is a key success factor. Managing stakeholders is about identifying stakeholders, their interest level, and their potential to influence the project; and managing and controlling the relationships and communications between stakeholders and the project.

**SOFTWARE PROJECT**

A Software Project is the complete procedure of software development from requirement gathering to testing and maintenance, carried out according to the execution methodologies, in a specified period of time to achieve intended software product.

**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 are planned, implemented, monitored and controlled.

It is a procedure of managing, allocating and timing resources to develop computer software that fulfills requirements.

**GOALS OF SOFTWARE PROJECT MANAGEMENT**

• End results of the project satisfy the customer’s needs

• All the desired and the needed product/project attributes (quality, security, productivity, cost, schedule, etc.) are met

• Team members are operating effectively and at a high level of morale

• Required tools and other resources are made available and are effectively utilized

**PROBLEMS WITH SOFTWARE BASED PROJECT MANAGEMENT / NEED OF SOFTWARE PROJECT MANAGEMENT**

Software is said to be an intangible product. Software development is a new stream in business and there is very little experience in building software products. Most of the software products are made to fit client’s requirements. The most important is that the basic technology changes and advances so frequently and rapidly that experience of one product may not be applied to the other one. Such type of business and environmental constraints increase risk in software development hence it is essential to manage software projects efficiently.

It is necessary for an organization to deliver quality product, keeping the cost within client’s budget constrain and deliver the project as per scheduled. Hence in order, software project management is necessary to incorporate user requirements along with budget and time constraints.

Software project management focuses on developing a product that will have a positive effect on an organization. Without project management, a software development team may begin working on a project without any clear vision or guidance, resulting in more frequent errors and confusion.

**PROJECT MANAGEMENT VS SOFTWARE PROJECT MANAGEMENT**

Project Management is a general term that covers all forms of project management. Software project management is a unique form of project management for managing a software development project.

Project management in software engineering is distinct from traditional project management in that software projects have a unique lifecycle process that requires multiple rounds of testing, updating, and customer feedback. Most IT-related projects are managed in the agile style, in order to keep up with the increasing pace of business, and iterate based on customer and stakeholder feedback.

Project Management is a structured approach usually using the traditional plan-driven waterfall approach.

Software Project Management is strongly influenced by changing requirements during the execution of the project and the use of Agile methodology to accommodate the changes.

Software development project management requires strategic communication first of all. To some extent, you need to drive the decision for your clients and take responsibility for the end results.

**ROLE OF PROJECT MANAGER**

The project manager plays a critical role in the leadership of a project team in order to achieve the project's objectives. The project manager’s role can be wide in range and include full responsibility for the successful start, design, planning, control, execution, tracking and finalizing of a project. These professionals work in many industries and use traditional ‘waterfall’ as well as agile (such as ‘scrum’) project management methodologies.

In addition to any specific technical skills and general management proficiencies required for the project, project managers should have at least the following attributes.

* Knowledge about project management, the business environment, technical aspects and other information needed to manage the project effectively.
* Skills needed to effectively lead the project team, co-ordinate the work, collaborate with stakeholders, solve problems and make decisions.
* Abilities to develop and manage scope, schedules, budgets, resources, risks, plans, presentations and reports
* Other attributes required to successfully manage the project such as personality, attitude, ethics and leadership.

The role of a project manager is distinct from that of a functional manager or operations manager. Typically, the functional manager focuses on providing management oversight for a functional or business unit. Operations managers are responsible for ensuring that business operations are efficient. The project manager is the person assigned by the performing organization to lead the team that is responsible for achieving the project objectives.

**INTERPERSONAL SKILLS**

Interpersonal skills are the soft skills that a project manager must have to be effective on the project.

Eventually the key to the project success is you as a project manager along with the project team needs to focus on completing the activities on the project.

1. Leadership

Leadership is one of the important skills that a good project manager must possess.Highly developed leaders provide positive feedback and constructive criticism. They communicate the organization's vision clearly and briefly, and they provide opportunities for professional development while promoting a healthy, supportive company culture.

A leader is especially important at the beginning of a project to define the vision of the project and communicate this vision to the team. This helps all of the team members to get on board with the goals of the project. Good leadership skills will also keep the members inspired and motivated to do their best work.

2. Team Building

Team building is another essential skill for a good project manager to possess. The nature of a project is that there are people from various different departments involved. In most cases, these people have not had the opportunity to work together and they may not even be familiar with each other’s departments. If the project manager isn’t able to turn these individuals into a team that is focused on the same goal, the project may not reach it’s potential. Also, building a team where each member is comfortable in reaching out to the others will ensure small details don’t turn into larger issues later in the project.

3. Motivation

Eventually the project manager needs to understand what really motivates the team?

Encourage the team to do a good job always. Also make sure you recognize and compensate the good work. Good skills as a motivator will allow you to create an environment that allows team members to meet the objectives of the project while simultaneously being satisfied with the work they are accomplishing. Everyone is motivated differently. Your project will be much more successful if you can determine what motivates your team and act on it.

4. Communication

Great communication skills are key to not only improving the relationships among all project team members, but also to establish trust and keep everyone motivated and on schedule. Usually there are many stakeholders involved in a project and they must all be kept up to date on the status, timelines, progress, risks and issues associated with the project. A good project manager and PMP must communicate all of these details to project stakeholders in a timely fashion and in the format that they expect to receive it in.

Project managers must also be able to properly communicate with senior management in their organization.

5. Influencing

Influencing is a critical interpersonal skill for project managers. All interactions with stakeholders involve influence. Successful project managers both recognize this and use a variety of influencing techniques. The project manager needs to work as a role model for the team. The way you behave, your ways of working with stakeholders should set the standard for the team. As a project manager, you lead by example. This way, the project team will learn from you on how to behave in different situations with the stakeholders

The role of a project manager is to bring together people from various departments and getting everyone to work together toward a common goal. A good project manager will use his/her skills to influence people and help them to come to an agreement.

6. Decision Making

There are many skills that a successful project manager may develop and among them is good decision making abilities.

Decision making tell you how to handle different situations occur in the project. Following are few basic decision making techniques

1. Command – Sometimes you make the decision for your team. And the team follows the decision.
2. Consultation – Consult the team members for their opinion on your decision and based on their inputs, you would finalize the decision.
3. Consensus – Discuss with few options with team and get all of the team members agree to one decision among the options.
4. Coin flip – Randomly selecting one of the options as the decision.

Having a decision making model will facilitate this process. Since there are so many people involved in the project who may not agree on a decision, having a process to follow can be very helpful to gain consensus with the group.

7. Political and Cultural Awareness

In today’s world, project managers operate in an environment that is more globally focused than in the past. Majority of the organizations introduced the concepts of virtual teams, who are scatter across the locations of the globe. As a project manager you need to understand different cultural backgrounds of your team members and other stakeholders. This will help the project manager to deal with team members efficiently.

Furthermore, it is important to recognize the politics involved in the project environment. Using political skills can help a project manager be very successful. Ignoring or avoiding politics and inappropriate use of power lead to difficult projects.

8. Negotiation

The nature of the role of a project manager makes it essential for them to have good negotiation skills. There are usually many stakeholders involved in the project and most projects have team members from different departments. This usually results in several different points of view which can sometimes make it difficult to keep the project on track and within the original scope.

There are many negotiation skills that you should be able to use related to negotiation. These include being able to analyze each situation, being an active listener and clearly communicating throughout the discussion.

Above all, skilled negotiators have the ability to manage the situation so that all parties involved feel as their sayings were taken into consideration.

9. Trust Building

Eventually building trust among the team members and other stakeholders of the project is key to success of the project.

To build trust the project manager needs to be open, unbiased and effective in problem solving. Team member should feel free to come to him for any problems that they face in the project.

Even in tough situations keep your team members informed on your decisions and justifications behind these decisions.

10. Conflict Management

Conflict is almost inevitable on a project. Project team members and stakeholders may have different opinions, areas of expertise, interests, personalities, work styles etc

As a project manager you need to understand the root cause of the conflict and try to resolve the root cause.

If lead properly, conflict can some time lead to better solutions.

There are many styles or behaviors that a project manager can choose to adopt when managing conflict. You can be assertive, accommodate, avoid or compromise. Using these techniques, project manager should be able to resolve the conflicts successfully, and ensure the all the parties are satisfied with problem resolution.

11. Coaching

Often you see situations where team members are not able to perform a required task due to the lack of skills.

As a project manager you need to identify those skill gaps and organize for formal or informal trainings to boost their performance.

Coaching and provide training is also treated as one of powerful motivation factors in the team.

**AREAS OF EXPERTISE**

In order for you, as the project manager, to manage the competing project constraints and the project as a whole, there are some areas of expertise you should bring to the project team. They are knowledge of the application area and the standards and regulations in your industry, understanding of the project environment, general management knowledge and skills, and interpersonal skills.

### **Application knowledge, Standards & Regulations**

Some projects require specific skills in certain application areas. These application areas are usually concerned with disciplines, regulations, and the specific needs of the project, the customer/client, or the industry. Having some level of experience in the application area you’re working in will give you an advantage when it comes to project management.

By standards, we mean guidelines or preferred approaches that are not necessarily mandatory. In contrast, when referring to regulations we mean mandatory rules that must be followed, such as government-imposed requirements through laws. Every industry has standards and regulations. Knowing which ones affect your project before you begin work will not only help the project to unfold smoothly, but will also allow for effective risk analysis.

### **Understanding the Project Environment**

There are many factors that need to be understood within your project environment. At one level, you need to think in terms of the cultural and social environments (i.e., people, demographics, and education). The international and political environment is where you need to understand about different countries’ cultural influences. Then we move to the physical environment; here we think about time zones. Think about different countries and how differently your project will be executed there.

Project managers in multicultural projects must appreciate the culture dimensions and try to learn relevant customs, courtesies, and business protocols before taking responsibility for managing an international project. A project manager must take into consideration these various cultural influences and how they may affect the project’s completion, schedule, scope, and cost.

### **Management Knowledge and Skills**

As the project manager, you have to rely on your project management knowledge and your general management skills. Here, we are thinking of items like your ability to plan the project, execute it properly, and control it and bring it to a successful conclusion, along with your ability to guide the project team to achieve project objectives and balance project constraints.

Inherent in the process of project management are the general management skills that allow the project manager to complete the project with some level of efficiency and control. In some respects, managing a project is similar to running a business: there are risk and rewards, finance and accounting activities, human resource issues, time management, stress management, and a purpose for the project to exist. General management skills are needed in every project.

### **Interpersonal Skills (11)**