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| IU International University |
| Applied Project Management |
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# Overall learning objectives

The **Applied Project Management** course provides you with a broad overview of professional project management in practice on the one hand and on the other detailed insights into the most common and effective methods and approaches in project management. For this purpose, a historical classification of project management as an independent discipline as well as definitional basics of projects, processes, project programs and project areas in practice are explained first. Since professional project management is often based on models of established standardization societies, you will furthermore get to know the most important national and international project management institutions as well as how they go about certification.

Based on this, the importance of the project context for the choice of suitable methods and approaches in project management is explained. On the one hand, tried and tested methods such as stakeholder analysis, the Cynefin model and organizational variants are used for this purpose. On the other hand, you will learn the importance of managing employees in projects by being presented with typical roles, team processes, and pitfalls of communication. This is followed by a focus on standardized and agile approaches to project management. You will learn about the most relevant practical approaches (such as PRINCE2, IPMA, Scrum and Kanban) and will be able to weigh and reflect on their advantages and limitations in a well-founded manner. In the same way, variants of standard and agile methods are presented and analyzed with regard to their suitability for specific project contexts. Finally, a number of the most effective methods for specific, selected project situations will be explained to you in detail. These include milestone planning, budgeting, analyzing project risks, and management reporting.

# Lesson 1 - The project management landscape

Learning objectives

After working through this lesson, you will be able to..

... explain the history of project management and its influence on today's project management landscape.

... distinguish projects from other relevant terms, such as programs or processes.

... demonstrate and structure the variety of projects in practice.

... designate the main international institutions for project management as well as opportunities for professional training in project management.

# 1. The project management landscape

### Introduction

If projects and project management are considered in operational reality, a seemingly endless spectrum of application fields and topics inevitably arises: For example, construction projects such as the building of the new Stuttgart Central Station ("Stuttgart 21") or the airport in Berlin are organized as projects in the same way as the planning and implementation of a soccer World Cup or the spin-off of a business unit as an independent company (e.g., Siemens Energy AG in 2020). Furthermore, over the past decades of project management practice, a wide variety of focal points have crystallized again and again: NASA's Apollo project to plan and execute the first manned lunar landing in the 1960s focused on absolute risk minimization and detailed planning and documentation. Software projects, such as the development of smartphone apps from around 2007, on the other hand, are characterized by flexible management of requirements and continuous incorporation of customer requirements. Last but not least, project management has also established itself as an independent discipline for further education. This is reflected, for example, in the numerous courses and certifications offered from a wide range of national and international training providers, institutes, and universities.

In order to understand this exemplified diversity of project management in practice and to be able to deal professionally with the applied management of projects, it is important to analyze the comprehensive general scope of project management in practice. In particular, the following questions must be clarified:

* What are the current project management procedures and methods based on?
* How can other procedures in companies be distinguished from projects?
* Which fields of application does project management cover exactly?
* How can you further specialize in project management nationally and internationally?

## History of project management

The planning and realization of large (and very large) projects has always occupied people throughout the world' s history. Examples include the construction of the pyramids or the Great Wall of China, the implementation of the Panama Canal, the construction of the Eiffel Tower in Paris, and even flights into space and the first manned moon landing. Although there are numerous such examples of "projects" in the history of mankind and such undertakings undoubtedly required goal-oriented management, project management as an independent discipline is not commonly spoken of until around the middle of the 20th century (Madauss, 2020, pp. 7-8). In this context, the so-called "Manhattan Engineering District Project", which included the construction of the atomic bomb in 1941, is often regarded as the starting point of professional project management. This project was particularly challenging because it required scientists and engineers from academic institutions, industry, and government to work closely together. Such interdisciplinary collaboration can still be seen in many projects today (especially in product development). Since then, a large number of R&D projects can be identified that can be assigned to one or more phases of project management development (see figure).

Lines of development of project management



Source: Oliver Neumann, 2022, based on Litke, 2004; Hagen 2009, p. 39.

All of these phases are characterized by a different focus for the design of the projects of the respective time (Hagen, 2009, pp. 40-50). However, all of them have found their way into today's project management approaches, to a greater or lesser extent:

* **Classic Logical Project Management**: In the period from about 1945 to the 1960s, project planning and management activities were dominated by engineering and technical understanding, as the focus was primarily on technical innovations (such as the development of color television). Project management at this stage is considered to be highly mechanistic. Based on clear, unambiguously described project goals, the project participants focused on the creation and implementation of rigid instructions and plans (e.g., construction plans), resource and cost plans based on the so-called **network planning technique** and risk management methods. It is quite interesting that project management at this time did not yet include any specific organizational components, such as a specific organizational structure with project leader, sub-project leaders and project team. This led to considerable losses in terms of the efficiency of these projects.

**Network planning technique**

The network planning technique is a method for analyzing, controlling, and monitoring project processes and procedures. The focus is on the timing and optimization of the project duration based on buffer times.

* **Phase-oriented project management**: Starting around 1960, a phase-oriented approach to managing projects based on the product life cycle concept began to emerge, primarily as a result of projects in the aerospace and defense industries. This basically divides the phases of a product into introduction, growth, maturity, saturation, and degeneration. Likewise, at this time, projects began to be divided into temporal episodes - mostly preparation, designing, specification, realization, and operation - in order to further develop the standardization of project management in particular. Even today's project management is usually still strongly based on such a phase concept.
* **System-oriented project management**: During the 1970s, the trend toward system-oriented perspectives and design began in economics in general and in project management in particular. Behind this is sometimes the understanding that psychosocial relationships between people involved in or affected by the project have a significant influence on the success of the project. In addition, this was the first time that the project context/environment was included in management as a key success factor (Patzak & Rattay, 2004, pp. 29-34). Furthermore, in contrast to purely phase-oriented project management, iterative, repetitive project processes (e.g., problem-solving process) were also implemented here for the first time.
* **Agile, evolutionary project management:** By the turn of the millennium at the latest, the latest stage of development in project management had become apparent. Against the background of constantly growing complexity and dynamics of project plans, flexible-agile process models and methods have found their way into the management of projects. All agile approaches are characterized by an incremental, iterative approach, as opposed to rigid planning and forecasting of project processes at the beginning of the project. This is accompanied by an understanding that complex problems can rarely be solved with rigid planning and pre-planned "step-by-step" processing. In addition, it proved inflexible for many projects to pursue a project goal defined at the beginning without adjustment to changing conditions over several years in some cases. Therefore, one focus of agile process models is the full inclusion and consideration of customer requirements, which can sometimes change over the project period of time. Although agile project management clearly originated in the IT sector and is still the standard there, such process models and methods are now spreading more and more frequently in other areas as well.

**Agile**

Agile translates as flexible and adaptability in the context of project management. The principles of agile working can be traced back to the so-called "Agile Manifesto". Common agile methods include Scrum or Kanban.

### Self-check questions

1. From which decade onwards does one commonly speak of project management as an independent management discipline?

*From the 1940s*

2. Please mark the correct statements with a cross.

* Agile project management is fundamentally based on rigid instructions and detailed plans.
* *Agile project management is characterized by incremental, iterative procedures.*
* *Classical logical project management uses, among other things, the network planning technique for the creation of schedules and resource plans.*
* Phase-oriented project management involves taking into account the constantly changing project environment and project context.

## Definition of projects, programs, and processes

For Applied Project Management in practice, it is essential to have sound knowledge about the definition of a project and especially with regard to the differentiation from other, relevant terms and activities in companies. For example, in product development projects in many companies, a standardized product development process (PDP) is often anchored, within the framework of which the respective project is organized. In addition, companies often do not have just one project running at any given time; rather, a large number of projects usually exist simultaneously, and their content is often combined in project programs. Therefore, the definitions and distinguishing characteristics of projects, programs, and processes are to be examined below.

### Projects

Despite the almost one-hundred-year history of project management, there are still a wide variety of definitions for the term project, as no internationally uniform definition has yet become established. Therefore, the following table briefly presents the definitions most frequently used in practice (for a detailed literature analysis of project definitions, see, among others, Madauss, 2020, pp. 47-53).

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| Project definitions (selection) | |
| **Source** | **Definition of a project** |
| German Institute for Standardization (DIN) | A project is a "*project that is essentially characterized by the uniqueness of the conditions in their entirety, such as target setting, time, financial, personnel, or other limitations, demarcation from other projects and project-specific organization*" (DIN 69901-1) |
| Project Management Institute (PMI) | "*A project is a temporary endeavor undertaken to create a unique product or service*" (Project Management Institute, 2017, p. 4) |
| International Project Management Association (IPMA) | "*A project is a one-time, time-limited, interdisciplinary, organized effort to achieve specified work results within a framework of predefined requirements and conditions."* (GPM, 2016, P. 29) |
| Office of Government Commerce (OGC) | "*An organization created for a limited period of time with a mandate to deliver at least one product according to an agreed business case*" (Axelos, 2017, p. 8). |

Source: Oliver Neumann, 2022.

In the different project definitions, it can be seen that certain characteristics occur in almost all publications (e.g., time limit) and others only in isolated cases (e.g., special organization, participation of many people). To ensure a common understanding of projects, a project definition based on "must" and "can" characteristics is therefore used, which is shown in the following figure and explained below.

Project definition based on "must" and "can" characteristics



Source: Oliver Neumann, 2022.

The obligatory, "must have" characteristics of a project include, first, a time limit. Projects always have a defined start and end time. Among other things, this feature represents a central differentiation criterion from the routine tasks of the company, which are generally not subject to a time limit (e.g., procurement of components for manufacturing). Furthermore, secondly, projects represent a unique special task. The result of a project is always a unique product, service, or other unique result. This characteristic is accompanied by the goal orientation of projects. All projects have a clearly outlined and documented goal in the project start letter ("Project Charter") (e.g., the introduction of new software, a product development, or the construction of a new factory building), which has a certain novelty and therefore does not belong to the routine activities of the company. Third, each project has a specific organizational structure. Since projects deal with special tasks, a **secondary organization** is generally implemented, such as in the form of a staff unit or matrix organization. The advantage of the secondary organization for projects is, among other things, that it can be dissolved after completion of the project without changing the basic structure of the company (e.g., the functional division into development, purchasing, manufacturing, and sales departments).

**Secondary organization**

Secondary organizations are cross-hierarchical organizational units that are used to solve interface and complex problems and are installed temporarily, complementing the basic structure of a company (primary structure).

In addition to the mandatory project characteristics, there are a number of "can" features that apply to many, but not necessarily all, projects. This includes, among other things, interdisciplinarity. Projects often require expertise from different areas of the company. Project members collaborate across departments. In some cases, members external to the company are also integrated into a project, such as employees of suppliers, customers, or development partners. In addition, in many cases projects are faced with limited resources. Most of them have a predefined budget and are to be implemented with a predefined capacity of employees within a limited period of time. The assignments worked on in projects are sometimes also characterized by a high degree of complexity. The individual assignments have many dependencies on each other and on the project or company environment. In addition, there is a high level of dynamism, so that content and dependencies can change frequently (e.g., in agile software development projects).

### Programs

A (project) program is a set of content-related individual projects that pursue an overall, sometimes strategic objective. They are formed to achieve a specific goal or several sub-goals in the company (e.g., all development projects in the area of Artificial Intelligence). The central motivation for the formation of project programs is that this generates greater benefits for the company than the independent implementation of individual projects. A project program can also be interpreted as a major project that - like any other project - is limited in time, pursues a defined objective, and is allocated a specific budget. An example of a project program is the collaborative development of a complex deliverable composed of several individual projects, such as a construction project. Project program management aims to "coordinate these various, relatively independent projects, align priorities, and allocate all resources, such as labor and finances, accordingly" (Kuster et al., 2011, p. 9).

Relationship between individual project, project program, and project portfolio



Source: Oliver Neumann, 2022.

As shown in the figure above, there is another level, namely the summary of the entire project landscape in the sense of a project portfolio. A project portfolio is understood to be the "summary of all planned, approved and ongoing projects, and programs of a company...” (Seidl, 2011, p. 6). Sometimes the terms "project map", "project landscape", "project compartments" or "project bundles" are also used for a project portfolio. Strictly speaking, the use of the term "portfolio" in this context is not always justified from a scientific point of view. A portfolio actually has two dimensions, one of which can be influenced well (endogenous component), and the other dimension can be influenced less well (exogenous component). However, this two-dimensionality of a portfolio is only expressed in a few dealings with project portfolios, for example by the classification of them in the dimensions "importance of the project" and "status in the project" (Stöger, 2019). Ultimately, a two-dimensional project portfolio emerges only after the project evaluation and prioritization phase. In contrast to a project program, a project portfolio has no time limit, no defined resource allocation, and does not pursue an overall project goal. Therefore, the structures created for the management of project portfolios are also of a long-term nature, i.e., they are usually part of the primary organization, whereas project management and program management have so-called tent structures, i.e., they are dismantled after the project is completed. A commonality with the project program is that even when projects are grouped into a project portfolio, the intent is to generate greater benefits than when viewed individually. In this context, project portfolio management encompasses all the assignments involved in planning and prioritizing, approving, and controlling a project portfolio.

### Processes

In practice, there is often confusion or unclear delineation of another important term related to projects, that of process. In general, a process can be defined as a "frequently repeated, rather sequential concatenation of activities [], where the initial situation as well as the desired result are defined and the required measures are categorized or specified" (Patzak & Rattay, 2018, p. 21). For example, the procurement of a supplier part, the processing of a shipping order, the manufacturing of an automobile, or the hiring of new employees are typical internal company processes. Often, processes are also referred to as routine tasks/processes or repetitive tasks such as "operational work". In practice, the distinction between primary core processes and secondary, supporting management processes ("business processes") has become established, which is derived from Micheal Porter's value chain model (Porter, 1985). The core processes include marketing, manufacturing, and logistics processes. Supporting processes are, for example, personnel, finance, investment, and information processes. To fully describe a process, at least the following points must be fulfilled:

* The activity or task that triggers the process and the activity or task that completes the process must be clearly defined.
* The activities to be listed are shown in a flow chart and are usually structured according to the SIPOC logic (Supplier-Input-Process-Output-Customer).
* Activities are ordered in the most efficient and effective sequence.
* The responsibilities for each process step are clearly documented.

By focusing on processes, i.e., standardized procedures, companies try to effectively coordinate cross-departmental assignments (e.g., between purchasing, development and manufacturing) and to counteract a large number of isolated solutions that are not coordinated with each other in different areas of the company (e.g., when projects are to be managed both in business area A and in business area B, which is organizationally separate from business area A).

There are some clear demarcation characteristics between processes and projects: Processes are continuous, so they do not have a defined end. Project work, on the other hand, ends as soon as the project goal is achieved, and the project is completed. Furthermore, processes are recurring, i.e., the activities and procedures are carried out in the same or very similar way again and again. Projects, on the other hand, are unique and are not repeated 1:1 in the same way.

Of central importance for professional project management in practice is the fact that projects are often embedded in processes. This can be illustrated by the example of product development: Since many companies are constantly developing new products, many have defined an independent product development process (PDP). This represents the basic, sequential procedure and the respective activities necessary for the development and manufacturing (and in part the distribution) of a product. This includes, among other things, the construction of various prototypes (samples) or measures to minimize risks during development (e.g., with the help of an FMEA). The goal of such a process is primarily standardization, this ensured that as far as possible all product developments meet certain quality requirements. Furthermore, process standards usually document the most cost- and time-efficient approach. However, the PDP often represents a "maximum" requirements list of product development activities. If a specific product with individual characteristics is then developed (e.g., a new automobile or a new dishwasher), this unique undertaking in turn reflects a project.

For the sake of completeness, it should be mentioned that the reverse case also occurs in project management practice, namely that processes are embedded in projects so-called "project processes" (Project Management Institute, 2017). This fact reflects that project management tasks can also be recurring, such as documentation, project controlling, or reporting, and therefore run as permanent processes with dedicated tools and methods within projects.

### Self-check questions

1. What are the defining "must have" characteristics of projects?

*Time limit, one-time special task, specific organization*

1. Please mark the correct statements with a cross.

* A project program represents the summary of all planned, approved and ongoing projects of a company.
* *The obligatory "must characteristics" of a project include the time limit and the novelty of the assignment.*
* Projects have a large overlap with processes in terms of their definition.
* *A project portfolio represents the summary of all planned, approved and ongoing projects of a company.*

1. Please mark the correct statements with a cross.

* *A process includes recurring assignments.*
* *A process is the sequential chaining of activities.*
* *A process can be embedded in projects*.
* A process always refers to a unique special task.

## Areas and examples of projects in the present time