**Project Planning and Management**

**What is Management?**

Basically, the management involves the following activities:

􀂐 **Planning**- deciding what is to be done

􀂐 **Organizing**- making arrangements

􀂐 **Staffing**- selecting the right people for the job

􀂐 **Directing**- giving instructions

􀂐 **Monitoring**- checking on progress

􀂐 **Controlling**- taking action to remedy hold-ups

􀂐 **Innovating**- coming up with new solutions

􀂐 **Representing**- liaising with users, etc.

**1.2 What is Project Management?**

Project Management is the art of maximizing the probability that a project delivers its goals on **Time**, to **Budget** and at the required **Quality**. The art of planning for the future has always been a human trait. In essence a project can be captured on paper with a few simple elements: a start date, an end date, the tasks that have to be carried out and when they should be finished, and some idea of the resources (people, machines etc) that will be needed during the course of the project. Project management is the **application of knowledge, skills, tools, and** **techniques** to project activities to meet project requirements. Project management is accomplished through the use of the processes such as: initiating, planning, executing, controlling, and closing. It is important to note that many of the processes within project management are iterative in nature. This is in part due to the existence of and the necessity for progressive elaboration in a project throughout the project life cycle; i.e., the more you know about your project, the better you are able to manage it.

Project management is also defined as a **strategic competency** that has successfully been applied in such high profile projects as the construction of silk root, organizing and managing the Olympics Games, and the construction of Islamabad-Lahore motorway, just to name a few. If project management can play a major role in these success stories, just imagine what it might be able to do for your own organization.

The term project management is sometimes used to describe an organizational approach to the management of ongoing operations. This approach, more properly called **management by projects**, treats many aspects of ongoing operations as projects to apply project management techniques to them.

As discussed earlier, a project manager must understand what can go wrong and how to do it right. Reel has defined a 5 step process to improve the chances of success. These are:

* Start on the right foot: this is accomplished by putting in the required effort to understand the problem, set realistic objectives, build the right team, and provide the needed infrastructure.
* Maintain momentum: many projects, after starting on the right, loose focus and momentum. The initial momentum must be maintained till the very end.
* Track progress: no planning is useful if the progress is not tracked. Tracking ensures timely delivery and remedial action, if needed, in a suitable manner.
* Make smart decisions
* Conduct a postmortem analysis: in order to learn from the mistakes and improve the process continuously, a project postmortem must be conducted.

**Critical Practices**

The Airlie Council has developed a list of critical success practices that must be present for successful project management. These are:

* Formal risk analysis
* Empirical cost and schedule estimation
* Metrics-based project management
* Earned value tracking
* Defect tracking against quality targets
* People aware project management

Finding the solution to these practices is the key to successful projects. We’ll therefore spend a considerable amount of time in elaborating these practices.

## Software Size Estimation

The size of the software needs to be estimated to figure out the time needed in terms of calendar and man months as well as the number and type of resources required carrying out the job. The time and resources estimation eventually plays a significant role in determining the cost of the project.

Most organizations use their previous experience to estimate the size and hence the resource and time requirements for the project. If not quantified, this estimate is subjective and is as good as the person who is conducting this exercise. At times this makes it highly contentious. It is therefore imperative for a government organization to adopt an estimation mechanism that is:

1. Objective in nature.
2. It should be an acceptable standard with wide spread use and acceptance level.
3. It should serve as a single yardstick to measure and make comparisons.
4. Must be based upon a deliverable that is meaningful to the intended audience.
5. It should be independent of the tool and technology used for the developing the software.

A number of techniques and tools can be used in estimating the size of the software. These include:

1. Lines of code (LOC)
2. Number of objects
3. Number of GUIs
4. Number of document pages
5. Functional points (FP)

**Project Scheduling and Tracking**

**Defining a Task Network**

Once the tasks have been identified, we need to develop a task network to determine the sequence in which these activities need to be performed. This will ultimately lead to the time required to complete the project (to be discussed later). The following diagram shows the task network for the above project.

1.1

Concept

scoping

1.2

Concept

Planning

1.3a

Tech. risk

assessment

1.3b

Tech. risk

assessment

1.3c

Tech. risk

assessment

1.4

Proof of

Concept

1.5a

Concept

Implement.

1.5b

Concept

Implement.

1.5c

Concept

Implement.

1.6

Integrate

1.7

Customer

reaction

## Scheduling

Once we have the task network, we are now ready to prepare a schedule for the project. For this we use two techniques known as:

* Program evaluation and review techniques (PERT)
* Critical Path Method (CPM)

These are quantitative tools that allow the software planner to determine the critical path – the chain of tasks that determines the duration of the project and establish most likely time estimates for individual tasks by applying statistical models. They also help the planner to calculate boundary times that define a time window for a particular task.

The boundary time defines the following parameters for a project:

* The earliest time that a task can begin when all preceding tasks are completed in the shortest possible time
* The latest time for task initiation before the minimum project completion time is delayed
* The earliest finish
* The latest finish
* The total float – the amount of surplus time or leeway allowed in scheduling tasks so that the network critical path is maintained on schedule

In order to use the PERT and CPM, the following is required:

* A decomposition of product function
* A selection of appropriate process model and task set
* Decomposition of tasks – also known as the work breakdown structure (WBS)
* Estimation of effort
* Interdependencies

**Timeline Chart**

To develop the schedule for a project, time required for each activity in the Task Network is estimated. This analysis and decomposition leads to the development of a Timeline or Gantt Chart for the project which portrays the schedule for the project. As an example, let us assume that Concept Scoping (the first task in the above list) is further subdivided into the following sub-tasks with the associated estimated time requirements:

1. Identification of needs and benefits (3 days)
2. Definition of desired output/control/input (7 days)
3. Definition of the function/behaviour (6 days)
4. Isolation of software elements (1 day)
5. Researching availability of existing software (2 days)
6. Definition technical feasibility (4 days)
7. Making quick estimate of size (1 day)
8. Creating scope definition (2 days)

We also assume that the following task network for this was developed.

1.1.1

Identification of needs and benefits

1.1.2

Definition of desired output/control/input

1.1.3

Definition of the function/behaviour

1.1.4

Isolation of software elements

1.1.5

Researching availability of existing software

1.1.6

Definition technical feasibility

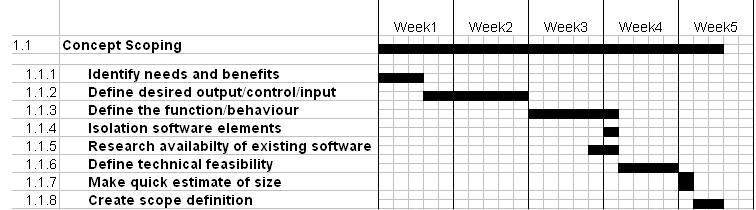
1.1.7

Making quick estimate of size

1.1.8

Creating scope definition

This is now converted in the following schedule in the form of a Gantt Chart. Note that, the concept of boundary time allows us to schedule Task Numbers 1.1.4 and 1.1.5 anywhere along Task Number 1.1.3. The actual time is determined by the project manager is based upon the availability of resources and other constraints. Each task is further subdivided in sub-tasks in the same manner until the schedule for the complete project is determined.



**Tracking a Schedule**