

INNOVATION PROJECT MANAGEMENT COURSE

Textbook



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1 MODULE 1: INTRODUCTION

Module Description

This module aims to provide the introduction to the **InnoPRo Course.** The approach of the course is based on a project cycle methodology applied to the preparation and management of innovation projects. It also includes an introduction to the essence of innovation management.

Module Objectives and Learning outcomes

Students are be acquainted with the structure of the InnoPro course and with the essence of the concepts of innovation and Innovation Management Systems. Students acquire theoretical knowledge as well as practical skills to deal with key issues and decisions associated with innovations and are provided with competences associated with the process of innovation management.

Learning outcomes:

1. Students are familiarised with the concepts of innovation, innovation process and Innovation Management Systems.

2. Students receive adaptable guidance for managing innovation processes.

3. Students are able to actively use common terms related to innovation and project management concepts.

4. Students achieve competence and skills related to key activities involved in innovation processes and their application in the framework of project management.

5. Students increase their level of understanding of conceptual foundations of innovation.

6. Students improve on their understanding of innovation as a process involving different activities within the framework of project management.

7. Students receive adaptable guidance for implementing an innovation management system in an organisation.

Keywords

Innovation, Project Management, Innovation Process, Innovation Management System, Competitive Advantages, Research and Development (R&D) Activities, Innovation Management.

Module Structure

The module presents the motivation behind the course as well as its general description and structure. In addition, key topics of innovation management are described for the sake of successful implementation of innovation projects. The background theory is set and current practices of innovation management defined based on real projects.

By setting practical guidance and tools for innovation and project management, the course can increase the efficiency and quality of the preparation and management of innovation projects.

1.1 COURSE INTRODUCTION

The course entitled Innovation Project Management (InnoPro) places emphasis on the linking methods of project management with technical-economic-managerial aspects of innovation projects. The course is training-based (including exchange of good practices and workshops) and developed along with e-learning support (on-line documentation and e-learning sessions). The InnoPro course focuses on practical aspects of project management and innovation issues which companies and institutions in the R&D sector often face. The main objective of the course is to develop relevant and

high-quality competence related to the preparation and management of innovation projects with the use of innovative teaching methods, tools and innovative up to date content.

This main objective will be supported by the following sub-objectives:

• Incorporation of the latest methods and tools into the course.

 \circ $\;$ Development of students' practical skills meeting the demand of the labour market and the R&D sector.

- Support of teachers' and lecturers' competence in interactive training.
- Enabling everyone to self-study and educate themselves.
- Promotion of lifelong learning in order to increase employability.

• Facilitation of modernisation and quality improvement in education and training through international cooperation and best practice exchange among universities and companies.

1.2 COURSE MOTIVATION

Requirements for project management skills and competences have been steadily on the rise across the majority of economic sectors, and demand for project managers is expected accelerate more than any other professions, according to the Project Management Institute (PMI). However, education of future project managers fails to fully meet the current requirements of the labour market and scientific research environment. The main motivation of the course entitled Innovation Project Management (InnoPro) is to enhance the professional competence of the target groups participating in the course in the area of project and innovation management. The course places emphasis on the interconnection of knowledge in the fields of study of innovation and project management by defining a set of tools, templates and concepts to support project management work. Students will also improve a number of management skills (especially critical thinking, decision-making, planning, oral and written communication), as well as their preparedness for future career in both universities/research centres and the industry/companies. This will increase their employability on the labour market, attract young people to innovation, and support the utilisation of R&D results in economies at the same time.

1.3 COURSE DESCRIPTION

The course gathers the key elements of innovation, innovation processes and innovation management systems developed by means of the **AIDIC** (Assessment-Initiation-Design-Implementation-Closure) **model**, which represents a unique approach in the general project cycle methodology, described in Module 2 and developed in detail in stages 1 (Assessment) to 5 (Closure). The InnoPro course provides an overall understanding of innovation project management from a wider perspective.

1.4 INTRODUCTION TO INNOVATION MANAGEMENT

Over the past century or more, new products and services have transformed our lives completely. The reason why the world has changed so much can be largely explained by innovation. Today economies become dominated by the service sector and the ownership of, or access to, knowledge is an intangible asset more valuable than physical assets. As a result, the locus of innovation is changing and innovation is becoming more internationalised, with important new sources outside the industrial powers, namely the United States, Europe or Japan.

The reason why innovation is so important has to be seen in the context of contemporary organisations facing the challenge of dealing with constantly changing markets and technologies.

Within this complex and turbulent world, innovation can help companies to achieve sustainable competitive advantages and, in turn, greater competitiveness. This introduction explains what innovation is and provides an analysis of the innovation process by describing its occurrence and outcomes.

1.5 INNOVATION CONCEPT AND PROCESS: THEORETICAL BASIS

Conceptual foundations for innovation primarily stem from disciplines related to management and economics (Smith, 2006). One of the first and most influential thinkers on innovation, Joseph Schumpeter, placed innovation centrally in his theory of Evolutionary Economics. Innovation in the Schumpeterian sense is defined in terms of the disruptive processes of "creative destruction" that arise when capitalist firms carry out the following five types of "new combinations" (Schumpeter 1942: 66):

1. The introduction of a new good or of a new quality of a good.

2. The introduction of a new method of production which need, by no means, be founded upon a discovery scientifically new and can also exist in a new way of handling a commodity commercially.

3. The opening of a new market whether or not this market has existed before.

4. The conquest of a new source of supply of raw materials or half-manufactured goods -again irrespective of whether this source already exists or it has first to be created.

5. The carrying out of the new organisation of any industry, like the creation of a monopoly position or the breaking up of a monopoly position.

From this starting point, the evolution of the concept has made it evident that innovation is about creating or preserving value from knowledge, which can be gained through formal processes, such as research and development (R&D), or from informal sources, for instance best or bad practice obtained from the field.

In response to strong policy demand for empirical evidence on innovation, the first edition of the *Oslo Manual* was issued in 1992 (OECD, 1992). Jointly published by the OECD and Eurostat, the *Oslo Manual* is a key component of a family of manuals under the title *The measurement of scientific, technological and innovation activities,* along with the *Frascati Manual* on resources dedicated to R&D and the *Patent Statistics Manual* on the numbers and characteristics of patented inventions. The *Oslo Manual* constitutes the international standard of reference for conceptualising and measuring business innovation and has been since revised on three occasions to reflect continual evolution in expert consensus on what should be measured. While the first and second editions of the Oslo Manual limited innovation to new or significantly improved "technological" products and processes, the third edition extended this vision defining innovation as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations" (OECD/Eurostat, 2005, p. 46).

The fourth and, to date, last edition of the *Oslo Manual* distinguishes between innovation as an outcome (innovation) and activities whereby innovation comes about (innovation activities). This fourth edition defines **innovation (outcome)** as "a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)" (OECD/Eurostat, 2018, p. 60). The generic term "unit" refers to any actor responsible for innovations in any sector, including households and their individual members. Hence, the basic definitions of product and business process innovation are as follows (OECD/Eurostat, 2018, p. 21):

A **product innovation** is a new or improved good or service that differs significantly from the firm's previous goods or services and that have been introduced on the market.

A **business process innovation** is a new or improved business process for one or more business functions that differs significantly from the company's previous business processes and that has been brought into use by the company.

Along with this definition of innovation as an outcome, the Oslo Manual also defines the **innovation process** as "all developmental, financial and commercial activities undertaken by a firm that are intended to result in an innovation for the firm" (OECD/Eurostat, 2018, p. 33). These activities that companies can undertake in pursuit of innovation include, according to the Oslo Manual:

1. **Research and experimental development (R&D) activities**: Applied research is directed towards a specific practical aim or objective, while experimental development seeks to produce new or improved products or processes.

2. **Engineering, design and other creative work activities**. Engineering involves production and quality control procedures, methods and standards. Design includes a wide range of activities to develop a new or modified function, form or appearance for goods, services or processes, including business processes to be used by the firm itself. Other creative work activities include the creative process of generating new ideas, the development of concepts for innovations, and activities related to organisational change as part of product or business process innovation activities.

3. **Marketing and brand equity activities**. Market research and market testing, methods for pricing, product placement and product promotion; product advertising, the promotion of products at trade fairs or exhibitions and the development of marketing strategies.

4. **IP-related activities**. All administrative and legal work to apply for, register, document, manage, trade, license-out, market and enforce a company's own intellectual property rights (IPRs), all activities to acquire IPRs from other organisations such as through licensing-in or the outright purchase of IP, and activities to sell IP to third parties.

5. **Employee training activities**. All activities that are paid for or subsidised by a company to develop knowledge and skills required for a specific trade, occupation or tasks of the company employees.

6. **Software development and database activities**. Software development as innovation activity involves computer games, logistical systems, or software to integrate business processes. Database activities involve analyses of data on the properties of materials or customer preferences.

7. Activities related to the acquisition or lease of tangible assets. Purchase, lease, or acquisition through a takeover of buildings, machinery, equipment, or the in-house production of such goods for own-use.

8. **Innovation management activities**. Include activities for establishing policies, strategies, objectives, processes, structures, roles and responsibilities to deal with innovation in the firm, as well as mechanisms to assess and review them.

The organisation of these activities varies greatly between companies, with some of them managing well-defined innovation projects, for which an innovation represents a milestone, while other companies integrate their innovation activities into regular business operations or other companies still primarily engage in innovation activities on an ad-hoc basis.

1.6 INNOVATION MANAGEMENT SYSTEMS: THEORETICAL BASIS

The Oslo Manual (OECD, 2018) defines **innovation management** as all systematic activities to plan, govern and control internal and external resources for innovation. This includes how resources for innovation are allocated, the organisation of responsibilities and decision-making among employees, the management of collaboration with external partners, the integration of external inputs into a firm's innovation activities, and activities to monitor the results of innovation and to support learning

from experience (OECD/Eurostat, 2018, p. 91). In parallel with work to produce the fourth edition of the Oslo Manual, the OECD established a relationship with the International Organisation for Standardisation's (ISO) Technical Committee (TC) on Innovation Management, responsible for developing standards for the Innovation Management ISO 56000 series, whose secretariat is held by AFNOR, ISO's member for France. The ISO 56000 family of standards is integrated by the following published documents:

• ISO 56000: 2020, Innovation management — Fundamentals and vocabulary.

- ISO 56002:2019, Innovation management Innovation management system Guidance.
- ISO TR 50004: 2019, Innovation management assessment Guidance.

 $^\circ$ $\,$ ISO 50003: 2019, Innovation management — Tools and methods for innovation partnership — Guidance.

It also has several standards in development, including:

 $^{\circ}$ ISO 56005, Innovation management – Tools and methods for intellectual property management – Guidance.

• ISO 56006, Innovation management – Strategic intelligence management – Guidance.

• ISO 56007, Innovation management – Idea management.

 $^\circ$ ISO 56008, Innovation management – Tools and methods for innovation operation measurements – Guidance.

An **innovation management system** is a set of interrelated and interacting elements, aiming for the realisation of value. It provides a common framework to develop and deploy innovation capabilities, evaluate performance, and achieve intended outcomes. The elements can be gradually adopted to implement the system according to the particular context and circumstances of the organisation. Full benefits can be gained when all the elements of the innovation management system are adopted by the organisation (ISO, 2019). Ultimately, the effective implementation of the innovation management system relies on the commitment by top management and the ability of leaders to promote innovation capabilities and a culture supporting innovation activities. These activities are usually organised and managed through well-defined projects. Following ISO 21500: 2012, **a project** can be defined as a *unique set of processes consisting of coordinated and controlled activities with start and end dates, performed to achieve project objectives* (ISO, 2012, p. 3), while **project management** – which constitutes the main objective of this course – is *the application of methods, tools, techniques and competencies to a project* (ISO, 2012, p. 4).

The structure of the guiding standard for innovation management ISO 56002: 2019 covers seven key elements:

• **Context**: The organisation should track external and internal issues and trends, e. g. user preferences, technology developments, and internal capabilities, in order to identify opportunities and challenges that can trigger innovation activities.

• **Leadership**: Based on the understanding of the context, top management should demonstrate leadership and commitment by establishing an innovation vision, strategy, and policy, including the necessary roles and responsibilities.

• **Planning**: Innovation objectives, organisational structures, and innovation portfolios, i.e. collection of innovation projects that are grouped together to facilitate their effective management in order to meet strategic goals, should be established based on the direction set by top management and the identified opportunities and risks.

• **Support**: The support necessary for innovation activities should be put in place, e.g. people with the right competences, financial and other resources, tools and methods, communication and awareness creating activities, as well as approaches for intellectual property (IP) management.

• **Operations**: Innovation initiatives should be established in line with the strategies and objectives. Innovation processes should be configured according to the types of innovations to be achieved, namely opportunities identified, concepts created and validated, and solutions developed and deployed.

• **Evaluation**: The performance of the Innovation Management System as a whole should regularly be evaluated to identify strengths and gaps.

• **Improvement**: Based on the evaluation, the system should be improved by addressing the most critical gaps with regards to the understanding of the context, leadership, planning, support, and operations.

Figure 1: Framework of the Innovation Management System with References to the Clauses of ISO 56002:2019



Source: ISO (2019)

Review Questions

- 1. How is innovation defined as an outcome?
- 2. What do you understand by product innovation and business process innovation?

3. What are, according to the Oslo Manual, the activities that firms can undertake in pursuit of innovation?

- 4. Describe the innovation process according to the last generation innovation models.
- 5. What is an Innovation Management System?

6. Describe the framework of an Innovation Management System according to the Standard ISO 56002:2019.

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Abbreviations

Abbreviation	Explanation
AFNOR	Association Française de Normalisation, French Standardisation Association
AIDIC	Assessment-Initiation-Design-Implementation-Closure Model
EU	European Union
Eurostat	Statistical Office of the European Communities
IMS	Innovation Management System
IP	Intellectual Property
IPR	Intellectual Property Rights
ISO	International Organisation for Standardisation
OECD	Organisation for Economic Co-operation and Development
PMI	Project Management Institute
R&D	Research and experimental Development
TC	Technical Committee

2 MODULE 2: INNOPRO COURSE CONCEPT

Module Description

This module sets out to provide the introduction to the **AIDIC** (Assessment-Initiation-Design-Implementation-Closure) **model** which represents a unique approach in a general project cycle methodology. It has been kept as lean as possible, while still providing enough information to allow for an effective understanding of the AIDIC model as practitioners begin to use it.

Module Objectives and Learning Outcomes

Students are acquainted with the essence and structure of the AIDIC model concept and increase their understanding of project cycle management.

Learning outcomes and students' skills:

1. Students can turn their general ideas about project management into a unique methodology.

2. Students develop understanding of project cycle management and receive adaptable guidance for managing their projects.

3. Students use common terms, which facilitates communication in project teams, and apply project management concepts.

4. Students share best practices by choosing the AIDIC model approach that will bring the most value to their projects.

Keywords

AIDIC Model, IPEC Project Life Cycle, Project Cycle Management, Project Stage, Project Step.

Module Structure

In this module, the structure of AIDIC model is introduced. Topics related to project cycle management will be identified for the sake of a successful implementation of coordination and of support of projects in the field of the EU internal and external border for academic researchers, policy-makers, SMEs, governmental public bodies and other project workers. Firstly, the context and the background theory will be set, which will be followed by the definition of current practices of project implementation based on the examples of real projects.

Both theoretical and practical analyses supported the achievement of the set objectives and have led to this practical handbook for project management.

2.1 AIDIC MODEL – CONCEPT, BASIS AND STRUCTURE

The concept of the AIDIC model aims to provide an overall understanding of successful project management and project implementation. This module captures the key elements of project management, project implementation, project management information systems, security, safety and ethical issues. It deals with project management from a wider perspective and defines a set of approaches and concepts to support future projects and the delivery of day-to-day project management work.

The AIDIC model may be read from cover to cover to learn about the methodology, or it may be used as a reference in the process of familiarisation with the project cycle. It represents a simple, easy-toimplement methodology which project teams can tailor to their specific needs. AIDIC model is fully supported by a comprehensive training programme (including workshops and e-learning sessions) and documentation of all model outputs, materials and activities within online course on the LMS Moodle platform. The AIDIC model concept incorporates elements from a wide range of globally accepted project management best practices, captured in standards and methodologies. Its development has also been influenced by operational experience on various projects both within the European Union (EU) Institutions and external bodies.

2.1.1 AIDIC Model Description

At the start of a project, the amount of planning and work required can seem overwhelming. There may be dozens or even hundreds of tasks that need to be completed at just the right time and in just the correct sequence.

Seasoned project managers know it is often easier to handle the details of a project and take steps in the right order when the project is broken down into phases. Dividing project management efforts into these five phases can help give efforts structure and simplify them into a series of logical and manageable steps.

There are many different models for the phases a project goes through during its life cycle. At the simplest level, a project has a beginning, middle, and end. During the course, a more complex approach is adopted, using the life-cycle model and terminology which is shown in **Table 2**, although other versions can be equally valid. The AIDIC model presented in our Innovation Project Management course is based on the basic concept of the project cycle within the well-known **IPEC model** (Initiate-Plan-Execute-Close) mainly based on *Project Management Institute* (PMI) methodology but has been organically adapted to the needs of this course.

Based on the PMI methodology, a Project Management Process Group is a logical grouping of project management processes to achieve specific project objectives. Process groups are independent of project phases and steps. Project management processes of IPEC model are usually grouped into the following five Project Management Process Groups (PMI, 2017):

• **Initiating Process Group:** Those processes performed to define a new project or a new phase of an existing project by obtaining authorisation to start the project or phase.

• **Project Initiation:** Initiation is the first phase of the project lifecycle. This is where the project's value and feasibility are measured. Project managers typically use two evaluation tools to decide whether or not to pursue a project:

• *Business Case Document* – this document justifies the need for the project, and it includes an estimate of potential financial benefits.

• *Pre-feasibility Study* or *Feasibility Study* – this is an evaluation of the project's goals, timeline and costs to determine if the project should be executed. It balances the requirements of the project with available resources to see whether it is sensible to pursue the project.

Teams abandon proposed projects that are labelled unprofitable and/or unfeasible. However, projects that pass these two tests can be assigned to a project team or a designated project office.

• **Planning Process Group**: Processes required to establish the scope of the project refine the objectives and define the course of action required to attain the objectives that the project is to achieve.

• **Project Planning:** Once the project receives the green light, it needs a solid plan to guide the team, as well as keep it on time and budget. A well-written project plan or design gives guidance for obtaining resources, acquiring financing and procuring required materials. The project plan gives the team direction for producing quality outputs, handling risk, creating acceptance, communicating benefits to stakeholders and managing suppliers.

Project plan also prepares teams for obstacles they may encounter throughout the project and helps them understand the cost, scope and timeframe of the project.

• **Executing Process Group**: Processes performed to complete the work defined in the project management plan to meet project requirements.

• **Project Execution/Implementation:** This project phase is most commonly associated with project management. The execution consists in building deliverables that satisfy the customer. Team leaders make this happen by allocating resources and keeping team members focused on the assigned tasks.

• The execution relies heavily on the planning phase. The work and efforts of the team during the execution phase are derived from the project plan.

• **Monitoring and Controlling Process Group**: Those processes required to track, review, and regulate the progress and performance of the project; identify any areas in which changes to the plan are required, and initiate the corresponding changes.

• **Project Monitoring and project control:** Monitoring and control are sometimes combined with execution because they often co-occur. As teams execute their project plan, they must constantly monitor their progress.

• To guarantee delivery of what was promised, teams must monitor tasks to prevent scope creep, calculate key performance indicators and track variations from the allotted cost and time. This constant vigilance helps keep the project moving ahead smoothly.

 \circ $\,$ Closing Process Group: Processes performed to formally complete or close the project, phase, or contract.

• **Project Closure:** Teams close a project when they deliver the finished project to the customer, communicating completion to stakeholders and releasing resources to other projects. This vital step in the project lifecycle allows the team to evaluate and document the project and move on the next one, using previous project slips and successes to build stronger processes and more successful teams.

The project management processes are linked by specific inputs and outputs where the result or outcome of one process may become the input to another process that is not necessarily in the same Process Group.

Although project management may seem overwhelming at times, breaking it down into these five distinct cycles can help the team manage even the most complex projects and use time and resources more wisely.

Based on the common methodology of the *European Commission – Centre of Excellence in Project Management*, the IPEC project lifecycle has four phases with a different type of activity predominant in each phase (i.e. initiating activities are predominant in the Initiating phase, etc.), as shown in Figure 2. However, while phase-related activities peak in terms of effort during a specific phase, activities of this type can also be executed during neighbouring phase(s) (e.g. planning activities are also repeated in the Executing phase). A project moves on to the next phase when the goals of its current phase have been deemed achieved as the results of a formal (or less formal) phase-exit review.





Source: European Commission. Centre of Excellence in Project Management (2018)

The focus of a project shifts from initiating and planning activities at the beginning to executing, monitoring and controlling activities in the middle, and acceptance, transitioning and closing activities at the end. Description of the individual phases is given in **Table 1**.

Phase	Description				
Initiating	Define the desired outcomes. Create a Business Case. Define the project scope. Get the project off to a good start.				
Planning	Assign the Project Core Team. Elaborate on the project scope. Plan the work.				
Executing	Coordinate the execution of project plans. Produce deliverables.				
Closing	Coordinate formal acceptance of the project. Report on project performance.CaptureLessonsLearnedandpost-projectrecommendations.Close the project administratively.				
Monitoring and Controlling	Oversee all project work and management activities throughout the project: monitor project performance, measure progress, manage changes, address risks and issues, identify corrective actions etc.				

Table 1: Description of Project Lifecycle Phases based on PM ² Project Management Methodol

Source: European Commission. Centre of Excellence in Project Management (2018)

Inexperienced project teams sometimes underestimate the importance of the work done in the initial project phases and start working on deliverables that are inadequately defined or planned. This results in the delivery of outputs which are of poor quality and little value to end-users. This is a common and costly mistake, which is often the root cause of overall project failure and the failure to realise the intended benefits of the project.

In the case of the AIDIC model, presented in InnoPro course, it is noticeable that every project begins as a concept, which is always "fuzzy" and that the project team must formalise the definition of the job before doing any work.

The AIDIC model includes the following project cycle stages:

- 1. Assessment.
- 2. Initiation.

- 3. Design.
- 4. Implementation.
- 5. **C**losure.

The AIDIC model is created based on the following project management methodologies and approaches:

• *The Project Management Institute (PMI)* – The Project Management Body of Knowledge (PMBOK[®] Guide).

• The International Project Management Association (IPMA) – Individual Competence Baseline (ICB4).

• The European Commission Centre of Excellence in Project Management (CoEPM²) – PM² Project Management Methodology.

• *The European Commission EuropeAid Cooperation Office (EuropeAID)* – Project Cycle Management (PCM) Guidelines.

2.2 AIDIC MODEL OBJECTIVES AND LEARNING OUTCOMES

Students are getting acquainted with the AIDIC model stages and steps in managing a straightforward project.

Students know the AIDIC model detail description (stages, sub-stages and steps). Dividing a project into stages simplifies the process and enables students to lead in the best possible direction.

Students can share a description of the AIDIC model concepts involved:

- 1. Assessment = Define the Problem.
- 2. Initiation = Develop Solution Options.
- 3. **D**esign = Plan the Project.
- 4. Implementation = Execute the Plan.
- 5. **C**losure = Monitor, Control Progress & Close the Project.

2.3 AIDIC MODEL: THEORETICAL BASIS

At the beginning of a project, the basic idea needs to be well explored and elaborated. Moreover, this initial phase includes goals for the project, decisions concerning the partners and parties to carry through the project implementation, and the project leader writing the plan and/or proposal. Even though the project management cycle and other project management methods create a tight framework, leadership should be visionary and motivating. "Instead of looking at the project as a closed entity, this perspective sees the project as an open organisation in tight contact and cooperation with the base organisation and its environment."

To be able to analyse and evaluate project management or project success, it is necessary to define the key measures or indicators. In an innovative project, the project success can be seen as a longterm impact: "project success in consortia is a secondary and intermediary issue as compared to the expected long-term impact in the industry and benefits to member organisations. As primary measures of success, consortia typically seek for example industry-level success as compared to another country's industry in terms of market shares or profits.

Stage 1: Assessment

Define the Problem: You need to identify the problem to be solved by the project. It helps to visualise the desired result. What will be different? What will you see, hear, taste, touch, or smell? What client's need is being satisfied by the project?

Stage 2: Initiation

Develop Solution Options: How many different ways might you go about solving the problem? Brainstorm solution alternatives (you can do this alone or as a group). Of the available alternatives, which do you think will best solve the problem? Is it more or less costly than other suitable choices? Will it result in a complete or only a partial fix?

Stage 3: Design

Plan the Project: Planning is answering questions: what must be done, by whom, for how much, how, when, and so on? Naturally, answering these questions often requires a crystal ball.

Stage 4: Implementation

Execute the Plan: Once the plan has been drafted, it must be implemented. Interestingly, we sometimes find people making a great deal of effort to put together a plan, then failing to follow it. If a plan is not followed, there is not much point in planning, is there?

Stage 5: Closure

Monitor, Control Progress & Close the Project: Plans are developed so that you can achieve your result successfully. Unless progress is monitored, you cannot be sure you will succeed. It would be like having a road map to a destination but not monitoring the highway signs along the way.

Of course, if a deviation from the plan is discovered, you must ask what must be done to get back on track or – if that seems impossible – how the plan should be modified to reflect the new reality.

Once the destination has been reached, the project is finished, but a final step should be taken. Some people call it an audit, others a post-mortem (sounds a bit morbid, doesn't it?). Whatever you call it, the point is to learn something from what you just did. Note the way the questions are phrased: "What was done well? What should be improved? What else did we learn?" We can always improve on what we have done. However, asking, "What did we do wrong?" is likely to make people a bit defensive, the focus should be on improvement, not on SO placing blame.

2.1.2 AIDIC Model: Breakdown and Structure

Table 2a: Breakdown and Structure of the AIDIC Model

STAGE	GENERAL DESCRIPTION	SUB-STAGE	STEPS	PROJECT OUTPUTS	TOOLS and TEMPLATES
ASSESSMENT	• The organisation defines needs and commissions the project to meet it	 Assessment of the problem, need or opportunity to start a project Innovation opportunities analysis 	 Formalisation of problem, need or opportunity to start a project Innovation prospective 	 Project Initiation Request (PIR) Innovation project report 	Tools: PIR Form Templates: Mindtools.com
INITIATION	The tasks required to authorise, fund and define the project, generally on the organisational level (above the project)	 Project identification and definition Initial project budget allocation Primary project stakeholder's identification Fundraising 	 Project Purpose Project Goals/Questions Project Scope Project Deliverables Project Stakeholders Grant Resources Instruments for financing innovations Public procurements 	 Project Initiation Plan Project Charter Project Scope Statement Stakeholder Analysis Grant Resources Analysis 	Tools: Mind Map Logical Framework Matrix (LFM) Project Charter Template Grant Resources Analysis Templates: Coggle.it Carleton.ca Easyproject.com Smarthseet.com Vertex42.com Logframer.eu
DESIGN	 The project management team define how the project will be carried out, who will do the work, how long it will take, and so forth The planning phase defines the project in sufficient detail that all stakeholders' expectations are understood 	 Creating of workflow project Estimating project time and budget Gathering resources Risk assessment Project communication Monitoring & Controlling 	 Scope of Work Project Milestones Project Scheduling Project Budgeting Resource Plan Identification and management of project risks Communication requirements and rules Monitoring of project performance and progress, managing changes, addressing risks 	 Statement of Work Gantt Chart Project Plan (Success Factors, Deliverables, Schedule, Budget, Human resource, Quality management) Risk management plan Procurement management plan Project status report and project change documentation 	Tools:Work Breakdown StructureOrganisation BreakdownStructureResponsibility AssignmentMatrixGantt ChartCost Breakdown StructureResource Breakdown StructureRisk Assessment ToolCommunication MatrixTemplates:Easyproject.comSmarthseet.comVertex42.comMS2014+ (for the CzechRepublic)

Source: Own elaboration (2020)

Table 2b: Breakdown and Structure of the AIDIC Model

STAGE	GENERAL DESCRIPTION	SUB-STAGE	STEPS	PROJECT OUTPUTS	TOOLS and TEMPLATES
IMPLEMENTATION	 The project work is completed and the final product or service is achieved while secondary stakeholder requirements are satisfied Concurrent to the project work the project management team monitors and controls all aspects of the project – schedule, cost, stakeholder's requirements, etc. If problems are encountered, changes to the project plan are made 	 Briefing team members Monitoring quality of work Validity and up-to-date innovations Managing budget and earned value Monitoring & Controlling 	 Kick-off meeting Project status Change request Prospective and technology watching Project outputs handovers Acceptance of project implementation Monitoring of project performance and progress, managing changes, addressing risks 	 Kick-off meeting minutes (agenda) Project status report Status updates and project change documentation Stakeholder communication Earned value analysis (EVA) Project checklist Technology watching report and business plan 	Tools: Kick-off Meeting Template EVA Template Project Checklist Template Change Management Document Template Progress Project Report Template Business plan template Templates: Easyproject.com Smarthseet.com Vertex42.com MS2014+ (for the Czech Republic)
CLOSURE	 The project has completed its product or service, and the necessary documentation and administrative work must be done to close the project Exploitation of results 	 Project reporting Analysing project and team results Project documentation closure Project evaluation Intellectual and industrial property aspects Monitoring & Controlling 	 Public Procurement procedures evaluation Instruments of industrial and intellectual property protection Final beneficiary and subsidy provider acceptance Project archiving Lessons learned Monitoring of sustainability of project outputs, managing changes, addressing risks 	 Project checklist Patents, utility models and/or industrial design Project final report Accounting report Project sustainability report 	Tools: Final Project Report Template Templates: Easyproject.com Smarthseet.com Vertex42.com MS2014+ (for the Czech Republic)
Source:		Own	elabora	tion	(2020)

Review Questions

- 1. What project cycle model is the basis of the Innovation Project Management course?
- 2. List at least two methodological approaches that characterise the project cycle.
- 3. Decipher what is hidden under the IPEC abbreviation.
- 4. What do you think of the Project Management Process Group?
- 5. What are the basic phases of the AIDIC project cycle model?

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Abbreviations

Abbreviation	Explanation
AIDIC	Assessment-Initiation-Design-Implementation-Closure
CoEPM ²	Centre of Excellence in Project Management
EU	European Union
EuropeAID	EuropeAid Cooperation Office
EVA	Earned Value Analysis
ICB4	Individual Competence Baseline
IPEC	Initiate-Plan-Execute-Close)
IPMA	International Project Management Association
LFM	Logical Framework Matrix
PCM	Project Cycle Management
PIR	Project Initiation Request
PM	Project Manager
РМВОК	Project Management Body of Knowledge
PMI	Project Management Institute

3 STAGE 1: ASSESSMENT

3.1 STAGE DESCRIPTION

The "Assessment stage" is the first stage of the InnoPro model, an innovative model aimed to enable learners (business entities, universities, professionals, researchers and students), to gain a better understanding of and an insight into the activities involved in the project management life cycle and to set the foundations for managing their projects efficiently and effectively.

From the project management and InnoPro model perspective, the "Assessment stage" takes place right before the initiation and planning of the project. It is the stage where the party/ies interested to initiate and implement the project will investigate whether it is "fit for purpose", its feasibility and its viability and place it among the organisation's priorities.

During the "Assessment stage" the interested parties identify and document the need for the initiation and implementation of the project. This will involve assessing what the project will achieve and the outputs it will develop, ensuring that the project is strategically aligned with other organisational activities.

The approval and the decision to initiate the project is granted at this stage by the owner or sponsor of the project. Having a project owner or a sponsor is important for organisations of all sizes. A project sponsor is usually a person high in the organisational hierarchy and the person that will ensure that the project has realistic goals, that it will be properly implemented and that the benefits of the project will be realised within the organisation. In the 2017 Project Management Survey, "Driving Business Performance", KPMG identifies the "lack of executive sponsorship and management buy-in" as one of the main reasons why projects show a shortfall and as the difference between success and failure.

Properly defining the outcomes and objectives of any project is crucial and should not be overseen. In its 2017 publication of the "Pulse of the profession", the Project Management Institute identifies that "37% of projects fail due to lack of defined project objectives and milestones".

Learners should remember the very nature of projects, meaning that all projects are unique, temporary, not repetitive like processes, and undertaken to deliver a unique and specific outcome (product, service or other result), with some predefined characteristics (PMI, 2020). Projects are part of a collective effort to achieve the organisation's objectives, drive growth and even support the organisation to change.

At the same time project management is the application of skills, knowledge and tools required to properly implement and meet the objectives of a project. In addition to the delivery of the project, proper project management will ensure accountability within the organisation, as well as a proper and efficient utilisation of organisational resources.

As identified by PWC in its 3rd global survey on the current state of project management, "Insights and Trends: Current Portfolio, Programme, and Project Management Practices", effective project management practices enable organisations to execute projects successfully and to measure progress, value, and risks.

In the above context, the initiation of a project may relate to a number of challenges an organisation or entity is faced with, including but not limited to:

- solving an existing business problem,
- creating or exploiting a new business opportunity,
- expanding into a new geographical area or market segment and

- investigating the commercial viability of an innovative concept,
- developing a new or improving an existing product,
- undertaking an academic research project.

Regarding research projects the OECD defines **research** as "Any creative systematic activity undertaken in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this knowledge to devise new applications". Despite the different nature of academic research projects, which are usually focused on expanding a specific learning or knowledge area, researching a totally new area, defending a thesis or developing a new course to address emerging changes in technological and business trends, project management is equally important in academic research projects.

Academic research projects share the same characteristics and challenges as **business projects**. They have a sponsor (the mentor or the advisor), specific deadlines, budget and resource constraints, different stakeholders, activities that must be coordinated and quality levels that must be achieved. Academic research projects must additionally be aligned with the research and academic interests of the institution, take into consideration existing research undertaken in the specific area and be connected to the realities of the industry.

The "Assessment stage" will provide the necessary input and data in order for the process to progress from the "Assessment" to the "Initiation" stage, which is the second stage of the InnoPro model.

Depending on the size, type and complexity of the project and the organisation, convincing evidence must be provided to the decision-making body in order to realise the added value and benefits of the new project and authorise its initiation and the utilisation of organisational resources for its implementation.

In the case of an academic research project the usefulness of the project could be defended before an academic committee while in an SME business setting before the owner or general manager of a small company. In larger organisations the project manager may be required to present the case before the Board of Directors or the executive committee.

The "Assessment stage" commences by formalising the need for the project to begin and leads to an official request to initiate the project.

The **Triple project management constraint** of scope, budget (or cost or resources), and schedule (or time) should be well assessed in the context of what the project will achieve, at what cost it will be achieved, with what resources, internal or external, over which time period and at what quality level.

Figure 3 Triple Project Management Constraints



Source: Own elaboration (2020)

It is important to remember that delivering a project faster than the original schedule and expediting its implementation may require a combination of more money, lower quality or allocating more human resources. The same will apply in cases where the organisation will decide to improve the product quality defined in the original project plan.

Recently, organisations are being urged to also consider the so called **Value Triple Constraint** (VTC), which involves measuring the expected and actual business success of a project and its added value in conjunction with other projects and organisational activities.

It is therefore important to remember that projects are not implemented in isolation and must be aligned with the organisation's overall strategic priorities and objectives.

3.2 STAGE OBJECTIVES & LEARNING OUTCOMES:

Students are familiarised with the importance of properly assessing business opportunities that can be achieved through the initiation of projects and identifying those that provide the best "strategic fit" for their organisation.

Selecting the right projects is equally important to project management and the organisation, as properly implementing projects.

The main learning outcomes of Stage 1 are aimed at understanding:

• How to assess an opportunity and the importance of determining the feasibility, viability and applicability of a project prior to recommending its implementation.

- The importance of aligning new projects with existing strategic priorities and projects.
- The purpose a project can serve in the organisational context.
- $\circ~$ The unique characteristics and challenges of a project and how project management can support in addressing those challenges.

Keywords:

Assessment, Strategic fit, Feasibility, Scope management, Fit for purpose.

Stage structure

Depending on the type of the organisation and the nature of the project, during the Assessment stage the following sub-stages and steps will take place, in an effort to evaluate whether the project should be approved and resources will be committed:

- Sub-stage: Assessment of Problems, Needs and Opportunities to Start a Project
- Step: Formalisation of Problems and Needs.
- Step: Opportunities to Start a Project.
- Sub-stage: Innovation Opportunities Analysis.
- Step: Innovation Prospective.

It is important to note that in addition to assessing traditional elements like the relevance, applicability, usefulness, added value, cost efficiency and profitability of a project, the sustainability issue is becoming increasingly important and must be evaluated at all stages of the project management lifecycle.

Sustainable Project Management does not only mean implementing projects that will support the environment or the society and the achievement of the 17 sustainable development goals published by the United Nations (https://www.un.org/sustainabledevelopment/sustainable-development-goals/).

Sustainable project management also means planning and delivering your projects efficiently and effectively, taking into consideration environmental, economic and social aspects, developing high quality outputs that will sustain in time and aimed at delivering benefits to the organisation's stakeholders. It additionally entails implementing projects transparently and ethically and taking into account the requirements of all stakeholders.

Steps

Assessing the viability and usefulness of a project will require not only a structured but also an iterative approach. Although conventionally used for process improvement, the **"As-Is-To-Be" method** is a good starting point for assessing the usefulness of a project.

The "**As-Is**" part will support the working team capture in sufficient detail a specific business situation or function and identify areas of improvement, while the "**To-Be**" part will support the working team to focus on the future and on how to improve.

At the same time, it is important to note that the "As-Is-To-Be" method and visualisation of the future state does not cast light on the viability of the project.

A "**Gap Analysis**", meaning the documentation and comparison of an actual or an existing performance with the potential or desired performance, the "current performance or state" vs the "desired future performance or state", is another approach that can be used.

The answer to whether a project should proceed or not will be provided through a **feasibility study** and a **business case analysis** which should generally provide answers to the following questions:

• Are **the competences, capabilities and resources** required to undertake the project available within the organisation will the sourcing of services be required? *Documenting the technical requirements of the project will answer the question.*

• Are the **financial resources** required to undertake the project available and is it in the best interest of the organisation to utilise them for the implementation of the specific project?

A cost/benefit analysis of the project will answer the question. A cost/benefit analysis will usually involve identifying the actual expenses related to the implementation of the project and the tangible benefits of the deliverables. This may not be straightforward in cases where the project is related to a new or to improve an existing product/service, expanding to a new geographical area or upgrading a manufacturing facility to achieve sales targets.

• Are there any **risks (legal, political, technical)** related to the implementation of the project? *Identifying and evaluating the risks related to the project and their potential impact on the*

organisation will answer this question. Risk management should not be reactive it should rather be part of the planning process. Project risk management is the process of identifying, analysing and then responding to any risk that arises over the life cycle of a project to help the project remain on track and meet its goal. Risk management isn't reactive only; it should be part of the planning process to figure out risk that might happen in the project and how to control that risk if it in fact occurs.

 \circ Are the **scope and the objectives** of the project aligned with the strategic objectives of the organisation?

Defining the exact scope of the project, meaning, the objectives, the deliverables and how they will be achieved, is extremely important for the success of the project. A well-documented scope statement will enhance the ability of the project manager to revise it as the project progresses. Although changes in the project scope are expected and may be unavoidable, organisations and project managers should avoid the "scope creep". PMI defines scope creep as "adding features and functionality (project scope) without addressing the effects on time, costs, and resources, or without customer approval" (PMI, 2008, p. 440).

• Can the project be completed within the **timeline** required?

A project is unique and undertaken to achieve specific objectives. This means that the project manager will need to ensure that the organisation has the resources and the capacity to complete the project within the defined time.

Taking into consideration that every project is part of an organisation wide activity, delaying the delivery of the project will result in delays in other areas and the inefficient utilisation of the organisational resources.

• Is the project within the strategic priorities?

All projects must be aligned with strategic priorities, meaning the mission, vision and objectives of the organisation as well as the other projects being implemented. The activities of the project management practice will enable the organisation to achieve this strategic oversight.

In larger organisational settings the establishment of a Project Management Office (PMO) or the appointment of a Chief Projects Officer (CPO) may support the organisation to ensure that all projects are aligned with the organisation's strategic objectives.

The PMO or the CPO may additionally support the organisation to:

• establish a common approach and adopt an organisational wide methodology in approving, initiating and managing projects,

- guide all projects towards the organisation's strategic direct objectives,
- support colleagues in receiving approval and managing their projects.

The assessment stage of AIDIC model is implemented through the steps described in the following subchapters.

3.3 ASSESSMENT OF PROBLEMS, NEEDS AND OPPORTUNITIES TO START A PROJECT

The needs assessment will enable the project manager to identify the need which can then be used for building the business case and determining the project objectives.

Although the needs assessment is undertaken prior to the initiation of the project, it is always important to consider that external and internal factors, business, environmental, economic, political, may force the organisation to modify the original project plan.

A properly assessed project will enable the organisation to effectively respond to such changes and deliver the project.

3.4 FORMALISATION OF PROBLEMS AND NEEDS

During this step the team or individuals that intent to propose the project must formalise their idea and elaborate why the organisation must commit resources to address the specific challenge or need, by implementing a project.

A deep analysis and background information of the problem to be solved, the business or commercial need or opportunity, along with a clear description of the proposed solution and its alternatives, must be presented to the decision-making bodies. Explaining why the proposed solution is the best possible solution under the circumstances and between other alternatives that have been investigated, is extremely important.

The proposed solution and its outcomes must be precise and clear and relate to the specific problem and the issue at large.

It is important to remember that every organisation's resources, regardless of how small or how large, are finite which essentially means that project managers are competing against their counterparts in having their project approved.

For instance, pinpointing the improvements a project will bring an existing product or service, identifying a business opportunity and how the project will support the company to penetrate a new market segment i.e. through the development of a new product, recognising the need to adapt a new technology in order to have efficiency gains and improve profitability, must be part of this step.

The same analysis should be followed for an academic research project where researchers can present their literature review and elaborate on how and which problem their research will tackle and the added value to the academic area.

In the case of academic research, it is important to remember that the fundamental purpose of academic research is to prove or validate a theory and to develop new or expand existing knowledge.

In understanding what **academic research** is, the following definition provided by UNESCO is useful although the existence of an abundance of definitions from various prestigious organisations should be stressed:

"Any creative systematic activity undertaken in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this knowledge to devise new applications".

In both business and research proposals, taking into consideration and analysing the stakeholders and their interests, how each solution may affect them and their influence on the decision-making process, are equally important.

Understanding and analysing the needs and expectations of all stakeholders is an essential and ongoing element required for the successful delivery of the project.

3.5 OPPORTUNITIES TO START A PROJECT

After formalising the problems and the needs the project will aim to address, the project manager should monitor the environment for the right timing that will allow them to receive the approval for the initiation of the project.

The business environment, priorities and budget of the customer or their own organisation are some of the factors a project manager should monitor in order to proceed to the initiation stage.

Selecting the right opportunities will not only ensure the proper utilisation of the organisation's resources, it will additionally increase the chances of successfully implementing the project. The right project for the organisation will automatically translate into positive impact for the organisation, as well as management buy-in and acceptance. International Project Management Association (IPMA, 2019) reports top five reasons why organisations start projects displayed in following Figure 4.

Figure 4: Top Five Reasons for Starting Projects



Source: IPMA (2019); Own elaboration (2020)

3.6 INNOVATION OPPORTUNITIES ANALYSIS

Merriam Webster defines **innovation** as 1: a new idea, method, or device: NOVELTY and 2: the introduction of something new. According to the global consulting firm Mckinsey & Company, while 84% of executives agree that innovation is important for their business and 80% consider their business models at risk, only 6% are satisfied with their innovation performance.

Innovation is pivotal to economic growth and can enhance the ability of organisations to sustain today's highly volatile and competitive environment and must be constantly sought by organisations of all sizes and types.

Innovation is not only about developing totally new technologies, it can rather be found in all organisational activities, from how the organisation adds value to its network and its value chain to how it performs its processes.

3.7 INNOVATION PROSPECTIVE

In addition to being extremely important and rewarding, innovation is an abstract and elusive concept. As Steve Jobs reminds us, *"Innovation has nothing to do with how many R&D dollars you have. When Apple came up with the Mac, IBM was spending at least 100 times more on R&D. It's not about money. It's about the people you have, how you're led, and how much you get it".*

The potential of innovation should be constantly evaluated and where possible integrated in the operations of all types of small or large organisations and in research projects.

Innovation areas can be identified by evaluating and gaining a deep insight of the market and the requirements of customers, the market segment, business trends, new and emerging technologies and opportunities created through the digitisation of a company's operations. At the same time, innovation may relate to both incremental and significant improvements in a product or a service, in a business or industrial process and in a company's business model.

Depending on the size and sector of the organisation, innovation potentials can be exploited through projects that will either seek to improve or optimise existing products or services or alternatively, to disrupt a specific sector or market by introducing a totally new product or service. Business model innovation usually requires a totally new approach in how a company operates and adds value to its customers.

Identifying the innovation potential requires a significant amount of time and effort as well as great consistency. It additionally requires looking inside and outside your organisation in order to identify

innovation potentials. In the absence of a predefined internal innovation process, questions of the following type can be asked in an effort to identify the areas where the efforts should be focused:

• How do we deliver our products and services and to our customers and how can we do it more effectively and more efficiently?

• Can we improve the cost structure of our product or service?

 \circ $\,$ Can we improve the functionality of our products in order to make them easy to use by more customer segments?

Review Questions

- 1. What tasks need to be done during the Assessment stage?
- 2. What is a Sustainable project management?
- 3. What does a triple project management constraint mean? What are its implications?
- 4. What characteristics do research academic projects share and how do they differ?
- 5. How can we assess the opportunity and the importance of an idea/proposed project proposal?
- 6. How would you define Innovation?

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Abbreviations

Abbreviation	Explanation
OECD	Organisation for Economic Co-operation and Development
PMI	Project Management Institute
PWC	PricewaterhouseCoopers
R&D	Research and development
SME	Small and Medium Enterprise
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VTC	Value Triple Constraint

4 STAGE 2: INITIATION

4.1 STAGE DESCRIPTION

This important stage sets the terms of reference within which the project will run. Within the initiation phase, the business problem or opportunity is identified, a solution is defined, a project is formed, and a project team is appointed to build and deliver the solution It ends with the establishment of the plans and processes needed to take the project forward. Time spent on planning, refining the business case, and communicating the expected benefits will help improve the success probability. A poor initiation stage may create a domino effect, disrupting all the following stages as well as the outcome.

4.2 STAGE OBJECTIVES AND LEARNING OUTCOMES

Students are getting acquainted with and improve their understanding of Project Initiation.

- 1. Students draft a Project Initiation Plan.
- 2. Students develop a Project Charter.
- 3. Students set SMART and SMARTER Goals.
- 4. Students are familiarised with the Logical Framework Matrix.
- 5. Students define a Project Scope Statement.
- 6. Students contact Project Stakeholders Analysis.

Keywords

Project Initiation Plan, Project Charter, Project Scope Statement, Stakeholders Analysis, Grant Resources Analysis, SMART goals, Logical Framework Matrix

Stage Structure

The initiation stage is where the project Purpose is defined, the Goals, Questions and Scope of the project are decided, the project Deliverables are specified, and an initial project Budget is determined. Also, the Stakeholders are designated, and their expectations are set. All these sub-stages will be analysed below. As a final sub-stage, project Fundraising is available where the Analysis of Grant Resources is made, Instruments for Financing Innovations and Public Procurements are provided.

4.3 PROJECT IDENTIFICATION AND DEFINITION

A project is a unique, progressive, and temporary endeavour to produce a result, tangible or intangible, like a unique service, product, or result. A project is a planned, organised and goaloriented work with a clear beginning and a clear end. It has a purpose and certain benefits are targeted. Those benefits come from certain deliverables that need to be produced during the project life. Projects are goal-oriented since clear objectives are set at the very beginning of a project and a plan is made for how the objectives will be met, what needs to be done, by whom, and when. Those objectives give common direction and guidelines for the project work. The execution of a project has certain requirements and limitations like cost, quality, and performance. For these reasons, each project should have its own organisation and its own budget, which might be either labour resources, money, or both. Before starting to work on a project the first step to be taken is **Project Identification**. This is the process to assess each project idea and select the project with the highest priority while taking into consideration the resource capacities and capabilities. Project Identification is a repeatable process for documenting, validating, ranking, and approving candidate projects. Project Identification proceeds Project Initiation. There are various tools that can be used during project Identification to help us evaluate the candidate projects to define the project that we will work with. One of the tools is Mind Mapping.

Mind Mapping

Mind mapping is a graphing technique for creative thinking that **visually outlines concepts** related to a central idea. The image shows relationships among pieces of the whole, from outward branches to specific ideas within them. When utilised properly, mind mapping can guide the team through the whole project lifecycle.

Figure 5: Mind Map



Source: Shutterstock (2016)

Mind mapping for projects is not about pictures and drawings in the way most people would think, it is about **breaking down information** to decide on the best and most appropriate action needed. Mind mapping is characterised by diversity and it is a technique that is widely used in many sectors for a big array of purposes. It is proven that it increases productivity and self-organisation, enhances creativity, and improves visualisation of complex ideas and concepts. Project managers who use the mind mapping technique must consider various measurable criteria that should be analysed, evaluated, and updated during the planning. In a mind map, these criteria can be presented separately or combined with each other. Often, the decision whether a mind map will contain one or more components depends on the goal and objective that stand behind the composition of it.

Mind mapping can be a valuable tool for project managers in decision making including project definition, planning project requirements, defining scope and then breaking it down in detailed tasks, creating work breakdown structures (WBS), then using the same mind maps to schedule and ongoing monitor, controlling and closing a project, but can also assist in all other day-to-day activities like brainstorming, organising, research, meeting management, team management, problem solving, as an idea vault and as project dashboard or a resource repository. So, this is an extremely helpful and versatile tool that can be applied over the whole project lifecycle.

Besides using pen and paper to create your mind maps, the development of mind mapping software like **Coogle** (<u>https://coggle.it/</u>) took mind mapping to another level.

Let's say that one had a few ideas about projects, brainstorming them using mind maps to identify with which project to proceed. It is important that the Project Definition is fully understood and agreed by all persons concerned. The details should be incorporated into a document which should be formally agreed by the project sponsors and communicated to all interested parties. This document should also provide a good source for communicating the project's definition, purpose and intended approach to future participants and other stakeholders. Many organisations have a standard name for such a document. It is commonly referred to as a "Project Initiation Document" (PID), "Project Charter" or "Project Definition".

Having come up with the Project Definition, an important step is to be taken before the start of the implementation of the project, the **Project Initiation Phase**.

4.4 **PROJECT INITIATION**

This phase often begins with a **business case**, which outlines the objectives, purpose, and deliverables of the proposed project. Stakeholders are identified, and the requirements of the project are documented. In addition to explaining the business value of the project, the charter outlines the objectives, scope, resources, and budget for the project. Any feasibility testing should also take place during this phase. The primary output of this phase is called a **Project Charter** and this key output assists with Planning in Stage 3: Design, since it defines and justifies your project and its scope, secures funding for the project (if necessary) and defines the roles and responsibilities of project participants **answering the key questions of What? Why? Who? How? When?**

4.5 PROJECT PURPOSE

The project purpose explains the reason for the project's existence. It is the sense of what is done, the ambition or the dream pursued by the project. So, the project purpose answers the important question of **why the project exists**.

The focus of the project purpose is to create a clear and correct understanding of the project in the minds of the people, the stakeholders, involved in the planning and development process. The purpose is a statement, a declarative sentence which summarises the specific goals of the project. To be effective, this statement of purpose should be:

• **Concise and Singular** (one or two sentences that will provide the necessity and uniqueness of the project with no reference to other projects or not related information and no conjunctions).

- **Specific and precise** (not general, broad, or obscure with no more than 5-7 concepts).
- **Goal-oriented** (stated in terms of desired outcomes and with an "in order to" clause).
- **Clear** (not vague, ambiguous, or confusing with simple and generally accepted words).
- **Complete** (includes everything that concerns and deals with the project).
- **Credible** (up to date with relevant information only).

"The project purpose statement must be developed with more rigor than just the provision of some general guidance as to its structure and some broad guidance as to its contents" (Ryan, 2011). "The project purpose provides the means toward the project goal and determines the required project outputs." (Baccarini, 2002).
4.6 PROJECT GOALS AND QUESTIONS

A project goal is a tangible statement of what a project should achieve. It shows a clear direction and gives motivation. A project should be tied to a higher purpose, the one already set. The tangible deliverables that support this goal are the objectives of the project, in other words objectives are the necessary elements to accomplish the goal for which the project has been created.

Goals and Objectives come from the project purpose statement and essentially, they help to further clarify it. Basically, Project *Objectives* define how the project result is going to look like. **Goals** are usually a broader or general statement about what the project is to attain. The project might be formulated in hierarchy, i.e. main/global objective (at the level of project impact) and specific objectives at the levels of project results and/ or outputs.

The objectives (higher goals) should be specific and measurable, ideally formulated as SMART targets, and if one wants to take it a step further, render the objectives SMARTER. KPIs can also be defined as project objectives. Another very useful technique which will be presented in the Logical Framework Approach that follows a hierarchical result-oriented planning structure and methodology which focuses all project planning elements on the achievement of one project purpose and the tool that will be used, is the Logical Framework Matrix.

SMART and SMARTER goals

Setting clear goals and objectives is an essential step because they provide a road map to the destination that is no other than a successful project implementation. As we mentioned in Project Initiation, the key questions of What? Why? Who? How? When? should be answered.

Setting goals and objectives based on the answers to those questions is a starting point but to increase the chances of achieving the goals, the SMART technique should be applied.

SMART stands for:

• **S** stands for **Specific** (to have defined and clearly understood goals and objectives, leave no room for misunderstanding, and always keep in mind who, what, when, where, and why questions).

• **M** stands for **Measurable** (to state the measure and specifications of the result of the goal and objective to know what and when has been accomplished and whether personal objectives met the defined objectives or not).

• **A** stands for **Achievable/Attainable/Actionable/Appropriate** (to have the necessary resources and team to have reasonable expectations to accomplish).

• **R** stands for **Realistic** (to set goals and objectives that fit within the broad project, that are aligned with the organisational or group/team goals).

 \circ **T** stands for **Time-Bound** (to have a specific timeline and a deadline by means of which the objectives will be accomplished).

SMART technique is for goal setting and alignment while SMARTER technique is for goal tracking. SmartER stands for:

• **E** is for **Evaluate** (to evaluate the goals as often as possible to eliminate the chance to get them ignored).

• **R** is for **Re-adjust** (to re-adjust the methods, techniques or resources that no longer serve the goals and objectives).

Logical Framework Approach

The Logical Framework Approach follows a **hierarchical result-oriented** planning structure and methodology which focuses all project planning elements on the achievement of one project purpose.

The product of this analytical approach is the **Logical Framework Matrix**, which summarises what the project intends to do and in which way, what the key assumptions are, and how outputs and outcomes will be monitored and evaluated. During the initial stages, it can be used to test project ideas and concepts for relevance and usefulness, and it defines links between the project and external factors. During implementation, the Matrix serves as the main reference for drawing up detailed work plans, terms of reference and budgets. It also provides indicators against which the project progresses and achievements can be assessed.

Logical Framework Matrix

A Logical Framework Matrix (Logframe or LFM) is the output of a programme design process where you work out how the programme activities will lead to the immediate outputs, and how these will lead to the goal and outcomes. The results of the stakeholder, problem, objectives, and strategy analysis are used as the basis for preparing the Logical Framework Matrix. The Logical Framework Approach refers to the steps involved in planning and designing the project. These steps include a stakeholder analysis, cause-effect analysis, objectives analysis, and alternatives analysis culminating in the design of the project. The Logical Framework Matrix, which summarises the final design of the project, usually comprises 16 frames organised under four major headings and allows for a complete project to be represented in a clear and related manner.

The LFM has four columns and four rows. The four rows, which are your long- to short-term objectives ranging from top to bottom, are:

- **Goal** What is the overall Objective/Aim of the project.
- **Outcome/Purpose** What will be achieved, who will benefit, and by when?
- Outputs What are the specific results the project will generate?
- Activities What tasks need to be done for the output to be achieved?

These are achieved and measured by the four columns from left to right:

• The first columns represent the **hierarchy of activities to outcomes** that needs to occur for the project to succeed.

• The second represents the **indicators** that are appropriate measures of whether the activities, outputs or outcomes have been achieved (how you will measure the achievements).

 $^\circ$ The third represents the **data source or means** to verify the indicator (how you will collect the information for the indicators).

• The last column is especially important and outlines the **assumptions** that need to hold true for that activity, output, or outcome to occur (external conditions needed to get the results).

Project Description	Indicators	Source of Verification	Assumptions
Overall Objective – The project's contribution to policy or programme objectives (impact)	How the OO is to be measured including Quantity, Quality, Time?	How will the information be collected, when and by whom?	
Purpose – Direct benefits to the target group(s)	How the Purpose is to be measured including Quantity, Quality, Time	As above	If the Purpose is achieved, what assumptions must hold true to achieve the OO?
Results — Tangible products or services delivered by the project	How the results are to be measured including Quantity, Quality, Time	As above	If Results are achieved, what assumptions must hold true to achieve the Purpose?
Activities – Tasks that have to be undertaken to deliver the desired results			If Activities are completed, what assumptions must hold true to deliver the results?

Table 3: Typical Structure of the LFM

Source: European Commission (2004)

How to read the LFM

• The **vertical / intervention logic**, using the first and last columns, reflects the sequence of steps that lead to the outcomes being achieved. It identifies what the project intends to do, clarifies the causal relationships, and specifies the important assumptions and risks beyond the project manager's control. The vertical logic is read from the bottom up. The assumptions that are noted in each row must be met for the hierarchy to be achieved. For example, by undertaking the activities, and assuming the assumptions are met, the outputs will be achieved.

• The **horizontal logic** relates to the measurement of the effects of, and resources used by the project through the specification of key indicators, and the sources where they will be verified. It consists of the individual rows and represents a concise outline for monitoring and evaluating the project. You could consider using this as your monitoring and evaluation plan, but it is recommended that you use the matrix as a foundation and expand it into a more comprehensive monitoring and evaluation plan.

How to Prepare the LFM

1. First Stage — TOP DOWN:

Table 4: First Stage of the LFM

Project Description	Objectively verifiable indicators of achievement	Sources and means of verification	Assumptions
Goal			
Purpose		· · · · · · · · · · · · · · · · · · ·	
Outputs			
Activities		Means and Costs	

Source: Barreto (2010)

Goal: starting at the top, write the overall objective of the project.

Purpose: describe the desired outcome that the project will achieve, make it clear and brief.

Outputs: describe the project intervention strategy, several outputs can be added

Activities: these are the tasks that are necessary to achieve these outputs, there may be several of them for each output. Statements should be brief and with an emphasis on action words.

Inputs: when required to do so, provide additional information, such as the means and costs needed to carry out these activities.

Second Stage — WORK ACROSS:

Table 5: Second Stage of the LFM

Project Description	Objectively verifiable indicators of achievement	Sources and means of verification	Assumptions
Goal			
Purpose			
Outputs			
Activities		Means and Costs	

Source: Barreto (2010)

Indicators: starting from the top to bottom of the hierarchy of the objectives, begin to work across the Matrix, identifying the Indicators for measuring the progress in terms of quantity, quality, and time.

There are two kinds of indicators:

a. **Impact indicators**: related to the overall goal, helps to monitor the achievement and the impact of the project.

b. **Process (our outcome) indicators**: related to the purpose and results. These measure the extent to which the stated objectives have been achieved.

Means of verification: the source of verification should be considered and specified at the same time as the formulation of indicators. This will help to test whether the indicators can be realistically measured at the expense of a reasonable amount of time, money, and effort or not. This should specify how, who and when the information will be gathered.

Third Stage — BOTTOM UP:

Table 6: Third Stage of the LFM

Project Description	Objectively verifiable indicators of achievement	Sources and means of verification	Assumptions
Goal	4		
Purpose	4		
Outputs	4		\rightarrow
Activities			\rightarrow

Source: Barreto (2010)

Assumptions: reflecting up from the bottom of the Matrix, consider how, if each assumption holds, it will be possible to move to the next stage of the project. Assumptions are external factors that have the potential to influence (or even determine) the success of a project but lie outside the direct control of project managers. Assumptions are usually progressively identified during the analysis phase. The analysis of stakeholders, problems, objectives and strategies will have highlighted a number of issues (i.e. policy, institutional, technical, social and/or economic issues) that will impact on the project "environment", but over which the project may have no direct control.

4.7 PROJECT SCOPE

For a project plan to be accurate, the first thing that needs to be performed is defining the project scope.

Project scope is the **totality of the purpose, vision, and work effort** for a given project and is defined as the body of work, the overall tasks, activities and decisions, that must be completed in order to ensure that project goals and deliverables are met. The scope should be clearly defined and limited to the work that must be done to meet the goals at hand. It establishes what the purpose of the project is, what it will accomplish and how it will achieve it. **Effectively, it defines the project**.

Once the project scope has been defined and approved, it provides a **working "template"** whereby projects are planned and executed. To achieve successful results, the project scope must be clearly defined in specific, measurable terms, ready for stakeholders' negotiation, acceptance, and approval.

Usually determining and presenting the project scope with its tangible or intangible key deliverables, including key milestones, high-level requirements, assumptions, and constraints, is achievable with a mind map. A project scope can be displayed in the centre of the mind map in a cluster that will branch out in key deliverables and every other important detail. Once the project scope and deliverables are documented, the mind map can be further refined according to one's individual needs.

The scope statement is modified as you learn more about the project scope during the progression through the project planning activities and although the final scope statement is determined during the project-planning phase, the initiation phase requires a high-level scope statement to communicate what the management intend to achieve by creating the project.

Project Scope Statement

A project scope statement is essential to put the team in sync and remain focused on tasks and to prevent unauthorised tasks from emerging. The documentation of the project's scope, the scope statement, or terms of reference, *explains* **the boundaries of the project**, *establishes responsibilities for each team member and sets up procedures for how completed work will be verified and approved.* The most important thing with project scope statement is to be as specific as possible to reduce the primary risks of the project.

A project scope statement is a written document that includes all the required information for producing project deliverables. Objectives and tasks not listed in the project scope statement should be considered out of scope. Project managers can also list specific work that will not be part of the project. This generally leads to the creation of a work breakdown structure (WBS), which will be analysed in Stage 3: Design.

A Scope Statement should include the following:

- **Overall description of the work** What is the end goal?
- Deliverables What will be produced by the project?
- Justification for the project Why this project was initiated? Why it is important?

• **Constraints** – Are there any *physical, legal, or policy issues limiting the options of the project team or constraining the solution produced by the project?* (PMI, 2004, p. 89). Those constraints are typically external to the organisation.

• **Assumptions** - All projects have assumed certain conditions as part of their existence. What are those assumptions and what impact does their inaccuracy have on the project? *It can represent a decision the project team believes is valid, but may not be valid, and for which they have little control over* (PMI, 2004, p. 89).

• **Critical Success Factor** – What are the major expectations the project MUST accomplish to be considered a SUCCESS?

An effective Project scope statement is further elaborated in Stage 3: Design.

4.8 PROJECT DELIVERABLES (OUTPUTS & OUTCOMES)

As has already been mentioned, projects are initiated to produce specific, unique outcomes/results based on specific needs. That purpose and need must be expressed in a result, tangible or intangible, like a unique service, product, or some other outcome. So, *Project Deliverables are defined by the* **tangible result or outcome** of a given project, whether intellectual/logical or physical.

Deliverables can vary according to the project's specifications and the stakeholders' requirements. A project deliverable is any specific output created as a result of work performed during the lifecycle of a project. Deliverables are the final outputs that are transferred to a third party outside of the project.

Defining, tracking, and managing project deliverables is one of the most important responsibilities of the project manager. It is impossible to deliver something unclearly defined and described in sufficient detail so that actual results are not left to the imagination. For any output to be classified as a deliverable within a project, several criteria must be met:

• Be within the scope of the project.

• Stakeholders, external and/or internal, accept it but clearly establish realistic stakeholder expectations.

• Be the result of deliberate work in sufficient terms to allow for development, production and/or acquisition aligned with all known functional, technical, and operational requirements.

- Have a definite role in accomplishing the project's objective(s) and ultimately the project goal.
- Have a measurable basis for deliverables testing and review.

To be able to define the deliverables of a project, the following questions should be answered:

- What is this project trying to achieve?
- What is the end goal of the project?
- What are the components of the project's objective and what is their form/function?
- What is the cost and are there any other resources needed?
- How long will I and my team need to accomplish it?

Initial Project Budget

The Project Budget is a tool used by project managers to estimate the total cost of a project. It is the detailed estimation of all costs needed to complete the project and, additionally, an estimation of what else is likely to arise before the project is completed and over the defined period of the project lifecycle. The Project Budget itself is a **dynamic document** used to estimate what the costs of the project will be for every phase of the project. It is **continuously reviewed**, **revised**, **and updated** over the course of the project. Throughout the course of the project, it allows the project manager to check whether the project sticks to its budget or fails to do so, making it an important instrument to control project cost and acts as a baseline to measure your performance as the actual costs are collected once the project has initiated.

The Project Budget is the **combined costs of all activities, tasks, and milestones** that the project must fulfil and will include aspects such as labour costs, material procurement costs and operating costs. Overall, it is the total amount of money necessary to finish the project that should be approved by all the stakeholders involved. The overall budget of the project should be discussed and added to

the project plan. All team members involved should know the resources that are being allocated to them, and what limitations this could put on their ability to complete the project. Also, any external project participants need to be outlined in this as well.

You start creating a project budget during the Initiation phase of the project and continue monitoring it till the project reaches the finish line. You can follow the steps below to create a basic project budget:

• Break down your project into tasks and milestones – it will give you an understanding of what you will need to accomplish and help you with project cost management.

• Estimate each item in the task list – you will be able to identify all the resources and materials you will need to perform well and include them into your estimate when calculating the price.

- Add the above estimates together.
- Add contingency and taxes.
- Get approval.

The most common project **cost categories** are:

- Human resources.
- Travelling.
- Training fees.
- Material resources.
- Research expenses.
- Professional services.
- Capital expenditures.
- Contingency reserves.

Project budgeting is explained in more detail in Stage 3: Design, Project Budgeting.

4.9 PROJECT STAKEHOLDERS

Project stakeholders are people (or groups) who can affect, be affected by, or believe to be affected by the decisions and/or the activities carried out during a project's lifecycle and/or by its output(s) and outcome(s). The effect can be real or perceived. Project stakeholders are **entities that have an** *interest in the given project*, they can be directly involved in a project's work, be members of other internal organisations or external to the organisation and they may have a positive or negative influence in the project completion.

The number of stakeholders depends on the complexity and scope of a project. However, the more people the project has an impact on, the more likely it is that it will affect people who have some power or influence over the project. If a project is small, the number of stakeholders can be small. Also, all stakeholders are not alike since they have different expectations and needs. One must treat every stakeholder uniquely according to their needs or else the stakeholders might feel left out which can put the project in danger.

Project stakeholders can be classified into two types, **internal** stakeholders who are the people involved in a project from within and **external** stakeholders who are not directly involved but are engaged from outside and are affected by the project outcome. We should keep in mind that any group or person affected by the project as it progresses and/or when it is completed is a stakeholder.

Stakeholders come in many forms and have substantially different needs as it relates to the project. They can also have varying levels of support. You often do not know how strongly they support or oppose the project until you consult with them. Different stakeholders often have opposing expectations that might create clashes within the project. Stakeholders may also interfere in the project, its deliverables, and the project team to fulfil their strategic business objectives or other requirements. As in any relationship good communication and collaboration is key. So, to build a quality relationship with stakeholders, constantly giving and receiving valuable information is crucial. Sharing key project information can be easily managed with the mind mapping technique. Mind mapping supports gathering information in one place and allows sharing it among project participants and stakeholders.

Stakeholders are people who are affected by a project or have any kind of interest in it. They can be internal, external, positive, negative, high power, low power and so on. However, to complete the project successfully, all these stakeholders must be managed and their prospects fulfilled.

Stakeholders Analysis

The important stakeholders are present right from the initial conception of the project. Therefore, they should be identified and to do that you should conduct a Stakeholder Analysis to determine all the stakeholders. As soon as the Project Charter is complete and the Project Scope is defined, those documents can be used to start mapping out your stakeholders.

Step 1: Identify your stakeholders – Use project charter or any other documents and compile the list of stakeholders that you can identify. Include both internal and external stakeholders. Keep in mind that some stakeholders come at a later stage of the project lifecycle, but if you can anticipate them in advance, you can start building the relationship with them and help them to feel involved from the very beginning of the project.

Step 2: Prioritise your stakeholders – this is important because it helps you understand where to invest your resources because you identify who the key decision makers are at any given moment. To prioritise and essentially identify the key stakeholders you can use the Power-Interest Grid. By answering two key questions you will be able to group them into one of the four categories. The questions are 1. What level of power do they have? (remember we said that stakeholders can be positive, negative, high power, low power and so on) and 2. What level of interest do they have?





Power / Interest Grid for Stakeholder Analysis

Source: Tidyfrom.com (2020)

0 Low Power – Low Interest stakeholders need to be monitored to ensure they do not unduly influence the project.

0 Low Power - High Interest stakeholders need to be kept informed to ensure they do not generate unnecessary influence other stakeholders.

0 High Power – Low Interest stakeholders must be kept satisfied; they must have all their needs met to ensure they do not derail the project over small issues.

0 High Power – High Interest stakeholders are major stakeholders and must be managed closely to ensure they remain supportive.

Step 3. Understand your stakeholders – at this point you should understand the full grasp of their expectations for the project. You should discuss things like:

- 0 What is their definition of project success?
- 0 Do they have any concerns about the project or its outcomes?
- 0 What are their expectations from the project?
- What impact will the project outcomes have on them? 0
- 0 Is there a conflict of interest?

Doing so you start building effective communication and interpersonal relationships with them, of course keep your eyes open for any political, cultural, or environmental cues that may exist. Since you are the project manager then you are responsible for stakeholder management in your project. Stakeholder analysis and stakeholder management call for the full range of soft skills, such as interpersonal communication, facilitation of teams and teamwork, or conflict management, to name a few.

4.10 PROJECT FUNDRAISING

Funding is essential to get the project started and **set all resources in motion**. Like the scope statement, funding levels must be finalised once the project planning has been completed, but the funding levels can communicate what the management team is thinking when creating the project, hence it can be a **strong part of the project charter**.

There are **different potential sources of funding**, depending on the aim and topic of the project. There are **Grants**, **Tenders**, **Sponsorships**, **Donations**, **Community-Business partnership and even Rotary**. You can also consider alternative ways to raise funds, such as crowdfunding campaigns or local fundraising events. Do your research and try to be as organised and as clear on what you want as possible, start locally (in your municipality/province), then nationally, and then expand to a worldwide search.

Taking the time to develop a simple plan for fundraising is quite useful. If you share the thinking that goes into a fundraising action plan, the company will have a clearer understanding on who is taking responsibility for what. A fundraising plan is a working document that should be updated regularly and adjusted, as necessary. As a minimum it comprises statements on:

- Aim What is the project trying to achieve?
- **Objectives** Refer to SMART objectives for fundraising
- Potential funders Make a shortlist of potential funders based on your research
- Environment Make an analysis of the fundraising environment
- Case for support Why a funder should part with their money to support your project?
- Implementation plan How you are going to achieve your fundraising objectives?
- Monitoring and evaluation How you intend to measure progress and success?

4.11 GRANT RESOURCES ANALYSIS

The **resource-based view** (**RBV**) is a managerial framework used to **determine the strategic resources** a company can exploit to achieve sustainable competitive advantage. One of the most common models for the implementation of RBV in organisations is the model proposed by Grant, an action plan for managers to identify their resources, then identify the capabilities, appraise competitive advantage, and then to use the applicable strategy that will better exploit these resources and capabilities. Grant's model outlines the connection between resources and capabilities and their potential competitive advantage. If any resource is considered to be a competitive advantage, the managers should determine the type of resource, the conditions under which they add value, gained capabilities, the potential for sustainable competitive advantage, exploitation of this resource, and what measures to be used to assess its outcome on the overall performance. At this point, this resource could be classified as valuable and rare if it improves the effectiveness and efficiency of the firm (Habbershon and Williams, 1999).





Source: Almarri.and Gardiner (2014)

Public Procurements

Public procurement refers to the process whereby **public authorities**, such as government departments or local authorities, **purchase work, goods, or services from companies**.

The public contracts field – and by extension the public procurement system – is recognised as one of the main pillars for the economy growth, given the fact that public expenditure for public contracts account for approximately 20% of GDP annually in EU member countries. The reasonable organisational and functional operation for public procurement optimises the utilisation of the relevant funds to serve the national development objectives, to support the economic growth and to create new jobs.

Public contracts are awarded by users of public funds and entities operating in specific, noncompetitive conditions (for example energy, water, public transport, postal services), for the purchase of services, supplies or civil engineering works.

Usually, all medium and higher value contracts must be awarded through competitive procedures (tenders), although there are exclusions and exceptions, such as purchasing real estate, cases of extreme urgency or situations where there is only one possible supplier.

Project Charter

Project Manager works with the Project Sponsor to identify the necessary resources and team members needed to further develop the project. A Project Charter is created, based on the Project Proposal including the initial Business Case, where the project Team documents its charge. The size of which depends significantly on the size of the project and the work effort. When the Project Charter is approved by the Project Sponsor the project team is authorised to initiate the planning effort for the project implementation.

The Project Charter is concerned with the **documentation** of the business needs, the project justification, the project requirements as of today and the results intended to be satisfied. It can be used as a **reference point** for the goals of the project through its objectives. According to *PMBOK* (PMI, 2017) the Project Charter should address, either directly or indirectly by referencing to other documents, the following information:

- Project purpose and/or justification.
- Measurable project objectives and related success criteria (ROI).
- High level requirements that the project be meant to address (objectives).
- Organisational, environmental, and external assumptions and constraints.
- High-level project description and boundaries.
- High-level risks.
- Stakeholder list.
- Budget summary and Resources needed.
- Summary of the milestones schedule (timeline).
- Project approval requirements.

• Determined Project Manager and their authority level and the Roles and Responsibilities of the project team.

• Project Sponsor.

A Project Charter helps to:

- Make a clear outline of the project objectives.
- Give comprehensive details of the project scope.
- Establish the timeline.
- Specify roles and responsibilities.
- Give initial guidelines for the project approach.
- Clarify Issue management.
- Make contact information available.
- Inform the change control (if applicable to the specific project).

The Project Charter must be **established at the very beginning** of the project to ensure the smooth process of the project implementation and in fact to make the project and the project manager legitimate. For this reason, it needs to be clear, direct, and concise without using technical terms and acronyms.

Review Questions

- 1. What is Mind Mapping? What do we use it for?
- 2. Why should we formulate project goals as SMART targets?
- 3. What is the structure and logic of the Logical Framework Matrix? Why should we use this method?
- 4. What is a project deliverable? Think of three tangible and three intangible project deliverables.
- 5. Who are stakeholders of the project? Why it is important to consider them?

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Abbreviations

Abbreviation	Explanation
EU	European Union
LFA	Logical Framework Analysis
LFM	Logical Framework Matrix
КРІ	Key Performance Indicators
PID	Project Identification Document
РМВОК	Project Management Body of Knowledge
RBV	Resource-based view
ROI	Return of Investment
SME	Small and Medium-sized Enterprise
WBS	Work Breakdown Structure

5 STAGE 3: DESIGN

5.1 STAGE DESCRIPTION

Project design is a **major step towards a successful project**. It is a strategic organisation of ideas, materials and processes to achieve a goal. Project managers rely on a good design to avoid pitfalls and provide parameters to maintain crucial aspects of the project, like the schedule and the budget.

Some might rush through the preliminary stages of a project, such as project design, but that would be a mistake. Any seasoned project manager can tell you from experience that the more you put in the frontend of a project, the better your results will be on the back-end.

Project design is one of the **first responsibilities of the project manager for a given project**. In this stage of the project, the decisions about how to manage and govern are made. A **project plan** is created and centres on the needs of the stakeholders, the organisation and the project itself, of course. This document will then be used to **manage all further stages of the project**. The thinking that goes on during the project design, however, does not focus on details as much as it works on a higher level in terms of managing the project.

5.2 STAGE OBJECTIVES AND LEARNING OUTCOMES

Students will be acquainted with how to plan a project in brief and learn about the general workflow of project steps in developing a project design.

Learning outcomes and students' skills:

- 1. Students can recognise and explain main steps of developing a project plan.
- 2. Students understand links between project scope, schedule and budget.
- 3. Students know a common approach to building the Work Breakdown Structure (WBS).
- 4. Students are able to construct a general view of the Organisational Breakdown Structure (OBS).
- 5. Students can identify project risks and rules of project communication and dissemination.

Keywords

Project Plan, WBS, Scheduling, Budgeting, OBS, Risks, Communication, Dissemination, Ethics, Monitoring, Controlling.

Stage Structure

In this project cycle stage, the theoretical basis of creating a project design is introduced. The following stage structure focuses on the main steps important when developing a project plan. A step-by-step point of view introduces a project plan to students in the view of traditional project triple constraints (scope – time – costs). The stage contains a theoretical background of project workflow, project time and budget, as well as resource plan and risk assessment. At the end of the project design the view of project communication, dissemination, monitoring and control is discussed.

5.3 WORKFLOW PROJECT

Project design can include everything from who is responsible for completing the project to a description of the project, its goals, outcomes and objectives. It describes when these goals, outcomes and objectives will be reached, and the major deliverables, products or features that will be completed. The project design also estimates the budget and outlines how to monitor and evaluate progres.

Project initiation phase has properly defined the project identification according to project vision and problems as well as project goals. These steps can be a starting point for developing a complete design of the project as shown in **Figure 8**. But the project design phase involves creating a suite of planning documents which help the project team through further steps to get the project design.

Figure 8: Project Design Questions



Source: Ray [online] (2018)

Scope of Work - Theoretical Basis

Whenever you collaborate with people outside your organisation, it is all too easy for miscommunication or presumptions to send a project off course. That is why the **scope of work** (SOW) is such an important document for any project manager for designing the project.

As a project manager, you will use the SOW to make sure expectations are clear and agreed upon, and that both you and whoever you work with know exactly what they are supposed to do. An effective SOW should include features that supposed to be discussed in its basic form in **initiating phase** (see chapter 2.1.3) and are further elaborated in more detail in the planning phase, like:

• **Project Objectives**: Your problem statement. What is it the issue that you face and what do you want to achieve with this project?

• **Schedule/Milestones**: When does the project begin and by when does it need to be finished? What are the major milestones or phases of the project enabling you to track and measure progress?

• Individual Tasks: What exactly needs to be done to from now onwards to finish the project?

• **Deliverables**: What do you need at the end of the project? Is it simply a PSD file of the website mock up? Or a usable code on a staging server that you can implement when you're ready?

• **Payment Information**: How much is the project going to cost and how are you going to pay the team with which you are working?

• **Expected Outcomes**: The answer to your problem statement. Are you looking for an increase in traffic, conversions, or sales? What is the business objective that you want to meet with this project and how will you measure and report on it?

• **Terms, Conditions and Requirements**: Define the terms that you use in the SOW and clarify any necessary conditions or requirements yet unclear.

Work Breakdown Structure

Breaking work into smaller tasks is a common productivity technique used to make the work more manageable and approachable. For projects, the Work Breakdown Structure (WBS) is a tool that utilises

this technique and is one of the most important project management templates or working documents. It singlehandedly integrates scope, cost and schedule baselines ensuring that project plans are in alignment.

The Project Management Institute (PMI) defines in the standard of Project Management Body of Knowledge (PMBOK) the Work Breakdown Structure as *a "deliverable oriented hierarchical decomposition of the work to be executed by the project team* (PMI, 2020b)." There are two types of WBS as described in **Figure 9.** The most common and preferred approach is the Deliverable-Based approach. The main difference between the two approaches are the elements identified in the first level of the WBS.

A **Deliverable-Based Work Breakdown Structure** defines and structures project activities based on the deliverables agreed to deliver. A **Phase-Based Work Breakdown Structure** defines and structures project activities based on the project phases.





Source: Engineeringmanagement [online] (2020); Own elaboration

Dividing the project into smaller tasks allows the project manager to obtain an overview of duration and cost. The appropriate method that accomplishes such a simplification is thus the Work Breakdown Structure. It guides the project manager through a structured process by starting with the whole project on the top level. The project manager divides the project into several sections on a second level. These sections can overlap but represent separate activities.

Let us take a general example of Work Breakdown Structure in the case of buying a new car as it is shown in **Figure 10**. When responsibly buying a new car as a case of a sample project, it is needed to think about project overview and in the stage of design about developing an activity work plan. Thus the Work Breakdown Structure template can be used for that purpose.

Figure 10: Activity Work Plan - Buying a New Car



Source: Own elaboration (2020)

5.4 ESTIMATING PROJECT TIME AND BUDGET

Two key features of a project are **on-time** and **on-budget delivery**. The project manager can only fulfil these objectives if the estimates leading to the project schedule and budget are accurate. Methods for estimating project times and costs focus on simplifying the process and breaking it down into little steps. Such methods allow project managers to estimate the cost and duration of tasks more reliably. Estimates of many tasks will be both high and low, and some will cancel out, reducing the overall error.

Task Costs

Once the project manager has broken the project up into small tasks, the further step is to assign costs. For equipment that must be purchased for the purposes of the project, we can contact suppliers to receive accurate estimates. For other tasks, we can estimate the number of hours and use an hourly rate. Another method of assigning costs is to use historical data. If the company has completed a similar project, the cost of equipment may be available. Finally, the project manager can estimate overhead by applying a percentage based on how much overhead costs such projects typically generate.

Activity Durations

The project manager can use the same method as is used in relation to costs to assign activity duration. The project manager can check with suppliers to obtain delivery times and use historical records to estimate how long a task takes to perform. For common tasks, such as pouring concrete or paving a parking lot, they can use industry norms to derive duration, based on the cubic feet of concrete or the square footage of the parking lot. For labour-intensive, non-standard activities, they can check with the people who will carry out the work.

Costs and Schedule

Once the activity costs project schedule have been established, the project manager has to link the estimates so as to be able to arrive at approximate **cash flow**. The manager has to look at the activities that have been schedule and the costs assigned to each activity to schedule payments. While companies are interested in the total cost of the project, they also have to be able to schedule their cash flow. This method allows the project manager to estimate the payments for each pay period.

5.5 PROJECT MILESTONES

A **project milestone** is a task of zero duration that shows an important achievement in a project. The milestones should represent a clear sequence of events that incrementally build up until your project is complete.

Project milestones are a way of knowing how the project is advancing, especially if you are unfamiliar with the tasks executed. They have zero duration because they symbolise an achievement or a point of time in a project. Since a milestone's start and end date depends on the start and end date of a task, task association is a major feature of a milestone.

Lets use an example - not everyone is a project manager in the construction field, but most of us are at least familiar with the steps involved in building a new home. When building a home from the ground up, one is likely to work off a list that resembles this:

- The floors will be finished on Monday.
- The roof will be completed on November 1st.
- The gas installation will be connected at the end of the month.

As you have probably noticed, we talk about project milestones, not tasks, because this is how we understand the process. When creating milestones for your projects, think of the house as the main deliverable, you as the project manager, and your friends and family as the stakeholders. If you are planning your first project or simply need a refresher, some typical milestones include project approval, requirements review, and final approval.

5.6 **PROJECT SCHEDULING**

Project scheduling is a mechanism to communicate what tasks need to get done and which organisational resources will be allocated to complete those tasks in what timeframe. A project schedule is a document collecting all the work needed to deliver the project on time.

A project is made up of many tasks, and each task is given a **start** and **end** (or due date), so it can be completed on time. Likewise, people have different schedules, and their availability and vacation or leave dates need to be documented to successfully plan those tasks.

Whereas people in the past might have printed calendars on a shared wall in the water-cooler room, or shared spreadsheets via email, today most teams use online project scheduling tools. Typically, project scheduling is just one feature within a larger project management software solution, and there are many different places in the software where scheduling takes place.

Because projects have so many moving parts and are frequently changing, project scheduling software automatically updates tasks that are dependent on one another, when one scheduled task is not completed on time. It also generates automated email alerts, so team members know when their scheduled tasks are due or overdue, and to let the manager know when someone's availability has changed.

Various types of graphs and diagrams are used in practice to capture the schedule - Gantt chart, line graph, network diagrams based on the Critical Path Method (CPM) or Program Evaluation and Review Technique (PERT). In the case of a simple project, the most common type of scheduling is a **Gantt chart**. It is a type of bar chart that illustrates a project schedule, named after its inventor, Henry Gantt (1861–1919). Modern Gantt charts also show the dependency relationships between activities and current schedule status. Gantt charts are often used as MS Excel or MS Project templates as shown in **Figure 11**.

										PHA	ISE ONE					PHASE TWO PHASE THREE				PHASE FOUR																				
TASK	TASK	TASK	START	DUE	DURATION	PCT OF TASK		WEEK 1		W	IEEK 2	Τ	WEE	K 3		WEEK	4	1	NEEK 5		W	EEK 6		WEEK	7		WEEK 8	3		WEEK	;	WEEK 10 WEEK 1		WEEK 1			WEEK	2		
ID	TITLE	OWNER	DATE	DATE	IN DAYS	COMPLETE	M	W	R F I	M T	WR	FM	TW	R	FM	T W	R F	M T	W R	F I	N T	WR	FM	T W	R F	M	T W	R F	M	W	R F	M	T W	R F	M	T W	R F	M	T W	R F
1	Project Conception and Initiation																																							
1,1	Project Charter	Leon W	03.12.23	03.15.23	3	100%																																		
1.1.1	Project Charter Revisions	Kylie R	03.15.23	03.16.23	1	100%																																		
1,2	Research	Pete \$	03.15.23	03.21.23	6	90%																																		
1,3	Projections	Steve L	03.16.23	03.22.23	6	40%																																		
1,4	Stakeholders	Allen W	03.17.23	03.22.23	5	70%																																		
1,5	Guidelines	Malik M	03.18.23	03.22.23	4	40%																																		
1,6	Project Initiation	Malik M	03.23.23	03.23.23		50%																																		
2	Project Definition and Planning																																							
2.1	Scope and Goal Setting	Steve L	03.24.23	03.28.23	4	5%																																		
2,2	Budget	Allen W	03.29.23	04.02.23	4	30%																																		
2,3	Communication Plan	Malik M				0%																																		
2,4	Risk Management	Malik M				0%																																		
3	Project Launch and Execution																																							
3,1	Status and Tracking	Pete S				0%																																		
3,2	KPIs	Leon W				0%																																		
3.2.1	Monitoring	Kylie R				0%																																		
3.2.2	Forecasts	Kylie R				0%																																		
3,3	Project Updates	Pete S				0%																																		
3.3.1	Chart Updates	Malik M				0%																																		
4	Project Performance / Monitoring																																							
4,1	Project Objectives	Steve L				0%																																		
4,2	Quality Deliverables	Allen W				0%																																		
4,3	Effort and Cost Tracking	Malik M				0%																																		
4.4	Project Performance	Malik M				0%																																		

Figure 11: Simple Gantt Chart Template

Source: Smartsheet [online] (2020a)

5.7 PROJECT BUDGETING

Project budgeting determines the total amount of financial resources allocated for the project to use. The initial project budget supposed to be estimated by the project manager and the project management team already in the initiation phase (see chapter 2.1.5). The budget is an estimate of all the costs that should be required to complete the project. We use the words "should be" because if a project is poorly estimated, then the project will require more costs.

The budget for a project is the combined costs of all activities, tasks, and milestones that the project must fulfil. In short: it is the total amount of money needed to finish the project that should be approved by all stakeholders involved.

You start creating a project budget during the kick-off phase of the project and continue monitoring it until the project reaches the finish line. A meticulously planned project budget is the holy grail of the new service economy where scaling smoothly and sustainably is critical to company survival.

There are at least three reasons to explain the importance of having a project budget plan.

• **First, it's an essential part of securing project funding**. The numbers will tell stakeholders exactly how much money is needed to button up the project and when the money is needed.

• Second, a well-planned budget provides the basis for project cost control. Having an end budget estimate helps measure the project's actual cost against the approved budget and see how much costs has been burned already. It will give you an understanding of how the project is progressing and if any changes need to be made to the plan.

• Third, a project budget has a direct effect on the company's financial viability. When calculated feasibly and with resource constraints in mind, a project budget will increase the operating margin and improve overall project success.

There can be many **types of forms** and **templates** that illustrate business budget, personal budget or project budget shown in MS Excel, MS Project or any other software. Example of a project budget based on the Excel template is shown in **Table 7**.

	LAB	OR	MATE	ERIALS	FIXED	COST	BUD	GET	ACTUAL		UNDE	R/OVER
HRS		RATE	UNITS	\$/UNIT								
	10	\$ 15,00	50	\$ 10,00	\$	200,00	\$	850,00	\$	800,00	\$	(50,00)
							\$	-			\$	-
							\$	-			\$	-
							\$	-			\$	-
							\$	-			\$	-
							\$	850,00	\$	800,00		
							\$	-			\$	-
							\$	-			\$	-
							\$	-			\$	-
							\$	-			\$	-
							\$	-			\$	-
							\$	-	\$	-		
							\$	-			\$	-
							\$	-			\$	-
							\$	-			\$	-
							\$	-			\$	-
							\$	-			\$	-
							\$	-	\$	-		
							\$	850,00	\$	800,00		

Table 7: Simple Project Budget Template

Source: Smartsheet [online] (2020b)

5.8 GATHERING RESOURCES

Getting a handle on all of the tasks that have to be done is a great start, but it is not enough to know the tasks and the order they come in. Before you can put the final schedule together, you need to know who is going to do each job, and what they will need so they can do it.

Resources can be **people**, **equipment**, **place**, **money** or **anything else** that you need to do all of the activities that you planned for. Every activity in your activity list needs to have resources assigned to it. Before you can assign resources to your project, you need to know their availability. **Resource availability** includes information about what resources you can use on your project when they are available to you and the conditions of their availability.

Remember that some resources, like consultants or training rooms, have to be scheduled in advance, and they might only be available at certain times. You will need to know this before you can finish planning your project. If you are starting to plan in January, a June wedding is harder to plan than one in December, because the wedding halls are all booked up in advance. That is a resource constraint. You will also need the activity list that you created earlier, and you'll need to know how your organisation typically handles resources. Once you have got a handle on these aspects, you are set for resource estimation.

Resources Analysis

The strategic capability of an organisation is determined by the adequacy and suitability of its resources and competences, these enabling it to survive and prosper.

The resource analysis is a strategic planning tool which considers:

• resources required to support particular strategies, and those needed to gain "competitive" advantage,

• required competencies to effectively use those resources. The resources that an organisation has is important, as important is its ability to effectively use and manage those resources.

There are several ways to categorise resources, for instance:

- *Physical*: For example buildings and respective capacity, the relative age and condition will determine its usefulness and adequacy.
- *Financial*: For example providers of funds, adequacy of working capital.
- Human resources: This will include numbers, demography and skill levels.
- Intellectual capital: This will include brand names, reputation, client databases and business systems.

A resource analysis needs to consider how resources are managed, deployed and utilised. For example, there is no merit in an organisation that has a good reputation & brand unless it is exploited effectively.

Capabilities are viewed at two levels, namely the threshold and competitive advantage level. The threshold level is the survival, the competitive advantage level is indicative of an organisation's USPs, being a market leader etc.

Resources are those that are required to operate at a certain level, competencies are those requisite skills, experiences and abilities to use those resources.

Making Resource Plan

Having a plan for your project does not mean you should only have listed the tasks it takes to deliver it. Planning your project also includes knowing what resources you are going to need, and when.

The kick-off phase, including creating the project scope, defining deliverables and dependencies, allows you to better estimate time and budget for the project.

Resource planning is no different, helping project managers to align projects' deliverables with available resources. Without it, you can't control the project's delivery, its timeline and the budget.

First of all, it is necessary to determine what resources (people, equipment, materials, etc.) and what quantities of each should be used to perform project activities. For most creative and service-based companies the resources are people, so resource planning is a process you can use to identify team members that you need to allocate for your project, and when you are going to need them.

What is important, **resource plans may change and should be adjusted regularly to reflect changes** in the scope, employees' availability, etc., so that your schedule is always up-to-date.

5.9 RISK ASSESSMENT

Risk assessment is a primary **management tool** in ensuring the health and safety of workers (and others). What many people may be unaware of, however, is that they are a legal requirement for employers and certain self-employed people. Should you be wondering how to complete a risk assessment or are unsure of their relevance within your industry, read on to discover everything you need to know.

The definition of a risk assessment is a systematic process of identifying hazards and evaluating any associated risks within a workplace, then implementing reasonable control measures to remove or reduce them. When completing a risk assessment, it is important to clearly define risk as the likelihood and the severity of a negative occurrence (injury, ill-health, damage, loss) resulting from a hazard.

Identification of Project Risks

Successful project managers have a common trait – they **identify and manage risks**. Lets look at tools and techniques to identify project risks.

Project managers often start with a splash. They get their teams together, identify lots of risks, and enter them into an Excel spreadsheet. However, the risks are never discussed again.

What is the result? Risks are not identified and managed. Threats morph into costly issues, and, the teams miss golden opportunities. Furthermore, project teams fail to achieve project objectives.

The risk exposure is greatest at the beginning of projects. The uncertainty is high because there is less information in the beginning of projects. Wise project managers start identifying risks early in their projects. Additionally, capture your top risks in your project charter.

Want to know how to improve your risk identification? Identify risks:

- early in the project,
- in an iterative manner,
- on a consistent frequency such as weekly,
- when change control is performed,
- when major milestones are reached.

Project Risk Management

Project risk management is the process of identifying, analysing and then responding to any risk that arises over the life cycle of a project to help the project remain on track and meet its goal. Risk management is not reactive only; it should be part of the planning process to figure out the risk that might happen in the project and how to control that risk if it occurs.

A risk is anything that could potentially impact your project's timeline, performance or budget. Risks are potentialities, and in the project management context, if they become realities, then they become classified as "issues" that must be addressed. So risk management, then, is the process of identifying, categorising, prioritising and planning for risks before they become issues.

Risk management can have different meanings on different types of projects. On large-scale projects, risk management strategies might include extensive detailed planning for each risk to ensure mitigation strategies are in place if issues arise. For smaller projects, risk management might mean a simple, prioritised list of high, medium and low priority risks.

How to manage risks? Using a risk-tracking template is a start, but to gain even more control over your project risks you will want to use project management software. We can go back to a theory of Gantt chart and use it for risk management plans by using award-winning Gantt charts to create detailed risk management plans to prevent risks from becoming issues where schedule, assign and monitoring of project tasks get full visibility in real-time.

Use **Kanban boards** to sort and prioritise your risks if they exist in a more agile environment. You can use custom tags to identify tasks as risks within your project. Or, you can dedicate a whole project within an online tool of ProjectManager.com to managing risks, so you can quickly see how the urgent risks are being addressed as displayed in **Figure 12**.

Figure 12: Kanban Boards for Managing Risks

My Work	Projects I	People	Overvie	w		(? Peter 😔	
≡ IT Software Development Risk	Tracker	List	Board	Gantt Dashboard	Calendar File	es	C	۲ 🕸
Q Search projects		4					de la	1.
Blog Calendar	Identify Ris	sk		Working on Ri	sks …	Risks Resolved	•••	
Data Science: Q2-2019	Budget			Hardware		Interface		
Glendale Bridge Construction – Issues	Risk		Today	25% / 1 Risk	20 May 20	100% // 1 (Risk)	07 May 20	
Guest Writers - Outstanding	Scheduling			Software		Add a Task		
Issues Issues	Pick)	3	29 May 20	50% / 1	18 Jun 20			
IT Software Development Risk	INIAN			(NIOK)				
Peter's Work	Scope		Today	Add a Task		FIL		
Social, Blog, Email Graphics	Risk			E Car				****
+ New Project	Add a Task							· •,

Source: Project Manager (2020)

Of course, **not all risks are negative**. Positive risks can be a boon for your project, and will likely be managed differently than your typical negative risk. Not all risk is created equally. As mentioned, risk can be either positive or negative, though most people assume risks are inherently the latter. Where a negative risk implies something unwanted that has the potential to irreparably damage the project, positive risks are opportunities that can affect the project in beneficial ways.

Negative risks are part of your risk management plan, just as the positive risk should be, but the difference is in approach. You manage and account for known negative risks to neuter their impact, but positive risks can also be managed to take full advantage of them.

There are many examples of **positive risks** in projects: you could complete the project early; you could acquire more customers than you accounted for; you could imagine how a delay in shipping might open up a potential window for better marketing opportunities, etc. It is important to note, though, that these definitions are not etched in stone. Positive risk can quickly turn to the negative risk and vice versa, so you must be sure to plan for all eventualities with your team.

5.10 PROJECT COMMUNICATION

Communication is an essential process in our day-to-day life, and the entire world revolves around it. Lasswell's Maxim defines communication in his "5W" model as "who (says) what (to) whom (in) what channel (with) what effect" (Wenxiu, 2015). Communication is an exchange of information from one point of the project to the other point in an efficient manner. Like this, there are various definitions and concepts about communication in today's world. However, how important is this communication in project management, we can say that this is 'Project – Life Blood' as everything in a project is based on how efficiently we perform this. Communication is an essential tool in the field of project management. It is gaining importance every day and is the centre of all management processes soon. The success of a project largely depends on the efficiency of its communication network. It starts working from day one of the ventures and continues for the entire life span of the project. It provides regular updates to notify the status of the project as well as its performance capacity. But surprisingly, it has been found that most projects experience a breakdown in communications. It has been said that 90% of a project manager's time is spent communicating what is going to be done.

When we communicate, we are trying to establish "commonness" with someone. That is, we are trying to share information, an idea, or an attitude among the team involved in that particular project. One can never take for granted that the receiver will interpret the message the same way as the sender intended it. Communication is not absolute and finite. To do this effectively, the project manager needs to consider all the factors like the different realities, the space the communication takes place in, verbal as

well as non-verbal messages, and the intended meaning versus the perceived meaning, etc. **Figure 13** depicts the cost of bad communication.





Source: Project Management Institute (2020a); Own elaboration

Organisational Breakdown Structure

The term **Organisational Breakdown Structure** (OBS) refers specifically to a tool that can be utilised by the project management team and/or project management team leader in a hierarchal manner to conduct and create a thorough and delineated depiction of the project organisation to create an arrangement to establish a relationship between and among the various project related work packages as well as between those work packages and the project's pre-defined performing organisational units. It is important to keep in mind that organisational breakdown structure is also written and recorded as an organisation breakdown structure with the same definition applied and typically using the same three-letter anagram of OBS. The organisational breakdown structure should be established at the onset of the activity to help in the purposes of an organisation; however, it is possible to conduct this on an ongoing basis.

OBS is a hierarchical model describing the established organisational framework for project planning, resource management, time and expense tracking, cost allocation, revenue/profit reporting, and work management. OBS groups together similar project activities or "work packages" and relates them to the organisation's structure. OBS is used to define the responsibilities for project management, cost reporting, billing, and budgeting and project control. The OBS provides an organisational rather than a task-based perspective of the project. The hierarchical structure of the OBS allows the aggregation (roll-up) of project information to higher levels. When project responsibilities are defined and work is assigned, the OBS and WBS are connected providing the possibility for powerful analytics to measure project and workforce performance at a very high level (example business unit performance) or down to the details (example user work on a task).

Developing an Organisation Breakdown Structure follows several steps shown in Figure 14:

- the drawing of the entire organisation as a hierarchy,
- definition of all departments and project teams,

• specification of functional (were cost for the work the user does is allocated to) and approval (who approves the work the user performs and any leave time approvals) groups for every user.



Figure 14: Sample of Organisational diagram (Organigram)



We distinguish several **forms** and **templates** that illustrate the organisational structure of the company or project based on **MS Excel**, MS Project or other platforms.

Roles and Responsibilities in Project Team

Successful projects are usually the result of careful planning and the talent and collaboration of a **project's team members** and other **project stakeholders**. Projects can't move forward without each of its key team members, but it is not always clear who those members are, or what roles they play. Below is a description of several roles and their associated duties.

Project Manager

Project manager plays a primary role in the project and is responsible for its successful completion. The manager's job is to ensure that the project proceeds within the specified time frame and under the established budget while achieving its objectives. Project managers make sure that projects are given sufficient resources while managing relationships with contributors and stakeholders.

Project manager duties may include:

- Develop a project plan.
- Manage deliverables according to the plan.
- Recruit project staff.
- Lead and manage the project team.
- Determine the methodology used on the project.
- Establish a project schedule and determine each phase.
- Assign tasks to project team members.
- Provide regular updates to upper management.

Project Team Member

Project team members are the individuals who actively work on one or more phases of the project. They may be in-house staff or external consultants, working on the project on a full-time or part-time basis. Team member roles may vary according to each project.

Project team member duties may include:

- Contributing to overall project objectives.
- Completing individual deliverables.
- Providing expertise.
- Working with users to establish and meet business needs.
- Documenting the process.

Project Sponsor

Project sponsor is the driver and an in-house champion of the project. They are typically members of senior management – those with a stake in the project's outcome. Project sponsors work closely with project manager. They legitimise the project objectives and participate in high-level project planning. Besides, they often help resolve conflicts and remove obstacles that occur throughout the project, and they sign off on approvals needed to advance each phase.

Project sponsor duties:

- Make key business decisions for the project.
- Approve the project budget.
- Ensure availability of resources.
- Communicate the project goals throughout the organisation.

Executive Sponsor

Executive sponsor is ideally a high-ranking member of management. He or she is the visible champion of the project with the management team and is the ultimate decision-maker, with final approval on all phases, deliverables and scope changes.

Executive sponsor duties typically include:

- Carry ultimate responsibility for the project.
- Approve all changes to the project scope.
- Provide additional funds for scope changes.
- Approve project deliverables.

Business Analyst

Business analyst defines needs and recommends solutions to make an organisation better. When part of a project team, they ensure that the project objectives solve existing problems or enhance performance, and add value to the organisation. They can also help maximise the value of the project deliverables.

Business analyst duties:

- Assist in defining the project.
- Gather requirements from business units or users.
- Document technical and business requirements.
- Verify that project deliverables meet the requirements.
- Test solutions to validate objectives.

Other project stakeholders who appear in the organisational structure of the organisation or the project can be *Advisory Board*, *Work Package Leader* and *Task Leader*.

Advisory board

A body that provides non-binding strategic advice to the management of a corporation, organisation or foundation. The informal nature of an advisory board gives greater flexibility in the structure and management compared to the board of directors. Unlike the board of directors, the advisory board does not have authority to vote on corporate matters or bear legal fiduciary responsibilities. Many new or small businesses choose to have advisory boards to benefit from the knowledge of others, without the expense or formality of the board of directors.

Work Package Leader

Each work package (WP) will be managed by a work package leader to ensure the performance and progress of the work package concerning the overall work plan. The WPL will evaluate the progress reports provided by WP participants within their work package to ensure the successful completion of objectives and tasks. The work package leaders have been appointed by the partners according to their expertise and the management skills required in the individual work packages.

Responsibilities of the Work Package Leaders are as follows:

• Monitoring the progress of the WP against time and budget allocations, ensure that the work package fulfils the objectives listed as milestones and deliverables.

- Alerting the coordinator in case of delay or default in the performance of the WP.
- Deliver biannual progress reports to the coordinator.
- Preparation of proposals for the update of the work plan and new parties (if needed).

Task Leader

Task leader, also known as Team Leader, plays a critical role in ensuring that a group of people complete a task or project as expected. The task leader's specific responsibilities might vary depending on the context and unique situation, but the individual and role should have some general characteristics common to all task leaders.

Responsibilities of the Task Leader can be followed:

- \circ \quad Motivate and provide support for people working in their areas of speciality.
- Ensure that the individual trajectories will accomplish the project goal.
- Check with individuals and find out how they are progressing in their parts of the project.

 \circ $\,$ Call meetings as needed for the whole group to get together and discuss issues that they all need to know about.

• Maintain cooperative group dynamics and resolve conflict as needed.

Specific *network type* of project organisational structures often used in the international project as well as research and development projects can be also represented by **Project Consortium**. Building a consortium becomes mandatory for many calls for international project. Consortium partners, once chosen and settled, will undoubtedly impact the success rates of the project itself.

Communication Requirements and Rules

The primary mission of the project manager working with either a virtual team or a traditional team is the delivery of the desired product or the facilitation of the required service. To that end, the team's efforts are focused on the activities and measures that would produce the deliverable of the project cost-effectively and efficiently. The team must plan the delivery of the product or service through best practices, policies, and procedures. Effective communication within the team and with the project's internal and external stakeholders is required.

Communication is defined as the transfer of some type of message that contains one or more pieces of information. The information that is conveyed can be either through formal channels or informal

channels. Today's project manager is both blessed and cursed by the number of communication tools available in the workplace. Formats for communication are extensive and include individual meetings, staff meetings, conference calls, e-mails, videoconferences, messages, and faxes. What each of these formats has in common is that all communication is interpersonal and goes from the sender to the receiver or receivers.

The project manager, as a communicator, must have correct tools and skills to reach all of the different types of individuals on the project team effectively. If the communication is predictable and effective, it will help maintain trust and momentum among team members. Communication techniques to assure team member involvement throughout all aspects of the project, therefore, are required.

Effective communication among project team members and stakeholders is important on any project team. Miscommunication can create hard feelings that might remain undetected for a long time, undermining team success. Open communication in all directions, without fear of reprisal, must be encouraged so that every team member feels comfortable contributing to discussions and debates. Project debates are exceptionally useful because it is during these debates that team members provide useful and important information to others. Improving communication involves identifying information needs and ways to best share information among the team. Predictable and effective communication will help maintain trust and momentum. The team's policies should provide an environment that assures that the information shared is valuable to the project.

Many different communications tools can be used. A common data interchange format should be available. To assure that the flow of information among the team is unencumbered, the team should be allowed to draft protocols as to when each tool should be used. Early involvement of team members sets the stage for encouraging them to work with one another to develop effective ways to communicate project information. Team meetings, either face to face or virtual, should be viewed as results-oriented and as a useful way to spend time. Each team member should participate actively in team meetings in whatever format, taking responsibility for being heard and being understood. Agreed-upon methods to stay in contact with team members throughout the project life cycle also are useful and can then serve as starting points to discuss ideas, issues, insights, and information. A communications schedule, as detailed in the communications management plan, should be established that is flexible and can be adjusted if required to changing conditions. Team members should be willing to modify their availability standards to best fit those of the team.

The project communications plan allows establishing a foundation for information exchange between the parties involved and identifying the key rules for either creating or receiving the particular document and the frequency of the document receiving/sending. The given guidelines give an understanding of the project communications management plan, its purpose, the respective process and phases of development.

The project communications management guidelines consist of the following topics:

- Identifying project stakeholders.
- Planning communications and distributing information.
- Managing stakeholder expectations.
- Reporting communication performance.

Communication, dissemination and exploitation

Communication, dissemination and exploitation activities help to maximise the impact of R&I projects. What differentiates them from one another are the objectives, focus and target groups they address is shown in **Table 8**.

• **Communication** means taking strategic and targeted measures for promoting the action itself and its results to a multitude of audiences, including the media and the public. The aim is to reach out to

society as a whole and in particular to some specific audiences while demonstrating how EU funding contributes to tackling societal challenges.

• **Dissemination** is the public disclosure of the results of the project in any medium. It is a process of promotion and awareness-raising right from the beginning of a project. It makes research results known to various stakeholder groups (like research peers, industry and other commercial actors, professional organisations, policymakers) in a targeted way, to enable them to use the results in their work. This process must be planned and organised at the beginning of each project, usually in a dissemination plan.

• **Exploitation** is the use of the results during and after the project's implementation. It can be for commercial purposes but also for improving policies, and for tackling economic and societal problems. (European Commission [online], 2020b).

Communication	Dissemination	Exploitation	
Reach out to society and show the impact and benefits of EU-funded R&I activities.	Transfer knowledge & results with the aim to enable others to use and take up results	Effectively use project results through scientific, economic, political or societal exploitation routes aiming to turn R&I actions into concrete value and impact for society.	Objective
Inform about and promote the project and its results/success. Using accessible non- specialised language	Describe and ensure that results are available for others to use. Using scientific language.	Make concrete use of research results (not restricted to commercial use)	Focus
Multiple audiences beyond the project's own community incl. media and the broad public	Audiences that may take an interest in the potential use of the results (e.g. scientific community, industrial partner, policymakers).	People/organisations/user groups that make concrete use of the project results.	Target audience

Table 8: Understanding	the Concepts behind	Communication.	Dissemination and	Exploitation
Table 0. Chuci standing	the concepts bennu	Communication	Dissemination and	Approximition

Source: European IPR Helpdesk [online], (2018); Own elaboration

In **European research and innovation projects,** the dissemination and communication of results is mandatory. There are various types of activities and channels that might be used according to the criteria mentioned before shown in **Table 9**.

	Activities		Channels	
	Communication	Dissemination	Communication	Dissemination
Publications	Non- scientific Publications	Scientific publications	Press release e-Newsletter News sites articles Blogs	Articles in scientific magazines and blogs
Events	Events for the general public	Stakeholders events	Open Doors Public talks	Market showcase B2B networking
Online	Online promotion	Online disclosure of results	Generalist website Social media	Online repository of results Social media
Meetings	Two-way exchanges with citizens	Stakeholders engagement	Citizens Blog and Prizes Photo contest Surveys	Feedback sessions Industrial events Training sessions

Table 9: Types and Activities of the Research and Innovation Project Communication and Dissemination

			Interviews	
Media	Mass media campaign	Presentations in scientific conferences	Newspapers Local TVs Radios	Scientific conferences, workshops and seminars
Materials	Promotional material	Conferences proceedings	Leaflet Brochure Poster	Publication of proceedings

Source: Viallon (2018); Own adjustments

The extent to which projects define their approach towards communication, dissemination and exploitation activities varies depending on the project.

Effective plans for communication, dissemination and exploitation are important, should thus be key components of every project. The strategic planning of these actions begins during the proposal stage of a project. Once it is running, the communication actions will accompany the R&I work of the project throughout its duration, while activities related to the dissemination and exploitation of results often continue even after the project has ended.

Dissemination and Communication plan are developed at the beginning of the project. Its purpose is to formalise all communication and dissemination activities planned in the project, provide guidelines and facilitate dissemination of outcomes and results and awareness on the project concept and objectives. The document is continuously updated along with the project's development, achievements and contributions from partners.

Project Ethics

Ethics is an integral part of research projects from the beginning to the end. It is only by getting the ethics right that research excellence can be achieved. Ethical research conduct implies the application of fundamental ethical principles and legislation to scientific research in all possible domains of research – for example, biomedical research, natural sciences, social sciences and humanities.

The most common ethical issues include:

- the involvement of children, patients, vulnerable populations,
- the use of human embryonic stem cells,
- privacy and data protection issues,
- research on animals and non-human primates.

It also includes the avoidance of any breach of research integrity, which means, in particular, avoiding fabrication, falsification, plagiarism or other research misconduct (European Commission, online, 2020b).

Ethical issues should be analysed, assessed and monitored when preparing a project proposal and for the whole duration of the project implementation. During the preparation phase, a Self-assessment should be carried out (check-list, 1st phase) that might be followed by an Ethics Assessment (in-depth analysis, 2nd phase) that applies only to a limited number of projects e.g. involving the use of human cells. Ethics checks/audits are executed during these research projects.

5.11 MONITORING & CONTROLLING

Project monitoring and controlling process group activities help to keep the project on track. Project monitoring and controlling, unlike the other phases, is done from the beginning until the end of the project as shown in **Figure 15**. These project monitoring and controlling process activities check whether the project is going as planned and whether there are any deviations from the baseline. So, this process group covers all the other four process groups, i.e. Initiating Process Group Activities, Planning Process Group Activities, Executing Process Group Activities, Closing Process Group Activities.

Monitoring and controlling activities check the existence of any deviations from the expected results of the project and continually track, review, adjust and report on the project's performance. It's important to find out how a project's performing and whether it's on time, as well as implement approved changes. This ensures the project remains on track, on budget and on time.

Figure 15: Process of Project Monitoring and Controlling



Source: Project Management Qualification (2019)

Monitoring of Project Performance and Progress

According to the PMBOK Guide, project control is a "project management function that involves comparing actual performance with planned performance and taking appropriate corrective action (or directing others to take this action) that will yield the desired outcome in the project when significant differences exist (PMI, 2020b)."

Essentially, project controls are a series of tools that help keep a project on schedule. Combined with people skills and project experience, they deliver information that enables accurate decision making.

The project control process mainly focuses on:

- Measuring planned performance vs actual performance.
- \circ $\,$ Ongoing assessment of the project's performance to identify any preventive or corrective actions needed.
- Keeping accurate, timely information based on the project's output and associated documentation.
- Providing information that supports status updates, forecasting and measuring progress.
- Delivering forecasts that update current costs and project schedule.
- Monitoring the implementation of any approved changes or schedule amendments. Description of the theoretical part of the step in the sub-stage.

Monitoring and control keep projects on track (see **Figure 16**). The right controls can play a major part in completing projects on time. The data gathered also lets project managers make informed decisions. They can take advantage of opportunities, make changes and avoid crisis management issues. Put simply, monitoring and control ensure the seamless execution of tasks. This improves productivity and efficiency.

Figure 16: Monitoring and Control Process



Source: Project Management Qualification (2019)

There is a range of monitoring and control techniques including:

• **A Requirements Traceability Matrix** (RTM). This maps, or traces, the project's requirements to the deliverables. The matrix correlates the relationship between two baseline documents. This makes the project's tasks more visible. It also prevents new tasks or requirements being added to the project without approval. This makes the project's tasks more visible. It also prevents new tasks or requirements being added to the project without approval.

• A control chart monitors the project's quality. There are two basic forms of control chart – a univariate control chart displays one project characteristic, while a multivariate chart displays more than one.

• **Review and status meetings** further analyse problems, finding out why something happened. They can also highlight any issues that might happen later.

Managing of Changes, Addressing Project Risks

Change management

Change management is an umbrella term that covers all types of processes implemented to prepare and support organisational change. These range from methodologies applied to resources, business processes, budget allocations and other operational aspects of a project. Change management in the context of project management often refers to a change control process when working on a project. That is, the process of changes in scope to a project are formally introduced and approved as a change management system.

One thing is certain: **change is going to happen**. It's an inevitable fact of any team or project and, therefore, an aspect of any project that must be planned for. To best plan and respond to change, first a clear definition of change management must be understood.

To first wrap your head around **change management models**, it's important to distinguish change as occurring in three distinct categories. By breaking the large subject of change into small subsets of change it immediately becomes more manageable.

• **Individual Change Management**: People are the root of all change. You can change systems and procedures, but unless the human in the room is addressed, nothing changes. To get people to change, you must know your subject. What do they need to hear to become open to change? How and when should training be offered to help them with the transition? The tools of this trade are psychological;

even neuroscience can help with finding the right angle to steer a person from one behaviour to another more productive one.

• **Organisational Change Management**: While the people on your team are the core target to affect change, there are also larger, more organisational issues you must address if you want to create real change in a project. To do so requires first identifying the groups that require change and how they must change. Then, create a plan that addresses these components of the project, which includes making everyone aware of the change, leading that change through coaching or some other method like training, and then driving that change in congress with the management of the whole project.

• **Enterprise Change Management**: Taking a step up from the organisational change is to address the entire enterprise. It is basically taking change management writ large to encompass all aspects of an organisation, meaning roles, structure, process, projects, leadership, etc. By approaching change on the macro-level you are more likely to implement change on the micro-level, as a strategic engagement with change has been applied to the very workings of the organisation. It creates a nimbler organisation, able to stay flexible and adapt quickly to changes as they occur.

The **best project change processes** start with a common understanding at project kick-off time. Explain to the project client how project change control will happen. Usually following some format of these basic steps:

- 1. A new request or requirement comes about.
- 2. The project manager and team estimate the effort.

3. The project change request is formally documented in the form of a change order with resources, effort, and dollars noted along with any assumptions, changes to the project schedule, etc.

4. The project schedule is modified to include the change order work and becomes part of the change order.

- 5. The change order is presented to the customer for approval/sign off.
- 6. The change order is ready to begin immediately or when documented on the change order.

Beyond this – on the delivery team side – the project manager must revise the financial forecast and analysis tool that is being used and any separate resource planning document that may be affected.

Risk management

Risk Management is simply defined as identifying and managing the uncertainties in a project – both positive (opportunities) and negative (threats). The benefits of risk management are instrumental to a project's success. By proactively addressing uncertainties, in combination with a strong project management program, problems within the project can decrease by as much as 60 or 70%. The International Organisation for Standardisation (ISO) identifies the following principles of risk management as evidenced in Table 10.

Risk management should	create value	be project-specific	be integral to the organisation process	account for human factors
	be part of the decision making	be transparent and inclusive	address uncertainty and assumptions	be responsive to change
	be systematic and structured	be periodically re-assessed	be based on accurate information	

Table 10: Principles of Risk Management

Source: International Organisation for Standardisation (2020)

But what are the steps to building an effective risk management program?

1. **Embed risk management as an integral part of the project.** Stakeholder buy-in and support is very important to achieve a successful risk management process. It is a good practice to ensure that there are demonstrable benefits to illustrate this approach and make risk management part of the day-to-day operations.

2. **Identify Risk.** This step is most effective when done very early in the project. Having a brainstorming session with team member to list out several potential risk items is a good beginning. Include all potential risks, including the risks that are already known and assumed, such as scope creep. Include threats that may stem from human threats, operational issues, procedural impacts, financial threats and natural events. Talk to the experts who may have experience in your project type to get a different perspective.

Identify not only the threats, but also any opportunities that may impact your project.
 Opportunities may assist you in bringing the project in on schedule, perhaps with better deliverables or make it more profitable.

• Communication at this stage is crucial. Including communication of risk as part of all meetings is effective to illustrate the importance of risk management, share the risk potentials and provide a platform for discussion.

3. **Assign Ownership.** Who is going to be responsible for what risk? This person will be accountable to optimise a specific risk-either decrease the threat or capitalise on the opportunity. They will identify the possible triggers to their assigned risk.

4. **Estimate or Prioritise Risks.** Once the risks are identified, the next step is to assess the likelihood of the threat being realised. Some risks will have a much higher impact. One approach to estimating the risk is to make a best estimate of the probability and multiply this by the amount it will cost to set things right, if this were to happen. This will provide an impact value associated with the risk. Another approach is to assign each risk a numerical rating, such as a scale from 1 to 5. Do you have any potentially large events that can cause huge losses OR gains? These will be the number one priorities. Ensure that your priorities are used consistently and focus on the biggest risks first and the lesser priority risks as applicable.

5. **Analyse the Risk.** What is this risk about? What are the effects of this risk? What causes will make this risk occur? List the different causes and circumstances that affect the risk likelihood; doing a simulation to illustrate how likely the project is to finish on a specific date or at what cost. Gaining a sound understanding of the risk is a solid foundation for an effective proactive response and provides insights to manage the risks.

6. **Manage the Risk.** Plan out and implement a response for each risk. Typically you will have four options – Transfer the risk (subcontracting scope or adding contractual clauses), risk avoidance (eliminating the source of the risk, such as changing a vendor), risk minimisation (influencing the impact) and risk acceptance.

7. **Create a Risk Register.** This will enable you to view progress and stay on top of each risk. A good risk register or log will include a risk description, ownership, and the analysis of cause and effect. This register will also include the associated tasks. A good risk register is a valuable tool in communication project status. It should be easily maintained and updated. By remaining current and up to date, the risk register will be viewed as a relevant and useful tool throughout the project lifecycle.

Review Questions

- 1. What are the key steps of project design?
- 2. Are you able to explain the meaning of Work Breakdown Structure (WBS) in the project plan?
- 3. What do you think the project milestone is?
- 4. Do you know any practical way to capture the schedule of the project?

5. How can you improve the risk identification of your project?
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Abbreviations

Abbreviation	Explanation
СРМ	Critical Path Method
ISO	International Organisation for Standardisation
OBS	Organisational Breakdown Structure
PERT	Program Evaluation and Review Technique
РМВОК	Project Management Body of Knowledge
PMI	Project Management Institute
R&I projects	Research and Innovation projects
RTM	Requirements Traceability Matrix
SOW	Scope of Work
WBS	Work Breakdown Structure
WP	Work Package

6 STAGE 4: IMPLEMENTATION

6.1 STAGE DESCRIPTION

Project implementation (or execution) is the stage in which the plan designed in the prior stages (Initiation and Design) of the project life is put into action. Project implementation simply means carrying out the activities described in the work plan. The purpose of project implementation is to deliver the expected results of the project (deliverables and other direct outputs). It is a very complex mission, as it requires the coordination of a wide range of activities, the overseeing of a team, the management of the budget, the communication to the public, among other issues. Unanticipated events and situations will inevitably be encountered, and the Project Manager and Project Team will have to deal with them as they come up.

This stage also includes monitoring and controlling as execution is not a blind implementation of what was written in advance but a watchful process where performing activities goes along with understanding what is being done, and re-doing it or doing it differently when the action does not fully correspond to what was intended. Monitoring and controlling are an integral part of project management and is a necessary task of the project manager.

Typically, this is the longest phase of the project management lifecycle, where most resources are applied.

Independent of whether it is a social project to raise awareness or it is a construction project, there is a certain process that has to be followed. The following lines will give you an introduction into the implementation of projects and highlights key aspects that have to be taken into account for a successful implementation.

6.2 MODULE OBJECTIVES AND LEARNING OUTCOMES

Objectives

Students will learn how to manage the project step by step at the stage of its implementation. The aim is to introduce to them the individual topics that they may encounter during the execution of the project.

Learning outcomes and students' skills:

Students are acquainted with

1. and are able to work with the project documentation.

2. the specifics of the project teams and the requirements for team management in the implementation phase.

- 3. financial requirements and are able to manage project budget and financial reporting.
- 4. how to continuously monitor the progress of a project, assess risks, and address changes.
- 5. how to complete and formally accept project outputs.

Keywords

Project implementation/execution, team management, project coordination, contract management, monitoring, reporting, change management, project risks.

6.3 STAGE STRUCTURE

In this module, the implementation phase and its steps are introduced. This is done by introducing the steps from the beginning of the implementation (kick-off meeting, contractual arrangements, ...) to its end (formal acceptance of the deliverables).

The module contains theoretical background that is supplemented by the practical examples from the real projects.

6.4 BRIEFING TEAM MEMBERS

The basic requirement for starting the implementation process is to have the work plan ready and understood by all the actors involved. Technical and non-technical requirements have to be clearly defined and the financial, technical and institutional frameworks of the specific project have to be prepared considering the local conditions. Another basic requirement is that the financial, material and human resources are fully available for the implementation. Other actions need to be taken before work can begin to implement the detailed action plan, including:

- Scheduling activities and identifying potential bottlenecks.
- \circ Communicating with the members of the team and ensuring all the roles and responsibilities are distributed and understood.
- Providing for project management tools to coordinate the process.
- Ensuring that the financial resources are available and distributed accordingly.

6.5 KICK-OFF MEETING

The Implementation phase starts with the Kick-off Meeting. The purpose of Kick-off is to formally acknowledge the beginning of Project Implementation. Team members are introduced to the project at this point, and must be thoroughly oriented and prepared to begin work. Current project status is reviewed and all prior deliverables (concept papers, plans, etc.) are re-examined, giving all new team members a common reference point. This meeting ensures that the whole Project Team is aware of the project's key elements and rules.

The main aim of Kick-off Meeting is to:

- ensure that everyone understands the project scope,
- clarify the expectations of all key project stakeholders,
- identify project risks,
- discuss the project plans.

Steps of Kick-off Meeting

Before the Executing Kick-off Meeting:

- 1. Plan the meeting.
- 2. Draft the Meeting Agenda clearly indicating the main points to be discussed
- 3. Send out the Meeting Agenda in advance.
- 4. Ensure the attendance of the required participants.
- 5. Address any logistical needs and prepare documentation or hand-outs for the meeting.

During the Executing Kick-off Meeting:

- 1. Ensure that someone is designated to take the Minutes of Meeting, including action points.
- 2. Present the Project Handbook and the Project Work Plan with the appropriate level of detail.

- 3. Present the Communications Management Plan.
- 4. Agree on the conflict resolution process and present the escalation procedure.
- 5. Present the Project Stakeholder Matrix.

6. Present the Risk Management and Project Change Management processes as well as the Quality Assurance & Control activities.

- 7. Clarify the expectations of the Project Team
- 8. Agree on the team's ground rules

After the Executing Kick-off Meeting:

1. Send out the Meeting Minutes to the relevant stakeholders.

The minutes should include a summary of project issues raised, risks identified, decisions taken and changes proposed. The issues, risks, decisions and project changes should also be recorded in the relevant logs (Davidson, 2001).

6.6 MANAGING THE PROJECT TEAM

The project team includes the project manager and the project staff who have been assigned with the responsibility to work on the project. Innovation projects, due to their complex nature, require a diverse mix of individuals who must be integrated into an effective project team.

Team management includes the processes required to make the most effective use of the people involved with the project. Managing a project team is quite different from managing other types of staff. The project team has a start and an end, in terms of duties assigned to the project. Team members come to the project with different skills and experiences, and in many cases, it is the first time that they are working together. Due to the high level of uncertainty, roles and responsibilities, changes occur more frequently, and the team needs to be flexible enough to adapt to new challenges (ISO/DIS 56006: 2020).

Methods of Managing Project Team

The process involves the use of specific project team management methods and techniques such as:

Communication and supervision are used to track current work and attitudes of project team members. By means of live conversation and observation, the project manager communicates with team members and reviews their achievements in the context of deliverables, accomplishments and interpersonal issues.

Performance appraisals allow measuring performance of project team members to clarify project team roles and responsibilities, review constructive feedback, discover unresolved issues, develop individual training programs, and outline specific goals for future project activities.

Conflict management allows handling conflicts in a team environment to achieve higher productivity and positive working relationships among team members (Barreto, 2020).

6.7 MANAGING THE PROJECT CONSORTIUM

Usually, there are two or more different legal entities or parties involved in the project. One of the **consortium** partners will need to be the **Project Coordinator** to serve as the central contact point and represent the consortium towards the fund provider. Correspondingly, the coordinator's budget includes a designated share for project management activities. The Coordinator is thus responsible for:

- Leading and launching the project implementation with the other beneficiaries.
- Arranging consortium meetings, facilitation communication within the consortium.
- Acting as the intermediary for communications between the beneficiaries and the fund provider.

- Handling administrative issues like contract management/amendments.
- \circ $\,$ Monitoring of the proper implementation of the project; implementing quality procedures for the project.
- Gather, monitor and consolidate scientific and technical content of reports.

 $\circ~$ Requesting and reviewing any documents or information required by the fund provider and verifying their completeness and correctness.

 \circ \quad Submitting the deliverables and reports to the fund provider.

 \circ Financial management including distribution of payments to the beneficiaries (usually the grant provider sends the whole grant to the coordinator who is responsible for payments to the project partners).

• Consolidation of project's deliverables and reports and maintaining Quality Assurance.

Once the project is retained for funding, the coordinator is required to initiate and manage the processes of signing the grant agreement (GA) with the fun provider, and of the consortium agreement (CA) between the partners.

Grant agreement

If your proposal is accepted, you will be invited to sign a detailed contract called a "grant agreement".

The Grant Agreement (GA) is the funding agreement concluded between the funding agency and the project participants and specifies the rights and obligations of the contracting parties. It contains important provisions for the implementation of the project such as criteria for the eligibility of costs and provisions for handling intellectual property rights.

Consortium/partner agreement

The consortium agreement is a private agreement between the beneficiaries, to set out the rights and obligations amongst themselves. (It does not involve the Funding Agency.) It should complement the grant agreement and must not contain any provision contrary to it. Consortium Agreement is essentially a commercial agreement between the partners. As such, it is flexible and can be adjusted to the specific needs of the project and its partners.

Consortium Agreement can address various aspects, such as Intellectual Property Rights (IPR), Future use and commercialisation of the project's results, Knowledge transfer processes between project partners, Internal management processes, Reporting processes within the project consortium, Conflict resolution processes and more.

6.8 MONITORING QUALITY OF WORK

Project **quality management** is the process through which quality is managed and maintained throughout a project. The main objective is making sure that the project meets the needs it was originally created to meet. Quality management comprises three steps:

1. Plan Quality

First identify the requirements for the quality of the deliverable and how the project needs to be managed. Agree on how this process will be documented and how that information will be delivered.

The plan will include these specifics as well as metrics for measuring the quality while managing the project. This should include a quality checklist to collect and organise the marks you need to hit during the project.

2. Quality Assurance

Quality assurance is "the planned and systematic activities implemented in a quality system so that quality requirements for a product or service will be fulfilled." It seeks to allow us to be confident that the project will satisfy the desired scope and quality requirements within the project constraints.

Use quality assurance to make sure your processes are in fact working towards making the project deliverables meet quality requirements.

A **quality management/assurance plan** is created at the start of the project to ensure that an integrated quality approach is built into all project elements and activities throughout the phases of the project life cycle.

Process checklist and project audits are being used to control the quality of the project implementation.

3. Quality Control

Every process needs a "police officer", so to speak, to make sure that the rules are being following and that the expected quality is being met. Some ways to ensure that the required quality of the deliverables is being achieved is through peer reviews and testing.

It is essential to check the quality of the deliverables during the project management process in order to adjust the deliverables should they fail to meet the standards that have been set. This can be done at the end of the project, but readjustment is more efficient than redoing.

Quality monitoring can be performed by the Project Manager, the Project Quality Assurance role, or other project roles such as the Project Team or Business Manager. External audits undertaken by entities outside the project can also be defined.

Project Status and Change Request

It is expected that every project will report its status on a regular basis. The reason for this being that the sponsor and other stakeholders want the comfort of knowing they have visibility of progress.

How to Track Project Status

1. Create a Project Plan or Project Outline: Before you officially start your project, create a rough outline of your project from start to finish, including all key details, resources, and time constraints.

2. Determine Specific Goals: Identify what you want to accomplish with this project, whether it be a new marketing campaign, a product deployment, etc.

3. Document Key Milestones: Determine key parts of your project timeline that you want to pay specific attention to - and that you need to hit on time.

4. Establish Clearly-Defined Deadlines: Ensure you and your team have a good sense of all the deadlines that must be met in order for your project to land on time.

5. Check on the Project Regularly: As your project kicks off, continue to check in on the progress regularly, referring to your project plan to check progress against projected timeline.

A **project status report** is a document that summarises a project's overall progress against the projected project plan. The goal of a project status report is to keep all stakeholders informed of progress, to mitigate issues before they arise, and to ensure that the project will land within the designated time frame. One of the many benefits of using a project status report is that it forces an organisation to agree to certain project milestones and measures of progress at the very beginning of that project. Project manager gathers those important criteria and creates a project status report that will prove useful to everyone who needs to see it.

In spite of planning the project to the minutest detail, project manager will come across **changes** during the course of the project. Changes are inevitable. They are additions to the projects. Changes could alter the scope, budget, resourcing, and timeline of a project. Or it could just alter an existing project

requirement and nothing else. They can be requested (or identified and raised) throughout the project lifecycle by any project stakeholder.

The project changes may have a character of:

• **Corrective Actions or Rework** - when a component of the project does not produce the required output or does not meet the required specifications, a defect repair /rework may be requested. A rework may change the project management plan, baselines, policies or procedures, charter, contract, or statement of work.

• **Preventive Actions** - taking corrective actions is a reactive approach whereas taking preventive actions is a proactive approach. It means dealing with anticipated or possible deviations from the performance measurement baseline. Knowing when to take preventive actions requires more experience than a mere understanding of the project management framework, hence, the process of taking preventive actions is not as clear as corrective actions.

Project change management defines the activities related to identifying, documenting, assessing, prioritising, approving, planning and controlling project changes, as well as communicating them to all relevant stakeholders.

Steps

1. Identify the change: The purpose of this step is to identify and document change requests. Project Manager (PM) ensures that a Change Request is appropriately documented

2. Assess the change and recommend action: The purpose of this step is to:

- a) assess whether this request is indeed a project change,
- b) consider the impact of not implementing the proposed change,

c) estimate the size of the identified change based on its impact on the project objectives, schedule, cost and effort,

d) prioritise the implementation of the change request in relation to other change requests.

3. Approve the change: The purpose of this step is to reach a decision regarding the approval of the change based on the project's escalation procedure (i.e. the change must be reviewed by the appropriate decision-makers within the Managing/Directing/Steering Layers).

4. Implement the change: For approved or merged changes, the Project Manager (PM) should incorporate all related actions into the Project Work Plan and update the related documentation.

5. Control the change: The purpose of this step is to monitor and control project changes so they can be easily communicated to the various project layers for approval or status updates. The Project Manager (PM) collects information on any project changes and related actions and controls the status of each change management activity.

All stakeholders affected by the project changes should be informed.

A change request is a formal proposal for an alteration to the project. These change requests can consist of changes, which range from minor changes to significant changes that drastically alter the project, however, typically formal change requests involve more significant changes and the less impactful changes are made at the project management level. A typical change request can ask for a change to a number of project areas including requests to expand or reduce the scope of the project, requests to modify policies, procedures, plans, or processes, requests to modify expenditures, and requests to update of modify schedules. Change requests can be made directly or indirectly, and can be initiated internally or externally. One constant throughout most change request processes is that change request must be made formally, via a written proposal or request form typically, and that changes are not to be implemented until they are formally approved.

In general, there are two types of change requests:

- those that are inside the scope. These change requests involve small corrections to an existing requirement. They usually have minimal impact on the budget or the rest of the team.

- those that are outside the scope of the project take a considerable amount of time to implement and have a more sizeable impact on the budget.

6.9 VALIDITY AND UP-TO DATE INNOVATIONS

Project development sometimes focuses on more technical and managerial issues, neglecting other important aspects that can result in project failure, especially when the projects involve Research and Development (R&D) and seek to generate innovations. Some of these factors related to the validity and updating of innovations are discussed below (Cordón, et al. 2018):

1) The alignment of challenges and objectives with the market

When considering the development of a project (especially in R&D and innovation projects), the analysis of the state of the art is a fundamental activity that is often approached with an inadequate focus, because it tends to centre exclusively on the technological aspects, losing sight of the competitive and business perspective of the project. In this way, the technological challenges and objectives may not be aligned from the beginning, with the market and the real possibilities of development and use by the company, i.e. they are not in the process of generating innovations but new knowledge, the application of which will be sought later. In this sense, the subsequent search for business applications usually generates an extension of time, additional financing needs and a greater risk of project failure.

2) Key external information

This is a fundamental issue, given the medium and long-term implementation time of projects, the rapid pace of technological change and the variation in markets and their competitive factors. This can lead, due to the lack of systematic and comprehensive updating of key strategic information for the project (new technological developments, patents, etc.), to work on obsolete assumptions, to misspending resources and to jeopardising the competitive position of the company.

3) The validity of the business case

Not paying continuous and systematic attention to the profitability factor that motivated the project launch can be a major problem. During the implementation, monitoring and control phases of the project, work is sometimes carried out almost exclusively on the technical side, ignoring commercial and financial aspects, which are often not updated until the final use phase. This can result in having resources and time allocated to a project whose business case changed, becoming unfeasible or having a low profitability during the development of the project.

Prospective and Technology Watching

Strategic intelligence, also called competitive intelligence in accordance with ISO/DIS 56006:2020, is a prospective and situation forecasting tool that includes the analysis, interpretation and communication of strategic value information about the business context, the competitors and the organisation itself. The managers receive this information to support project decision-making in relation to updating key strategic information, aligning objectives and challenges with the market and validating the business case.

Technology watching is a fundamental instrument in the management of Research & Innovation projects. It provides improvements in the access to and management of scientific and technical knowledge and information on its application context, together with a timely understanding of the impact of changes and novelties in the environment. In this way, competitive vigilance is indispensable in the decision-making process for the development of projects aimed at innovation in new products,

services or industrial and business processes. On the other hand, technology is conditioned by other factors, such as legislation, regulations, economy, market, social factors, etc., which must be monitored.

Technology watching and competitive intelligence take into account two possible and often complementary working approaches:

• The search for investigation of the unknown.

• The systematic search for and monitoring of novelties in delimited areas (for example, the business case for a project).

Technological watching activities applied in the management of projects for the validation and updating of the innovations proposed include:

- The management and operation of specialised databases.
- The use of tools and resources to search for information on the Internet.
- Specific techniques and tools for data recovery, analysis and treatment.
- Scientific and technical text mining.
- Classification systems of technologies and technological areas.

 \circ $\,$ Knowledge of the information provided by intellectual property, patents, models, and their mechanisms of operation.

• Analysis and management of technologies, business environment and markets.

Finally, the systematisation of the management of the external information sources, through the Watching and Competitive Intelligence (WCI) activities, is one of the key factors to consider for the success of the projects (Davidson, 2001). In this sense, it is of vital importance to define a dynamic system that allows update the critical information of the project, in order to make the timely strategic decisions during all the time of the R&D and innovation project. For that, this WCI system has functions to ensure the observation and systematic analysis of the environment, information search, the selection and communication of the needed information and inputs for the strategic decision-making by the stakeholders involved in the R&D and innovation projects, which requires observation in the following areas:

- Technological: the best available and emerging technologies.
- Competitive: the current and potential competitors, leading companies and their competitiveness factors, this is the maximum utility feature to analyse possible actions of benchmarking.
- Commercial: the features of the target market.
- Environment: the socio-political, legislative / regulatory and environmental factors.

6.10 MANAGING BUDGET AND EARNED VALUE

Once the project budget has been reviewed and approved the next step is to create a budget baseline, the baseline is a time-phased budget that project managers use to measure and monitor budget performance. The baseline will be used to compare with the actual costs incurred by the project as it makes progress, every month new data come from the expenses in personnel, purchases of goods and services and other project expenses such as benefits and shared costs.

The budget baseline will be used to control the budget using the Earned Value calculations to determine how the project is performing according to the progress made. Usually the total project is divided into the total months/years of the project duration. One of the problems with this approach is that projects seldom follow a linear progression. Most project budgets follow an S curve progression in which the initial months the project doesn't incur in many expenses, the **Figure 17** below shows an example of a project budget chart in which the planned budget is a dotted line and the actual budget is shown as a solid line (MyMG, 2020).

Figure 17: The project S chart





Budget Execution

Executing the budget is the action of authorising the expenses approved in the project budget, the project manager then initiates to carry out the activities that lead to hiring project staff, purchase of equipment, materials and services, all according to a project procurement plan developed during the resource management process. This step occurs after the budget has been approved and the project authorised to start the activities according to the project plan. At this moment the finance department of the organisation and the donor have established the disbursement schedule that will put financial resources on a bank account available for the project (MyMG, 2020).

6.11 EARNED VALUE ANALYSIS

Earned Value Analysis (EVA) is one of the key tools and techniques used in Project Management, to have an understanding of how the project is progressing. EVA implies gauging the progress based on earnings or money. Both, schedule and cost are calculated on the basis of EVA.

Earned value analysis uses three key pieces of project information: the planned value, actual cost, and earned value, which are shown in following **Figure 18**. The first two terms are not new, they are the plan spend curve and the actual cost expenditures curve many project teams have been using for years (GreyCampus, 2020).

Figure 18: Sample Showing of PV, EV, and AC



Source: PMI (2012)

Planned Value (PV) is the budgeted cost for the work scheduled to be done. This is the portion of the project budget planned to be spent at any given point in time. This is also known as the budgeted cost of work scheduled (BCWS).

Budgeted Cost of Work Scheduled (BCWS): Also known as Planned Value (PV), this is the amount that the task should have been completed at the point of analysis (usually today).

BCWS = % Complete (Planned) x Task Budget

Example: If the task budget is 20,000 EUR the task dates are from May 1 to May 20 and it's May 10 today, BCWS = 50% x 20,000 EUR = 10,000 EUR.

Actual Costs (AC) is simply the money spent for the work accomplished. This is also known as the actual cost of work performed (ACWP).

Actual cost of work performed (ACWP): is one of the fundamental inputs of the Earned Value Management System. It is defined as realised cost incurred for the work performed during a specific time period.

Earned Value (EV) is the percent of the total budget actually completed at a point in time. This is also known as the budgeted cost of work performed (BCWP). EV is calculated by multiplying the budget for an activity or work package by the percentage progress:

Budgeted Cost of Work Performed (BCWP): Also known as Earned Value (EV), this is the amount of the task that is actually completed. It is calculated from the project budget.

BCWP = % Complete (Actual) x Task Budget

Example: If the actual percent complete is 65% and the task budget is 12,000 EUR, BCWP = 65% x 12,000 EUR = 7,800 EUR (PM4DEV, 2015).

6.12 PROJECT OUTPUTS HANDOVERS

Project Outputs are results which are achieved immediately after the implementation of an activity. They are directly produced by the project. They are typically tangible and easy to measure.

For example, if we are organising a workshop on Intellectual Property Rights (IPR), participants who attend it have now got a clear understanding on IPR issues. So, this is an output the project has achieved and it is achieved right after the conclusion of the workshop.

Before handing over the project outputs, it is necessary to analyse the current status of the project. You must be up-to-date on the resources, resource plan, budget analysis, forecast, delivery reports and sales record to identify the current progress of the project.

Moreover, make sure to identify all the existing issues and challenges, if there are any. It is fine to not reach a solution in this short period of time, but at least the ongoing issues must be assessed in addition to the current progress and statistics of the project.

Handover strategy

Project outputs have to be handed over according to the project plan. It is recommended that we provide the checklist of outputs and their related results that will be required from project partners. Usually, that should be a part of the project application and should be specified in detail in the implementation stage.

The Project Manager throughout the mobilisation and construction period shall ensure that:

 \circ $\,$ The required handover activities that were planned and detailed during earlier project Stages are undertaken.

- All stakeholders in the handover process are involved throughout these Stages.
- The monitoring and reporting of all costs associated with the handover is maintained.
- Any certification from external agencies is obtained.
- \circ The Project Manager shall refer to the list of activities to be considered through the mobilisation and construction period.

Outputs gathering

The gathering of the project outputs is in competence of the coordinator and its project manager. At the implementation stage it is performed in two ways: Managerial and Technical.

From the managerial aspect the crucial approach is the communication and cooperation with partners through: project meetings, teleconferences, e-mails, etc.

The results of the practice show that for the sake of success at the communication level, the following steps should be taken:

- 1. Informing partners about upcoming meetings, teleconferences.
- 2. Voting about an appropriate date of the meeting.
- 3. Preparation of the meeting agenda and related forms, documents.
- 4. Sending partners the points of the meeting agenda to be ready for the interaction.
- 5. Leading of the project meeting.
- 5. Encouraging communication among partners.
- 6. Dividing the tasks.
- 7. Setting up of the deadline and next project meeting.
- 8. Checking performed tasks.

As far as the technical aspects are concerned, electronic technologies, such as electronic storage (clouds, drives, etc.), emails, online platforms, apps (Skype, MS Teams, GoToMeeting etc.), mobile phones, among others, are widely used these days.

6.13 MONITORING & CONTROLLING OF PROJECT WORKFLOW

Monitor and control activities run throughout the duration of the project, but peak during the executing phase. The effective execution of these activities is the responsibility of the Project Manager.

6.14 MONITORING OF PROJECT PERFORMANCE AND PROGRESS

The purpose of project performance monitoring is to collect information about the state of the project's progress and overall health. The Project Manager tracks the project dimensions of scope, schedule, cost and quality, monitors risks, issues and project change, and forecasts their evolution for the purpose of reporting the overall project progress. Project Manager creates performance measures or use existing organisational performance measures to identify project performance at regular intervals in the course of the project. Monitoring and controlling project work is measuring against the project management plan.

Steps

1. Use the baselined Project Work Plan as a reference for monitoring project performance.

2. **Regularly exchange information** about the project's current status and next steps with the Project Team at formal and informal meetings.

3. Gather information on, and monitor the progress of:

- Tasks—i.e. the status of critical and next critical path tasks.
- Key outputs—i.e. completed and verified deliverables, and milestones achieved as planned.
- Resource utilisation—i.e. resources used as planned and costs as budgeted.
- Logs—i.e. the status and evolution of risks and issues, changes and decisions.
- People—i.e. team morale, stakeholder engagement, overall project dynamics and productivity.

6.15 ADDRESSING RISKS

Risks have been already mentioned in Chapter Managing of Changes, Addressing Project Risks.

A risk is anything that could have a potential impact on the project's timeline, performance or budget. Risks are potentialities, and in the project management context, if they become realities, they then become classified as "issues" that must be addressed.

Risk management can have different meaning in different types of projects. In large-scale projects, risk management strategies might include extensive detailed planning for each risk to ensure mitigation strategies are in place should issues arise. For smaller projects, risk management might mean a simple, prioritised list of high, medium and low priority risks.

Steps

1. **Risk identification**: The purpose of this step is to identify and document the risks that can have impact on the project's objectives. Note that new risks may arise at any point during the project. The following tools and guidelines are used to identify risks in a structured and disciplined manner, which ensures that no significant potential risk is overlooked.

Risk Sources

• Risk repository – is the history data containing the list of risks identified for completed projects.

• Checklist analysis – the risk identification checklist is a questionnaire that helps identify gaps and potential risks. It is developed based on experience and project type.

• Expert judgement – risk identification is also done by brainstorming with or interviewing experienced project participants, stakeholder and subject matter experts.

• Project status – includes meeting reports, quality reports, status reports etc. These reports provide current project progress, issues faced, violations. These provide potential new risks.

The risks may be divided into several categories, such as:

- **Technical risks** technology, requirements, interface, performance, quality.
- External risks customers, market, suppliers, legislation.
- **Organisational risks** logistics, resources, budget, and project dependencies.
- **Project management risks** planning, schedule, communication, controlling.
- and others.

2. **Risk analysis**: Once the risks are identified, they are analysed to identify the qualitative and quantitative impact of the risk on the project so that appropriate steps can be taken to mitigate them.

This assessment is necessary before any risk response can be planned. The following guidelines are used to analyse risks.

Probability of Risk Occurrence

High probability – ($80 \% \le x \le 100\%$)

Medium-high probability – (60 % \leq x < 80%)

Medium-Low probability – $(30 \% \le x < 60\%)$

Low probability (0 % < x < 30%)

Risk Impact

High – Catastrophic (Rating A – 100)

Medium – Critical (Rating B – 50)

Low – Marginal (Rating C – 10)

Medium to high level risks are dealt with at a higher priority level.

3. **Plan** a risk-response strategy: There may not be quick solutions to reduce or eliminate all the risks facing a project. Some risks may need to be managed and reduced strategically over longer periods. Therefore, action plans or strategies should be worked out to reduce these risks.

4. Act – Risk controlling-response activities: The purpose of this step is to monitor and control the implementation of risk-response activities and to revise/update the Risk Log based on a regular reassessment.

5. **Record**: Update the Project Work Plan with clear risk-response tasks whenever deemed necessary.

6. **Report:** Regularly inform the Project management/Project Steering Committee about risk-related activities.

Acceptance of Project Implementation

A project may produce one or more deliverables. Each of these deliverables must be formally accepted. Deliverables acceptance management ensures that these deliverables meet the predefined objectives and criteria (in Project Work Plan Quality Management Plan, Outsourcing Plan), so the project requestor can formally accept them.

A review and approval are recommended before the project can move to the next phase. The Project Manager assesses whether all the goals of the Implementation Phase have been achieved, verifies that all planned activities have been carried out, that all requirements have been met, and that the project's outputs have been fully delivered. The Project Manager is also responsible for ensuring that the Project

Owner/fund provider accepts the deliverables (at least provisionally), finalises the transition and makes the outputs available to the end-users.

Once all the above conditions have been met, the Project management/Project Steering Committee can authorise the Project Manager to move the project to the Closing Phase.

Review Questions

- 1. What is a Kick-off meeting and what are its objectives?
- 2. How can we monitor the quality of project work?
- 3. What is the difference between preventive and corrective actions in project change management?
- 4. What is Earned Value Analysis (EVA)? What do we use it for?
- 5. What may be a project risk? Name five possible risks which may occur in a project.
- 6. What may be a project output? Name five possible project outputs.

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Abbreviations

Abbreviation	Explanation
AC	Actual Costs
ACWP	Actual cost of work performed
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted cost of work scheduled
CA	Consortium agreement
EV	Earned Value
EVA	Earned Value Analysis
GA	Grant agreement
PM	Project Manager
PV	Planned value
WCI	Watching and competitive intelligence

7 STAGE 5: CLOSURE

7.1 STAGE DESCRIPTION

A project is a temporary endeavour undertaken to complete a unique product, service or other outcome. Projects officially start during a kick-off meeting, where all stakeholders are informed about the purpose, objectives and duration of the project, how the project will be executed and who will perform what.

Establishing a formal and structured process that will trigger the closure of the project upon its completion and delivery of its outputs is also crucial. Delivering the outcomes of the project is mistakenly comprehended as the closure of the project while, on the contrary, the completion of the deliverables should trigger the initiation of a process and a sequence of activities that will officially close the project.

It is advisable for the closure process to include a sign-off element, where the owner(s) or sponsor(s) of the project will officially accept the deliverables produced and ensure that the project plan was properly followed. It is noted that the words beneficiaries, customers, owners or sponsors, may interchangeably be used to demonstrate the person or entity that will benefit from the implementation of the project.

In addition to receiving the official acceptance of beneficiaries for the deliverables produced, the signoff process will capture their concerns and their experience with the organisation and the project team.

The "Closure stage" is the fifth and final stage of the InnoPro life-cycle, an innovative model aimed to enable learners (business entities, professionals, universities, researchers and students), to gain a better understanding and an insight of the activities involved with the project management life cycle and to acquire the foundations for executing their projects efficiently and effectively.

From a project management theory and InnoPro model perspective, the "Closure stage" takes place immediately after the implementation of the project and the completion of its deliverables.

The purpose of the "Closure stage" is to ensure that all project work has been completed according to the project plan and the original scope and to receive the formal "sign-off" and approval from all internal and external stakeholders involved. By "sign-off" it is usually understood that the internal or external "customer", meaning the owner(s) or the sponsor(s) of the project, in project management lingo, have accepted the final outcomes produced during the lifecycle of the project. The owner(s) or sponsor(s) of the project are usually the ones that have authorised the initiation of the project and are therefore in the position to approve its closure.

In the business world, depending on the size of the company, the approving authority could be the head of the unit that authorised the project and the one that will benefit from the outputs that have been developed, a steering committee formed to oversee the implementation of a large project or the general manager of a small company.

In an academic environment, the approval is usually granted by the supervisor (mentor), the research committee and/or the academic committee.

It is important to note that a project may conclude either according to the original planning, meaning by confirming its completion and the handing out of its products, or prematurely, in cases where due to a significant budget, cost or schedule overruns or because the progress of the project has reached a dead end and the sponsor decides to "pull the plug". In both cases the decision for closing the project must be taken by the owner of the project, in coordination with the project manager and other internal or external stakeholders.

It is further noted that diverging from the original scope of the project is a common phenomenon, given the constantly fluctuating business environment. Att the same time what is crucial is to manage to integrate any changes into the original planning and safeguard the best interests of the organisation.

A study by PricewaterhouseCoopers, which reviewed 10,640 projects from 200 companies in 30 countries and across various industries, found that only 2.5% of the companies successfully completed 100% of their projects.

In large organisational settings, where a Project Management Office (PMO) has been established, coordinating and managing all projects, the processes of the PMO should be followed. Depending on the size of the organisation, a PMO can provide a number of services, from a simple central registry of organisational projects, to providing resources (systems, training, experienced project managers) to other departments for managing their projects and providing strategic guidance. It is noted that even small organisations can benefit from employing PMO practices.

In the 2018 survey published by KPMG, "The state of play in project management", establishing a Project Management Office is identified as one of the traits of success in project management.

- 67% of delivery co-ordinated by a centralised PMO.
- 60% have formal benefits measurement processes in place at project and/or enterprise level.
- 66% have formal review and development processes for PMs.
- 74% have actively engaged project sponsors.

Another important objective of the closure stage is to release the internal and external resources acquired during the course of the project for its implementation, so that they can be utilised elsewhere. The project manager should also have the responsibility to evaluate the performance of the resources utilised for the implementation of the project in order for the organisation to have future reference.

Last but not least, having a complete picture about the implementation of the project and its deliverables, will provide a solid understanding of any risks involved and enable the organisation to manage risks proactively.

7.2 STAGE OBJECTIVES & LEARNING OUTCOMES

Students are familiarised with the importance of closing a project and the steps that must be followed in order to properly implement the Closure stage of the InnoPro model.

The following are the main learning outcomes of the Closure stage. Students understand the importance of:

• reporting and its benefits,

 \circ measuring the performance of the team, the quality of the outcomes and the adherence to the agreed budget and time plan,

- being able to measure the impact of a project,
- metrics and evaluation,
- and complexity of managing potential intellectual and industrial property rights,

• monitoring and controlling processes and their role in the support the project manager as well as the stakeholders of the project in monitoring the execution of the project,

• sustainability.

Keywords

Project closing, Deliverables, Evaluation, Monitoring, Sustainability, Intellectual Property.Stage structure

Based on the InnoPro model, during the Closure stage the following six sub-stages will take place in order for the organisation to properly close a project:

• Sub-stage 5.1: Project Reporting

Depending on the type and size of the organisation and the project and whether the project is properly terminated, having achieved all its outputs, or prematurely terminated, the project manager, in collaboration with the project sponsor, will decide about the type of reports produced in order to document the work undertaken.

The reports that can be produced at the closure of the project may include a simple "Final report" compiling the work undertaken, challenges addressed during the course of the project and describing the deliverables produced, plus any other reports related to specific issues like a risk report, where specific risks to the organisation are identified or a sustainability report detailing how the deliverables will be utilised in the future.

• Sub-stage 5.2: Analysing Project and team Results

Project manager should evaluate the performance of the project and the team that participated in its implementation, through a structured, well-documented and transparent process. Analysing the results of the project and the team involved with its implementation will enable the organisation to identify areas of improvement and increase its efficiency for future projects.

• Sub-stage 5.3: Project Documentation Closure

Project manager will produce the documentation required to officially close the project and submit it to the project owner or sponsor for evaluation and formal approval.

• Sub-stage 5.4: Project evaluation

Evaluating a project means undertaking an analysis of the deliverables and outputs produced during the course of the project and determining whether the project has produced the results originally planned and delivered the expected benefits.

It is equally important to evaluate the effect of the project on its intended beneficiaries and other stakeholders.

• Sub-stage 5.5: Intellectual and Industrial Property Aspects

The project manager should ensure that all Intellectual and Industrial property aspects of the project are properly managed and that potential rights of the organisation are safeguarded.

• Sub-stage 5.6: Monitoring & Controlling and Project Evaluation

Establishing a framework that will facilitate the monitoring and controlling all stages of the project will allow the project manager to continuously evaluate the project progress and its proper implementation.

The purpose of the above sub-stages is to support the project manager to ensure that all the work has been completed and to formally establish that the project has been executed as agreed between all stakeholders. As indicated by the six sub-stages of the Closure stage, closing the project is not like switching off the light or shutting down your computer.

On the contrary, closing the project requires analysing the performance of the project team, evaluating the quality of the products developed, ensuring that any intellectual and industrial property rights are properly managed. Apart from that, reviewing the monitoring and controlling undertaken during the life cycle of the project must be carried out.

It is considered mandatory for the closure of the project to have the required documentation and reporting authorised, from both internal as well as external stakeholders.

The closure stage should not be considered as the end of the project by the organisation, it should rather be considered the beginning of a process through which the organisation will integrate the deliverables and outputs of the project into the organisation and utilise its outputs.

Steps

The "Closure stage" is the stage where the project manager will bring everything together and support the organisation and the final beneficiaries of the project to evaluate if the project has achieved its objectives and if it was implemented in the best possible manner.

In order to achieve this goal, the project manager will evaluate the outputs of the project and ensure that they were developed within the time, budget and quality criteria defined in the original project plan and alternatively identify any deviations from the original project plan and understand what went wrong.

Another important aspect is to evaluate whether the organisational resources, internal and/or external, were utilised efficiently and effectively, even in projects that overran a budget or schedule, or projects that failed completely. The activities of the closure stage should not commence at the end of the project, they should rather be integrated in each and every step of the project. In order to close the project effectively the Project Manager will need to establish a framework that will allow them to constantly collect reliable information about the project and develop performance indicators. This will allow the project manager to have sufficient information and data at the end of the project in order to properly analyse the performance of the project. Evaluating the performance of the team involved with the implementation of the project is equally important.

Assessing the project's performance will additionally require a detailed analysis of the quality of the deliverables/outputs developed, ensuring that the deliverables/outputs were developed according to the requirements detailed in the project plan and that they meet the expectations of the project's stakeholders.

Based on the InnoPro model, the following seven steps will support the project manager to implement the Closure stage:

7.3 FORMAL PROJECT CLOSURE

During this step the project manager receives approval for initiating the closure of the project from the owner or sponsor the project and other stakeholders, as defined in the project charter and the organisational processes.

The roles and responsibilities of each stakeholder involved in the execution of the project, including how the project closure stage will be initiated, should be clearly documented in the project charter or other documentation that has authorised the initiation of the project.

Once the project closure stage commences, the project manager will proceed with verifying that all deliverables have been completed according to the project plan and proceed with transferring the ownership of each deliverable to the person or unit it has been developed for.

A formal sign off document for each deliverable or for the whole project, should be maintained, in order to have evidence for the closure of the project.

A report should also be prepared in those cases where the criteria of the project, budget, schedule, quality, have not been met and the project has been prematurely terminated. It is emphasised that a budget or schedule overrun does not necessarily mean that the team that undertook the initiation of the project has failed.

7.4 PROJECT DOCUMENTATION CLOSURE

Public Procurement Procedures Evaluation

Project managers should maintain detailed records for the public procurement procedures undertaken during the course of the project, the reason for externally sourcing product or services, as well as for the selection process followed each time.

Depending on the type of organisation, maintaining records and/or following a specific procedure for public procurement could also be a legal requirement. The same applies for projects undertaken under the framework of a grant published by a funding agency which may require beneficiaries to follow a specific procurement process when acquiring products or services from external organisations.

A public procurement process may include different phases for example, a pre-acquisition phase during which the requirements of the tender are documented, the tender process during which eligible entities are invited to submit their tenders in either an open or closed process, the contract award phase during which tenders are evaluated and the contract is awarded, and the vendor/contract management stage which defines how the organisation interacts with the vendor.

During this step the project manager should also maintain records confirming that the organisation has settled its financial and other obligations with its contractors.

Instruments of industrial and intellectual property protection

Project managers should ensure that, where required, they will undertake all necessary procedures to protect any industrial and intellectual property rights created under the framework of the project. This should include protecting the rights and the fair and equal treatment each individual stakeholder involved in the project.

Depending on the size of the organisation, the nature of the project and the type or potential of the industrial and intellectual property, the process could involve engaging the organisation's internal legal advisor or outsourcing the process to a specialised law firm.

In cases where the project is implemented by a consortium of companies/organisations it could be useful to define the management of industrial and intellectual property created under the framework of the project, prior to the initiation of the project. Defining in advance how industrial and intellectual property rights will be managed will establish trust and ensure that all stakeholders and potential beneficiaries have a common understanding of their potential legal rights and obligations.

Final beneficiary and subsidy provider acceptance

During this step the documentation required to complete the project is compiled and finalised. As this is the step where everything is formalised and the project is coming to an end, it is noted that an important element for the closure of the project is the acceptance of the outcomes or the approval of the closure by the final beneficiary.

In cases where a national, European or other subsidy/grant was provided for the implementation of the project, the closure of the project will additionally require the approval of the agency that provided the subsidy/grant. It is therefore important for the project manager to have a full understanding of the terms and conditions of the subsidy/grant agreement, and take them into consideration during the execution of the project, not only during its closure.

Project managers should facilitate the decision making of final beneficiaries and subsidy providers by ensuring they have sufficient information gathered throughout the duration of the project. Employing a technique where reports such as monthly or quarterly project progress reports, an intermediary report and a final project report, will be submitted to the beneficiaries of the project on a predefined period using an agreed template, shall ensure that there is a common understanding about the progress achieved. Establishing a mechanism for openly receiving feedback from the beneficiaries for each report, will build trust between the project team and the beneficiaries, provide guidance to the project team and ensure that the expectations of shareholders are fully met.

Project Archiving

The project archiving process must take into consideration the organisation's data and document retention policy. Additionally, the project archiving process should take into consideration the applicable legal and regulatory framework.

Project managers must ensure that all data and documentation related to the project is properly maintained and archived according to the organisation's relevant policies. Respecting personal privacy and protecting personal information and sensitive corporate information is considered equally important and should be integrated in the archiving process.

Projects funded by a national, European or international organisation may have specific requirements that the project manager must consider and comply with.

Lessons Learned

Organisations should establish a formal and structured process to identify lessons learned from each project completed, document these in a template, store in a registry and make accessible for future use.

Lessons can be categorised according to various characteristics such as the project type, size, nature, the stage of the project etc., in order to facilitate the learning process and support the company learn and improve both from its successes as well as from its failures.

Although there are different approaches, project managers usually look to identify what went right and what went wrong and how things could be done better in similar projects.

Having a "lessons log" policy, enabling project managers to register lessons on a continuous basis during the life cycle of the project, can ensure that lessons are logged as they occur and that important lessons are not forgotten.

Monitoring of sustainability of project outputs, managing changes, addressing risks

Monitoring of sustainability of project outputs:

• The project manager should establish a process for monitoring the sustainability of the project and its outputs.

• It is critical to remember that projects are not undertaken in isolation and that they are part of the whole organisational setting.

• Sustainability does not only relate to the environment and the movement towards "green" societies and businesses, it relates to the general efficient, effective and timeless, to the extent possible, utilization of organisational resources.

• To achieve sustainability, projects must be aligned with the vision and mission of the organisation, its internal needs and the needs of its customers and other stakeholders. The deliverables of a project should therefore complement the efforts of organisations to achieve their mission.

• Projects can generate financial gains, reduce costs, increase customer satisfaction, improve organisational performance and enhance the ability of the organisation to innovate. In an academic or research environment, projects should advance existing research, create grounds for new academic knowledge and/or be part of a larger research initiative.

• Project outputs should be of high quality, in order to be sustainable in time and be adaptable to changes in the organisation or the market.

Organisations should establish a mechanism to monitor the utilisation of the project's deliverables within the organisation.

Managing changes:

• Project managers should identify and implement all changes required by the project's stakeholders in order to accept deliverables of the project.

Addressing risks:

• Project managers should identify and manage any risks related to the project or the organisation.

Review Questions

- 1. When does the project close?
- 2. What is the goal of the final "closing" phase of the project?
- 3. Who ensures the archiving process and what is it governed by?
- 4. What should be the outputs of the project?
- 5. Who ensures project sustainability and how?

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Abbreviations

Abbreviation	Explanation
AC	Actual Costs
ACWP	Actual cost of work performed
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted cost of work scheduled
CA	Consortium agreement
EV	Earned Value
EVA	Earned Value Analysis
GA	Grant agreement
PM	Project Manager
PV	Planned value
WCI	Watching and competitive intelligence

8 GLOSSARY OF TERMS

TERMS	Description/explanation
Advisory board	A body that provides non-binding strategic advice, guidance and support to the project and assess the project's innovation content both in process and methodology to ensure that the project achieves its objectives.
Business Case Analysis	This analysis provides a best-value analysis that considers not only cost, but other quantifiable and non-quantifiable factors supporting an investment decision. This can include, but is not limited to, performance, producibility, reliability, maintainability, and supportability enhancements.
Call	Procedure for inviting applicants to submit project proposals, with the aim of receiving EU funding
Communication	Activities aiming at promoting the project and its results. The purpose is to make the research activities known to multiple audiences (broad public, media) in a way that they can be understood by non-specialists.
Consortium/partne r agreement	A private agreement between the beneficiaries/project partners, to set out the rights and obligations amongst themselves. (It does not involve the Funding Agency.) It should complement the grant agreement and must not contain any provision contrary to it. Consortium Agreement is essentially a commercial agreement between the partners. As such, it is flexible and can be adjusted to the specific needs of the project and its partners.
Coordinator	Lead beneficiary in a group of beneficiaries/consortium. Main contact point for the funding agency.
Deliverable	A project deliverable is any specific output created as the result of work performed during the lifecycle of a project. Deliverables are the final outputs that are transferred to a third party outside of the project. Project Deliverables are defined by the tangible result or outcome of a given project, whether intellectual/logical or physical.
Dissemination	Public disclosure of the project results to various stakeholder groups (research peers, industry, professional organizations, policymakers) with the aim to enable others to use and take up the results.
Earned Value Analysis (EVA)	A method that allows the project manager to measure the amount of work actually performed on a project beyond the basic review of cost and schedule reports.
Grant agreement	A funding agreement concluded between the funding agency and the project participants and specifies the rights and obligations of the contracting parties. It contains important provisions for the implementation of the project.
Ethics	For all activities funded by the European Union, ethics is an integral part of research from beginning to end. Ethical research conduct implies the application of fundamental ethical principles and legislation to scientific

	research in all possible domains of research.
Exploitation	Means to make use of the results produced in a project in further activities e.g. in other research activities; in developing, creating and marketing a product, process or service; in standardisation activities.
Feasibility Study	An analysis that takes all of a project's relevant factors into account— including economic, technical, legal, and scheduling considerations—to ascertain the likelihood of completing the project successfully. Project managers use feasibility studies to discern the pros and cons of undertaking a project before they invest a lot of time and money into it.
Gantt Chart	A type of bar chart that illustrates a project schedule, named after its inventor, Henry Gantt.
Innovation	A new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process).
	A product innovation is a new or improved good or service that differs significantly from the firm's previous goods or services and that has been introduced on the market.
	A business process innovation is a new or improved business process for one or more business functions that differs significantly from the firm's previous business processes and that has been brought into use by the firm.
Innovation management	All systematic activities to plan, govern and control internal and external resources for innovation. This includes how resources for innovation are allocated, the organisation of responsibilities and decision-making among employees, the management of collaboration with external partners, the integration of external inputs into a firm's innovation activities, and activities to monitor the results of innovation and to support learning from experience
Innovation process	All developmental, financial and commercial activities undertaken by a firm that are intended to result in an innovation for the firm.
Kick-off Meeting	A project kick off meeting is the first meeting between a project team and the client or sponsor of a project when kicking off a new project. The purpose of a project kick off meeting is to introduce the team, understand the project background, understand what success looks like, understand what needs to be done, and agree on how to work together effectively
Key Performance Indicators (KPIs)	Various specific measurement tools for indicating how well teams are achieving specific goals. Project management KPIs are generally agreed upon early in the project. Examples of KPIs within project management include: Time Spent, FTE Days Vs. Calendar Days, Number Of Errors, Customer Satisfaction, Return On Investment etc.

Logical Framework Matrix (LFM, logframe)	A planning tool consisting of a matrix which provides an overview of a project's goal, activities and anticipated results. It provides a structure to help specify the components of a project and its activities and for relating them to one another. It also identifies the measures by which the project's anticipated results will be monitored.
Milestone	A control point in the project showing progress or achievement in the project. It may correspond to the completion of a key deliverable, allowing the next phase of the work to begin. At interim stages, it enables corrective measures to be taken for any problems that have arisen.
Mind Mapping	A graphing technique for creative thinking that visually outlines concepts in relation to a central idea. The image shows relationships among pieces of the whole, from outward branches to specific ideas within them
Minutes of meeting (MoM)	The written record of everything that's happened during a meeting. They're used to inform people who didn't attend the meeting about what happened, or to keep track of what was decided during the meeting so that you can revisit it and use it to inform future decisions.
Organizational Breakdown Structure (OBS)	A hierarchical model describing the established organizational framework for project planning, resource management, time and expense tracking, cost allocation, revenue/profit reporting, and work management. OBS groups together similar project activities or "work packages" and relates them to the organization's structure. The OBS provides an organizational perspective of the project
Project	A unique, progressive, and temporary endeavour to produce a, tangible or intangible, result like a unique service, product, or result. It is a planned, organized and goal-oriented work with a clear beginning and a clear end. It has a purpose and certain benefits are targeted. Those benefits come from certain deliverables that need to be produced during the project life.
Project Handbook	The document identifies the procedures related to project execution, project management and communication. The goal of this handbook is to identify, for each of the operational need of the project, roles, procedures and best practices in order to develop a clear approach or supporting the partners throughout the development of the project.
Project Manager	A professional in the field of project management. Project managers have the responsibility of the planning, procurement and execution of a project.
Project Goals	A more broad or general statement about what the project is to attain
Project Objectives	Objectives define how your project result is going to look like
Project Output	Results which are achieved immediately after implementing an activity. They are directly produced by the project. They are typically tangible and easy to measure.
	For example, if we are organizing a workshop on Intellectual Property Rights (IPR), participants who attended it have now got a clear understanding on IPR issues. So, this is an output the project has

	achieved and it is achieved right after the conclusion of the workshop. So, this is an output the project has achieved and it is achieved right after the conclusion of the workshop.
Project Outcome	Outcomes can be considered as mid-term results. They are not seen immediately after the end of the project activity. But after some time, when we see some change at the ground level because of the project activity, then it can be termed as an outcome. Typically, they are more intangible and harder to measure. Taking the above example of an IPR workshop, if the participants have started to protect their own intellectual property and follow the law in this area, then it is an outcome of the project.
Project owner	The Project Owner is the client of the project, and as such sets the business objectives and ensures that project outcomes are in line with business objectives and priorities. is accountable for the overall project's success, and later becomes the owner of the project's outputs (product or service). Project Owners build the vision. Project Managers build the execution of a vision.
Project Scope Statement	A written document that explains the boundaries of the project, establishes responsibilities for each team member and sets up procedures for how completed work will be verified and approved. It includes all the required information for producing the project deliverables.
Project Sponsors	Typically, they are members of senior management. They legitimize the project's objectives and participate in high-level project planning. They often help resolve conflicts and remove obstacles that occur throughout the project, and they sign off on approvals needed to advance each phase.
Public Procurements	Public procurement refers to the process by which public authorities, such as government departments or local authorities, purchase work, goods or services from companies.EU law sets out minimum harmonised public procurement rules. These rules govern the way public authorities and certain public utility operators purchase goods, works and services. They are transposed into national legislation and apply to tenders whose monetary value exceeds a certain amount.
Results	Any tangible or intangible output of the project, such as data, knowledge and information, which are generated in the project as well as any attached rights, including intellectual property rights
Risk	Anything that could potentially impact project's timeline, performance or budget. Risks are potentialities, and in a project management context, if they become realities, they then become classified as "issues" that must be addressed
Stakeholders	People (or groups) who can affect, be affected by, or believe to be affected by the decisions and/or the activities carried out during a project's lifecycle and/or by its output(s) and outcome(s). Entities that have an interest in the given project, they can be directly involved in a project's work, be members of other internal organizations or external to the organization and they may have a positive or negative influence in

	the project completion.
Steering committee	A body usually made up of representatives of key organisations who are partners in the project, and/or who have particular expertise to lend to the project, and/or whose clients are the intended users of the output of the project. Its role is to provide advice, ensure delivery of the project outputs and the achievement of project outcomes.
Subcontractor	A subcontractor is a company or person whom a beneficiary hires to perform a specific task as part of an overall project and normally pays for services provided to the project.
Work breakdown structure (WBS)	A deliverable-oriented breakdown of a project into smaller components. A work breakdown organizes the team's work into manageable sections.