THE PROJECT MANAGEMENT FRAMEWORK

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1. Introduction

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INTRODUCTION

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The *Project Management Body of Knowledge* (PMBOK) is an inclusive term that describes the sum of knowledge within the profession of project management. As with other professions such as law, medicine, and accounting, the body of knowledge rests with the practitioners and academics who apply and advance it. The full PMBOK includes knowledge of proven, traditional practices which are widely applied as well as knowledge of innovative and advanced practices which have seen more limited use.

This chapter defines and explains several key terms and provides an overview of the rest of the document. It includes the following major sections:

1.1 **Purpose of this Document**
1.2 **What is a Project?**
1.3 **What is Project Management?**
1.4 **Relationship to Other Management Disciplines**
1.5 **Related Endeavors**

1.1 PURPOSE OF THIS DOCUMENT

The primary purpose of this document is to identify and describe that subset of the PMBOK which is *generally accepted.* Generally accepted means that the knowledge and practices described are applicable to most projects most of the time, and that there is widespread consensus about their value and usefulness. Generally accepted does *not* mean that the knowledge and practices described are or should be applied uniformly on all projects; the project management team is always responsible for determining what is appropriate for any given project.

This document is also intended to provide a common lexicon within the profession for talking about project management. Project management is a relatively young profession, and while there is substantial commonality around what is done, there is relatively little commonality in the terms used.

This document provides a basic reference for anyone interested in the profession of project management. This includes, but is not limited to:

• Project managers and other project team members.
• Managers of project managers.
• Project customers and other project stakeholders.
• Functional managers with employees assigned to project teams.
• Educators teaching project management and related subjects.
• Consultants and other specialists in project management and related fields.
• Trainers developing project management educational programs.

As a basic reference, this document is neither comprehensive nor all-inclusive. Appendix E discusses application area extensions while Appendix F lists sources of further information on project management.

This document is also used by the Project Management Institute to provide a consistent structure for its professional development programs including:

- Certification of Project Management Professionals (PMPs).
- Accreditation of degree-granting educational programs in project management.

1.2 WHAT IS A PROJECT?

Organizations perform work. Work generally involves either *operations* or *projects,* although the two may overlap. Operations and projects share many characteristics; for example, they are:

- Performed by people.
- Constrained by limited resources.
- Planned, executed, and controlled.

Operations and projects differ primarily in that operations are ongoing and repetitive while projects are temporary and unique. A project can thus be defined in terms of its distinctive characteristics—*a project is a temporary endeavor undertaken to create a unique product or service. Temporary* means that every project has a definite beginning and a definite end. *Unique* means that the product or service is different in some distinguishing way from all similar products or services.

Projects are undertaken at all levels of the organization. They may involve a single person or many thousands. They may require less than 100 hours to complete or over 10,000,000. Projects may involve a single unit of one organization or may cross organizational boundaries as in joint ventures and partnering. Projects are often critical components of the performing organization's business strategy. Examples of projects include:

- Developing a new product or service.
- Effecting a change in structure, staffing, or style of an organization.
- Designing a new transportation vehicle.
- Developing or acquiring a new or modified information system.
- Constructing a building or facility.
- Running a campaign for political office.
- Implementing a new business procedure or process.

1.2.1 Temporary

Temporary means that every project has a definite beginning and a definite end. The end is reached when the project's objectives have been achieved, or when it becomes clear that the project objectives will not or cannot be met and the project is terminated. Temporary does not necessarily mean short in duration; many projects last for several years. In every case, however, the duration of a project is finite; projects are not ongoing efforts.

In addition, temporary does not generally apply to the product or service created by the project. Most projects are undertaken to create a lasting result. For example, a project to erect a national monument will create a result expected to last centuries.

Many undertakings are temporary in the sense that they will end at some point. For example, assembly work at an automotive plant will eventually be discontinued, and the plant itself decommissioned. Projects are fundamentally different because the project *ceases* when its declared objectives have been attained, while non-project undertakings adopt a new set of objectives and *continue* to work.

The temporary nature of projects may apply to other aspects of the endeavor as well:
- The opportunity or market window is usually temporary—most projects have a limited time frame in which to produce their product or service.
- The project team, as a team, seldom outlives the project—most projects are performed by a team created for the sole purpose of performing the project, and the team is disbanded and members reassigned when the project is complete.

1.2.2 Unique Product or Service

Projects involve doing something which has not been done before and which is, therefore, *unique*. A product or service may be unique even if the category it belongs to is large. For example, many thousands of office buildings have been developed, but each individual facility is unique—different owner, different design, different location, different contractors, and so on. The presence of repetitive elements does not change the fundamental uniqueness of the overall effort. For example:
- A project to develop a new commercial airliner may require multiple prototypes.
- A project to bring a new drug to market may require thousands of doses of the drug to support clinical trials.
- A real estate development project may include hundreds of individual units.

Because the product of each project is unique, the characteristics that distinguish the product or service must be progressively elaborated. *Progressively* means "proceeding in steps; continuing steadily by increments" while *elaborated* means "worked out with care and detail; developed thoroughly" [1]. These distinguishing characteristics will be broadly defined early in the project and will be made more explicit and detailed as the project team develops a better and more complete understanding of the product.

Progressive elaboration of product characteristics must be carefully coordinated with proper project scope definition, particularly if the project is performed under contract. When properly defined, the scope of the project—the work to be done—should remain constant even as the product characteristics are progressively elaborated. The relationship between product scope and project scope is discussed further in the introduction to Chapter 5.

The following two examples illustrate progressive elaboration in two different application areas.

Example 1. A chemical processing plant begins with process engineering to define the characteristics of the process. These characteristics are used to design the major processing units. This information becomes the basis for engineering design which defines both the detail plant layout and the mechanical characteristics of the process units and ancillary facilities. All of these result in design drawings which are elaborated to produce fabrication drawings (construction isometrics). During construction, interpretations and adaptations are made as needed and subject to proper approval. This further elaboration of the characteristics is captured by "as built" drawings. During test and turnover, further elaboration of the characteristics is often made in the form of final operating adjustments.

Example 2. The product of a biopharmaceutical research project may initially be defined as "clinical trials of XYZ" since the number of trials and the size of each is not known. As the project proceeds, the product may be described more explicitly as "three Phase I trials, four Phase II trials, and two Phase III trials." The next round of progressive elaboration might focus exclusively on the protocol for the Phase I trials—how many patients get what dosages and how frequently. In the project's final stages, the Phase III trials would be explicitly defined based on information gathered and analyzed during the Phase I and Phase II trials.

1.3 WHAT IS PROJECT MANAGEMENT?

Project management is the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project. Meeting or exceeding stakeholder needs and expectations invariably involves balancing competing demands among:

- Scope, time, cost, and quality.
- Stakeholders with differing needs and expectations.
- Identified requirements (needs) and unidentified requirements (expectations).

The term *project management* is sometimes used to describe an organizational approach to the management of ongoing operations. This approach, more properly called *management by projects*, treats many aspects of ongoing operations as projects in order to apply project management to them. Although an understanding of project management is obviously critical to an organization that is managing by projects, a detailed discussion of the approach itself is outside the scope of this document.

Knowledge about project management can be organized in many ways. This document has two major sections and 12 chapters as described below.

1.3.1 The Project Management Framework

Part I, The Project Management Framework, provides a basic structure for understanding project management.

Chapter 1, **Introduction**, defines key terms and provides an overview of the rest of the document.

Chapter 2, **The Project Management Context**, describes the environment in which projects operate. The project management team must understand this broader context—managing the day-to-day activities of the project is necessary for success but not sufficient.

Chapter 3, **Project Management Processes**, describes a generalized view of how the various project management processes commonly interact. Understanding these interactions is essential to understanding the material presented in Chapters 4 through 12.

1.3.2 The Project Management Knowledge Areas

Part II, The Project Management Knowledge Areas, describes project management knowledge and practice in terms of its component processes. These processes have been organized into nine knowledge areas as described below and as illustrated in **Figure 1–1**.

Chapter 4, **Project Integration Management**, describes the processes required to ensure that the various elements of the project are properly coordinated. It consists of project plan development, project plan execution, and overall change control.
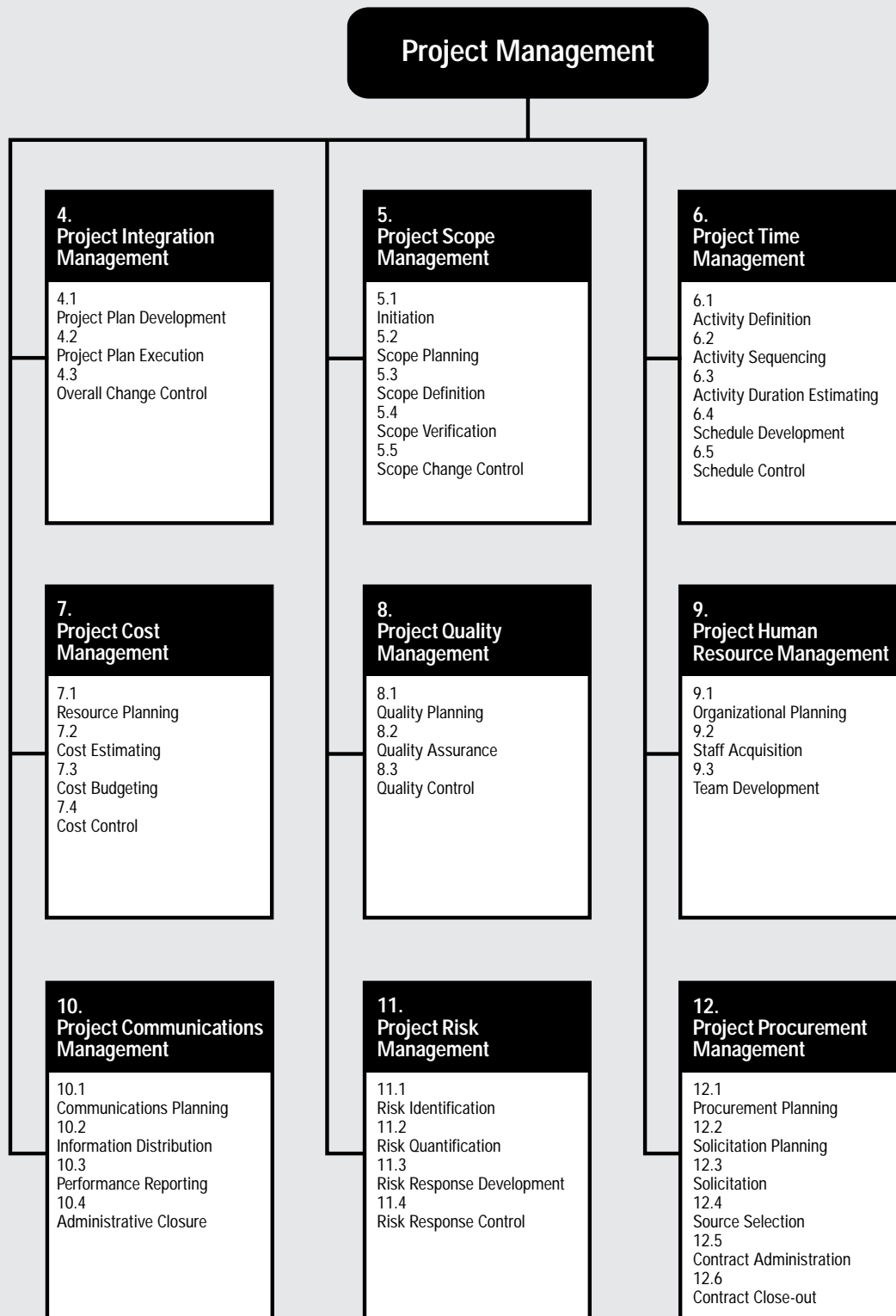
Chapter 5, **Project Scope Management**, describes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. It consists of initiation, scope planning, scope definition, scope verification, and scope change control.

Chapter 6, **Project Time Management**, describes the processes required to ensure timely completion of the project. It consists of activity definition, activity sequencing, activity duration estimating, schedule development, and schedule control.

Chapter 7, **Project Cost Management**, describes the processes required to ensure that the project is completed within the approved budget. It consists of resource planning, cost estimating, cost budgeting, and cost control.

Chapter 8, **Project Quality Management**, describes the processes required to ensure that the project will satisfy the needs for which it was undertaken. It consists of quality planning, quality assurance, and quality control.

Figure 1–1. Overview of Project Management Knowledge Areas and Project Management Processes

Project Management

4.
Project Integration Management

4.1
Project Plan Development
4.2
Project Plan Execution
4.3
Overall Change Control

5.
Project Scope Management

5.1
Initiation
5.2
Scope Planning
5.3
Scope Definition
5.4
Scope Verification
5.5
Scope Change Control

6.
Project Time Management

6.1
Activity Definition
6.2
Activity Sequencing
6.3
Activity Duration Estimating
6.4
Schedule Development
6.5
Schedule Control

7.
Project Cost Management

7.1
Resource Planning
7.2
Cost Estimating
7.3
Cost Budgeting
7.4
Cost Control

8.
Project Quality Management

8.1
Quality Planning
8.2
Quality Assurance
8.3
Quality Control

9.
Project Human Resource Management

9.1
Organizational Planning
9.2
Staff Acquisition
9.3
Team Development

10.
Project Communications Management

10.1
Communications Planning
10.2
Information Distribution
10.3
Performance Reporting
10.4
Administrative Closure

11.
Project Risk Management

11.1
Risk Identification
11.2
Risk Quantification
11.3
Risk Response Development
11.4
Risk Response Control

12.
Project Procurement Management

12.1
Procurement Planning
12.2
Solicitation Planning
12.3
Solicitation
12.4
Source Selection
12.5
Contract Administration
12.6
Contract Close-out

Chapter 9, **Project Human Resource Management**, describes the processes required to make the most effective use of the people involved with the project. It consists of organizational planning, staff acquisition, and team development.

Chapter 10, **Project Communications Management**, describes the processes required to ensure timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information. It consists of communications planning, information distribution, performance reporting, and administrative closure.

Chapter 11, **Project Risk Management**, describes the processes concerned with identifying, analyzing, and responding to project risk. It consists of risk identification, risk quantification, risk response development, and risk response control.

Chapter 12, **Project Procurement Management**, describes the processes required to acquire goods and services from outside the performing organization. It consists of procurement planning, solicitation planning, solicitation, source selection, contract administration, and contract close-out.

1.4 RELATIONSHIP TO OTHER MANAGEMENT DISCIPLINES

Much of the knowledge needed to manage projects is unique or nearly unique to project management (e.g., critical path analysis and work breakdown structures). However, the PMBOK does overlap other management disciplines as illustrated in **Figure 1–2**.

General management encompasses planning, organizing, staffing, executing, and controlling the operations of an ongoing enterprise. General management also includes supporting disciplines such as computer programming, law, statistics and probability theory, logistics, and personnel. The PMBOK overlaps general management in many areas—organizational behavior, financial forecasting, and planning techniques to name just a few. Section 2.4 provides a more detailed discussion of general management.

Application areas are categories of projects that have common elements significant in such projects but not needed or present in all projects. Application areas are usually defined in terms of:

- Technical elements, such as software development, pharmaceuticals, or construction engineering.
- Management elements, such as government contracting or new product development.
- Industry groups, such as automotive, chemicals, or financial services.

Appendix E includes a more detailed discussion of project management application areas.
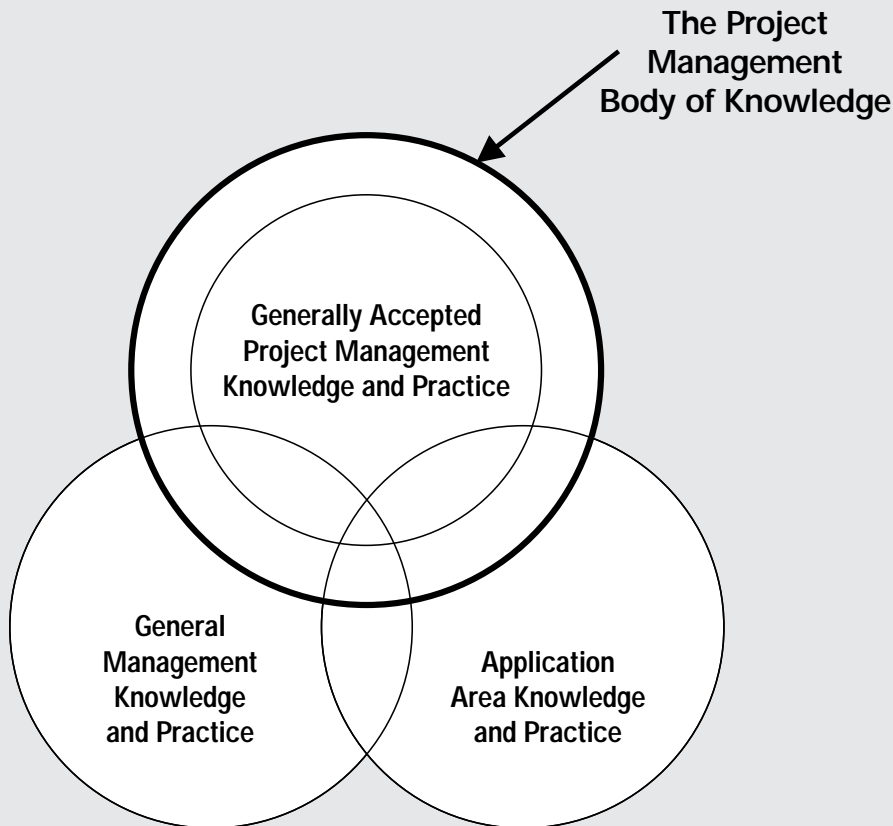
1.5 RELATED ENDEAVORS

Certain types of endeavors are closely related to projects. These related undertakings are described below.

Programs. A *program* is a group of projects managed in a coordinated way to obtain benefits not available from managing them individually [2]. Many programs also include elements of ongoing operations. For example:

- The "XYZ airplane program" includes both the project or projects to design and develop the aircraft as well as the ongoing manufacturing and support of that craft in the field.
- Many electronics firms have "program managers" who are responsible for both individual product releases (projects) and the coordination of multiple releases over time (an ongoing operation).

Figure 1–2. Relationship of Project Management to Other
Management Disciplines

**The Project
Management
Body of Knowledge**

**Generally Accepted
Project Management
Knowledge and Practice**

**General
Management
Knowledge
and Practice**

**Application
Area Knowledge
and Practice**

This figure is a conceptual view of these
relationships. The overlaps shown are not proportional.

Programs may also involve a series of repetitive or cyclical undertakings, for example:

- Utilities often speak of an annual "construction program," a regular, ongoing operation which involves many projects.
- Many non-profit organizations have a "fundraising program," an ongoing effort to obtain financial support that often involves a series of discrete projects such as a membership drive or an auction.
- Publishing a newspaper or magazine is also a program—the periodical itself is an ongoing effort, but each individual issue is a project.

In some application areas, program management and project management are treated as synonyms; in others, project management is a subset of program management. Occasionally, program management is considered a subset of project management. This diversity of meaning makes it imperative that any discussion of program management versus project management be preceded by agreement on a clear and consistent definition of each term.

Subprojects. Projects are frequently divided into more manageable components or *subprojects*. Subprojects are often contracted out to an external enterprise or to another functional unit in the performing organization. Examples of subprojects include:

- A single project phase (project phases are described in Section 2.1).
- The installation of plumbing or electrical fixtures on a construction project.
- Automated testing of computer programs on a software development project.
- High-volume manufacturing to support clinical trials of a new drug during a pharmaceutical research and development project.

However, from the perspective of the performing organization, a subproject is often thought of more as a service than as a product, and the service is unique. Thus subprojects are typically referred to as projects and managed as such.