CERIC

PaGES[7]

Planning, Management and Execution of a Scientific Experiment in an international research infrastructure

Project management

A project is……

- a **unique task** designed to attain a specific result that requires a variety of resources and is limited in time;
- a **goal-oriented process** that involves the coordinated undertaking of interrelated activities;
- any **series of activities and tasks** that have a specific objective to be completed within **certain specifications**, have defined start and end dates, have funding limits (if applicable), consume human and nonhuman resources, and is multifunctional;
- a collection of **linked activities** carried out in an organised manner with a clearly defined start point and finish point to achieve some specific results that satisfy the needs of an organization as derived from the organization's current business plans;
- **sequence of unique, complex and connected activities** that have one goal and purpose that must be completed by a specific time, within budget, and according to specification.

Project features

Temporariness (limited in time) and has a clearly defined and agreed time limit, including start and end date.

Uniqueness – projects create unique products, services or results.

Goal orientation – a project is organised to achieve one or more objectives Limited - the project is limited by constraints such as quality, deadline and budget.

Complexity – a project may have a very complex goals, which require a lot of interrelated tasks, and a wide mix of people with different skills, roles and responsibilities. The complexity of the project requires careful coordination and control of time, cost and performance.

Connected and interdependent project tasks – a project consists of a series of related tasks to be carried out in order to deliver the required deliverable(s).

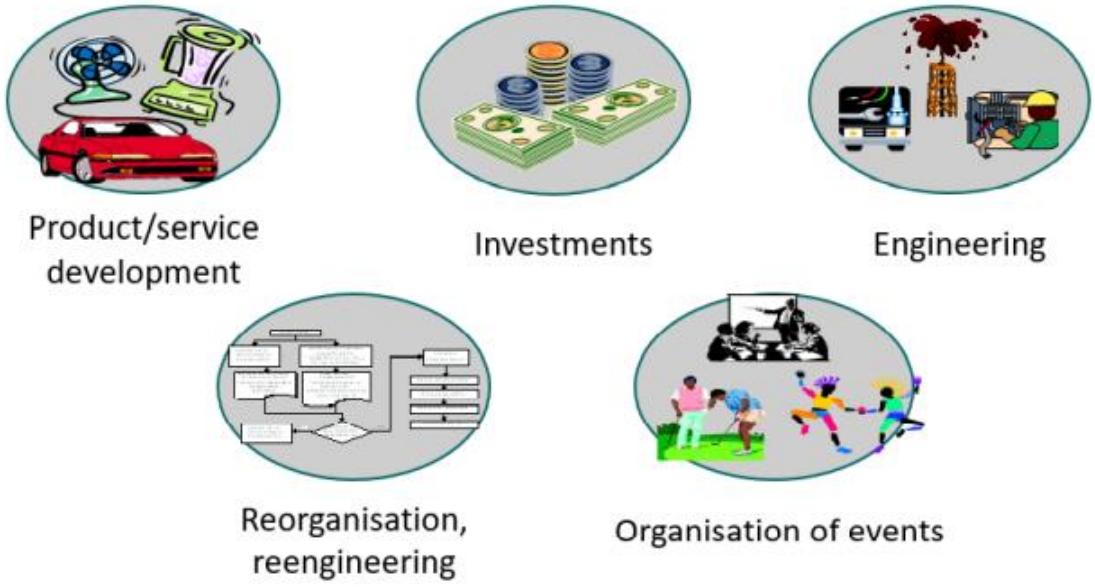
Conflict - project managers work in a much more conflicted environment than other managers. The project is an organisation within the organization. Individuals have two superiors (project and functional), who have different objectives and priorities.

Riskiness - is related to uniqueness and conflict (difficulties in implementation, change requirements by the client, weather, influential individuals, etc.)

Typical types of projects

Projects can be divided into **three main groups**:

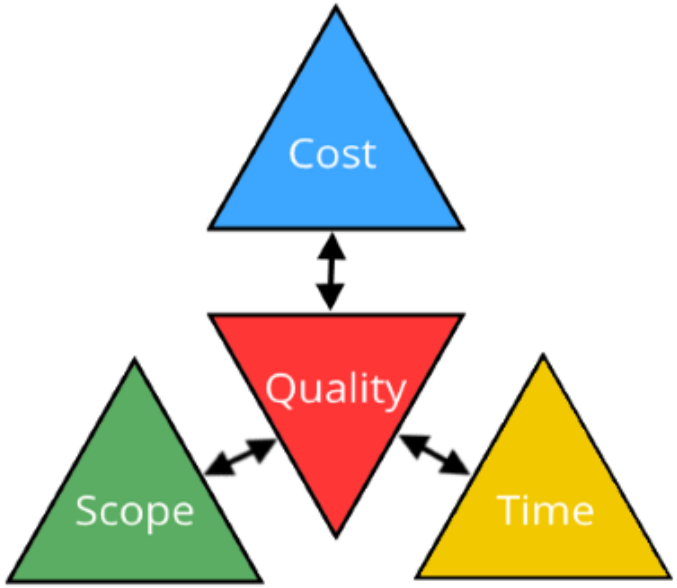
- investment projects
- research and development projects
- organisational projects



Project constraints

Project constraints are the general limitations that you need to account for during the project life cycle.

The triple constraints of project management—also known as the **project management triangle** or the iron triangle—are scope, cost, and time. You'll need to balance these three elements in every project, and doing so can be challenging because they all affect one another.



Project management in a nutshell

Among the first good examples of project management include the building and completion of the **Great Pyramid of Giza** in 2570 BC.
The building of the **Great Wall of China in 208 BC** can also be argued what is considered among the best examples of project management.
In 1917, one of the first fathers of project management, Henry Gantt, created a scheduling diagram called the **Gantt chart.**
In 1957, the **Critical Path Method (CPM)** was invented. Developed by the Dupont Corporation, CPM is used to estimate project duration and designed to address the complex method of shutting down as well as restarting chemical plants due to maintenance.
In 1958 the US Navy Special Projects Office designed **PERT (Program Evaluation Review Technique)** during the cold war. PERT is a method for analysing the tasks involved in completing a project, especially the time needed to complete each task and identifying the minimum time needed to complete the total project.
Another milestone happened in 1962, when the United States Department of Defense created and mandated the **Work Breakdown Structure (WBS) Approach** for its projects.

time

Project life cycle and project phases

a) the project manager is selected;
b) the project team is composed;
c) necessary resources are identified;
d) list of tasks is drawn;
e) an execution plan is prepared, and resources defined;
f) the project is executed;
g) the results are evaluated.

Burke, Charvat	Cleland, Frame, Dinsmore	Lewis	Meredith in Mantel	Thomsett	Morris & Pinto, Milosevic	Wysocki
Concept, analysis	Conceptualisation	Concept	Conception, selection	Feasibility	Conceptualisation	Scoping
Planning	Planning	Definition	Planning, scheduling	Analysis	Planning	Planning
		Planning				
Design	Execution	Execution	Monitoring, control	Design	Execution	Launching
Built, execute				Built, test		Monitoring, controlling
Closure	Termination	Closeout	Evaluation, termination	Ship	Termination	Closing

Project stakeholders

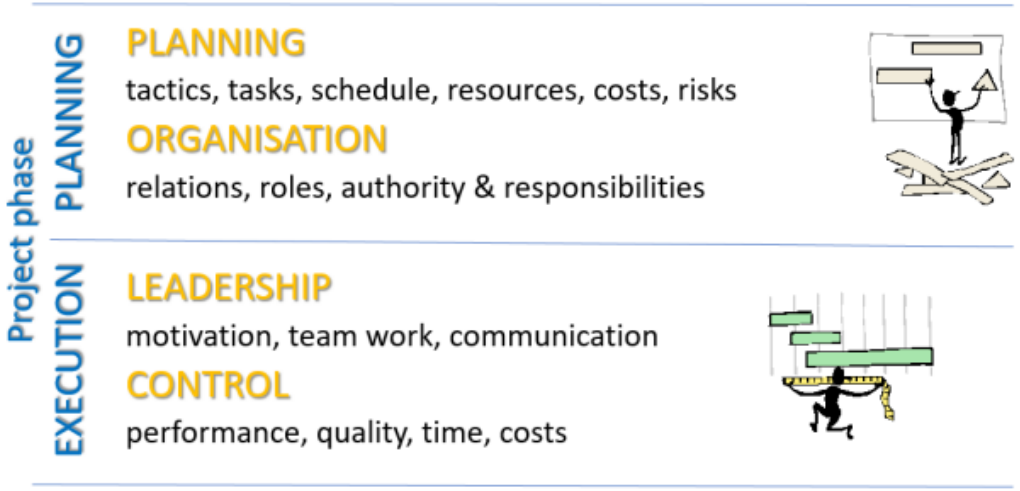
The project should meet the interests of different participants - **project stakeholders**

- Client;
- Users;
- Project team;
- Other involved persons from the enterprise where the project is implemented;
- Suppliers;
- Shareholders.
- Public entities;

Stakeholders are individuals or organizations that are actively involved in the project or whose interests may **positively or negatively affect the performance or completion of the project.**

Project management process

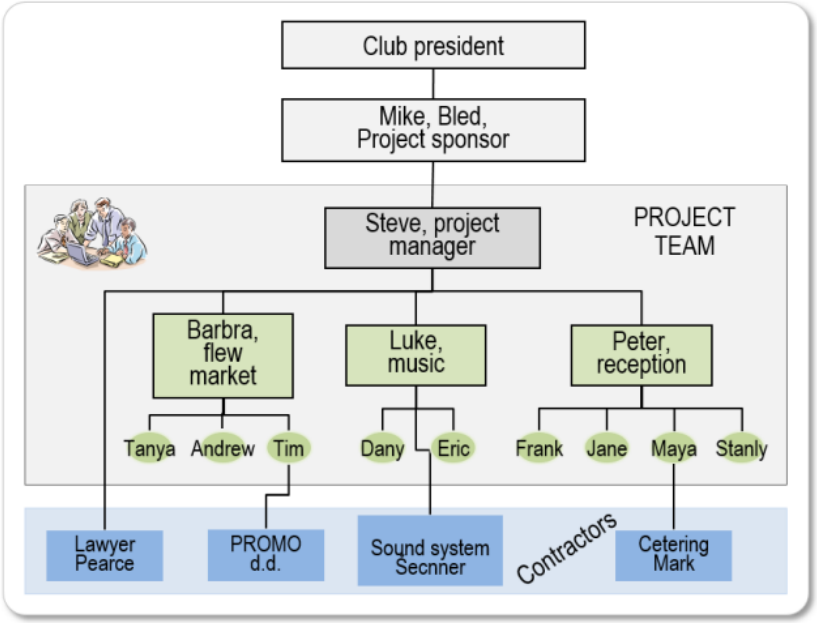
1) Planning:
- definition of the project execution tactics;
- preparation of the **work breakdown structure (WBS).** Determination of task sequences and linkages in combination with the estimated duration of the tasks (needed time for the execution of the individual tasks) also defines the task execution dates and the final deadline.
- Determination of the other resources required are determined (equipment, material, etc.), as basis for the project cost estimation.
- Addressing the potential risks and develops a contingency plan.
- A project control / quality assurance plan.
- the communication plan (transfer of information and documentation management)



Project management process

2) Organisation

The **resource breakdown structure** (RBS) is prepared in order to define the relations among project stakeholders, while an additional organisation chart determines the **relation of the project team and the organisation**, (matrix, project, etc.) which also determines the authority of the project manager.
Roles, authorities and responsibilities of the key project stakeholders are defined in more detail in the responsibility assignment matrix. Some authors also consider team rules as part of organisation (the way of reporting, communication, regular progress meetings, etc.)



Project management process

3) Team leadership

Team members are not the project manager's **permanent subordinate** staff (so e.g. project manager does not define their wages nor grant their leave), but rather are **temporarily assigned for the execution of project tasks** by line managers.

Therefore, high interpersonal relations are of great importance; leadership is based on the strength of personality rather than position, etc.

Relations and motivation of team members depend on leadership style, team work, and working atmosphere.

Leader need to promote direct, open and informal communication between all team members and to resolve any conflicts.

Project management process

4) Control

Includes three steps:

- determination of the **current level of performance**;
- **comparing** the situation with the plan;
- identifying the **deviations**, and **corrective measures** implementation to (re)ensure the project execution within its constraints, despite of the current deviations (e.g. the project delay).

The most common areas of control are the results of **work, time, costs, quality and risks**.

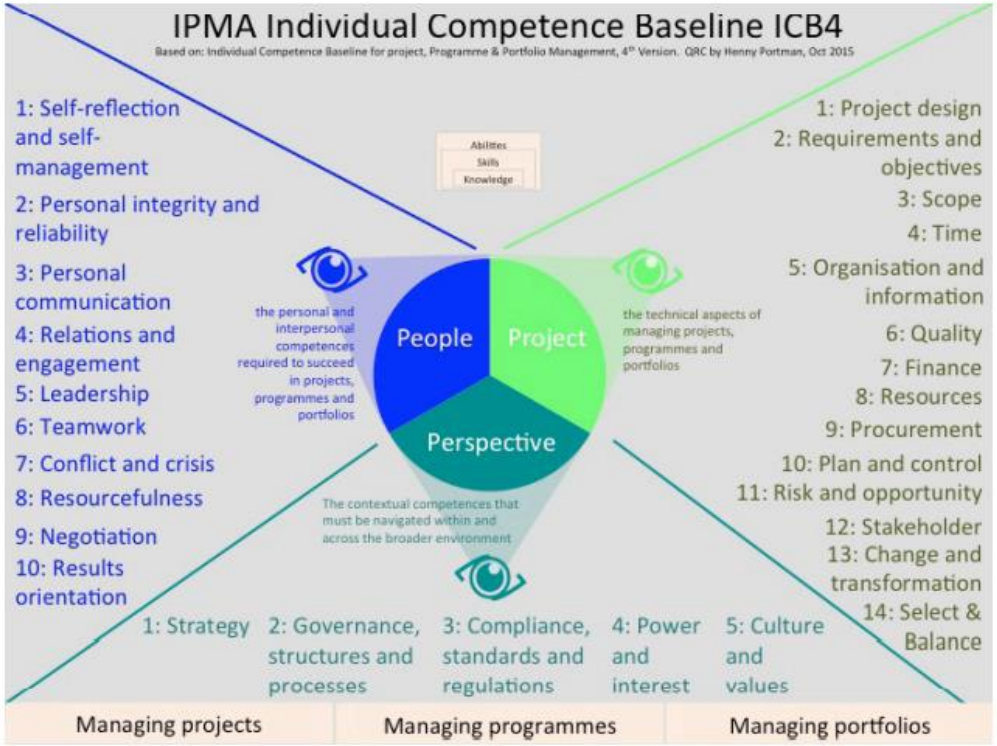
Project management knowledge area

GENERIC DEFINITION OF "MANAGEMENT" to be responsible for **controlling or organizing someone or something.**

Project manager

The project manager is the **holder of the project management functions** and is **responsible for the project execution**. The project manager is responsible for almost everything, so it is easier to determine for what he or she is not responsible. This is the most vital role of the entire project. The project manager should have the full support of top management and thus the necessary authority.

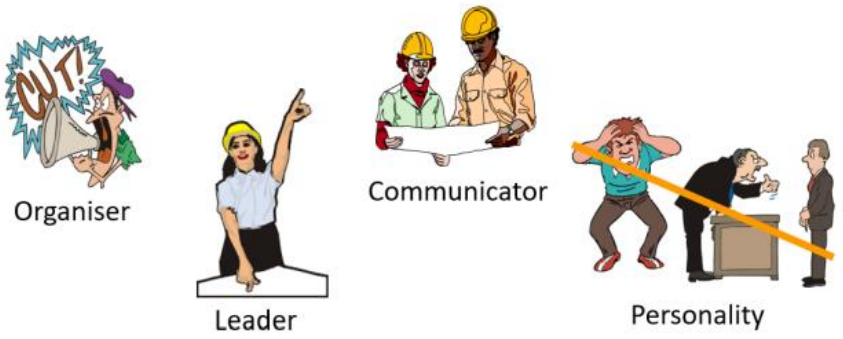
The International Project Management Association (IPMA) identifies **29 competencies** of an excellent project manager in three groups: practice (14), people (10), and perspective.



Project manager

and more…..

- choosing the **right team** members with the **appropriate skills**;
- ability to identify and understand **personalities** of team members;
- reconciliation of tasks objectives and personal goals of performers;
- creating a **real sense of responsibility** in a team;
- establishing **the interconnection of team members** and their commitment to the project;
- understandable **explanation of decisions** and effective reporting on project progress
- **coordination and management of contractors, suppliers and consultants**
- understanding the real needs of **end users**

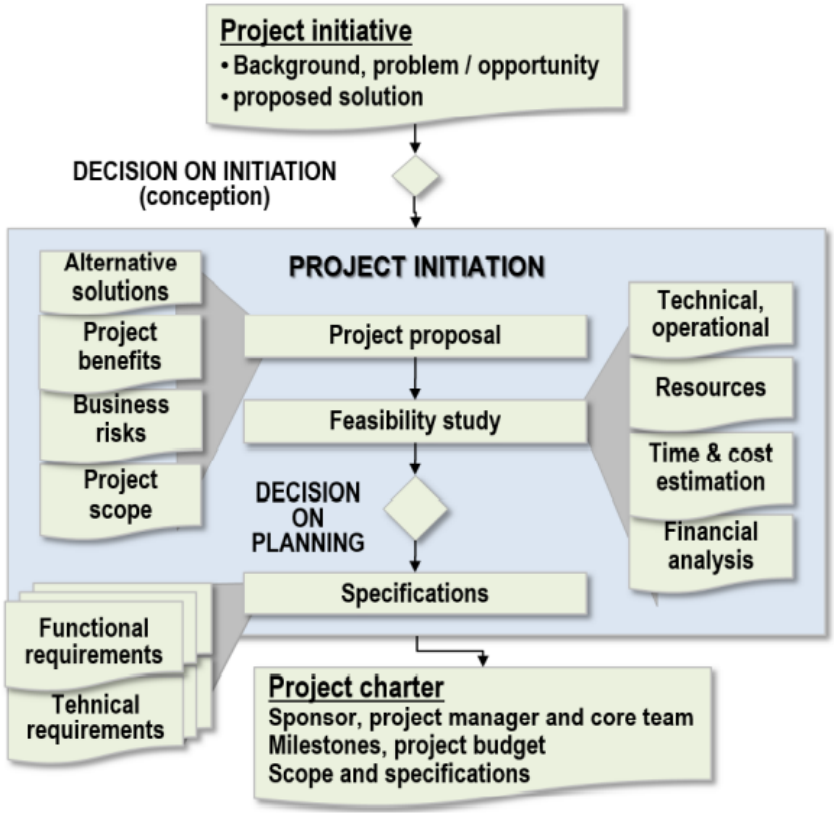


NO!

Technocrat, bureaucrat, “salesman”…

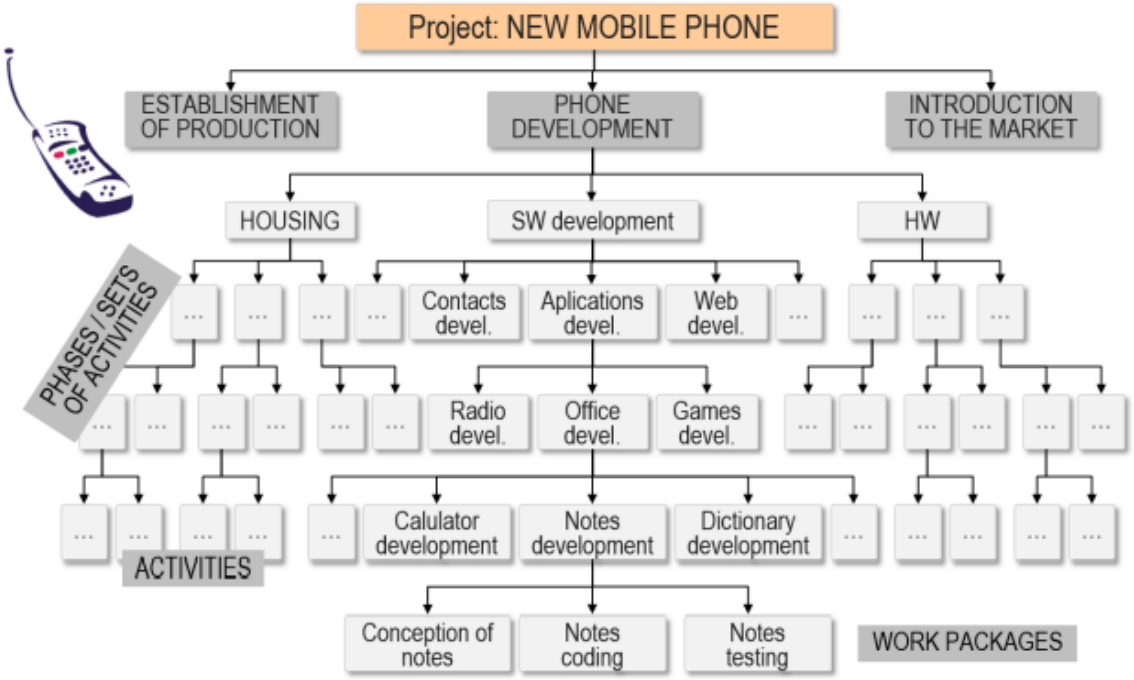
Project initiation

Project initiation is the **first phase of the project** in which the reasonableness and feasibility of the project is verified. This is done on the basis of expected business benefits, especially in comparison with the necessary resources and costs for implementation.



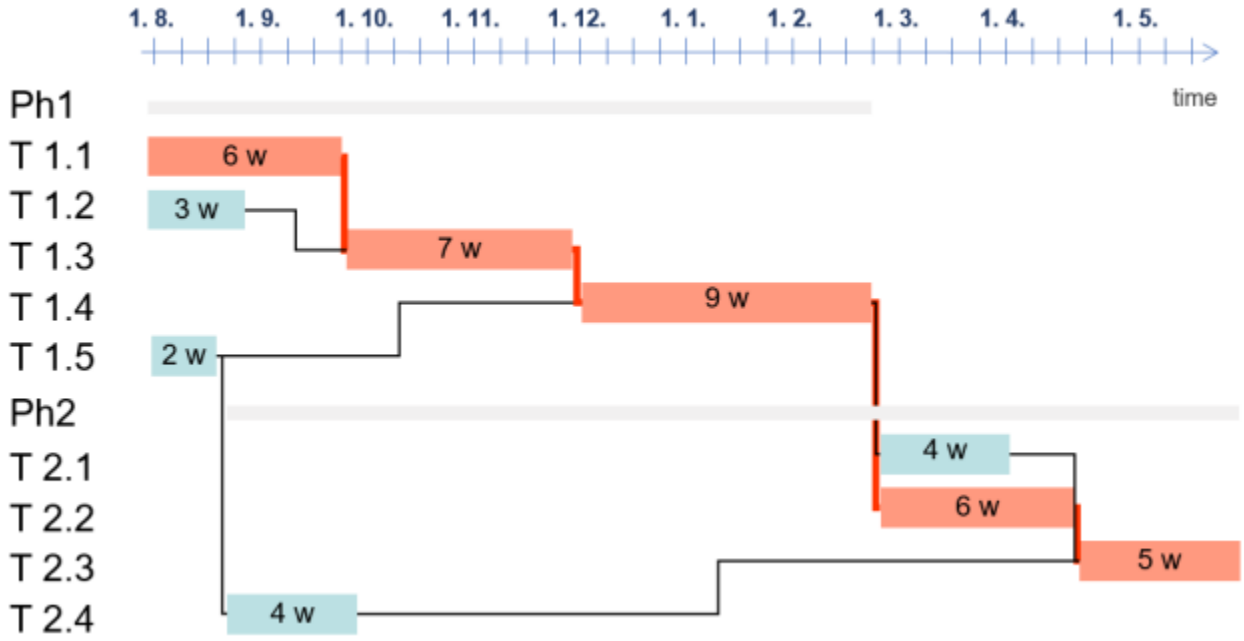
Project scheduling

Definition of the deadlines and duration of all tasks needed to achieve the objectives. It starts with defining of a list of tasks - **Work breakdown structure (WBS)** . When the start of project execution and the duration of all tasks are defined, the schedule in finished.



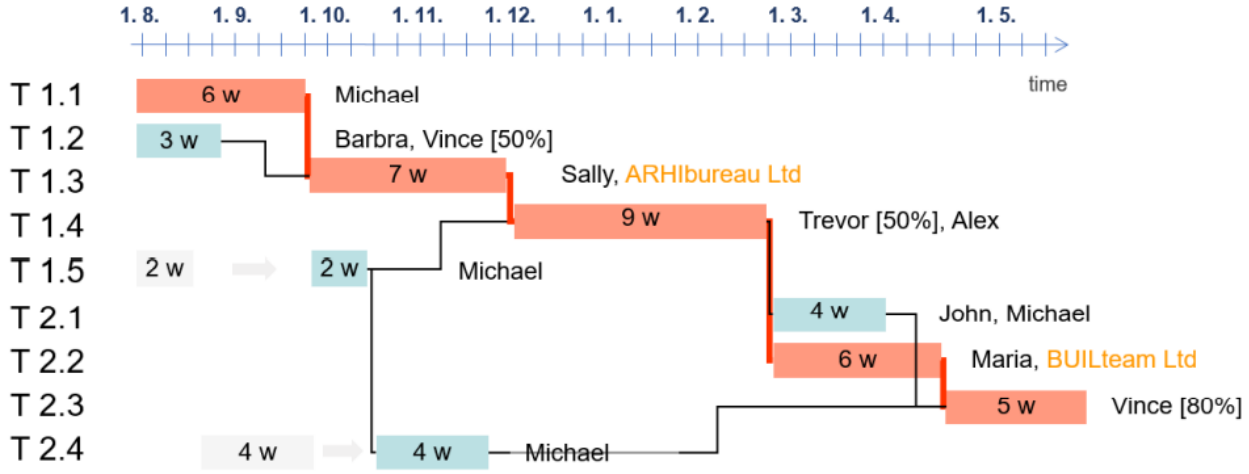
Project scheduling

The graphically displayed schedule is called a **Gantt chart**, and it is a basis (and a tool) for **monitoring/controlling the progress** of the project during the execution phase.



Resource planning

Task	HR	Outsourcing	Material	Equipment
T1.1	Michael (240h)			Test. device
T1.2	Barbra (120h), Vince (60h)		PVC, 5 kg	
T1.3	Sally (280h)	ARHIbureau Ltd	10 Prototipes	
T1.4	Trevor (180h), Alex (360h)			
T1.5	Michael (80h)			Assem. line
…			10 Sony µP	



Costs planning

Schedule and resource plan are the most important inputs for a detailed estimation of the project costs.
The team only needs to define the cost **(price)** of each planned resource.

Detailed assessment of the costs and the cost plan are needed for:

- ✓ checking indicative cost estimates, which were constructed during the initiation phase, correcting the value of the project, and verifying financial indicators
- ✓ final agreement on the project budget
- ✓ controlling costs in the execution phase
- ✓ defining the plan for project financing

A detailed cost estimation is used for verifying the financial indicators of the project.

Task	HR	Outsourcing	Material	Equipment
T1.1	4.800 €			12.400 €
T1.2	5.100 €		500 €	
T1.3	6.440 €	45.000 €	1.200 €	
T1.4	13.320 €			
T1.5	160 €			8.700 €
…			140 €	

Project risks

Even the most perfect plan cannot prevent unwanted events during the execution of a project!!!!

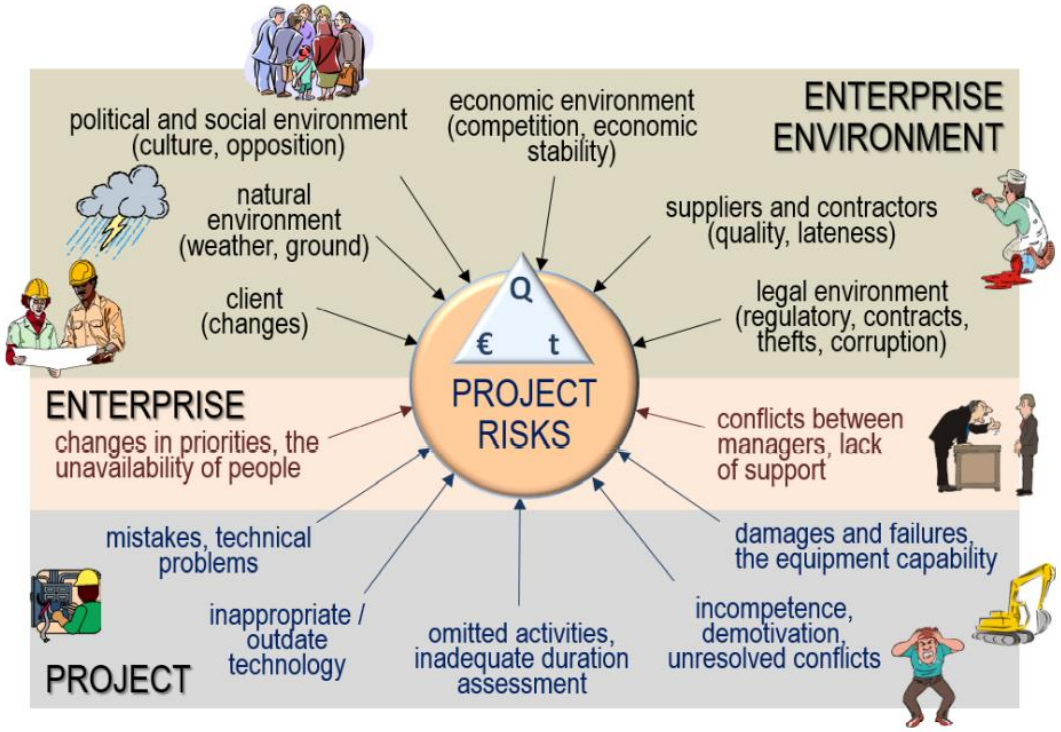
Phases:

› risk identification **(what can go wrong)**

› evaluation of risks **(how strong can affect the execution)**

› planning measures to reduce the risks **(can we prevent them or at least minimize their impact)**

› risks control and response to materialised risks **(early detection and intervention).**

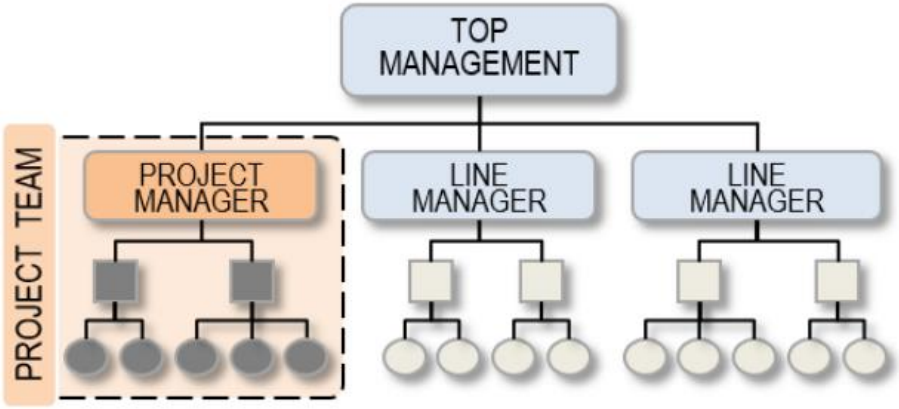


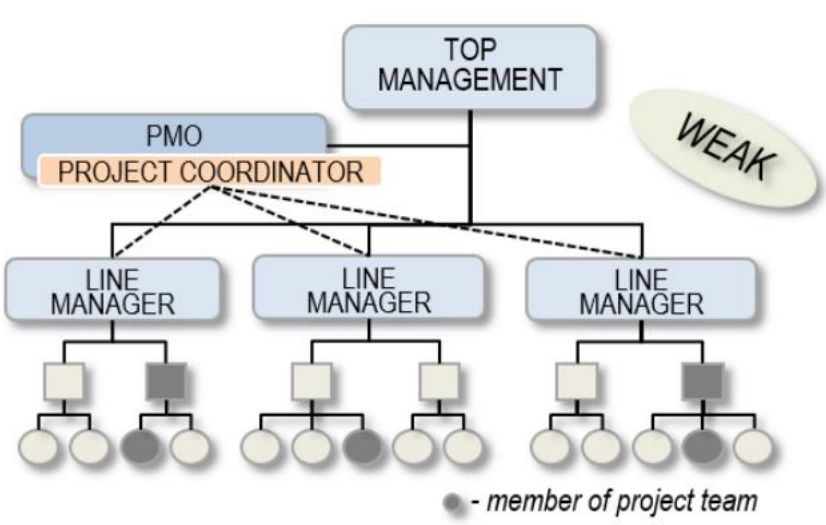
Procurement plan

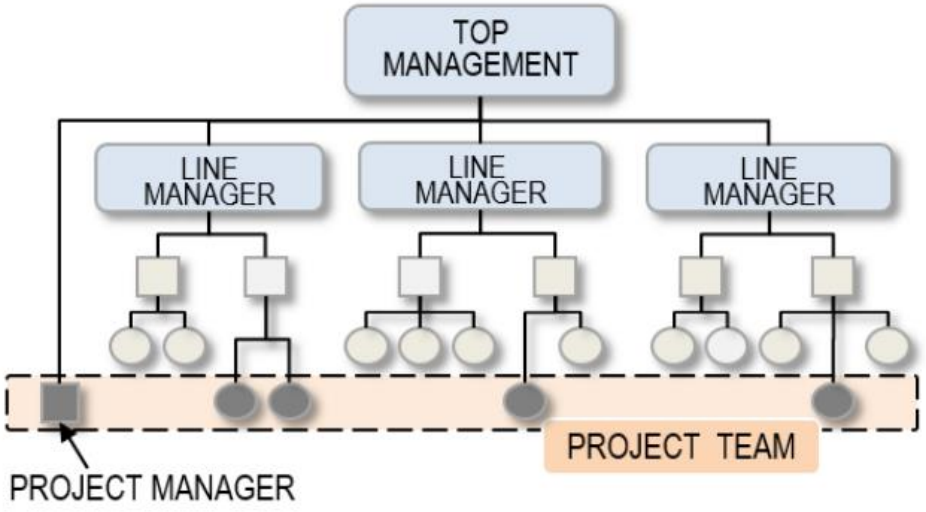
The typical **acquisition process** includes:

- ✓ preparation of the **specifications** of the expected deliverable;
- ✓ searching for **suitable contractors/candidates** and sending the demand (or publishing it on the web site, in newspapers, or other media);
- ✓ negotiations with **contractors / new employees** (in terms of price and time);
- ✓ **signing the contract** and **execution of the deal.**

Project organisation







Team rules

One of more important issues to be defined in the **team rules** is the way of **reporting**, particularly how team members report to the project manager, so one can be constantly up to date with the project progress.
The **frequency of reporting** is defined along with the information to be contained in the report and when the report should be written or given orally.

Procedures and rules should be established for team meetings, problem solving, decision making, conflict resolution, consensus building, and brainstorming.

The rules can also define any regular **collaboration with line managers**. For internal projects, collaboration with end users can be defined, while team interaction with **external clients** is usually defined in the contract. The same usually applies to **cooperation with contractors and consultants**.

Project team leader

Satisfied people make better use of their skills and abilities.

Satisfaction impacts their contentedness with the work they do, their environment (equipment, co-workers) and their superiors.

The leader delegates (right) tasks to subordinates, provides them equipment and maintain good relations among co-workers.

In a **matrix organisation**, team members are typically assigned to the project for a limited period of time determined by their line managers.

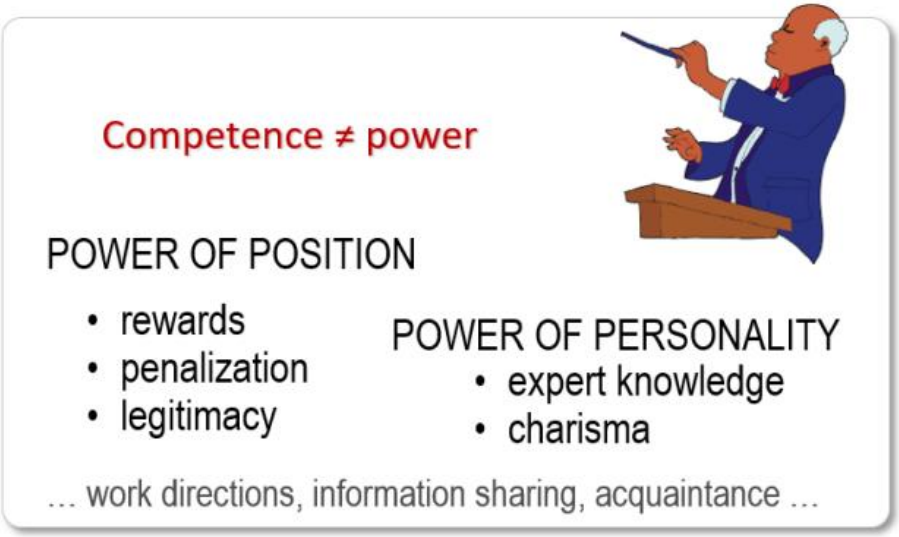
They are stronger and longer connected with their subordinates and know them better (their personality, abilities, etc.).
In addition, they determine their salary and bonuses, approve leave, etc.

Therefore, operational tasks that line managers delegate to team members have usually (informally) higher priority.

Difference between real power and authorities

Authorities give the manager the right to command and make decisions, while **real power** is the ability to influence others in order to get the desired response.

Line managers regularly use reward and a punishment (i.e. coercive power), but project managers in many enterprises have no authority to use –this!!!



Leadership styles

- **patriarchal** (It will be as I said)
- **informational** (I made that decision for the following reasons)
- **consulting** (Your opinion is interesting, but I have already decided)
- **cooperative** (I will consider some of your opinions)
- **participatory** (My opinion is worth more than yours)

In finalising the project (or each phase), the leader should become more **authoritative**, because he or she is more focused on the tasks and strives to ensure that the team members have completed the tasks for which they were responsible. While team **creativity** is important in planning and searching for the right means of execution, effective completion of work is most important in finalising the project.

Motivation factors

The **efficiency** of people depends on **their commitment to carry out assigned tasks**. Commitment, to a large extent, depends **on motivation**. Motivated people take advantage of their **knowledge and experience**; therefore, a highly motivated team with satisfied members is more **productive**; the **quality of execution is better**; and the **project cost** is lower.

Communication on the project team

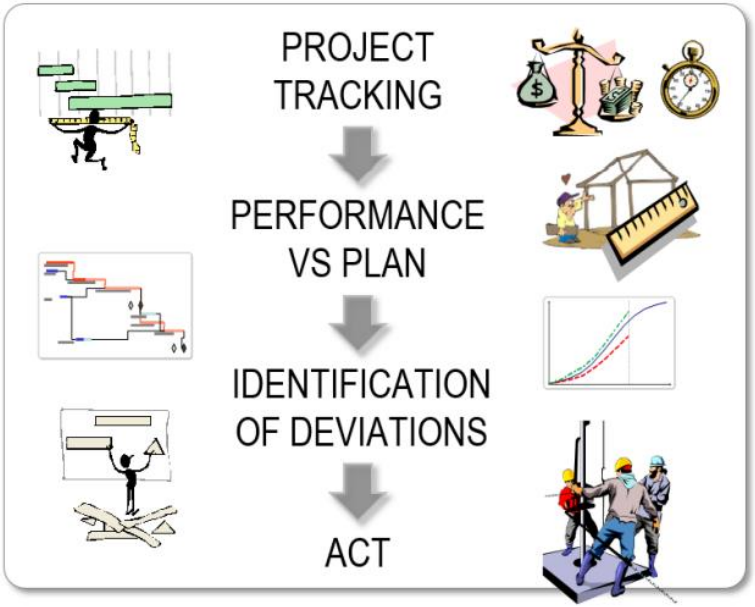
A good **working atmosphere** is an important condition for successful team work.

It is created by interpersonal relations, which often depend on communications among team members.
The project manager:
directs the project,
leads the meetings,
encourages ideas,
connects team members with other participants.

Project control

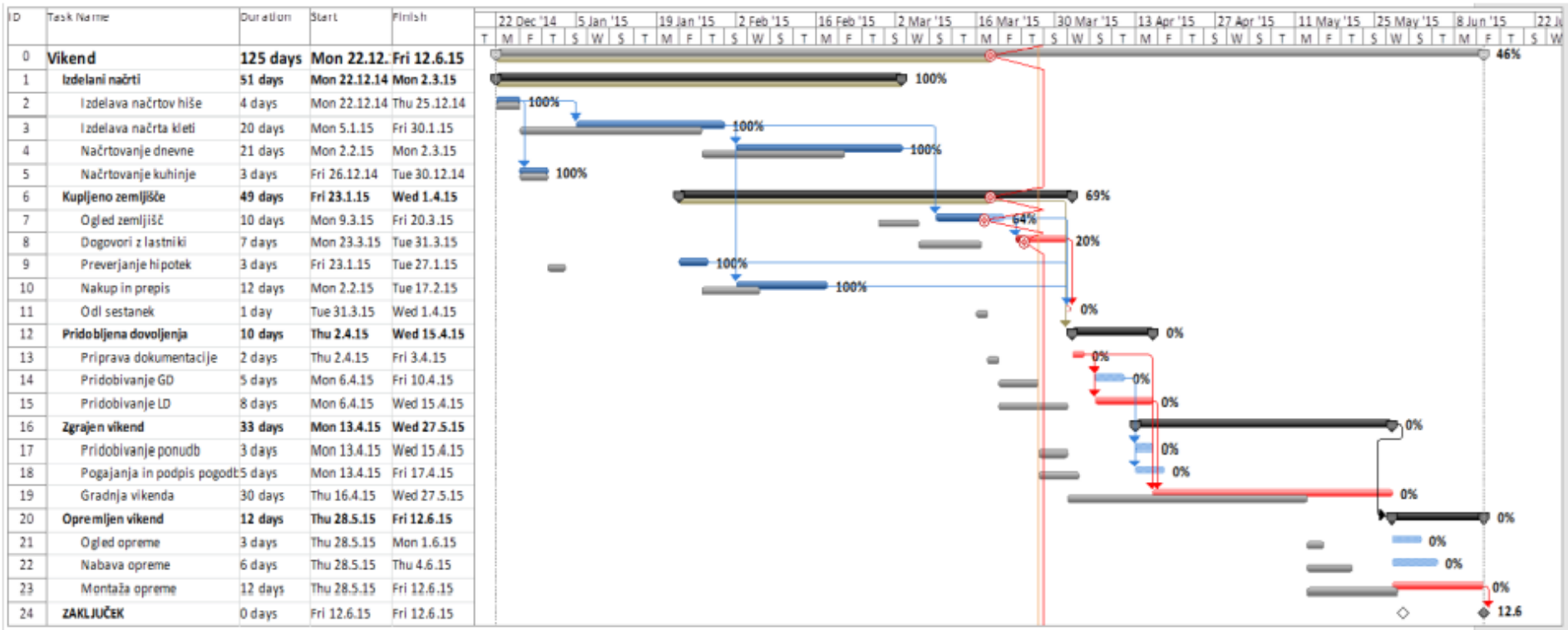
Minutes of the progress meeting should include following information:

- tasks that have been (or were planned to be) executed after the last meeting
- tasks that are going to be (or were planned to be) finished soon
- tasks in progress and their current state (results)
- tasks that are planned to start in the future (and the adequacy of input data) actual project cost (and estimated value at completion)
- problems, obstacles, and risks
- proposed measures and changes to eliminate deviations (time, cost, quality), the responsible person, and the deadline for each one



Project control

The most well-known technique for **time management** (as an upgrade of the Gantt chart) is the Baseline-Current-Future (BCF) analysis.



ID	Task Name	Duration	Start	Finish
0	**Vikend**	**125 days**	**Mon 22.12.**	**Fri 12.6.15**
1	**Izdelani načrti**	**51 days**	**Mon 22.12.14**	**Mon 2.3.15**
2	Izdelava načrtov hiše	4 days	Mon 22.12.14	Thu 25.12.14
3	Izdelava načrta kleti	20 days	Mon 5.1.15	Fri 30.1.15
4	Načrtovanje dnevne	21 days	Mon 2.2.15	Mon 2.3.15
5	Načrtovanje kuhinje	3 days	Fri 26.12.14	Tue 30.12.14
6	**Kupljeno zemljišče**	**49 days**	**Fri 23.1.15**	**Wed 1.4.15**
7	Ogled zemljišč	10 days	Mon 9.3.15	Fri 20.3.15
8	Dogovori z lastniki	7 days	Mon 23.3.15	Tue 31.3.15
9	Preverjanje hipotek	3 days	Fri 23.1.15	Tue 27.1.15
10	Nakup in prepis	12 days	Mon 2.2.15	Tue 17.2.15
11	Odl sestanek	1 day	Tue 31.3.15	Wed 1.4.15
12	**Pridobljena dovoljenja**	**10 days**	**Thu 2.4.15**	**Wed 15.4.15**
13	Priprava dokumentacije	2 days	Thu 2.4.15	Fri 3.4.15
14	Pridobivanje GD	5 days	Mon 6.4.15	Fri 10.4.15
15	Pridobivanje LD	8 days	Mon 6.4.15	Wed 15.4.15
16	**Zgrajen vikend**	**33 days**	**Mon 13.4.15**	**Wed 27.5.15**
17	Pridobivanje ponudb	3 days	Mon 13.4.15	Wed 15.4.15
18	Pogajanja in podpis pogodb	5 days	Mon 13.4.15	Fri 17.4.15
19	Gradnja vikenda	30 days	Thu 16.4.15	Wed 27.5.15
20	**Opremljen vikend**	**12 days**	**Thu 28.5.15**	**Fri 12.6.15**
21	Ogled opreme	3 days	Thu 28.5.15	Mon 1.6.15
22	Nabava opreme	6 days	Thu 28.5.15	Thu 4.6.15
23	Montaža opreme	12 days	Thu 28.5.15	Fri 12.6.15
24	**ZAKLJUČEK**	0 days	Fri 12.6.15	Fri 12.6.15

Project control

Typical causes for poor **performance** and project delays are:

- poor estimation of planned work and task duration or overly optimistic estimates
- ineffective or incapable task performer › insufficient resources when needed
- technical and quality problems
- additional requirements or changes in the client's specifications
- late delivery of materials and equipment
- poor integration of tasks or inter-functional complications
- technological breakthroughs
- conflicts in the project team (technical solutions, personal conflicts)
- changes in the entrepreneurship environment (market, legislation)
- delays caused by predecessors.

The most common reasons for **cost** increases are:

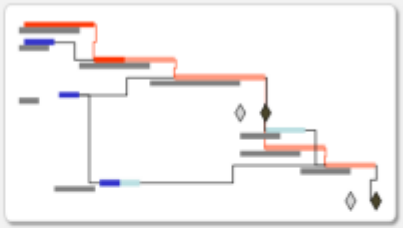
- inadequate assessment of costs in the planning phase
- difficulties, delays and additional tasks
- material price increases
- irregularities in the hours recorded
- invoicing by contractors for work that has yet not been performed
- belated or ineffective control
- pre-performance of the contracts, which was planned for a later date

Risk control

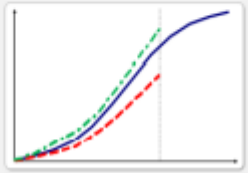
Continuous **risk monitoring** is the responsibility of risk owners.
Their duty is to detect the occurred risk event as soon as possible and to launch the planned corrective action promptly.
The sooner the risk is detected, the lower are the consequences.
Risk should be controlled weekly; the highest risks, even more frequently.

ACTIVITIES

- who were and / or to the finished
- approaching and / or to be approaching completion,
- underway,
- to be implemented in the near future.

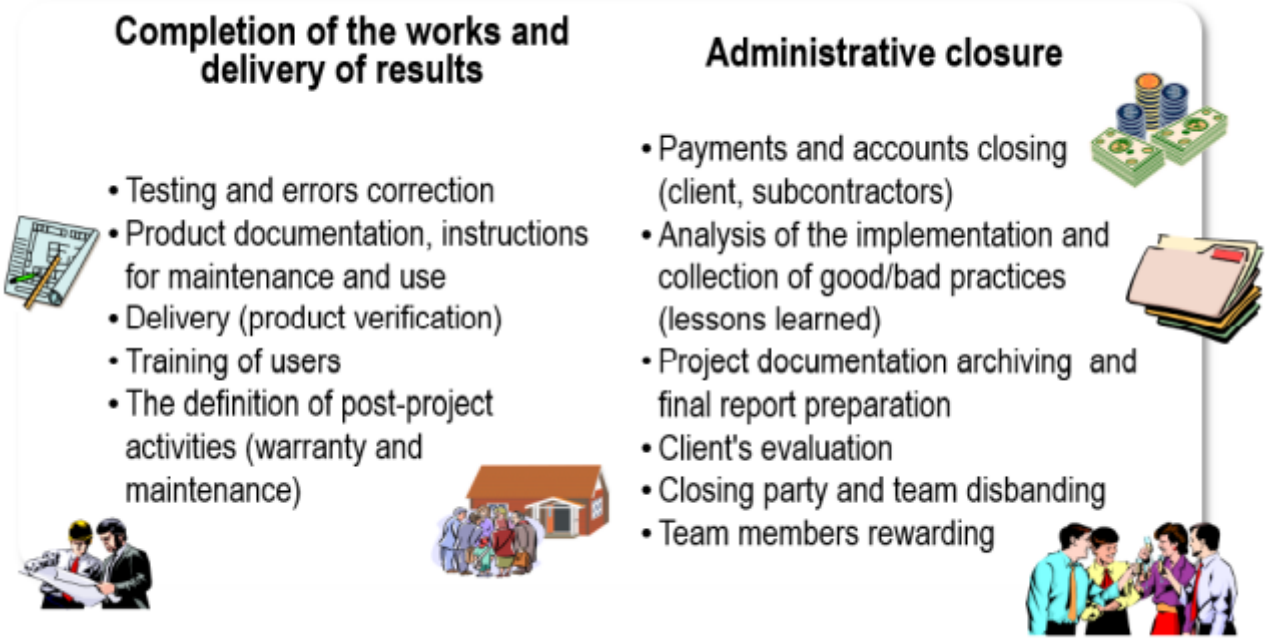


Project costs – actual, estimated value at the end
Performance indicators - SPI, CPI
Problems, obstacles, risks
Proposed measures, changes (scope, deadlines, costs)



Project closure

The project does not end by itself, with the completion of last task of the execution phase.



The final report of the project

TECHNOLOGY

Technical problems ➔ consequences ➔ solving (who, how) ➔ solution (and solution evaluation)

NEW IDEAS
- realized
- unrealized

(Reasons, benefits and extra work and costs)

PEOPLE

Problems and faults due to work and behavior of team members, project participants and other influential.

Consequences ➔ solving ➔ solution

- meetings
- teamwork
- resolving disagreements
- encourage creativity
- communication

METHODOLOGY

Difficulties due to the project management rules and the organisational culture in the enterprise

Consequences ➔ solving ➔ solution

Amendments

What have we learned? How it could be prevented or effectively executed?

FINAL REPORT

- tactical mistakes, proposals for future projects
- time / schedule analysis – maximal delays – sources of delays, corrective measures
- cost analysis – cost increase / reduction, sources, actions for cost reduction
- poor quality sources, consequences
- changes, risk analysis

Thank you

Andrea Santelli