Project Planning

Planning is an important step in project execution. Planning means:

- Thinking through future project actions
- Seeking and mentally inspecting the long path from the start to the finish
- Achieving the desired goal by means of available resources.

A systematic, goal-oriented planning based on the functional specification is the foundation of every successful implementation. In order to reach the goals specified in the functional specification, planning must be carried out carefully, step by step, and realistically.

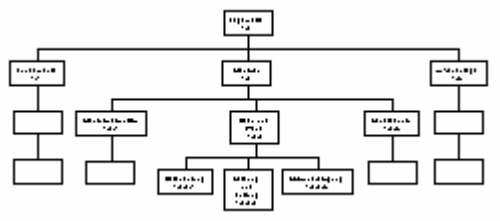
Planning is not a static process, it is dynamic. In the planning phase once established planning data must often be changed in the subsequent planning steps based on newly gained knowledge.

The planning process itself is a part of the total project and often takes place over a long period of time. Depending on the scope of the project, extensive human and financial resources will have to be utilized.

In order to obtain an overview of the entire scope, the project is broken down into comprehensible, definable elements. The elements are then put into order. The ordered elements are combined in a hierarchical outline to form a work breakdown structure (WBS).

The work breakdown structure is usually composed of:

- Total project
- Partial project
- Main work package
- Work package



Project

Partial project

Main work package

Work package

The work breakdown structure can usually be prepared based on the object (modules/components), the function (activities) or a mixture of the two (objects and functions).

It is conceivable, however, that the work breakdown structure may be structured in phases; this would then be a time-based structure.

Describe what needs to be done - not how - and to enough of an extent that the following planning steps can be carried out.

With the following questions you can check the work breakdown structure with regard to the completeness and feasibility of the project:

- Does processing the work packages lead to the goals of the project?
- Is every work package clearly defined according to the desired results, schedule and costs?
- Is it possible to assign the work packages to individual members of the project teams?

As soon as the work breakdown structure is complete, it forms the basis for the execution, scheduling, capacity and cost planning.

Then, the project organization must be established for every project. This is used to implement the tasks shown in the work breakdown structure.

In project organization the cooperation of the stakeholders is regulated, and decision-making processes between the project roles are stipulated.

The RAM Matrix is a helpful means to achieve this. RAM stands for Responsibility – Assignment – Matrix. After this matrix has been set up, every project participant will know what he is responsible (R) for, what he is participating in or supporting (S), and where to obtain information (N).

Example of a RAM Matrix

Work package	Steering committee	Project manager	Team member	Technical supervisor
Sub-task 1		**R**	**S**	**N**
Sub-task 2	**R**	**N**		**S**

After it has been determined what must be done, a sequence for processing the work packages must be established.

A project sequence plan must now be prepared, and the following questions must be answered:

- In which logical order should the work packages be completed?
- Which work packages can be processed at the same time?
- How much capacity and time is required for processing the work packages?

Now it is necessary to conduct an expense estimate, i.e. how many hours are needed for processing the work packages. At the very latest you will see at this point whether you have planned the work packages with sufficient detail in your work breakdown structure.

If necessary, supplement your work breakdown structure.

The general planning is complete with the work breakdown structure and the project sequence plan. And, with these results, we proceed from the general to the detailed and are now in the position to prepare a project schedule.

The schedule provides information on when certain work results must be available, and from whom. Each work package shows the following information:

- starting and ending dates
- the persons in charge, and all stakeholders.

Depending on the complexity of the project, the presentation of the chronological course of the project can be made by using various instruments.

Tabular list:

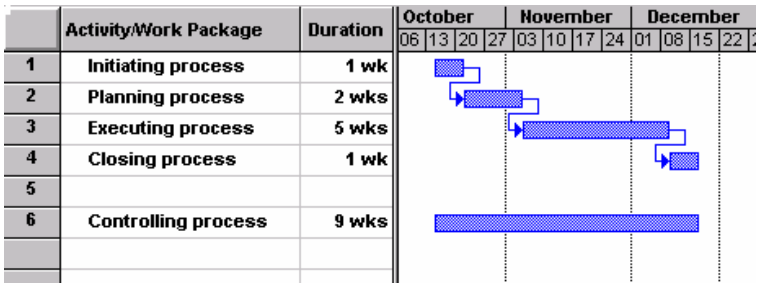
The work packages are listed in the order of processing, with deadlines and stakeholders. This is an adequate

instrument for simple projects.

Bar chart (Gantt Chart):

The work packages are represented as bars along a time axis. The length of the bars corresponds to duration and provides a clear, visual overview of the time spent on the work packages, as well as on the overall project.

When the project is more complex, or has many interdependent relationships and/or difficult links, the use of



	Activity/Work Package	Duration
1	Initiating process	1 wk
2	Planning process	2 wks
3	Executing process	5 wks
4	Closing process	1 wk
5		
6	Controlling process	9 wks

network plans for the overall project or parts thereof has shown good results. The most well-known techniques include:

- Critical Path Method (CPM)
- Program Evaluation and Review Technique (PERT)

The resources required for project work are allocated to the available employees, machinery and plants in resource planning. The result is a total overview in the form of a resource plan, of all resources required for the execution of the project by the scheduled deadlines during the whole course of the project.

This information is required by all project stakeholders and functional departments in order to be able to schedule the estimated processing costs and work load.

Depending on the project task you need financial resources to cover the costs for materials, external services, external personnel, investments, etc. The costs are determined per work package and presented as a general overview. This creates the basis for the project evaluation which is to be carried out within the scope of project control.

Since there are significant interdependencies between scheduling, capacity and cost planning, it is necessary to adjust the planning many times.

At this point the following goal conflicts will become clear:

- generally insufficient availability of time, resources, money
- not available by scheduled date
- capacity peaks cannot be covered.

The consequence? Optimization of the entire planning!

When you have reached this point it is necessary to optimize the entire planning, beginning with the execution and scheduling, and without affecting the date for project conclusion.

After several reviews you may discover a goal conflict, i.e. the desired objective cannot be completed with available resources by the scheduled deadline .

The conclusions to be drawn from this goal conflict must be weighed carefully in each individual case.
The quality planning specifies which requirements must be fulfilled in order to achieve the objective. Objectives in this context does not just mean components and modules, but engineering services as well. That means: quality must be planned, checked and assured. Every service must be described in a way that makes it possible to measure the result during the acceptance process. To review how this is to be reached, refer to the discussion in the chapter "goal setting".

An often neglected but still very important task within project planning consists in the investigation of the possible risks and difficulties which may occur during the execution of the project. Within the scope of a risk analysis, processes and conditions are analyzed within the project environment to determine whether they will have a negative influence on the project or part of it, or could endanger the quality, finances or schedule of the project.

If this is done early enough, difficulties and risks can often be avoided. It can reduce the consequences in any case.

Consider the alternatives and make arrangements with the stakeholders with regard to emergency and back-up plans.

Action is better than reacting.

To ensure that all project stakeholders have access to the same, required level of information, it is necessary to specify the information channels. It is also advisable to hold meetings with the stakeholders at regular intervals, as needed.
Relevant distribution lists must be created for the distribution of documents.

The procurement of the necessary human resources is often a considerable problem for many projects. Every project manager would like to have his own favorite candidates within the team. But, this is simply impossible in actual practice. In some cases his own personnel is not sufficient so that it becomes necessary to take appropriate remedial action. Personnel qualification, as well as training and further education are additional aspects departmental managers must also take into account.

The procurement of long delivery items or items from foreign suppliers and the fulfillment of customer specifications (nominated subcontractors, local supply, etc.) must be initiated well in advance. The selection of suppliers also belongs to the duties of the project manager in order to ensure the required level of quality.

Essential results of planning include:

- **Reliable statements on the course of the project**
- **Determination of critical factors in the course of the project to reduce risk during the project**
- **Ensuring goal-oriented use of all project resources**
- **Basis for efficient project control**