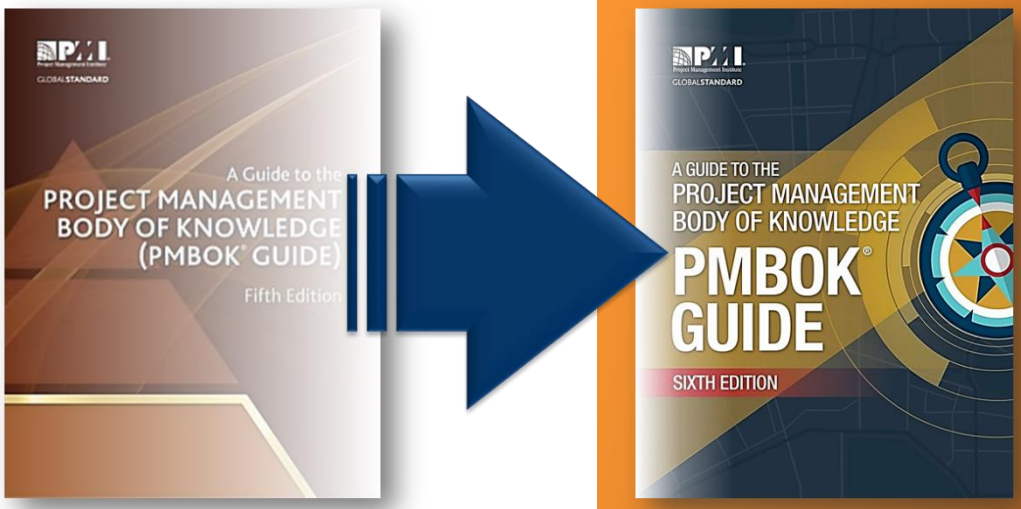
What is New in the *PMBOK Guide*® 6th Edition - an In-Depth Comparison



Contributors

Asad Naveed, PMP®, RMP®, MEF-CECP

Erjola Mimani, PMP®, PSM I

Greta Blash, MA, PMP®, PMI-ACP®, PMI-PBA®, CSM

Jason Saetrum, PMP®, ASQ® CSSBB, IASSC ATA™, MCP, Project+™ Certified

Kavya Gupta, PMP®

Oliver Yarbrough, M.S., PMP®

Samuel Odemo, B.Tech, PMP®

Steve Blash, MA, PMP®, PMI-ACP®

Varun Anand, PMP®, CSM

CONTENTS

NOTIFICATIONS

Disclaimer

The contents of this eBook are intended to assist the reader in becoming familiar with the changes from the Fifth to Sixth Edition found in the Project Management Institute's *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*. These contents are not meant to be a replacement for the *PMBOK® Guide Sixth Edition*.

Every effort has been made to confirm the accuracy of the contents of this eBook. The information contained herein is provided as an information service only and may be subject to errors, omissions, changes, withdrawals, and deletions. While the sources from which this information has been obtained are considered to be reliable, the contributors make no representations or warranties (expressed or implied) regarding, and do not guarantee the accuracy of, that information. The contributors and providers accept no legal responsibility for the contents within.

The views expressed in this eBook do not necessarily reflect that of the Project Management Institute (PMI)®. PMI® did not participate in the development of this publication. PMI® does not endorse or otherwise sponsor this publication and makes no warranty, guarantee, or representation, expressed or implied, as to its accuracy or content.

PMI®, PMBOK®, PMP®, and CAPM® are registered marks of the Project Management Institute, Inc. Images of the *PMBOK® Guide* Fifth and Sixth Editions, and the *Business Analysis for Practitioners: A Practice Guide* are property of the Project Management Institute, Inc.

In no event shall the contributors be liable for direct, indirect or incidental damages resulting from the use of the information contained herein for any purpose. The contributors claim no intellectual property to the content contained herein. The contributors' work is presented as best effort.

Content and Updates

Readers are welcome to send their suggestions for improvements, modifications, or etc. in this document to Asad Naveed (Email: asadnaveed@hotmail.com) or any of the contributors listed at the end of this eBook. Any significant, accepted contribution will be formally given credit in this document as "Reviewer."

SUMMARY OF MAJOR CHANGES

PMBOK® Guide 5th Edition to 6th Edition

In a Nutshell

The first three sections (Sections 1 – 3) of the 5th edition of the *PMBOK® Guide* have been completely revised, while relevant information in the previous editions was retained. New information reflecting the evolution of our profession as a driver of organizational change and a means of providing business value were also added.

The Sixth Edition incorporates terminology and practices that reflect the larger, more inclusive spectrum of project management practices. This is especially present in Part 1 - Section 1, where the project and development life cycles are discussed, as well as the various Predictive, Adaptive, Agile, Iterative and Incremental, and Hybrid project approaches, which are referred to throughout the Knowledge Areas.

Part 1 - Section 3 discusses the Role of the Project Manager, including topics on how project managers operate in various organizational environments and the skills and competencies that they need to be effective.

Part 1 – Sections 4 – 13 provide the detail for each knowledge area and processes.

Part 2 becomes The Standard for Project Management including an Introduction and sections for each of the five Process Groups.

Part 3 includes Appendices, Glossary and the Index. Of special note are:

- Appendix X3 – Agile, Iterative, Adaptive, and Hybrid Project Environments
- Appendix X4 – Summary of Key Concepts for Knowledge Areas
- Appendix X5 – Summary of Tailoring Considerations for Knowledge Areas
- Appendix X6 – Tools and Techniques

Process Groups

The Process Groups remain the same in the Sixth Edition

Knowledge Areas

The names of two of the Knowledge Areas have been changed slightly.

- Project Time Management is now **Project Schedule Management**, emphasizing the importance of scheduling in project management. This aligns with PMI®'s Practice Standard for Scheduling.
- Project Human Resource Management is now **Project Resource Management**, which now includes the management of both team resources and physical resources.

Processes

New Processes

There are three new processes in the Sixth Edition (49 total):

- **Manage Project Knowledge**, which is now included as part of the Executing Process Group and Project Integration Management knowledge area.
- **Implement Risk Responses**, which is now included as part of the Executing Process Group and Project Risk Management knowledge area.
- **Control Resources**, which is now included as part of the Monitoring and Controlling Process Group and Project Resource Management knowledge area.

Minor Process Changes

Estimate Activity Resources is still part of the Planning Process Group, but it is now been associated with the Project Resource Management processes instead of a process within the set of Project Schedule Management processes.

Some processes have been renamed to align the process with its intent. This reflects the overall change from project managers controlling project activities to that of monitoring the overall project activities.

The table below shows the process name changes that have been made.

PMBOK 5th Edition		PMBOK 6th Edition
Perform Quality Assurance	→	Manage Quality
Plan Human Resource Management	→	Plan Resource Management
Acquire project Team	→	Acquire Resources
Develop Project Team	→	Develop Team
Manage Project Team	→	Manage Team
Control Communications	→	Monitor Communications
Control Risks	→	Monitor Risks
Plan Stakeholder Management-	→	Plan Stakeholder Engagement
Control Stakeholder Engagement	→	Monitor Stakeholder Engagement

Deleted Process

The Close Procurement process has been removed and portions have now been moved to Control Procurements and other portions to the Close Project or Phase process.

Research shows that few project managers have the authority to formally and legally close a contract. On the other hand, project managers are responsible to determine that work is complete, records are indexed and archived, and responsibilities are transferred appropriately.

The final work associated with Close Procurements has now been included as part of the closing process.

Knowledge Area Information

The general information that was previously included at the beginning of each Knowledge Area has been organized into four sections:

Key Concepts

This section contains expanded information from that which was previously included at the beginning of each Knowledge Area.

Trends and Emerging Practices

In the past, the *PMBOK® Guide* included what was considered good practice on most projects, most of the time. Many of the recent trends in the industry were not included as they were not practiced on many projects. Some of this new information is included in the 6th Edition in this introductory portion of each Process Group and Knowledge Area, though it may not yet be reflected in the identified inputs, tools, techniques and outputs for individual processes.

Tailoring Considerations

As stated in previous editions, each project must determine which processes, and what approach is most appropriate for individual project. The Sixth Edition emphasizes the need to tailor all aspects of project management, including the processes, inputs, tools, techniques, outputs, life cycles and all others, as deemed necessary. In order to facilitate this tailoring, this section contains a list of questions to help with the tailoring of the project management aspects for each individual project.

Considerations for Agile/Adaptive Environments

The use of various aspects of agile, iterative and adaptive approaches for projects is increasing. This includes development methods, techniques, outputs and other activities and practices. Some agile terminology and techniques have been integration into specific *PMBOK® Guide* processes. The section describes specific approaches that are associated with various agile environments to help practitioners recognize and integrate these practices into their projects where it makes sense to do so.

Process Categories

Each process has been categorized by one of three descriptions:

- Processes used once or at predefined points in the project
- Processes that are done periodically as needed
- Processes that are done continuously throughout the project

These definitions were added to clear the misconception that the processes included are done in a linear manner, or that they are done only once, or done in a particular sequence. Since this is not true, it is hoped that this misconception can be corrected by emphasizing that many processes are ongoing, or only done periodically. This is further explained in Section 1.2.4.4 of the *PMBOK® Guide*.

Project Management Plan Components

In the final review draft rather than listing individual component parts of the project management plan as an input or output of a process, the entire project management plan was listed. . . In the final edition, the individual components for the project management plan that would be helpful as inputs or updated as outputs are shown in the diagrams as well as referred to in the textual description. (This is similar to the way in which the components were identified in the Third Edition). However, it is important to remember that the description of project management plan components provides examples, but it is not meant to be all-inclusive or exhaustive.

Project documents

A similar approach has been applied to project documents. The process which actually creates a project document lists that document and the individual components, as an output. n subsequent processes, the inclusive name, project documents, as well as the recommended components are identified as an input or an output. Some of these project documents are different from previous editions, once again emphasizing the need to tailor the project documents to reflect the needs of each individual project. Once again, the list of examples of project documents is not meant to be all-inclusive or exhaustive.

Lessons Learned

Project management as a profession has matured as to how knowledge and information is shared. This is reflected in the Sixth Edition with the inclusion of a new process, Manage Project Knowledge. One of the outputs from this new process is a lessons learned register, a project document that will be used as an input to many processes and updated as an output in many Executing and Monitoring and Controlling Processes Groups. At the end of a project or phase the information is transferred and becomes an Organization Process Asset referred to as a lessons learned repository.

Tools and Techniques

To support the importance of project tailoring, many tools and techniques are grouped together based on their purpose. The groups include:

- Data gathering
- Data analysis
- Decision making
- Communication
- Interpersonal and team skills
- Communication skills

When one of these groups is identified, one or more examples of specific tools or techniques may be given. As with the other inputs and outputs, the usage of these tools and techniques should be based on the needs of your project. This list is not all-inclusive or exhaustive and not all tools and techniques fall into one of these categories.

The table on the following page represents the updated version of the project framework with the *PMBOK® Guide* 6th edition changes identified:

Knowledge Areas (49 processes)	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
Project Integration Management	.1 Develop Project Charter	.2 Develop Project Management Plan	.3 Direct and Manage Project Work .4 Manage Project Knowledge	.5 Monitor and Control Project Work .6 Perform Integrated Change Control	.7 Close Project or Phase
Project Scope Management		.1 Plan Scope Management .2 Collect Requirements .3 Define Scope .4 Create WBS		.5 Validate Scope .6 Control Scope	
Project Schedule Management		.1 Plan Schedule Management .2 Define Activities .3 Sequence Activities .4 Estimate Activity Durations .5 Develop Schedule		.6 Control Schedule	
Project Cost Management		.1 Plan Cost Management .2 Estimate Costs .3 Determine Budget		.4 Control Costs	
Project Quality Management		.1 Plan Quality Management	.2 Manage Quality	.3 Control Quality	
Project Resource Management		.1 Plan Resource Management .2 Estimate Activity Resources	.3 Acquire Resources .4 Develop Team .5 Manage Team	.6 Control Resources	
Project Communications Management		.1 Plan Communications Management	.2 Manage Communications	.3 Monitor Communications	
Project Risk Management		.1 Plan Risk Management .2 Identify Risks .3 Perform Qualitative Risk Analysis .4 Perform Quantitative Risk Analysis .5 Plan Risk Responses	.6 Implement Risk Responses	.7 Monitor Risks	
Project Procurement Management		.1 Plan Procurement Management	.2 Conduct Procurements	.3 Control Procurements	
Project Stakeholder Management	.1 Identify Stakeholders	.2 Plan Stakeholder Engagement	.3 Manage Stakeholder Engagement	.4 Monitor Stakeholder Engagement	

Detailed Analysis

SECTION 1: Introduction

The *PMBOK® Guide* is a foundational reference for PMI®'s project management professional development programs and the practice of project management. It is different from a methodology

Details about key concepts, emerging trends, considerations for tailoring the project management processes, and information on tools and techniques are applied to projects. A common vocabulary is an essential element of a professional discipline and this guide, as well as *The PMI® Lexicon of Project Management Terms* incorporate terminology that can be consistently used as a part of project management practices.

The *PMI® Code of Ethics and Professional Conduct* instills confidence in the project management profession and helps an individual in making wise decisions.

The values that the global project management community defines as most important and that are the basis of the code are responsibility, respect, fairness, and honesty.

Introduction	PMBOK 5th Edition	PMBOK 6th Edition
Overview and Purpose of this Guide	**Overview Purpose of this Guide**	**Overview and Purpose of this Guide**
	.1 Introduction	.1 The Standard fpr Project Management
	.2 Purpose of the *PMBOK® Guide*	.2 Common Vocabulary
	.3 What is a Project?	.3 Code of Ethics and Professional Conduct
	.4 The Relationships Among Portfolios, Programs, and Projects	
Foundational Elements	**What is a Project?**	**Foundational Elements**
	.1 What is Project Management?	.1 Projects
	.2 Relationships Among Portfolio Management, Program Management, Project Management, and Organizational Project Management	.2The Importance of Project Management
	.3 Relationship Between Project Management, Operations Management, and Organizational Strategy	.3 Relationship of Project, Program, Portfolio, and Operations Management
	.4 Business Value	.4 Components of the Guide
		.5 Tailoring
		.6 Project Management Business Documents

Introduction

1.1 Overview and Purpose of the PMBOK® Guide

The *PMBOK® Guide* is constantly evolving but identifies a subset of project management that is generally recognized as good practice. This *PMBOK® Guide* is different from a methodology but rather a foundation upon which organizations can build methodologies, policies, procedures, rules, tools and techniques, and life cycle phases needed to perform project management

1.1.1 The Standard for Project Management

The Standard for Project Management, upon which the *PMBOK® Guide* is based, is a foundational reference for PMI®'s project management professional development programs and the practice of project management, identifying descriptive processes, rather than prescriptive practices, that are considered good practices on most projects most of the time.

This standard is a document established by an authority, custom, or general consent as a model or example. This is an American National Standards Institute (ANSI) standard and was developed based on their requirements. This standard is included as Part II of the *PMBOK® Guide*.

Two other standards that PMI® publishes include:

- The Standard for Portfolio Management, and
- The Standard for Program Management

1.1.2 Common Vocabulary

A common vocabulary is essential for a professional discipline. *The PMI® Lexicon of Project Management Terms* provides the consistent vocabulary to be consistently used by portfolio, program and project managers along with their stakeholders.

1.1.3 Code of Ethics and Professional Conduct

PMI® publishes the *Code of Ethics and Professional Conduct* to instill confidence in the project management profession and to help individuals make wise decisions. The code includes both aspirational standards and mandatory standards. Practitioners who do not conduct themselves in accordance with these standards are subject to disciplinary procedures before PMI®'s Ethics Review Committee.

1.2 Foundational Elements

This section describes foundational elements necessary for working in and understanding the discipline of project management.

1.2.1 Projects

A project is a temporary endeavor undertaken to create a unique product, service, or result.

Projects drive change in organizations to move an organization from one state to another state in order to achieve a specific objective. For more information on project management and change, refer to PMI®'s *Managing Change in Organizations: A Practice Guide*.

Projects enable business value creation, which is defined as the net quantifiable benefit derived from a business endeavor. Business value that is the result of a specific project may be tangible, intangible, or both.

Leaders in organizations initiate projects in response to factors which influence their organization's ongoing operations and business strategies to keep the organization viable. The four fundamental categories for these factors, which should ultimately link to the strategic objectives of the organization, include:

- Meet regulatory, legal or social requirements
- Satisfy stakeholder requests or needs
- Implement or change business or technological strategies; and
- Create, improve, or fix products, processes, or services

The various factors, and their relationships to the fundamental categories, are shown in Table 1-1: Examples of Factors that Lead to the Creation of a Project.

1.2.2 The Importance of Project Management

Project management enables organizations to execute projects effectively and efficiently. Effective and efficient project management should be considered a strategic competency within organizations. Effective project management helps individuals, groups and organizations, which poorly manage projects or the absence of project management results in a negative outcome.

Effective and efficient project management should be considered a strategic competency, enabling organizations to:

- Tie project results to business goals
- Compete more effectively in their markets
- Sustain the organization and
- Respond to the impact of business environment changes on projects by appropriate adjusting project management plans

1.2.3 Relationship of Project, Program, Portfolio, and Operations Management

1.2.3.1 Overview

Project management puts in place a sound foundation for organizations to achieve their goals and objectives. This may be managed through a stand-alone project, within a program, or within a portfolio. From an organizational perspective:

- Program and project management focus on doing programs and projects the "right" way
- Portfolio management focus on doing the "right" programs and projects

1.2.3.2 Program Management

Program management focuses on the interdependencies between component projects and the optimal approach for managing them. Additional information on program management is included in PMI®'s *The Standard for Program Management*.

1.2.3.3 Portfolio Management

Portfolio management focuses on ensuring that projects and programs are reviewed to prioritize resource allocation and also confirm that the portfolio is consistent with and aligned with organizational strategies. Components that comprise the portfolio are prioritized so that those contributing the most to the organization's strategic objectives have the required financial, team, and physical resources.

Additional information on portfolio management is included in PMI®'s *The Standard for Portfolio Management*.

1.2.3.4 Operations Management

Operations management is concerned with the ongoing production of goods and/or services – and is outside the scope of formal project management as described in the *PMBOK® Guide.*

1.2.3.5 Operations and Project Management

Changes in business organizations operations may be the focus of a project – especially when there are substantial changes to business operations as a result of a new product or service delivery.

Ongoing operations are outside the scope of a project, but deliverables and knowledge are transferred between the project and operations for implementation of the delivered work at the end of the project, or through a transfer of operational resources to the project at the start.

1.2.3.6 Organizational Project Management (OPM) and Strategies

Systematic management of portfolios, programs and projects through the application of organizational project management (OPM) allows for the achievement of an organization's strategic business goals. OPM ensures that the organization undertakes the right projects, allocates critical resources appropriately, and all levels in the organizations understand the strategic vision, the initiatives that support the vision, the objectives and the deliverables.

1.2.4 Components of the guide

This guide identifies and explains some of the key components that, when effectively managed, result in successful completion of a project. The interrelationship of these key components is described in Table 1-3 and are shown in Figure 1-5.

1.2.4.1 Project and Development Life Cycles

A project life cycle is a series of phases that a project passes through from its start to its completion. Project life cycles can be predictive or adaptive. Project life cycles are independent of a product life cycle. Within a project life cycle, one or more phases that are associated with the development of the product, service, or result and are referred to as development life cycles. Development life cycles can utilize various models including:

- Predictive
- Iterative
- Incremental
- Adaptive
- Hybrid

It is up to the project management team to identify the best life cycle for each project. The life cycle chosen must be flexible enough to deal with a variety of factors included in the project. Flexibility includes

- Identifying the process or processes need to be performed
- Performing processes in the appropriate phase
- Adjust various attributes of a phase

Project life cycles are independent of product life cycles where products are produced by a project.

1.2.4.2 Project Phase

A project phase is a collection of logically related project activities that culminates in the completion of one or more deliverables. These phases may be described by a variety of attributes and may be given names that indicate the type of work done in that phase. A key component used with project phases is the phase review, as referred to as a phase gate.

1.2.4.3 Phase Gate

A phase gate is held at the end of a phase to compare the project's performance and progress to project and business documents. Often a go/no-go decision on whether to continue is made as a result of this comparison review. These reviews may also examine other pertinent items which are beyond the scope of this guide.

1.2.4.4 Project Management Processes

The project life cycle is managed by executing a series of activities known as project management processes. Processes are logically linked by the outputs they produce and may contain overlapping activities that occur throughout the project.

Every process produces on or more outputs from one or more inputs by using appropriate project management tools and techniques. The output can be a deliverable or an outcome. Outcomes are an end result of a process

Processes generally fall into one or three categories:

- Processes used once or at predefined points in the project
- Processes that are performed periodically as needed

- Processes that are performed continuously throughout the project

These processes are grouped in the *PMBOK® Guide* into five categories named Process Groups.

1.2.4.5 Project Management Process Groups

Project Management Process Groups are logical grouping of project management processes to achieve specific project objectives and are independent of project phases.

Process groups are not the same as project phases.

1.2.4.6 Project Management Knowledge Areas

A Knowledge Areas is an identified area of project management defined by its knowledge requirements and described in terms of its component processes, practices, inputs, outputs, tools and techniques. Even though this guide refers to ten (10) knowledge areas, additional specific project needs may require additional knowledge areas.

The mapping between Process Groups and Knowledge areas is shown on Table 1-4 on page 25.

1.2.4.7 Project Management Data and Information

A project collects, analyses, transforms and distributes lots of data and information, in various formats, to project team members and other stakeholders. Project data is collected as a result of various processes and shared within the project team. The data is collected and analyzed in context, aggregated and transformed into information and communicated verbally, stored, or distributed in various formats as reports. The key terminology includes:

- Work performance data
- Work performance information
- Work performance reports

The flow of project data, information and reports is shown in Figure 1-7.

1.2.5 Tailoring

Project managers apply a project management methodology to their work.

A methodology is a system of practices, techniques, procedures and rules used by those in a discipline, such as project management. There is no single project management methodology that can be applied to all projects all the time to produce a successful project every time, so therefore some tailoring is necessary, and is recognized as good practice. This guide is not a methodology.

This guide and *The Standard for Project Management* are recommended references for tailoring by identifying the subset of project management body of knowledge that is generally recognized as good practice.

Tailoring is necessary because each project is unique. Tailoring includes the selection of the appropriate project management processes, inputs, tools, techniques, outputs and life cycle phases by the project management to manage every unique project.

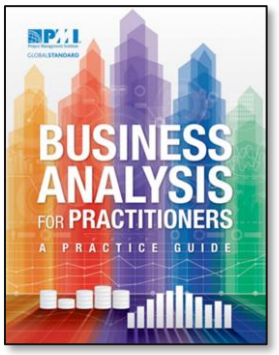
1.2.6 Project Management Business Documents

The project management approach must reflect the intent specified in business documents. These two key documents are interdependent and iteratively developed and maintained throughout the project life cycle. In many cases these documents are developed prior to starting the project, and are often used as input to justify the selection of the project by the Portfolio Management processes. The project sponsor is generally accountable for the development and maintenance of the project business case document. The project managers is responsible for providing recommendations and oversight to keep the project business case, project management plan, project charter, and project benefits management plan success measures in alignment with one another and with the goals and objectives of the organization. The interrelationship of these critical project management business documents, both pre-project and during the project life cycle, are show in Figure 1-8.

1.2.6.1 Project Business Case

The project business case documents the economic feasibility that was used to establish the validity of the project benefits and used for authorization of project management activities. It lists the objectives and reasons for project initiation and is used throughout the project life cycle.

A needs assessment often precedes the business case and is often led by a business analyst. It involves understanding business goals, and objectives, issues, and opportunities and recommends actions to address those areas. It is also used to compare the progress and results of the project at various points in the life cycle with objectives and identified success criteria. This comparison is included in PMI®'s *Business Analysis for Practitioners: A Practice Guide.*



A business case may include but not limited to documenting:

- Business needs
- Analysis of the situation
- Recommendations
- Evaluation (including the plan for measurement the benefits the project will deliver.

1.2.6.2 Project Benefits Management Plan

The project benefits management plan describes how and when the benefits of the project will be delivered, and describes how those benefits will be measured.

A project benefit is defined as an outcome of actions, behaviors, products, services or results that provide value to the sponsoring organization as well as to the project's intended beneficiaries.

These key elements are identified early in the project life cycle by defining the target benefits to be realized. They may include, but not be limited to documenting:

- Target benefits
- Strategic alignment
- Timeframe for realizing benefits
- Benefits owner
- Metrics
- Assumptions
- Risks

Developing this benefits management plan utilized data and information documented in the business case and needs assessment. This plan, along with the project management plan, describe how the business value resulting from the project becomes part of the organization's ongoing operations, including the metrics to be used. These metrics also provide verification of the business value and validation of the project's success.

The development and maintenance of this document is an iterative activity and complements the business case, project charter and project management plan and should be kept in alignment throughout the life cycle of the project by the project manager working with the sponsor.

1.2.6.3 Project Charter and Project Management Plan

The project charter is a document issued by the project sponsor and formally authorizes the existence of a project and provides the project management to apply organizational resources to project activities

The project management plan describes how the project will be executed, monitored and controlled and defines the basis of all project work

1.2.6.4 Project Success Measures

Traditionally project success was measured by metrics of time, cost, scope and quality. More recently, it has been determined that project success should be measured with consideration toward achievement of project objectives. Since stakeholders may have different ideas as to the successful completion of a project and which factors are most important, these objectives should be clearly documented and objectives that are selected are measurable.

Project success may also include additional criteria linked to the organizational strategy and the delivery of business results and agreed-upon financial measures. The project team needs to be able to assess the project situation, balance the demands and maintain proactive communication with stakeholders to deliver a successful project.

Projects may be successful from a scope/schedule/budget viewpoint, but unsuccessful from a business viewpoint if there is a change in the business needs or the market environment before the project is completed. This is one of the situations that has increased the utilizing a more adaptive approach to project delivery.

SECTION 2: The Environment in Which Projects Operate

Projects exist and operate in environments that may have an influence on them. These influences can have a favorable or unfavorable impact on the project. The two major categories of influences are enterprise environmental factors, (including both EEFs internal to the organization, and external to the organization) and organizational process assets (including processes, policies, procedures and organizational knowledge repositories). Additionally, Organizational Systems are addressed, including Organizational Governance Frameworks, Management Elements and Organizational Structure Types.

Introduction	*PMBOK® Guide* 5th Edition	*PMBOK® Guide* 6th Edition
Overview	**Organizational Influences and Project Life Cycle**	**The Environment in which Projects Operate**
	.1 Project Stakeholders and Governance	.1 Overview
	.2 Project Team	.2 Enterprise Environmental Factors
	.3 Project Life Cycle	.3 Organizational Process Assets
		.4 Organizational Systems

2.1 Overview

Projects exist and operate in environments that may have an influence on them. These influences can have a favorable or unfavorable impact on the project. The two major categories of influences are Enterprise environmental factors (EEFs) and organizational process assets (OPAs). EEFs originate from the environment outside of the project and often outside of the enterprise. OPAs are internal to the organization. These influences are show in Figure 2-1.

Organizational systems, with factors that impact the power, influence, interests, competencies and political capabilities of the people to act within those systems, also play a significant role in the life cycle of the project.

2.2 Enterprise Environmental Factors

Enterprise environmental factors refer to conditions, not under the control of the project team, that influence, constrain or direct the project. These can be internal and/or external to the organizations. They may enhance or constrain project management options and may have a positive or negative influence on the outcome of the project.

2.2.1 EEFs Internal to the Organization

EEFs that are internal to the organization include:

- Organizational culture, structure, and governance
- Geographic distribution of facilities and resources
- Infrastructure
- Information technology software
- Resource availability
- Employee capability

2.2.2 External to the Organization

EEF's that are external to the organization include:

- Marketplace conditions
- Social and cultural influences and issues
-
- Legal restrictions
- Commercial databases
- Academic research
- Government or industry standards
- Financial considerations
- Physical environmental elements

2.3 Organizational Process Assets

OPAs are the plans, processes, policies, procedures and knowledge bases specific to and used by the performing organization and have an influence on the management of the project. These include any artifact, practice or knowledge from any or all of the organizations involved in the project that can be used to perform or govern the project. Since these are internal to the organization, the project team may update or add to the organizational process assets as necessary throughout the project. They may be grouped into two categories:

- Processes, policies, and procedures – which are not updated as part of the project work, but usually established by the project management office (PMO) or another function outside of the project
- Organizational knowledge bases – which are updated throughout the project with project information (including financial performance, lessons learned, performance metrics and issues and defects)

2.3.1 Processes, Policies and Procedures

The processes and procedures that apply to how project work is conducted can be grouped based on the process groups.

Initiating and Planning:

- Guidelines and criteria for tailoring standard processes
- Specific organizations policies
- Product and project life cycles, and methods and procedures
- Templates
- Preapproved supplier lists and various types of contractual agreements

Executing, Monitoring and Controlling

- Change control procedures
- Traceability matrices
-
- Financial controls procedures
- Issues and defect management procedures
- Resource availability control and assignment management
- Organizational communication requirements
- Procedures for prioritizing, approving and issuing work authorizations
- Templates

- Standardized guidelines, work instructions, proposal evaluation criteria, and performance measurement criteria
- Product, service, or result verification and validation procedures

Closing

- Project closure guidelines or requirements

2.3.2 Organizational Knowledge Repositories

These repositories for storing and retrieving information include:

- Configuration management knowledge repositories
- Financial data repositories
- Historical information and lessons learned knowledge repositories
- Issue and defect management data repositories
- Data repositories for metrics used on processes and product
- Project files from previous projects

2.4 Organizational Systems

2.4.1 Overview

For projects to operate effectively and efficiently within the constraints imposed by the organization through their structure and governance framework, it is necessary for the project manager to understand where responsibility, accountability and authority reside within the organization. The organizational system determines the power, influence, competence, leadership and political capabilities of the people who can act within the system. These system factors include, but are not limited to:

- Management elements
- Governance frameworks
- Organizational structure types

The complete information regarding these factors and how the combined factors impact a project is beyond the scope of this guide

Systems, in general, are a collect of various components that together can produce results not obtainable by the individual components alone. A component is an identifiable element with the project or organization that provides a particular function or group of related functions, and is the responsibility of the organization's management. The interaction of the various system components creates the organizational culture and capabilities. Several principles regarding systems include:

- Systems are dynamic
- Systems can be optimized
- System components can be optimized
- Systems and components cannot be optimized at the same time
- Systems are nonlinear in responsiveness (a change in the input does not produce a predictable change in the output.

Multiple changes may occur within the system and between the system and its environment, causing adaptive behavior to occur within the components that in turn add to the system's dynamics, defined by the interaction based on relationships and dependencies that exist between components.

Systems are typically the responsibility of an organization's management. As optimization trade-offs between the components and the system are examined, actions may be taken to achieve the best outcomes for the organization. These changes may impact the project and therefore it is important for the project manager to take these results, as well as the organization's governance framework, into consideration when determining how the project will fulfill its objectives.

2.4.2 Organizational Governance Frameworks

Governance refers to organizational or structure arrangements at all levels of an organization designed to determine and influence the behavior of the organization's members. This includes consideration of people, roles, structures and policies and requires direction and oversight through data and feedback.

2.4.2.1 Governance Framework

Project governance is the framework within which authority is exercised in organizations. This framework includes, but is not limited to:

- Rules
- Policies
- Procedures
- Norms
- Relationships
- Systems
- Processes

This framework influences how:

- Objectives of the organization are set and achieved
- Risk is monitored and assessed
- Performance is optimized

2.4.2.2 Governance of Portfolios, Programs, and Projects

Project governance refers to the framework, functions and processes that guide project management activities in order to create a unique product, service, or result to meet organizational, strategic, and operational goals. There is no one governance framework that fits all organization, and thus should be tailored to the organizational culture, types of projects, and the needs of the organization to be effective.

Each function has associated process and activities for both stand-along projects or projects within portfolio or program environments. These are described in PMI®'s *Governance of Portfolios, Programs, and Projects: A Practice Guide*. This practice guide describes a common governance framework aligning organization project management (OPM) and portfolio, program and project management. This guide describes four governance domains:

- Alignment
- Risk
- Performance
- Communications

Each function has governance supporting processes and activities for stand-alone projects, or projects operating within the portfolio or program environments

2.4.3 Management Elements

Management elements are the components that comprise the key functions or general management principles of the organization. Management elements include:

- Division of work using specialized skills and availability to perform work
- Authority given to perform work
- Responsibility to perform work appropriately assigned based on such attributes as skill and experience
- Discipline of action
- Unity of command
- Unity of direction
- General goals of the organization take precedence over individual goals
- Paid fairly for work performed
- Optimal use of resources
- Clear communication channels
- Right materials to the right person for the right job at the right time
- Fair and equal treatment of people in the workplace
- Clear security of work positions
- Safety of people in the workplace
- Open contribution to planning and execution by teach person
- Optimal morale

Performance of these management elements are assigned to selected individuals within the organization and within various organizational structure.

2.4.4 Organizational Structure Types

There is not a one-size-fits-all organizational structure but rather the result of the analyzing the tradeoffs between the organizational structure type available for use and how to optimize them for a given organization.

2.4.4.1 Organizational Structure Types

Organizational structures take many forms or types and each influence a project differently, especially as regards the authority of the project manager. Comparison of the various types of organizational structures and their influence on projects is shown in Table 2-1.

Organizational structure types can include:

- Organic or Simple (flexible)
- Functional (centralized)
- Multidivisional with replication for each division with little centralization
- Matrix – strong
- Matrix – weak
- Matrix – balanced
- Project-oriented (composite, hybrid)
- Virtual
- Hybrid
- PMO (Portfolio, program, or project management office or organization)

2.4.4.2 Factors in Organization Structure Selection

Factors to consider in selecting an organization structure include:

- Degree of alignment with organizational objectives
- Specialization capabilities
- Span of control efficiency and effectiveness
- Clear path for escalation of decisions
- Clear line and scope of authority
- Delegation capabilities
- Accountability assignment
- Responsibility assignment
- Adaptability of design
- Simplicity of design
- Efficiency of performance
- Cost considerations
- Physical locations
- Clear communication

2.4.4.3 Project Management Office

The project management office (PMO) is a management structure that standardizes the project-related governance processes and facilitates the sharing or resources, methodologies, tools and techniques. The primary function of a PMO is to support project managers. The various types of PMOs vary in the degree of control and influence on projects within the organization, such as:

- Supportive
- Controlling
- Directive

A PMO may have the authority to act as an integral stakeholder and a key decision maker throughout the life of each project in order to keep it aligned with the business objectives. The PMO may:

- Make recommendations
- Lead knowledge transfer
- Terminate projects
- Take other actions, as required

The primary function of a PMO is to support project managers in a variety of ways, which may include but are not limited to:

- Managing shared resources across all projects administered by the PMO
- Identifying and developing project management methodology, best practices, and standards
- Coaching, mentoring, training, and oversight
- Monitoring compliance with project management standards, policies, procedures, and templates by means of project audits
- Developing and managing project policies, procedures, templates and other shared documentation (organizational process assets)
- Coordinating communication across projects

SECTION 3: The Role of the Project Manager

The Project Manager plays a critical role in the leadership of a project team to achieve the project's objectives.

Introduction	*PMBOK® Guide* 5th Edition	*PMBOK® Guide* 6th Edition
Project Manager	**Project Management Process Interactions**	**The Role of the Project Manager**
	.1 Project Information	.1 Overview
	.2 Role of the Knowledge Areas	.2 Definition of a Project Manager
		.3 The Project Manager's Sphere of Influence
		.4 Project Manager Competencies
		.5 Performing Integration

3. The Role of the Project Manager

3.1 Overview

The role of a project manager may vary from organization to organization and is often tailored to fit the business. Project managers become involved in a project from its initiation to its closing, and, in some organizations, may also be involved in the evaluation and analysis activities prior to project initiation. The project manager may also manage or assist in business analysis, business case development, and aspects of portfolio management as well as being involved in follow-on activities related to realizing business benefits from the project. The role includes:

- Membership and roles
- Responsibility for team
- Knowledge and skills

3.2 Definition of a Project Manager

The role of a project manager is distinct from that of a functional manager or operations managers. The project manager is assigned by the performing organization to lead the team that is responsible for achieving the project objectives. Operations managers are responsible for ensuring that business operations are efficient.

3.3 The Project Manager's Sphere of Influence

3.3.1 Overview

Project managers fulfil numerous roles within their sphere of influence. These roles reflect the capabilities of the project manager and represent the value and contributions of the project management profession. The roles of the project manager in the various sphere of influence are shown in Figure 3-1.

3.3.2 The Project

The project manager leads the project team to meet the project's objectives and satisfy the project stakeholders, while balancing the various constraints with the resources available. Also included is communicating with the project sponsor, team members, and stakeholders. Soft skills are used to balance conflicting and competing goals to achieve consensus. Project managers are able to distinguish themselves by having superior relationship and communication skills.

The ability to communicate applies across multiple aspects of the project including, but not limited to, the following:

- Developing finely tuned skills using multiple methods
- Creating, maintaining, and adhering to communications plans and schedules
- Communicating predictably and consistently
- Seeking to understand the project stakeholders' communication needs
- Making communications concise, clear, complete, simple, relevant and tailored
- Including important positive and negative news
- Incorporating feedback channels
- Relationship skills involving the development of extensive networks of people

3.3.3 The Organization

Project managers proactively interact with other project managers who manage other independent projects or projects that are part of the same program. These interactions may impact because of

- Demands on the same resources
- Priorities of funding
- Receipt or distribution of deliverables
- Alignment of project goals and objectives with those of the organization

Project managers also works with project managers within the organization during the project, including the project sponsor to create a positive influence for fulfilling the various needs of the project. These needs may include human, technical or financial resources and deliverables required by the team for project completion.

The project manager maintains a strong advocacy role within the organization, proactively interacting with managers within the organization and the sponsor to address internal political and strategic issues that may impact the team or the project.

The project manager works toward increasing the project management competency and capability within the organization and is involved in both tacit and explicit knowledge transfer or integration initiatives. The project manager also works to:

- Demonstrate the value of project management
- Increase acceptance of project management in the organization

- Advance the efficacy of the PMO when one exists in the organization

Depending on the organizational structure the project may report to various organizational managers, but also must work closely and in collaboration with other roles in the organization.

3.3.4 The Industry

The project manager must stay informed about current industry trends and how they might impact or apply to current projects. These include:

- Product and technology development
- New and changing market niches
- Standards
- Technical support tools
- Economic forces that impact the immediate project
- Influences affect the project management discipline
- Process improvement and sustainability strategies

3.3.5 Professional Discipline

Knowledge and development is ongoing in the project management profession and continuing knowledge transfer and integration is very important. This knowledge transfer and integration includes;

- Contribution of knowledge and expertise to others within the profession at the local, national, and global levels
- Participation in continuing education and development in the profession itself, in a related profession or in other professions

3.3.6 Across Disciplines

A professional project manager may choose to orient and educate other professional regarding the value of a project management approach to the enterprise by serving as information ambassador, educating the enterprise on the advantages of project management including timeliness, quality, innovation and resource management.

3.4 Project Manager Competencies

3.4.1 Overview

The PMI® Talent Triangle™, shown in Figure 3-2, focuses on the three key skill sets needed by project managers including

- Technical project management
- Leadership
- Strategic and business management

Even though technical skills are core to project management, companies are seeking added skills in leadership and business intelligence. These competencies can enhance the ability to support longer-range strategic objectives that contribute to the bottom line.

To be most effective, project managers need to have a balance of these three skill sets.

3.4.2 Technical Project Management Skills

Technical project management skills are the skills to effectively apply project management knowledge to deliver the desired outcomes for programs or projects. Several key skills that top project managers consistently demonstrate include:

- Focus on critical project management elements, including having the right artifacts readily available
- Tailor both traditional and agile tools, techniques, and methods for each project
- Make time to plan thoroughly and prioritize diligently
- Managing project elements, including schedule, cost, resources and risk

3.4.3 Strategic and Business Management Skills

Strategic and business management skills involve the ability to see the high-level overview of the organization and effectively negotiate and implement decisions and actions that support strategic alignment and innovation. This ability may include a working knowledge of other functions such as finance, marketing and operations. Strategic and business management skills may also include developing and applying pertinent product and industry expertise and is known as domain knowledge. Project managers should be knowledgeable enough about the business to be able to:

- Explain to others the essential business aspects of a project
- Work with the project sponsor, team and subject matter experts (SMEs) to develop an appropriate project delivery strategy
- Implement that strategy in a way that maximizes the business value of the project

Project managers should seek out and consider the expertise of the operational managers who run the business to make the best decisions regarding the successful delivery of their projects. The more the project manager is able to know about the project's subject matter, the better. At a minimum, the project manager should be able to explain the following aspects of the organization:

- Strategy
- Mission
- Goals and objectives
- Products and services
- Operations
- The market and market conditions
- Competitions

To ensure project alignment with the organization, the project manager should apply the following knowledge and information about the organization to the project:

- Strategy
- Mission
- Goals and objectives
- Priority
- Tactics
- Products or services

Strategic and business skills help the project manager determine which business factors should be considered for the project and how they could affect the project. These factors include:

- Risks and issues
- Financial implications
- Cost versus benefit analysis
- Business value
- Benefits realization expectations and strategies
- Scope, budget, schedule, and quality

Through the application of business knowledge, a project manager has the ability to make the appropriate decisions and recommendations for a project. As conditions change, the project manager and sponsor must work to keep the business and project strategies aligned.

3.4.4 Leadership Skills

Leadership skills involve the ability to guide, motivate, and direct a team. These skills may include essential capabilities such as negotiation, resilience, communication, problem solving, critical thinking and interpersonal skills. Project management is more than just working with numbers, templates, charts, graphs, and computing systems – but about people.

3.4.4.1 Dealing with People

A large part of the project manager's role involves dealing with people and the project manager should strive to be a good leader. Leadership skills and qualities are applied to work with all project stakeholders, including the project team, the steering committee team and project sponsor.

3.4.4.2 Qualities and Skills of a Leader

Qualities and skills of a leader includes

- Being a visionary
- Being optimistic and positive
- Being collaborative
- Managing relationships and conflict
- Communication
-
- Being respectful, courteous, friendly, kind, honest, trustworthy, loyal, and ethical
- Exhibiting integrity and being culturally sensitive, courageous, a problem solver, and decisive
- Being a life-long learner who is results- and action-oriented
- Focusing on the important things
- Having a holistic and systemic view of the project
- Being able to apply critical thinking
- Being able to build effective teams, be service-oriented, and have fun and share humor effectively with team members

3.4.4.3 Politics, Power, and getting Things Done

Leadership and management are ultimately about being able to get things done and achieving the project goals and objectives. The root of many skills and qualities is the ability to deal with politics. The more the project manager understands how the organization works, the better the chance to be successful.

The manager must select the right kind of power to influence and negotiate with others. Project managers must be proactive and intentional when it comes to power. They will work to acquire the power and authority needed within the boundaries of organizational policies, protocols, and procedures rather than waiting for that power and authority to be granted.

There are numerous forms of power including:

- Positional
- Informational
- Referent
- Situational
- Personal or charismatic
- Relational
- Expert
- Reward-oriented
- Punitive or coercive
- Ingratiating
- Pressure-based
- Guilt-based
- Persuasive
- Avoiding

3.4.5 Comparison of Leadership and Management

Leadership and management, even though often used interchangeably, are not synonymous.

"Managing" is closely associated with directing another person to get from one point to another using a known set of expected behaviors. "Leadership" involves working with others through discussion or debate in order to guide them from one point to another. Project managers need to employ both leadership and management in order to be successful but must choose the right balance for each situation.

The comparison of Team Management and Team Leadership is shown in Table 3-1.

3.4.5.1 Leadership Styles

The leadership style a project manager select may be a personal preference, or the result of the combination of multiple factors associated with the project, and may change over time based on factors including:

- Leader characteristics
- Team member characteristics
- Organizational characteristics
- Environmental characteristics

Some of the most common examples of these styles include, but are not limited to:

- Laissez-faire
- Transactional
- Servant leader
- Transformational
- Charismatic
- Interactional

3.4.5.2 Personality

Personality refers to the individual differences in characteristic patterns of thinking, feeling, and behaving. Each project, organization and situation requires that the project manager emphasize different aspects of personality including:

- Authentic
- Courteous
- Creative
- Cultural
- Emotional
- Intellectual
- Managerial
- Political
- Service-oriented
- Social
- Systemic

3.5 Performing Integration

The role of the project manager is twofold when performing integration on the project

- Working with the project sponsor to understand the strategic objectives and ensure the alignment of the project objects and results with those of the portfolio, program and business areas and therefore contribute to the execution of the integration of the strategy
- Responsible for convincing everyone on the team to work in the same direction and focus on what is essential at the project level

3.5.1 Performing Integration at the Process Level

Project management includes a set of processes and activities that are done to achieve project objectives. It is critical that the project manager understands how to integrate the various project processes and where they interact. Even though there is no specific definition as to how to integrate the project processes, if the project management fails to integrate the project processes where they interact there is a small change of meeting the project's objectives.

3.5.2 Integration at the Cognitive Level

There are many ways to manage a project and the method selected depends on the specific characteristics of project including its size, how complicated either the project or organization may be, and the culture of the performing organization. The personal skills and abilities of the project manager are closely related to how the project is managed.

In addition to becoming proficient in all Project Management Knowledge Areas, the project manager should also apply experience, insight, leadership, and technical and business management skills to the project. By integrating all of these abilities and processes it is possible to achieve the desired project results

3.5.3 Integration at the Context Level

Project managers must be cognizant of the new context in which business and projects exist today and be able to decide how best to use these new elements to achieve success. These include new technologies, social network, multicultural aspects, virtual teams and new values. These implications must be considered when planning communications and the knowledge management requirements for guiding the project team. Project managers then must decide how to best use these new elements of the environment in each project to achieve success.

3.5.4 Integration and Complexity

Complexity in a project is the result of the organization's system behavior, human behavior and the uncertainty within the organization or its environment. The three dimensions of complexity as defined in PMI®'s *Navigating Complexity: A Practice Guide* are:

- System behavior
- Human behavior
- Ambiguity

Complexity itself is perceived based on an individual's personal experience, observation, and skills. Rather than a project being complex, it contains complexities. A project is more accurately described as containing elements of complexity include:

- Containing multiple parts
- Possessing a number of connections between the parts
- Exhibiting dynamic interactions between the parts
- Exhibit behavior produced as a result of those interactions that cannot be explained as the simple sum of the parts (emergent behavior)

Examining these various items that appear to add to the complexity of the project should help the project manager identify key areas when planning, managing and controlling the project to ensure integration.

Overview of Major Changes: SECTIONS 4 – 13

Additional Sections

In addition to the information for each Knowledge Area and processes included in the 5th Edition of the PMBOK, a few new sections have been added. These include:

- Project management trends and emerging practices that cover what is considered a good practice on most projects. These are new project management trends that are described in this section and may not be reflected in the process inputs, tools, techniques and outputs.

- Tailoring considerations emphasizing the necessity of modify the processes, inputs, tools and techniques, outputs, life cycles and all other aspects of project management. This section also contains a list of questions to help project managers tailor their approach to their project.

- Approaches in agile, iterative and adaptive environments have been increasing in many more projects. Some agile techniques have been integrated into this version of the PMBOK Guide. This section describes specific approaches that are aligned with agile environments to help project managers identify and integrate these practices into their projects where it makes sense to do so.

Input and Output Changes

In many of the processes, the inputs from the 5th edition, which included the subsidiary project management plans or specific project documents, were combined into the overall Project Management Plan or Project Documents. The specific component items that are applicable, but not limited to, have now been noted in the changes to the specific items for each process below.

Project Management Plan Components

Another change from previous editions is that the Sixth Edition mentions the project management plan as an input or output of a process, rather than listing individual component parts of the project management plan. The process by which a project management plan component is developed lists that component as an output. In other processes, it is listed as a project management plan component. In the text, there is a description of some of the common components that can be helpful as inputs or updated as outputs; however, please keep in mind that the list provides examples only, and is not meant to be all- inclusive or exhaustive.

Project Documents

A similar approach has been applied to project documents. The process in which a project document is created lists the document as an output. Thereafter, individual documents may be noted under the inclusive heading of project documents identified as an input or an output.

Some of the project documents are different from those in previous editions. This underscores the need to tailor the appropriate project documents based on the needs of a specific project. Again, the list of examples is not meant to be all-inclusive or exhaustive.

SECTION 4: Project Integration Management

Project Integration Management includes the process and activities to identify, define, combine, unify and coordinate the various processes and project management activities within the Project Management Process Groups. This includes making choices about:

- Resource allocation
- Balancing competing demands
- Examining any alternative approaches
- Tailoring the processes to meet the project objectives
- Managing the interdependencies among the Project Management Knowledge Areas

4.1 Develop Project Charter

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Initiating	**4.1 Develop Project Charter**	**4.1 Develop Project Charter**
Inputs	~~.1 Project statement of work~~	**.1 Business Documents**
	~~.2 Business case~~	.2 Agreements
	.3 Agreements	.3 Enterprise environmental factors
	.4 Enterprise environmental factors	.4 Organizational process assets
	.5 Organizational process assets	
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	~~.2 Facilitation techniques~~	**.2 Data gathering**
		.3 Interpersonal and team skills
		.4 Meetings
Outputs	.1 Project charter	.1 Project charter
		.2 Assumption log

New Inputs:

Business Documents: These documents include, but are not limited to:

a. Business Case – describes the necessary information to determine whether the expected outcomes of the project justify the required investment

Clarification: Even though Agreements are not new to this edition, it is important to remember that they represent a general grouping of project documents that define initial intentions for the project.

New Tools:

Data Gathering: This includes techniques, many of which were previously referred to as Facilitation Techniques, which can be used for this process, but are not limited to:

a. Brainstorming – identifies a list of ideas in a short period of time; comprises two parts: idea generation and analysis
b. Focus Groups – bring together stakeholders and subject matter experts to learn about the perceived project risk, success criteria, and other topics in a more conversational way than a one-on-one interview
c. Interviews – obtain information on high-level requirements, assumptions or constraints, approval criteria, and other information from stakeholders by talking directly to them

Interpersonal and Team Skills: These skills that can be used for this process include, but are not limited to:

a. Conflict Management – helps bring stakeholders into alignment on the objectives, success criteria, high-level requirements, project description, summary milestones, and other elements of the charter
b. Facilitation – ability to effectively guide a group event to a successful decision, solution, or conclusion
c. Meeting Management – includes preparing the agenda, ensuring that a representative for each key stakeholder group is invited, and preparing and sending the follow-up minutes and actions

Meetings: They are held with key stakeholders to identify the project objectives, success criteria, key deliverables, high-level requirements, summary milestones, and other summary information.

New Outputs:

Assumption Log: This log records all assumptions and constraints throughout the project life cycle.

4.2 Develop Project Management Plan

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**4.2 Develop Project Management Plan**	**4.2 Develop Project Management Plan**
Inputs	.1 Project charter	.1 Project charter
	.2 Outputs from other processes	.2 Outputs from other processes
	.3 Enterprise environmental factors	.3 Enterprise environmental factors
	.4 Organizational process assets	.4 Organizational process assets
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	~~.2 Facilitation techniques~~	**.2 Data gathering**
		.3 Interpersonal and team skills

		.4 Meetings
Outputs	.1 Project management plan	.1 Project management plan

New Inputs: None

New Tools:

Data Gathering: This includes activities, many of which were previously referred to as Facilitation Techniques, which can be used for this process, but are not limited to:

a. Brainstorming – gathers ideas and solutions about the project approach Checklists – guides the project manager to develop the plan or helps verify that all the required information is included in the project management plan
b. Focus Groups – bring together stakeholders to discuss the project management approach and the integration of the different components of the project management plan
c. Interviews – obtain specific information from stakeholders to develop the project management plan or any component plan or project document

Interpersonal and Team Skills: These skills include, but are not limited to:

a. Conflict Management – brings diverse stakeholders into alignment on all aspects of the project management plan
b. Facilitation – ensures that there is effective participation, that participants achieve a mutual understanding, that all contributors are considered, and that conclusions or results have full buy-in according to the decision process established for the project
c. Meeting Management – ensures that the numerous meetings that are necessary to develop, unify, and agree on the project management plan are well run

Meetings: These are used for, but are not limited to:

a. Discuss the project approach
b. Determine how work will be executed to accomplish the project objectives
c. Establish the way the project will be monitored and controlled

The project kick-off meeting is very specific to this process to communicate the objectives of the project, gain commitment of the team for the project, and explain the roles and responsibilities of each stakeholder

New Outputs: None

4.3 Direct and Manage Project Work

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
	4.3 Direct and Manage Project Work	**4.3 Direct and Manage Project Work**
Inputs	.1 Project management plan	.1 Project management plan
	.2 Approved Change requests	**.2 Project documents**
	.3 Enterprise environmental factors	.3 Approved change requests
	.4 Organizational process assets	.4 Enterprise environmental factors
		.5 Organizational process assets
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	.2 Project management information system	.2 Project management information system
	.3 Meetings	.3 Meetings
Outputs	.1 Deliverables	.1 Deliverables
	.2 Work performance data	.2 Work performance data
	.3 Change requests	**.3 Issue log**
	.4 Project management plan updates	.4 Change requests
	.5 Project documents updates	.5 Project management plan updates
		.6 Project documents updates
		.7 Organizational process assets updates

New Inputs:

Project Documents: The project documents for this process include, but are not limited to:

a. Change log – contains the status of all change requests
b. Lessons learned register – improve the performance of the project and to avoid repeating mistakes
c. Milestone list – shows the scheduled dates for specific milestones
d. Project Communications – include performance reports, deliverable status, and other information generated by the project
e. Project Schedule – includes at least the list of work activities, their durations, resources, and planned start and finish dates
f. Requirements traceability matrix – links product requirements to the deliverables that satisfy them and helps to focus on the final outcomes
g. Risk register – provides information on threats and opportunities that may impact project execution
h. Risk report – provides information on sources of overall project risk along with summary information on identified individual project risks

New Tools: None

New Outputs:

Issue Log: This is a project document where all the issues are recorded and tracked.

Organizational Process Assets Updates: This includes updates to any organizational process asset in this process.

4.4 Manage Project Knowledge

New Process:

Manage Project Knowledge: Process of using existing knowledge and creating new knowledge to achieve the project's objectives and contribute to organizational learning.

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Executing		**4.4 Manage Project Knowledge**
Inputs		**.1 Project management plan**
		.2 Project documents
		.3 Deliverables
		.4 Enterprise environmental factors
		.5 Organizational process assets
Tools & Techniques		**.1 Expert judgment**
		.2 Knowledge management
		.3 Information management
		.4 Interpersonal and team skills
Outputs		**.1 Lessons learned register**
		.2 Project management plan updates
		.3 Organizational process assets updates

New Inputs:

Project Management Plan: This includes all components of the project management plan.

Project Documents: The project documents for this process include, but are not limited to:

a. Lessons learned register – provides information on effective practices in knowledge management
b. Project team assignments – provide information on the type of competencies and experience available in the project and the knowledge that may be missing
c. Resource breakdown structure – includes information on the composition of the team and may help understand what knowledge is available as a group and what knowledge is missing
d. Stakeholder register – contains details about the identified stakeholders to help understand the knowledge they may have

Deliverables: Any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project

Enterprise Environmental Factors: Factors that can influence this process include, but are not limited to:

a. Organization, stakeholder, and customer culture
b. Personnel administration
c. Geographic distribution of facilities and resources
d. Organizational knowledge experts
e. Project Schedule
f. Legal and regulatory requirements and/or constraints

Organizational Process Assets: The assets that can influence this process include, but are not limited to:

a. Organizational standard policies, processes, and procedures
b. Personal administration
c. Organizational communication requirements
d. Formal knowledge-sharing and information-sharing procedures

New Tools:

Expert Judgement: Expertise should be considered from individuals or groups with specialized knowledge or training in the following topics:

a. Knowledge management
b. Information management
c. Organizational learning
d. Knowledge and information management tools
e. Relevant information from other projects

Knowledge Management: Tools and techniques which connect people, face-to-face or virtually, or both, so they can work together to create new knowledge, share tacit knowledge, and integrate the knowledge of diverse team members include, but are not limited to:

a. Networking
b. Communities of practice and special interest groups
c. Meetings
d. Work shadowing and reverse shadowing
e. Discussion forums such as focus groups
f. Knowledge-sharing events such as seminars and conferences

g. Workshops, including problem-solving sessions and learning reviews designed to identify lessons learned
h. Storytelling
i. Creativity and ideas management techniques
j. Knowledge fairs and cafes
k. Training involving interaction between learners

Information Management: The tools and techniques used to create and connect people to information in order to share simple, unambiguous, codified explicit knowledge for this process include, but are not limited to:

a. Methods for codifying explicit knowledge
b. Lessons learned register
c. Library services
d. Information gathering
e. Project management information system (PMIS)

Interpersonal and Team Skills: The skilled used for this process include, but are not limited to:

a. Active listening – helps reduce misunderstandings and improves communication and knowledge sharing
b. Facilitation – helps to effectively guide a group to a successful decision, solution, or conclusion
c. Leadership – used to communicate the vision and inspire the project team to focus on the appropriate knowledge and knowledge objectives
d. Networking – allows informal connections and relations among project stakeholders to be established and creates the conditions to share tacit and explicit knowledge
e. Political awareness – helps the project manager to plan communications based on the project environment as well as the organization's political environment

New Outputs:

Lessons Learned Register: It can include the category and description of the situation. It may also include its impact, recommendations, and proposed actions. The lessons learned register records challenges, problems, and successes beginning early in the project and updated throughout the project

Project Management Plan Updates: Changes to the project management plan should go through the organization's change control process via a change request. Any component of the project management plan may be updated as a result of this process

Organizational Process Assets Updates: All projects create new knowledge and some of which is codified, embedded in deliverables, or embedded in improvements to processes and procedures as a result of this process and can update existing assets as a result of this process

---

4.5 Monitor and Control Project Work

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Monitoring and Controlling	**4.4 Monitor and Control Project Work**	**4.5 Monitor and Control Project Work**
Inputs	.1 Project management plan	.1 Project management plan
	~~.2 Schedule forecasts~~	**.2 Project documents**
	~~.3 Cost forecasts~~	.3 Work performance information
	~~.4 Validated changes~~	**.4 Agreements**
	.5 Work performance information	.5 Enterprise environmental factors
	.6 Enterprise environmental factors	.6 Organizational process assets
	.7 Organizational process assets	
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	~~.2 Analytical techniques~~	**.2 Data analysis**
	~~.3 Project management information system~~	**.3 Decision making**
	.4 Meetings	.4 Meetings
Outputs	.1 Change requests	.1 Work performance reports
	.2 Work performance reports	.2 Change requests
	.3 Project management plan updates	.3 Project management plan updates
	.4 Project documents updates	.4 Project documents updates

New Inputs:

Project Documents: The project documents for this process include, but are not limited to:

a. Assumption log (described in 4.1.3.2)
b. Basis of estimates (described in 6.4.3.2)
c. Cost forecasts (described in 7.4.3.2)
d. Issue log (described in 4.3.3.3)
e. Lessons learned register (described in 4.4.3.1)
f. Milestone list (described in 6.2.3.3)
g. Quality reports (described in 8.2.3.1)
h. Risk register (described in 11.2.3.1)
i. Risk report (described in 11.2.3.2)
j. Schedule forecasts (described in 6.6.3.2)

Agreements: Procurement agreements include terms and conditions, and may incorporate other items that the buyer specifies regarding what the seller is to perform or provide. The project manager needs to oversee any contracted work to make certain that all agreements meet the specific needs of the project while adhering to organization procurement policies

New Tools:

Data Analysis: Techniques that can be used for this process include, but are not limited to:

a. Alternatives analysis (described in 9.2.2.5)
b. Cost-benefit analysis (described in 8.1.2.3)
c. Earned value analysis (described in 7.4.2.2)
d. Root cause analysis (described in 8.2.2.2)
e. Trend analysis – used to forecast future performance based on past results
f. Variance analysis – reviews the differences (or variances) between planned and actual performance

Decision Making: Technique that can be used for this process include, but are not limited to, voting. Voting can include making decisions based on:

a. Unanimity
b. Majority
c. Plurality

New Outputs: None

4.6 Perform Integrated Change Control

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Monitoring and Controlling	**4.5 Perform Integrated Change Control**	**4.6 Perform Integrated Change Control**
Inputs	.1 Project management plan	.1 Project management plan
	.2 Work performance reports	**.2 Project documents**
	.3 Change requests	.3 Work performance reports
	.4 Enterprise environmental factors	.4 Change requests
	.5 Organizational process assets	.5 Enterprise environmental factors
		.6 Organizational process assets
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	.2 Meetings	.2 Change control tools

	.3 Change control tools	**.3 Data analysis** **.4 Decision making** .5 Meetings
Outputs	.1 Approved change requests ~~.2 Change log~~ .3 Project management plan updates .4 Project documents updates	.1 Approved change requests .2 Project management plan updates .3 Project documents updates

New Inputs:

Project Documents: The project documents for this process include, but are not limited to:

a. Basis of estimates (described in 6.4.3.2)
b. Requirements traceability matrix (described in 5.2.3.2)
c. Risk report (described in 11.2.3.2)

New Tools:

Data Analysis: The techniques that can be used for this process include, but are not limited to:

a. Alternatives analysis (described in 9.2.2.5)
b. Cost-benefit analysis (described in 8.1.2.3)

Decision Makings: Techniques that can be used for this process include, but are not limited to:

a. Voting (described in 5.2.2.4)
b. Autocratic decision making – one individual takes the responsibility for making the decision for the entire group
c. Multicriteria decision making (described in 8.1.2.4), which uses a decision matrix to provide a systematic analytical approach to evaluate according to a set of predefined criteria

New Outputs: None

4.7 Close Project or Phase

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Closing	**4.6 Close Project or Phase**	**4.7 Close Project or Phase**
Inputs	.1 Project management plan	**.1 Project charter**
	.2 Accepted deliverables	.2 Project management plan
	.3 Organizational process assets	**.3 Project documents**
		.4 Accepted deliverables
		.5 Business documents
		.6 Agreements
		.7 Procurement documentation
		.8 Organizational process assets
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	~~.2 Analytical techniques~~	.2 **Data analysis**
	.3 Meetings	.3 Meetings
Outputs	.1 Final product, service, or result transition	.1 Project documents updates
	.2 Organizational process assets updates	**.2 Final product, service, or result transition**
		.3 Final report
		.4 Organizational process assets updates

New Inputs:

Project Charter: This documents the project success criteria, the approval requirements, and who will sign off on the project

Project Documents: The project documents for this process include, but are not limited to:

a. Assumptions log (described in 4.1.3.2)
b. Basis of estimates (described in 7.2.3.2
c. Change log (described in 4.6.3.3)
d. Issue log (described in 4.5.3.3)
e. Lessons learned register (described in 4.3.3.1)
f. Milestone list (described in 6.2.3.3)
g. Project communications (described in 10.2.3.1)
h. Quality control measurements (described in 8.3.3.1)
i. Quality reports (described in 8.2.3.1)
j. Requirements documentation (described in 5.2.3.1)
k. Risk register (described in 11.2.3.1)

l. Risk report (described in 11.2.3.2)

Business Documents: The business documents for this process include, but are not limited to:

a. Business case
b. Benefits management plan

Agreements: These include the requirements for formal procurement closure and are usually defined in the terms and conditions of the contract and are included in the procurement management plan

Procurement Documentation: To close a contract, all procurement documentation is collected, indexed and filed. Contract information that should be considered includes, but are not limited to:

a. Contract schedule, scope, quality and cost performance
b. Contract change documentation
c. Payment records
d. Inspection results
e. "As-built" plans/drawings or "as-developed" documents, manuals, troubleshooting and other technical documentation

New Tools:

Data Analysis: The techniques that can be used for this process include, but are not limited to:

a. Document analysis (described in 5.2.2.3)
b. Regression analysis – analyzes the interrelationships between different project variables that contributed to the project outcomes to improve performance on future projects
c. Trend analysis (described in 4.5.2.2)
d. Variance analysis (described in 4.5.2.2)

New Outputs:

Project Documents Updates: The project documents that can be updated as a result of this process include, but are not limited to the lessons learned register. This final lessons learned register may include information on:

a. Benefits management
b. Accuracy of the business case
c. Project and development life cycles
d. Risk and issue management
e. Stakeholder engagement
f. Other project management processes

Final Report: The final report provides a summary of the project performance and can include:

a. Summary level description of the project or phase
b. Scope objectives

c. Quality objectives
d. Cost objectives
e. Summary of the validation information for the final product, service, or result
f. Schedule objectives
g. Summary of how the final product, service, or result achieved the business needs
h. Summary of any risks or issues encountered on the project and how they were addressed

---

SECTION 5: Project Scope Management

5.1 Plan Scope Management

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**5.1 Plan Scope Management**	**5.1 Plan Scope Management**
Inputs	.1 Project management plan	.1 Project charter
	.2 Project charter	.2 Project management plan
	.3 Enterprise environmental factors	.3 Enterprise environmental factors
	.4 Organizational process assets	.4 Organizational process assets
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	.2 Meetings	.2 Data analysis
		.3 Meetings
Outputs	.1 Scope management plan	.1 Scope management plan
	.2 Requirements management plan	.2 Requirements management plan

New Inputs: None

New Tools:

Data Analysis: The techniques that can be used for this process include, but are not limited to alternatives analysis. Evaluation is done of various way of:

a. Collecting and eliciting requirements
b. Elaborating the project and product scope
c. Creating the product
d. Validating the scope
e. Controlling the scope

New Outputs: None

5.2 Collect Requirements

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**5.2 Collect Requirements**	**5.2 Collect Requirements**
Inputs	~~.1 Scope management plan~~	.1 Project charter
	~~.2 Requirements management plan~~	.2 Project management plan
	~~.3 Stakeholder management plan~~	.3 Project documents
	.4 Project charter	.4 Business documents
	~~.5 Stakeholder register~~	.5 Agreements
		.6 Enterprise environmental factors
		.7 Organizational process assets
Tools & Techniques	~~.1 Interviews~~	.1 Expert judgment
	~~.2 Focus groups~~	.2 Data gathering
	~~.3 Facilitated workshops~~	.3 Data analysis
	~~.4 Group creativity techniques~~	.4 Decision making
	~~.5 Group decision making techniques~~	.5 Data Representation
	~~.6 Questionnaires & surveys~~	.6 Interpersonal and team skills
	~~.7 Observations~~	.7 Context diagram
	.8 Prototypes	.8 Prototypes
	~~.9 Benchmarking~~	
	.10 Context diagrams	
	~~.11 Document analysis~~	
Outputs	.1 Requirements documentation	.1 Requirements documentation
	.2 Requirements traceability matrix	.2 Requirements traceability matrix

New Inputs:

Project Management Plan: The portions of this document specifically applicable to this process include, but are not limited to:

a. Scope management plan (described in 5.1.3.1)
b. Requirements management plan (described in 5.1.3.2)
c. Stakeholder engagement plan (described in 13.2.3.1)

Project Documents: The project documents for this process include, but are not limited to:

a. Assumptions log (described in 4.1.3.2)
b. Lessons learned register (described in 4.3.3.1)
c. Stakeholder register (described in 13.1.3.1)

Business Documents: The business documents for this process includes the business case, which can define required, desired, and non-mandatory criteria for meeting the business needs

Agreements: Will have both project and product requirements.

Enterprise Environment Factors: The factors that can influence this process include, but are not limited to:

a. Organization's culture
b. Infrastructure
c. Personnel administration
d. Marketplace conditions

Organizational Process Assets: The assets that can influence this process include, but are not limited to:

a. Policies and procedures
b. Historical information
c. Lessons learned repository

New Tools:

Expert Judgment: Expert knowledge is considered from individuals/groups with specialized knowledge or training in the following topics:

a. Business analysis
b. Requirements elicitation
c. Requirements analysis
d. Project requirements in previous similar projects
e. Diagramming techniques
f. Facilitation
g. Conflict management

Data Gathering: This includes activities, previously referred to as Facilitation or Group Creativity Techniques, which can be used for this process, but are not limited to:

a. Brainstorming (described in 4.1.2.2)
b. Interviews
c. Focus groups
d. Questionnaires and surveys
e. Benchmarking (described in 8.1.2.2)

Data Analysis: The techniques that can be used for this process include, but are not limited to:

a. Document analysis – including techniques often utilized by business analysts, but not limited to:
    - Agreements
    - Business plans
    - Business process or interface documentation
    - Business rules repositories
    - Current process flows
    - Marketing literature
    - Problem/issue logs
    - Policies and procedures
    - Regulatory documentation such as laws, codes, or ordinances
    - Requests for proposal
    - Use cases

Decision Makings: Techniques that can be used for this process include, but are not limited to:

a. Voting: This is further divided into following:
    i. Unanimity: Everyone have to agree to a decision
    ii. Majority: More than 50% have to agree
    iii. Plurality: The option with largest votes wins. It is not necessary that largest vote is majority.
b. Autocratic Decision Making: One person is responsible to take a decision.
c. Multi-criteria decision making: In order to reach to a decision, the project team has to consider multiple criteria. These multiple criteria are used to rank these ideas.

Data Representation: Techniques that can be used for this process include, but are not limited to:

a. Affinity Diagram: The stakeholders identify large number of ideas and similar ideas are grouper together.
b. Mind Mapping: The stakeholders identify large number of ideas through the process of backtracking.

Interpersonal and Team Skills: The skilled used for this process include, but are not limited to:

a. Nominal group Technique: Initially the stakeholders do brainstorming session and then do voting to reach to a decision.
b. Observation/conversation, also known as “job shadowing”
c. Facilitation (described in 4.1.2.3) skills used, but are not limited to
    - Joint application design/development (JAD)
    - Quality function deployment (QFD)
    - User stories

New Outputs: None

5.3 Define Scope

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**5.3 Define Scope**	**5.3 Define Scope**
Inputs	~~.1 Scope management plan~~	.1 Project charter
	.2 Project charter	.2 Project management plan
	~~.3 Requirements documentation~~	.3 Project documents
	.4 Organizational process assets	.4 Enterprise environmental factors
		.5 Organizational process assets
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	.2 Product analysis	.2 Data analysis
	~~.3 Alternatives generation~~	.3 Decision making
		.4 Interpersonal and team skills
	~~.4 Facilitated workshops~~	.5 Product analysis
Outputs	.1 Project scope statement	.1 Project scope statement
	.2 Project documents updates	.2 Project documents updates

New Inputs:

Project Management Plan: The component of this document that can be helpful in this process includes, but is not limited to:

a. Scope management plan which documents how the project cope will be defined, validated and controlled.

Project Documents: The project documents for this process include, but are not limited to:

a. Assumptions log (described in 4.1.3.2)
b. Requirements documentation (described in 5.2.3.1)
c. Risk Register (described in 11.2.3.1)

Enterprise Environmental Factors: Factors that can influence this process include, but are not limited to:

a. Organization's culture
b. Infrastructure
c. Personnel administration
d. Marketplace conditions

New Tools:

Data Analysis: The techniques that can be used for this process include, but are not limited to alternatives analysis.

Decision Makings: Techniques that can be used for this process include, but are not limited to:

a. Multicriteria decision analysis (described in 8.1.2.4)

Interpersonal and Team Skills: The skill used for this process include, but is not limited to facilitation (described in 4.1.2.3).

New Outputs: None

5.4 Create WBS

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**5.4 Create WBS**	**5.4 Create WBS**
Inputs	~~.1 Scope management plan~~	.1 Project management plan
	~~.2 Project scope statement~~	.2 Project documents
	~~.3 Requirements documentation~~	.3 Enterprise environmental factors
	.4 Enterprise environmental factors	.4 Organizational process assets
	.5 Organizational process assets	
Tools & Techniques	.1 Decomposition	.1 Expert judgment
	.2 Expert judgment	.2 Decomposition
Outputs	.1 Scope baseline	.1 Scope baseline
	.2 Project documents updates	.2 Project documents updates

New Inputs:

Project Management Plan: The component of this document that can be helpful in this process includes, but is not limited to:

a. Scope management plan which documents how the WBS will be created from the project scope statement and how the WBS will be maintained and approved

Project Documents: The project documents for this process include, but are not limited to:

a. Project scope statement (described in 5.3.3.1)

b. Requirements documentation (described in 5.2.3.1)

New Tools: None

New Outputs: None

5.5 Validate Scope

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Monitoring and Controlling	**5.5 Validate Scope**	**5.5 Validate Scope**
Inputs	.1 Project management plan	.1 Project management plan
	~~.2 Requirements documentation~~	.2 Project documents
	~~.3 Requirements traceability matrix~~	.3 Verified Deliverables
	.4 Verified deliverables	.4 Work performance data
	.5 Work performance data	
Tools & Techniques	.1 Inspection	.1 Inspection
	~~.2 Group decision-making techniques~~	.2 Decision making
Outputs	.1 Accepted deliverables	.1 Accepted deliverables
	.2 Change requests	.2 Work performance information
	.3 Work performance information	.3 Change requests
	.4 Project documents updates	.4 Project documents updates

New Inputs:

Project Documents: The project documents for this process include, but are not limited to:

a. Quality reports (described in 8.2.3.1)
b. Lessons learned register (described in 4.4.3.1)
c. Requirements documentation (described in 5.2.3.1)
d. Requirements traceability matrix (described in 5.2.3.2)

New Tools:

Decision Making: This technique is the same as the previously named Group Decision Making Techniques and refers to the various ways that voting can be utilized to reach a conclusion.

New Outputs: None

5.6 Control Scope

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Monitoring and Controlling	**5.6 Control Scope**	**5.6 Control Scope**
Inputs	.1 Project management plan	.1 Project management plan
	~~.2 Requirements documentation~~	.2 Project documents
	~~.3 Requirements traceability matrix~~	.3 Work performance data
	.4 Work performance data	.4 Organizational process assets
	.5 Organizational process assets	
Tools & Techniques	~~.1 Variance analysis~~	.1 Data analysis
Outputs	.1 Work performance information	.1 Work performance information
	.2 Change requests	.2 Change requests
	.3 Project management plan updates	.3 Project management plan updates
	.4 Project documents updates	.4 Project documents updates
	~~.5 Organizational process assets updates~~	

New Inputs:

Project Documents: The project documents for this process include, but are not limited to:

a. Lessons learned register (described in 4.4.3.1)
b. Requirements documentation (described in 5.2.3.1)
c. Requirements traceability matrix (described in 5.2.3.2)

New Tools:

Data Analysis: The techniques that can be used for this process include, but are not limited to:

a. Variance analysis (described in 4.5.2.2)
b. Trend analysis (described in 4.5.2.2)

New Outputs: None

SECTION 6: Project Schedule Management (Formerly Project Time Management)

Project scheduling provides a detail plan that represents how and when the project will deliver the products, services and results defined in the project scope and serves as a tool for communication, managing stakeholders' expectations, and as a basis for performance reporting.

6.1 Plan Schedule Management

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**6.1 Plan Schedule Management**	**6.1 Plan Schedule Management**
Inputs	.1 Project management plan	.1 Project charter
	.2 Project charter	.2 Project management plan
	.3 Enterprise environmental factors	.3 Enterprise environmental factors
	.4 Organizational process assets	.4 Organizational process assets
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	~~.2 Analytical techniques~~	.2 Data analysis
	.3 Meetings	.3 Meetings
Outputs	.1 Schedule management plan	.1 Schedule management plan

New Inputs: None

New Tools:

Data Analysis: The techniques that can be used for this process include, but are not limited to alternatives analysis. This can include:

a. Determining which schedule methodology to use, or how to combine various methods
b. Determining how detailed the schedule needs to be
c. The duration of waves for rolling wave planning
d. How often it should be reviewed and updated

New Outputs: None

6.2 Define Activities

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**6.2 Define Activities**	**6.2 Define Activities**
Inputs	~~.1 Schedule management plan~~	. Project management plan
	~~.2 Scope baseline~~	.2 Enterprise environmental factors
	.3 Enterprise environmental factors	.3 Organizational process assets
	.4 Organizational process assets	
Tools & Techniques	.1 Decomposition	.1 Expert judgment
	.2 Rolling wave planning	.2 Decomposition
	.3 Expert judgment	.3 Rolling wave planning
		.4 Meetings
Outputs	.1 Activity list	.1 Activity list
	.2 Activity attributes	.2 Activity attributes
	.3 Milestone list	.3 Milestone list
		.4 Change requests
		.5 Project management plan updates

New Inputs:

Project Management Plan: The component of this document that can be helpful in this process includes, but is not limited to:

a. Schedule management plan (described in 6.1.3.1) to define the schedule methodology, the duration of waves for rolling wave planning and the level of detail necessary to manage the work
b. Scope baseline (described in 5.4.3.1)

New Tools:

Meetings: These may be face-to-face, virtual, formal, or informal. It may be held with team members or subject matter experts to define activities needed to complete the work.

New Outputs:

Change Requests: Once the project has been baselined, the progressive elaboration of deliverables into activities may reveal work that was not initially part of the project baselines.

Thus, resulting in a change request, which are processed for review and disposition through the Perform Integrated Change Control process.

Project Management Plan Updates: Any change to the project management plan should go through the organization's change control process via a change request. Components that may require a change request as a result of this process include, but are not limited to:

a. Schedule baseline (described in 6.5.3.1)
b. Cost baseline (described in 7.3.3.1)

6.3 Sequence Activities

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**6.3 Sequence Activities**	**6.3 Sequence Activities**
Inputs	~~.1 Schedule management plan~~	.1 Project management plan
	~~.2 Activity list~~	.2 Project documents
	~~.3 Activity attributes~~	.3 Enterprise environmental factors
	~~.4 Milestone list~~	.4 Organizational process assets
	~~.5 Project scope statement~~	
	.6 Enterprise environmental factors	
	.7 Organizational process assets	
Tools & Techniques	.1 Precedence diagramming method (PDM)	.1 Precedence diagramming method
	.2 Dependency determination	.2 Dependency determination and integration
	.3 Leads and lags	.3 Leads and lags
		.4 Project management information system
Outputs	.1 Project schedule network diagrams	.1 Project schedule network diagrams
	.2 Project documents updates	.2 Project documents updates

New Inputs:

Project Management Plan: The components of this document that can be helpful in this process include, but is not limited to:

a. Schedule management plan (described in 6.1.3.1)
b. Scope baseline (described in 5.4.3.1)

Project Documents: The project documents that can be helpful in this process include, but are not limited to:

a. Activity attributes (described in 6.2.3.2)
b. Activity list (described in 6.2.3.1)
c. Assumption log (described in 4.1.3.2)
d. Milestone list (described in 6.2.3.3)

New Tools:

Project Management Information System: Includes scheduling software that has the capability to:

a. Help plan, organize and adjust the sequence of the activities
b. Insert the logical relationships, leads and lags
c. Differentiate the different types of dependencies

New Outputs: None

Estimate Activity Resources (5th Ed – Moved)

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**6.4 Estimate Activity Resources**	
Inputs	.1 Schedule management plan	(Moved to Resource Management)
	.2 Activity list	
	.3 Activity attributes	
	.4 Resource calendars	
	.5 Risk register	
	.6 Activity cost estimates	
Tools & Techniques	.1 Expert judgment	(Moved to Resource Management)
	.2 Alternative analysis	
	.3 Published estimating data	
	.4 Bottom-Up estimating	
	.5 Project management software	
Outputs	.1 Activity resource requirements	(Moved to Resource Management)

	.2 Resource breakdown structure	
	.3 Project documents updates	

New Inputs: (Moved to Resource Management)

New Tools: (Moved to Resource Management)

New Outputs: (Moved to Resource Management)

6.4 Estimate Activity Durations

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**6.5 Estimate Activity Durations**	**6.4 Estimate Activity Durations**
Inputs	~~.1 Schedule management plan~~	.1 Project management plan
	~~.2 Activity list~~	.2 Project documents
	~~.3 Activity attributes~~	.3 Enterprise environmental factors
	~~.4 Activity resource requirements~~	.4 Organizational process assets
	~~.5 Resource calendars~~	
	~~.6 Project scope statement~~	
	~~.7 Risk register~~	
	~~.8 Resource breakdown structure~~	
	.9 Enterprise environmental factors	
	.10 Organizational process assets	
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	.2 Analogous estimating	.2 Analogous estimating
	.3 Parametric estimating	.3 Parametric estimating
	.4 Three-point estimating	.4 Three-point estimating
	~~.5 Group decision-making techniques~~	.5 Bottom-up estimating
	~~.6 Reserve analysis~~	.6 Data analysis
		.7 Decision making
		.8 Meetings

Outputs	~~.1 Activity duration estimates~~	.1 Duration estimates
	.2 Project documents updates	.2 Basis of estimates
		.3 Project documents updates

New Inputs:

Project Management Plan: The component of this document that can be helpful in this process includes, but is not limited to:

a. Schedule management plan (described in 6.1.3.1) which defines the method used, as well as the level of accuracy and other criteria required to estimate activity duration.
b. Scope baseline (described in 5.4.3.1) includes the WBS dictionary, which contains technical details that influence the effort and duration estimates.

Project Documents: The project documents for this process include, but are not limited to:

a. Activity attributes (described in 6.2.3.2)
b. Activity list (described in 6.2.3.1)
c. Assumption log (described in 4.1.3.2)
d. Lessons learned register (described in 4.4.3.1)
e. Milestone list (described in 6.2.3.3)
f. Project team assignments (described in 9.3.3.1)
g. Resource breakdown structure (described in 9.2.3.3)
h. Resource calendars (described in 9.2.1.2)
i. Resource requirements (described in 9.2.3.1)
j. Risk register (described in 11.2.3.1)

New Tools:

Bottom-up Estimating: A method of estimating project duration or cost by aggregating the estimates of the lower-level components of the WBS.

Data Analysis: The techniques that can be used for this process include, but are not limited to:

a. Alternatives analysis
b. Reserve analysis

Meetings: These sessions may be used to estimate activity durations. When using an agile approach, they are usually done during a sprint or iteration planning meeting to discuss and prioritize product backlog items to determine which of these items the team will commit to work on in the upcoming iteration.

New Outputs:

Duration Estimates: These are quantitative assessments of the likely number of time periods that are required to complete an activity, phase or a project. They may include some indication of the range of possible results or probability of meeting the estimate.

Basis of Estimates: The detail that can be used to support this process may include, but is not limited to:

a. Documentation of the basis of the estimate, or how it was developed
b. Documentation of all assumptions made
c. Documentation of any known constraints
d. Indication of the range of possible estimates
e. Indication of the confidence level of the final estimate
f. Documentation of the individual project risks influencing this estimate

---

6.5 Develop Schedule

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**6.6 Develop Schedule**	**6.5 Develop Schedule**
Inputs	~~.1 Schedule management plan~~	.1 Project management plan
	~~.2 Activity list~~	.2 Project documents
	~~.3 Activity attributes~~	.3 Agreements
	~~.4 Project schedule network Diagrams~~	.4 Enterprise environmental factors
	~~.5 Activity Resource requirements~~	.5 Organizational process assets
	~~.6 Resource calendars~~	
	~~.7 Activity duration estimates~~	
	~~.8 Project scope statement~~	
	~~.9 Risk register~~	
	~~.10 Project staff assignments~~	
	~~.11 Resource breakdown structure~~	
	.12 Enterprise environmental factors	
	.13 Organizational process assets	
Tools & Techniques	.1 Schedule network analysis	.1 Schedule network analysis
	.2 Critical path method	.2 Critical path method

	~~.3 Critical chain method~~	.3 Resource optimization
	.4 Resource optimization ~~techniques~~	.4 Data analysis
	.5 Modeling techniques	.5 Lead and lags
	.6 Lead and lags	.6 Schedule compression
	.7 Schedule compression	.7 Project management information system
	~~.8 Scheduling tool~~	.8 Agile release planning
Outputs	.1 Schedule baseline	.1 Schedule baseline
	.2 Project schedule	.2 Project schedule
	.3 Schedule data	.3 Schedule data
	.4 Project calendars	.4 Project calendars
	.5 Project management plan updates	.5 Change requests
	.6 Project documents updates	.6 Project management plan updates
		.7 Project documents updates

New Inputs:

Project Management Plan: The components of this document that can be helpful in this process includes, but are not limited to:

a. Schedule management plan (described in 6.1.3.1)
b. Scope baseline (described in 5.4.3.1)

Project Documents: The project documents for this process include, but are not limited to:

a. Activity attributes (described in 6.2.3.2)
b. Activity list (described in 6.2.3.1)
c. Assumption log (described in 4.1.3.2)
d. Basis of estimates (described in 6.4.3.2)
e. Duration estimates (described in 6.4.3.1)
f. Milestone list (described in 6.2.3.3)
g. Lessons learned register (described in 4.4.3.1)
h. Project schedule network diagrams (described in 6.3.3.1)
i. Project team assignments (described in 9.3.3.1)
j. Resource calendars (described in 9.2.1.2)
k. Resource requirements (described in 9.2.3.1)
l. Risk register (described in 11.2.3.1)

Agreements: Documents from sellers or vendors with details of how they will perform the project work to meet contractual commitments.

New Tools:

Data Analysis: The techniques that can be used for this process include, but are not limited to:

a. What-if scenario analysis
b. Simulation

Project Management Information system: Includes scheduling software that expedites the process of building a schedule model by generating start and finish dates based on the inputs of activities, network diagrams, resources, and activity durations.

Agile Release Planning: This provides a high-level summary timeline of the release schedule (typically three to six months) based on the product roadmap and the product vision for the product's evolution. It also determines the number of iterations or sprints in the release, and allows the product owner and team to decide how much needs to be developed and how long it will take to have a releasable product based on business goals, dependencies, and impediments.

New Outputs:

Change Requests: Modifications to the project scope or project schedule may result in change requests to the scope baseline, and/or other components of the Project management plan. However, they are processed for review and disposition through the Perform Integrated Change Control process.

6.6 Control Schedule

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Monitoring and Controlling	**6.7 Control Schedule**	**6.6 Control Schedule**
Inputs	.1 Project management plan	.1 Project management plan
	~~.2 Project schedule~~	.2 Project documents
	.3 Work performance data	.3 Work performance data
	~~.4 Project calendars~~	.4 Organizational process assets
	~~.5 Schedule data~~	
	.6 Organizational process assets	
Tools & Techniques	~~.1 Performance reviews~~	.1 Data analysis
	~~.2 Project management software~~	.2 Critical path method
	.3 Resource optimization ~~techniques~~	.3 Project management information system

	~~.4 Modeling techniques~~	.4 Resource optimization
	.5 Lead and lags	.5 Lead and lags
	.6 Schedule compression	.6 Schedule compression
	~~.7 Scheduling tool~~	
Outputs	.1 Work performance information	.1 Work performance information
	.2 Schedule forecasts	.2 Schedule forecasts
	.3 Change requests	.3 Change requests
	.4 Project management plan updates	.4 Project management plan updates
	.5 Project documents updates	.5 Project documents updates
	~~.6 Organizational process assets updates~~	

New Inputs:

Project Documents: The project documents for this process include, but are not limited to:

a. Lessons learned register (described in 4.4.3.1)
b. Project calendars (described in 6.5.3.4)
c. Project schedule (described in 6.5.3.2)
d. Resource calendars (described in 9.2.1.2)
e. Schedule data (described in 6.5.3.3)

New Tools:

Data Analysis: The techniques that can be used for this process include, but are not limited to:

a. Earned value analysis (described in 7.4.2.2)
b. Iteration burndown chart
c. Performance reviews
d. Trend analysis (described in 4.5.2.2)
e. Variance analysis
f. What-if scenario analysis (described in 6.5.2.4)

Critical Path Method: Compares the progress along the critical path to determine schedule status, since any variance on that path will have a direct impact on the project end date (described in 6.5.2.2). In addition, evaluating the progress of activities near critical paths can identify schedule risk.

Project Management Information System: This include scheduling software that provides the ability to track planned dates versus actual dates, to report variances to and progress made against the schedule baseline, and to forecast the effects of changes to the project schedule model.

New Outputs: None

SECTION 7: Project Cost Management

7.1 Plan Cost Management

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**7.1 Plan Cost Management**	**7.1 Plan Cost Management**
Inputs	.1 Project management plan	.1 Project charter
	.2 Project charter	.2 Project management plan
	.3 Enterprise environmental factors	.3 Enterprise environmental factors
	.4 Organizational process assets	.4 Organizational process assets
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	~~.2 Analytical techniques~~	.2 Data analysis
	.3 Meetings	.3 Meetings
Outputs	.1 Cost management plan	.1 Cost management plan

New Inputs: None

New Tools:

Data Analysis: The techniques that can be used for this process includes, but is not limited to, alternatives analysis. This can be used for:

a. Reviewing strategic funding options such as self-funding, funding with equity, or funding with debt
b. Consider ways to acquire project resources such as making, purchasing, renting or leasing

New Outputs: None

7.2 Estimate Costs

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**7.2 Estimate Costs**	**7.2 Estimate Costs**
Inputs	~~.1 Cost management plan~~	.1 Project management plan
	~~.2 Human resource management plan~~	.2 Project documents
	~~.3 Scope baseline~~	.3 Enterprise environmental factors
	~~.4 Project schedule~~	.4 Organizational process assets
	~~.5 Risk register~~	
	.6 Enterprise environmental factors	
	.7 Organizational process assets	
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	.2 Analogous estimating	.2 Analogous estimating
	.3 Parametric estimating	.3 Parametric estimating
	.4 Bottom-Up estimating	.4 Bottom-Up estimating
	.5 Three-point estimating	.5 Three-point estimating
	~~.6 Reserve analysis~~	.6 Data analysis
	~~.7 Cost of quality~~	.7 Project management information system
	~~.8 Project management software~~	.8 Decision making
	~~.9 Vendor bid analysis~~	
	~~.10 Group decision-making techniques~~	
Outputs	.1 ~~Activity~~ cost estimates	.1 Cost estimates
	.2 Basis of estimates	.2 Basis of estimates
	.3 Project documents updates	.3 Project documents updates

New Inputs:

Project Management Plan: The components of this document that can be helpful in this process include, but are not limited to:

a. Cost management plan (described in 7.1.3.1)
b. Quality management plan (described in 8.1.3.1)
c. Scope baseline (described in 5.4.3.1), including the Project scope statement, the WBS and the WBS dictionary

Project Documents: The project documents for this process include, but are not limited to:

a. Lessons learned register (described in 4.4.3.1)
b. Project schedule (described in 6.5.3.2)
c. Resource requirements (described in 9.2.3.1)
d. Risk register (described in 11.2.3.1)

New Tools:

Data Analysis: The techniques that can be used for this process include, but are not limited to:

a. Alternatives analysis
b. Reserve analysis
c. Cost of quality

Project Management Information System: This can include spreadsheets, simulation software and statistical analysis tools to assist with cost estimating, thus simplifying and facilitating rapid consideration of cost estimate alternatives.

Decision Making: The technique that can be used for this process includes, but is not limited to voting (described in 5.2.2.4).

New Outputs: None

7.3 Determine Budget

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**7.3 Determine Budget**	**7.3 Determine Budget**
Inputs	~~.1 Cost management plan~~	.1 Project management plan
	~~.2 Scope baseline~~	.2 Project documents
	~~.3 Activity cost estimates~~	.3 Business documents
	~~.4 Basis of Estimates~~	.4 Agreements
	~~.5 Project schedule~~	.5 Enterprise environmental factors
	~~.6 Resource calendars~~	.6 Organizational process assets
	~~.7 Risk register~~	

	.8 Agreements	
	.9 Organizational process assets	
Tools & Techniques	.1 Cost aggregation	.1 Expert judgment
	~~.2 Reserve analysis~~	.2 Cost aggregation
	.3 Expert judgment	.3 Data analysis
	.4 Historical relationships	.4 Historical relationships
	.5 Funding limit reconciliation	.5 Funding limit reconciliation
		.6 Financing
Outputs	.1 Cost baseline	.1 Cost baseline
	.2 Project funding requirements	.2 Project funding requirements
	.3 Project documents updates	.3 Project documents updates

New Inputs:

Project Management Plan: The components of this document that can be helpful in this process include, but are not limited to:

a. Cost management plan (described in 7.1.3.1)
b. Resource management plan (described in 9.1.3.1)
c. Scope baseline (described in 5.4.3.1)

Project Documents: The project documents for this process include, but are not limited to:

a. Basis of estimates (described in 6.4.3.2)
b. Cost estimates (described in 7.2.3.1)
c. Project schedule (described in 6.5.3.2)
d. Risk register (described in 11.2.3.1)

Business Documents: The business documents for this process include, but are not limited to:

a. Business case
b. Benefit management plan

Enterprise Environmental Factors: The factor that can influence this process include, but are not limited to exchange rates. For large-scale projects that extend multiple years with multiple currencies, the fluctuations of currencies need to be understood and built into this process.

New Tools:

Data Analysis: The technique that can be used for this process includes, but is not limited to reserve analysis, which can establish the management reserves for the project.

Financing: This entails acquiring funding for projects. For long-term infrastructure, industrial, and public services project, it is common to seek external sources of funds. However, such funding entity may have certain requirements that are required to be met.

New Outputs: None

7.4 Control Costs

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Monitoring and Controlling	**7.4 Control Costs**	**7.4 Control Costs**
Inputs	.1 Project management plan	.1 Project management plan
	.2 Project funding requirements	.2 Project documents
	.3 Work Performance Data	.3 Project funding requirements
	.4 Organizational process assets	.4 Work performance data
		.5 Organizational process assets
Tools & Techniques	~~.1 Earned value management~~	.1 Expert judgment
	~~.2 Forecasting~~	.2 Data analysis
	.3 To-complete performance index ~~(TCPI)~~	.3 To-complete performance index
	~~.4 Performance reviews~~	.4 Project management information system
	~~.5 Project management software~~	
	~~.6 Reserve analysis~~	
Outputs	.1 Work performance information	.1 Work performance information
	.2 Cost forecasts	.2 Cost forecasts
	.3 Change requests	.3 Change requests
	.4 Project management plan updates	.4 Project management plan updates
	.5 Project documents updates	.5 Project documents updates
	~~.6 Organizational process assets updates~~	

New Inputs:

Project Documents: The project documents for this process include, but are not limited to the lessons learned register (described in 4.4.3.1)

New Tools:

Expert Judgment: Examples that can be used for this process include, but are not limited to:

a. Variance analysis
b. Earned value analysis
c. Forecasting
d. Financial analysis

Data Analysis: The techniques that can be used for this process include, but are not limited to:

a. Earned value analysis (described in 7.4.2.2), including planned value (PV), earned value (EV) and actual cost (AC)
b. Variance analysis (described in 4.5.2.2), including schedule variance (SV), cost variance (CV), schedule performance index (SPI), and cost performance index (CPI)
c. Trend analysis (described in 4.5.2.2), including charts showing the three EVM dimensions (PV, EV, and AC) and forecasting for estimate at completion (EAC) that may differ from the budget at completion (BAC) based on the project performance
d. Reserve analysis (described in 7.2.2.6)

Project Management Information system: These are often used to monitor the three EVM dimensions (PV, EV, and AC), to display graphical trends, and to forecast a range of possible final project results.

New Outputs: None

SECTION 8: Project Quality Management

8.1 Plan Quality Management

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**8.1 Plan Quality Management**	**8.1 Plan Quality Management**
Inputs	.1 Project management plan	.1 Project charter
	~~.2 Stakeholder register~~	.2 Project management plan
	~~.3 Risk register~~	.3 Project documents
	~~.4 Requirements documentation~~	.4 Enterprise environmental factors
	.5 Enterprise environmental factors	.5 Organizational process assets
	.6 Organizational process assets	
Tools & Techniques	~~.1 Cost-benefit analysis~~	.1 Expert judgment
	~~.2 Cost of quality~~	.2 Data gathering
	~~.3 Seven basic quality tools~~	.3 Data analysis
	~~.4 Benchmarking~~	.4 Decision making
	~~.5 Design of experiments~~	.5 Data representation
	~~.6 Statistical sampling~~	.6 Test and inspection planning
	~~.7 Additional quality planning tools~~	.7 Meetings
	.8 Meetings	
Outputs	.1 Quality management plan	.1 Quality management plan
	~~.2 Process improvement plan~~	.2 Quality metrics
	.3 Quality metrics	.3 Project management plan updates
	~~.4 Quality checklists~~	.4 Project documents updates
	.5 Project documents updates	

New Inputs:

Project Charter: This high-level document contains the following information that will influence the quality management of the project including, but not limited to:

a. High-level project description
b. Product characteristics

c. Project approval requirements
d. Measurable project objectives
e. Related success criteria

Project Documents: The project documents for this process include, but are not limited to:

a. Assumption Log (described in 4.1.3.2)
b. Requirements documentation (described in 5.2.3.1)
c. Requirements traceability matrix (described in 5.2.3.2)
d. Risk register (described in 11.2.3.1)
e. Stakeholder register (described in 13.1.3.1)

New Tools:

Expert Judgment: Experts should be considered with specialized knowledge or training in the following topics:

a. Quality assurance
b. Quality control
c. Quality measurements
d. Quality improvements
e. Quality systems

Data Gathering: This includes activities which can be used for this process, but are not limited to:

a. Benchmarking: Comparing actual or planned project practices.
b. Brainstorming (described in 4.1.2.2)
c. Interviews (described in 5.2.2.2)

Data Analysis: This includes activities which can be used for this process, but are not limited to:

a. Cost-benefit analysis
b. Cost of quality, including prevent, appraisal and failure (internal/external) costs

Decision Making: This includes techniques which can be used for this process, but are not limited to multi-criteria decision analysis which can be used to identify key issues and suitable alternatives to be prioritized as a set of decisions for implementations. They are used in this process to help prioritize quality metrics.

Data representation:

a. Flowcharts
b. Logical data model
c. Matrix diagrams
d. Mind mapping

Test and Inspection Planning: This technique is used to determine how to test or inspect the product, deliverable, or service to meet the stakeholders' needs and expectations. Various types of tests include:

a. Alpha and beta tests in software projects
b. Strength tests in construction projects
c. Inspections in manufacturing
d. Field tests
e. Nondestructive tests in engineering

New Outputs:

Project Management Plan Updates: Any change to the project management plan should go through the organization's change control process via a change request. Components that may require a change request may include, but are not limited to:

a. Risk management plan including decisions as to the greed-upon approach to managing risk
b. Scope baseline if specific quality management activities need to be added

---

8.2 Manage Quality

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Executing	**8.2 Perform Quality Assurance**	**8.2 Manage Quality**
Inputs	~~.1 Quality management plan~~	.1 Project management plan
	~~.2 Quality metrics~~	.2 Project documents
	~~.3 Process improvement plan~~	.3 Organizational process assets
	~~.4 Quality control measurements~~	
	.5 Project documents	
Tools & Techniques	~~.1 Quality management and control tools~~	.1 Data gathering
	.2 ~~Quality~~ audits	.2 Data analysis
	~~.3 Process analysis~~	.3 Decision making
		.4 Data representation
		.5 Audits
		.6 Design for x
		.7 Problem solving
		.8 Quality improvement methods

Outputs	.1 Change requests	.1 Quality report
	.2 Project management plan updates	.2 Test and evaluation documents
	.3 Project documents updates	.3 Change requests
	~~.4 Organizational process assets updates~~	.4 Project management plan updates
		.5 Project documents updates

New Inputs:

Project Management Plan: The components of this document that can be helpful in this process include, but are not limited to the quality management plan

Organizational Process Assets: The assets that can influence this process include, but are not limited to:

a. Organizational quality management systems that includes policies, procedures and guidelines
b. Quality templates such as check sheets, traceability matrix, test plans, test documents and others
c. Results from previous audits
d. Lessons learned repository

New Tools:

Data Gathering: This includes techniques which can be used for this process, but are not limited to checklists.

Data Analysis: This includes activities which can be used for this process, but are not limited to:

a. Alternatives analysis (described in 9.2.2.5)
b. Document analysis (described in 5.2.2.3)
c. Process analysis to identify opportunities for process improvements
d. Root cause analysis (RCA)

Decision Making: This includes techniques which can be used for this process, but are not limited to multi-criteria decision analysis which can be used to discuss alternatives that impact project or product quality.

Data representation:

a. Affinity diagrams
b. Cause and effect diagrams
c. Flowcharts
d. Histograms
e. Matrix diagrams
f. Scatter diagrams

Design for X: This (DfX) is a set of technical guidelines that may be applied during the design of a product for the optimization of a specific aspect of the design and can control or even improve the product's final characteristics. Direct aspects which may result in cost reduction, quality improvement, better performance and customer satisfaction include:

a. Reliability
b. Deployment
c. Assembly
d. Manufacturing
e. Cost
f. Service
g. Usability
h. Safety
i. Quality

Problem Solving: An effective and system technique that can be used to help eliminate a problem and develop a long-lasting solution. All problem-solving methods include the following elements:

a. Defining the problem
b. Identifying the root-cause
c. Generating possible solutions
d. Choosing the best solution
e. Implementing the solution
f. Verifying the solution effectiveness

Quality Improvement Methods: These techniques that are used to analyze and evaluate opportunities for improvements include, but are not limited to:

a. Plan-Do-Check-Act
b. Six Sigma

New Outputs:

Quality Reports: Graphical, numerical or qualitative methods to provide information to help take corrective actions in order to achieve the project quality expectations. The information in the reports may include, but are not limited to:

a. Quality management issues escalated by the team
b. Recommendations for process, project and product improvements
c. Corrective action recommendations (including rework, defect/bug repair, 100$ inspection and more)
d. Summary of findings from the Control Quality process

Test and Evaluation Documents: These documents are input to the Control Quality process and are used to evaluate the achievement of quality objectives. These may include, but are not limited to:

a. Dedicated checklist
b. Detailed requirements traceability matrices

8.3 Control Quality

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Monitoring and Controlling	**8.3 Control Quality**	**8.3 Control Quality**
Inputs	.1 Project management plan	.1 Project management plan
	~~.2 Quality metrics~~	.2 Project documents
	~~.3 Quality checklists~~	.3 Approved change requests
	.4 Work performance data	.4 Deliverables
	.5 Approved change requests	.5 Work performance data
	.6 Deliverables	.6 Enterprise environmental factors
	.7 Project documents	.7 Organizational process assets
	.8 Organizational process assets	
Tools & Techniques	~~.1 Seven basic quality tools~~	.1 Data gathering
	~~.2 Statistical sampling~~	.2 Data analysis
	.3 Inspection	.3 Inspection
	~~.4 Approved Change Request Review~~	.4 Testing/product evaluations
		.5 Data representations
		.6 Meetings
Outputs	.1 Quality control measurements	.1 Quality control measurements
	~~.2 Validated changes~~	.2 Verified deliverables
	.3 Verified deliverables	.3 Work performance information
	.4 Work performance information	.4 Change requests
	.5 Change requests	.5 Project management plan updates
	.6 Project management plan updates	.6 Project documents updates
	.7 Project documents updates	
	~~.8 Organizational process assets updates~~	

New Inputs:

Enterprise Environmental Factors: The factors that can influence this process include, but are not limited to:

a. Project management information system
b. Quality management software

c. Governmental agency regulations
d. Rules, standards and guidelines

New Tools:

Data Gathering: This includes techniques which can be used for this process, but are not limited to:

a. Checklists (described in 11.2.2.2)
b. Check sheets
c. Statistical sampling
d. Questionnaires and Surveys

Data Analysis: This includes techniques which can be used for this process, but are not limited to:

a. Performance reviews
b. Root cause analysis (RCA) (described in 8.2.2.2)

Testing/Product Evaluations: This is an organized and constructed investigation conducted to provide objective information about the quality of the product or service under test in accordance with the project requirements

Data representation:

a. Cause-and-effect diagrams
b. Control charts
c. Histograms
d. Scatter diagrams

Meetings: The following types of meetings can be used for this process, but are not limited to:

a. Approved change requests reviews.
b. Retrospectives/lessons learned

New Outputs: None

SECTION 9: Project Resource Management

Note: The name of this Knowledge Area was changed to reflect that there are resources, beyond human resources, that need to be identified, acquired and managed to achieve a successful completion of the project

9.1 Plan Human Resource Management changed to Plan Resource Management

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**9.1 Plan Human Resource Management**	**9.1 Plan Resource Management**
Inputs	.1 Project management plan	.1 Project charter
	~~.2 Activity resource requirements~~	.2 Project management plan
	.3 Enterprise environmental factors	.3 Project documents
	.4 Organizational process assets	.4 Enterprise environmental factors
		.5 Organizational process assets
Tools & Techniques	~~.1 Organization charts and position descriptions~~	.1 Expert judgment
	~~.2 Networking~~	.2 Data representation
	.3 Organizational theory	.3 Organizational theory
	.4 Expert judgment	.4 Meetings
	.5 Meetings	
Outputs	.1 ~~Human~~ resource management plan	.1 Resource management plan
		.2 Team charter
		.3 Project documents updates

New Inputs:

Project Charter: This high-level description and requirements including, but not limited to:

a. Key stakeholder list
b. Summary milestones
c. Pre-approved financial resources

Project Documents: The project documents for this process include, but are not limited to:

a. Project schedule (described in 6.2.3.2)

b. Requirements documentation (described in 5.2.3.1)
c. Risk register (described in 11.2.3.1)
d. Stakeholder register (described in 13.1.3.1)

New Tools:

Data Representation: The techniques that can be used for this process include, but are not limited to:

a. Hierarchical-type charts
    - Work breakdown structures (WBS)
    - Organizational breakdown structure (OBS)
    - Resource breakdown structure (RBS)
b. Assignment matrix
    -
c. Text-oriented formats

New Outputs:

Team Charter: A document that establishes the team values, agreements and operating guidelines for the team. It may include, but is not limited to:

a. Team values
b. Communication guidelines
c. Decision making criteria and process
d. Conflict resolution process
e. Meeting guidelines
f. Team agreements

Project Documents Updates: Project documents that may be updated as a result of this process may include, but are not limited to:

a. Assumption log (described in 4.1.3.2)
b. Risk register (described in 11.2.3.1)

9.2 Estimate Activity Resources

New Resource Management Process

Estimate Activity Resources: This process was moved from Time Management.

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning		**9.2 Estimate Activity Resources**
Inputs	(Moved from the Project Time Management Knowledge Area)	.1 Project management plan .2 Project documents .3 Enterprise environmental factors .4 Organizational process assets
Tools & Techniques	(Moved from the Project Time Management Knowledge Area)	.1 Expert judgment .2 Bottom-up estimating .3 Analogous estimating .4 Parametric estimating .5 Data analysis .6 Project management information system .7 Meetings
Outputs	(Moved from the Project Time Management Knowledge Area)	.1 Resource requirements .2 Basis of estimates .3 Resource breakdown structure .4 Project documents updates

New Inputs:

Project Management Plan: The components of this document that can be helpful in this process include, but are not limited to:

a. Resource management plan (described in 9.1.3.1)
b. Scope baseline (described in 5.4.3.1)

Project Documents: The project documents for this process include, but are not limited to:

a. Activity attributes (described in 6.2.3.2)
b. Activity list (described in 6.2.3.1)
c. Assumption log (described in 4.1.3.2)
d. Cost estimates (described in 7.2.3.1)

e. Resource calendars
f. Risk register (described in 11.2.3.1)

New Tools:

Analogous Estimating: uses information regarding resources from a previous similar project as the basis for estimating a future project

Parametric Estimating: uses an algorithm or a statistical relationship between historical data and other variables to calculate resource quantities needed for an activity, based on historical data and project parameters

Data Analysis: This includes techniques which can be used for this process, but are not limited to alternatives analysis including:

a. Various levels of resource capability or skills
b. Different sizes or types of machines
c. Different tools (manual versus automated)
d. Make-rent-or-buy decisions

Project Management Information System: This name was changed from the Project Management System in the previous process

Meetings: These include types of meetings which can be used for this process, but are not limited to:

a. Estimate the resources needed per activity
b. Level of effort (LoE)
c. Skill level of the team resources
d. Quantity of materials needed

New Outputs:

Resource Requirements: This name was changed from the Activity Resource Requirements in the previous process

Basis of Estimates: The amount and type of detail to support this process include, but are not limited to:

a. Method used to develop the estimate
b. Resources used to develop the estimate (such as past project information)
c. Assumptions associated with the estimate
d. Known constraints
e. Range of estimates
f. Confidence level of the estimate
g. Documentation of identified risks influencing the estimate

9.3 Acquire Project Team to Acquire Resources

Renamed Process

Acquire Resources: Obtaining team members, facilities, equipment, materials, supplies, and other resources necessary to complete project work.

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Executing	**9.2 Acquire Project Team**	**9.3 Acquire Resources**
Inputs	~~.1 Human resource management plan~~	.1 Project management plan
	.2 Enterprise environmental factors	.2 Project documents
	.3 Organizational process assets	.3 Enterprise environmental factors
		.4 Organizational process assets
Tools & Techniques	.1 Pre-assignment	.1 Decision making
	~~.2 Negotiation~~	.2 Interpersonal and team skills
	~~.3 Acquisition~~	.3 Pre-assignment
	.4 Virtual teams	.4 Virtual teams
	~~.5 Multi-criteria decision analysis~~	
Outputs	~~.1 Project staff assignments~~	.1Physical resource assignments .2 Project team assignments
	~~.2 Resource calendars~~	.3 Resource calendars
		.4 Change requests
	.3 Project management plan updates	.5 Project management plan updates
		.6 Project documents updates
		.7 Enterprise environmental factors updates
		.8 Organizational process assets updates

New Inputs:

Project Management Plan: The components of this document that can be helpful in this process include, but are not limited to:

a. Resource management plan (described in 9.1.3.1)
b. Procurement management plan (described in 12.1.3.1)
c. Cost baseline (described in 7.3.3.1)

Project Documents: The project documents for this process include, but are not limited to:

a. Project schedule (described in 6.5.3.2)
b. Resource calendars (described in 9.2.1.2)
c. Resource requirements (described in 9.2.3.1)
d. Stakeholder register (described in 13.1.3.1)

New Tools:

Decision Making: A technique that can be used to help with the selection of physical project resources or project team members in the process, but is not limited to multi-criteria decision analysis and can include the following selection criteria:

a. Availability
b. Cost
c. Ability
d. Experience
e. Knowledge
f. Skills
g. Attitude
h. International factors including location, time zone and communication capabilities

Interpersonal and Team Skills: The skill used for this process include, but is not limited to negotiation. The project management team may need to negotiate with:

a. Functional managers
b. Other project management teams within the performing organization
c. External organizations and suppliers

New Outputs:

Physical Resource Assignments: Documentation of the physical resource assignments records the material, equipment, supplies, locations, and other physical resources that will be used during the project.

Project Team Assignments: Documentation of team assignments records the team members and their roles and responsibilities for the project.

Resource Calendars: It identifies the working days, shifts, start and end of normal business hours, weekends, and public holidays when each specific resource is available.

Change Requests: If change requests occur as a result of this process or if recommended corrective or preventive actions impact any of the components of the project management plan or project documents, the project manager needs to submit a change request and follow the Perform Integrated Change Control process

Project Documents Updates: The project documents that may be updated as a result of this process include, but not limited to:

a. Lessons learned register (described in 4.4.3.1)
b. Project schedule (described in 6.5.3.2)
c. Resource breakdown structure (described in 9.2.1.2)
d. Resource calendars (described in 9.2.1.2)
e. Resource requirements (described in 9.2.3.1)
f. Risk register (described in 11.2.3.1)
g. Stakeholder register (described in 11.1.3.1)

Enterprise Environmental Factors Updates: The factors that are updated for this process include, but is not limited to:

a. Resource availability within the organization
b. Amount of the organization's consumable resources that have been used

Organizational Process Assets Updates: The assets that are updated as a result of this process include, but are not limited to documentation related to:

a. Acquiring resources
b. Assigning resources
c. Allocating resources

9.4 Develop Project Team changed to Develop Team

Renamed Process

Develop Team: Improving competencies, team member interaction, and the overall team environment to enhance project performance.

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Executing	**9.3 Develop Project Team**	**9.4 Develop Team**
Inputs	~~.1 Human resource management plan~~	.1 Project management plan
	~~.2 Project staff assignments~~	.2 Project documents
	~~.3 Resource calendars~~	.3. Enterprise environmental factors
		.4 Organizational process assets
Tools & Techniques	.1 Interpersonal Skills	.1 Colocation
	.2 Training	.2 Virtual teams
	~~.3 Team-building activities~~	.3 Communication technology

	~~.4 Ground rules~~ .5 Colocation .6 Recognition and rewards .7 ~~Personal~~ assessment ~~tools~~	.4 Interpersonal and team skills .5 Recognition and rewards .6 Training .7 Individual and team assessments .8 Meetings
Outputs	.1 Team performance assessments .2 Enterprise environmental factors updates	.1 Team performance assessments .2 Change requests .3 Project management plan updates .4 Project documents updates .5 Enterprise environmental factors updates .6 Organizational process assets updates

New Inputs:

Project Management Plan: The components of this document that can be helpful in this process include, but are not limited to the resource management plan providing guidance on:

a. Providing project team member rewards
b. Feedback
c. Additional training
d. Disciplinary actions as a result of team performance assessment
e. Team performance assessment criteria

Project Documents: The project documents for this process include, but are not limited to:

a. Lessons learned register (described in 4.4.3.1)
b. Project schedule (described in 6.5.3.2)
c. Project team assignments (described in 9.3.3.1)
d. Resource calendars (described in 9.2.1.2)
e. Team charter (described in 9.1.3.2)

Enterprise Environmental Factors: The factors that can influence this process include, but are not limited to:

a. Human resource management policies regarding
    - Hiring and termination
    - Employee performance reviews
    - Employee development and training records
    - Recognition and rewards
b. Team member skills, competencies and specialized knowledge
c. Geographic distribution of team members

Organizational Process Assets: The assets that can influence this process include, but are not limited to:

a. Historical information
b. Lessons learned repository

New Tools:

Colocation: The placing of many or all of the active team members in the same physical location to enhance their ability to perform as a team is referred to as colocation, or a "tight matrix" and may include, but are not limited to the following strategies:

a. Team meeting room
b. Common place to post schedules and other conveniences to enhance communication and a sense of community

Virtual Teams: The use of virtual teams can bring benefits such as the use of more skilled resources, reduced costs, less travel and relocation expenses.

Communication Technology: Examples of types of technology requirements for collocated and virtual team may include, but are not limited to:

a. Shared portal
b. Video conferencing
c. Audio conferencing
d. Email/chat

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to:

a. Conflict management (described in 9.5.2.1)
b. Influencing (described in 9.5.2.1)
c. Motivation
d. Negotiation (described in 12.2.2.5)
e. Team building

Individual and Team Assessment: Tools that can be used to help assess areas of strengths and weaknesses for this process include, but are not limited to:

a. Attitudinal surveys
b. Specific assessments
c. Structured interviews
d. Ability tests
e. Focus groups

Meetings: Meetings that can be used to discuss and address pertinent topics for this process include, but are not limited to:

a. Project orientation meetings
b. Team building meetings
c. Team development meetings

New Outputs:

Change Requests: If change requests occur as a result of this process or if recommended corrective or preventive actions impact any of the components of the project management plan or project documents, the project manager needs to submit a change request and follow the Perform Integrated Change Control process.

Project Documents Updates: The project documents that may be updated as a result of this process include, but not limited to:

a. Lessons learned register (described in 4.4.3.1)
b. Project schedule (described in 6.5.3.2)
c. Project team assignments (described in 9.3.3.1)
d. Resource calendars (described in 9.2.1.2)
e. Team charter (described in 9.1.3.2)

Organizational Process Assets Updates: The assets that are updated as a result of this process include, but are not limited to:

a. Training requirements
b. Personnel assessment

9.5 Manage Project Team changed to Manage Team

Renamed Process

Manage Team: Tracking team member performance, providing feedback, resolving issues, and managing team changes to optimize project performance.

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Executing	**9.4 Manage Project Team**	**9.5 Manage Team**
Inputs	~~.1 Human resource management plan~~	.1 Project management plan
	~~.2 Project staff assignments~~	.2 Project documents
	.3 Team performance assessments	.3 Work performance reports
	~~.4 Issue log~~	.4 Team performance assessments
	.5 Work performance reports	.5 Enterprise environmental factors
	.6 Organizational process assets	.6 Organizational process assets
Tools & Techniques	~~.1 Observation and conversation~~	.1 Interpersonal and team skills
	~~.2 Project performance appraisals~~	.2 Project management information system

	~~.3 Conflict management~~ ~~.4 Interpersonal skills~~	
Outputs	.1 Change requests .2 Project management plan updates .3 Project documents updates .4 Enterprise environmental factors updates .5 Organizational process assets updates	.1 Change requests .2 Project management plan updates .3 Project documents updates .4 Enterprise environmental factors updates

New Inputs:

Project Management Plan: The components of this document that can be helpful in this process include, but are not limited to the resource management plan providing guidance on how the project team resources should be managed and eventually released.

Project Documents: The project documents for this process include, but are not limited to:

a. Issue log (described in 4.3.3.3)
b. Lessons learned register (described in 4.4.3.1)
c. Project team assignments (described in 9.3.3.1)
d. Team charter (described in 9.1.3.2)

Enterprise Environmental Factors: The factors that can be helpful in this process include, but are not limited to human resource management policies.

New Tools:

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to:

a. Conflict management
b. Decision making (described in 5.2.2.4)
c. Emotional intelligence
d. Influencing
e. Leadership

Project Management Information System: Software including resource management scheduling support that can be used for managing and coordinating team members across project activities.

9.6 Control Resources

New Process

Control Resources: Ensuring that the physical resources assigned and allocated to the project are available as planned, as well as monitoring the planned versus actual utilization of resources and taking corrective action as necessary.

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Monitoring and Controlling		**9.6 Control Resources**
Inputs		.1 Project management plan
		.2 Project documents
		.3 Work performance data
		.4 Agreements
		.5 Organizational process assets
Tools & Techniques		.1 Data analysis
		.2 Problem solving
		.3 Interpersonal and team skills
		.4 Project management information system
Outputs		.1 Work performance information
		.2 Change requests
		.3 Project management plan updates
		.4 Project documents updates

New Inputs:

Project Management Plan: The components of this document that can be helpful in this process include, but are not limited to the resource management plan providing guidance on how the project team resources should be managed and eventually released.

Project Documents: The project documents for this process include, but are not limited to:

a. Issue log (described in 4.3.3.3)
b. Lessons learned register (described in 4.4.3.1)
c. Physical resource assignments (described in 9.3.3.1)
d. Project schedule (described in 6.5.3.2)
e. Resource breakdown structure (described in 9.2.3.3)
f. Resource requirements (described in 9.2.3.1)
g. Risk register (described in 11.2.3.1)

Work performance data: The data included on project status for this process include, but are not limited to the number and type of resources that have been used.

Agreements: Agreements made within the context of the project are the basis for all resources external to the organization and should define procedures when new, unplanned resources are needed or when issues arise with current resources.

Organization Process Assets: The assets that can influence this process include, but are not limited to:

a. Policies regarding resource control and assignment
b. Escalation procedures for handling issues within the performing organization
c. Lessons learned repository from previous similar projects

New Tools:

Data Analysis: This includes techniques which can be used for this process, but are not limited to:

a. Alternatives analysis (described in 9.2.2.5)
b. Cost-benefit analysis (described in 8.1.2.3)
c. Performance reviews
d. Trend analysis (described in 4.5.2.2)

Problem Solving: This includes a set of tools to solve problems. The methodical steps to deal with problem solving can include:

a. Identify the problem
b. Define the problem
c. Investigate
d. Analyze
e. Solve
f. Check the solution

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to:

a. Negotiation (described in 12.2.2.5)
b. Influencing (described in 9.5.2.1)

Project Management Information System: Software including resource management and scheduling capabilities that can be used to monitor the resource utilization to help ensure that the right resources are working on the right activities at the right time and place.

New Outputs:

Work Performance Information: Information on how the project work is performing by comparing resource requirements and resource allocations to resource utilization across the project activities

Change Requests: If change requests occur as a result of this process or if recommended corrective or preventive actions impact any of the components of the project management plan or project documents, the project manager needs to submit a change request and follow the Perform Integrated Change Control process

Project Management Plan Updates: Components of the project management plan that may require a change request as a result of this process include, but not limited to:

a. Resource management plan (described in 9.1.3.1)
b. Schedule baseline (described in 6.5.3.1)
c. Cost baseline (described in 7.3.3.1)

Project Documents Updates: The project documents that may be updated as a result of this process include, but not limited to:

a. Assumption log (described in 4.1.3.2)
b. Issue log (described in 4.3.3.3)
c. Lessons learned register (described in 4.4.3.1)
d. Resource assignments (described in 9.3.3.1)
e. Resource breakdown structure (described in 9.2.3.3)
f. Risk register (described in 11.2.3.1)

SECTION 10: Project Communications Management

Communication**s** refers to a system or technology for transmitting information.
Communication refers to the exchange of messages between individuals.
Communications is technology; whereas, communication is human.

10.1 Plan Communications Management

Renamed Process

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**10.1 Plan Communications Management**	**10.1 Plan Communications Management**
Inputs	.1 Project management plan	.1 Project charter
	~~.2 Stakeholder register~~	.2 Project management plan
	.3 Enterprise environmental factors	.3 Project documents
	.4 Organizational process assets	.4 Enterprise environmental factors
		.5 Organizational process assets
Tools & Techniques	.1 Communication requirements analysis	.1 Expert judgment
	.2 Communication technology	.2 Communication requirements analysis
	.3 Communication models	.3 Communication technology
	.4 Communication methods	.4 Communication models
	.5 Meetings	.5 Communication methods
		.6 Interpersonal and team skills
		.7 Data representation
		.8 Meetings
Outputs	.1 Communication~~s~~ management plan	.1 Communications management plan
	.2 Project documents updates	.2 Project management plan updates
		.3 Project documents updates

New Inputs:

Project Charter: The high-level project document identifies the key stakeholders and may contain information about the roles and responsibilities of the stakeholders

Project Documents: The project documents that may be considered as input to this process include, but not limited to:

a. Requirements documentation (described in 5.2.3.1)
b. Stakeholder register (described in 13.1.3.1)

New Tools:

Expert Judgment: Expertise should be considered from individuals or groups with specialized knowledge or training in the topics that include, but are not limited to:

a. Politics and power structures in the organization
b. Environment and culture of the organization and other customer organizations
c. Resource breakdown structure (described in 9.2.1.2)
d. Industry or type of project deliverables
e. Corporate communications technologies
f. Corporate policies and procedures regarding legal requirements of corporate communications
g. Corporate policies and procedures regarding security
h. Stakeholders, including customers or sponsors

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to:

a. Communication styles assessment
b. Political awareness
c. Cultural awareness

Data Representation: A data representation technique that can be used for this process include, but not limited to a stakeholder engagement assessment matrix:

a. Stakeholder engagement assignment matrix

New Outputs:

Project Management Plan Updates: Components of the project management plan that may require a change request as a result of this process include, but not limited to the stakeholder engagement plan. It may be updated to reflect any processes, procedures, tools or techniques that affect the engagement of stakeholders in project decisions and execution.

10.2 Manage Communications

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Executing	**10.2 Manage Communications**	**10.2 Manage Communications**
Inputs	~~.1 Communications management plan~~	.1 Project management plan
	.2 ~~Work~~ performance reports	.2 Project documents
	.3 Enterprise environmental factors	.3 Work Performance reports
	.4 Organizational process assets	.4 Enterprise environmental factors
		.5 Organizational process assets
Tools & Techniques	.1 Communication technology	.1 Communication technology
	~~.2 Communication models~~	.2 Communication methods
	.3 Communication methods	.3 Communication skills
	~~.4 Information management systems~~	.4 Project management information system
	~~.5 Performance reporting~~	.5 Project reporting
		.6 Interpersonal and team skills
		.7 Meetings
Outputs	.1 Project communications	.1 Project communications
	.2 Project management plan updates	.2 Project management plan updates
	.3 Project documents updates	.3 Project documents updates
	.4 Organizational process assets updates	.4 Organizational process assets updates

New Inputs:

Project Management Plan: The project management plan components that can be helpful in this process include, but are not limited to:

a. Resource management plan (described in 9.1.3.1)
b. Communications management plan (described in 10.1.3.1)
c. Stakeholder engagement plan (described in 13.2.3.1)

Project Documents: The project documents for this process include, but are not limited to:

a. Change log (described in 4.6.3.1)
b. Issue log (described in 4.3.3.3)
c. Lessons learned register (described in 4.4.3.1)
d. Quality report (described in 8.2.3.1)

e. Risk report (described in 11.2.3.2)
f. Stakeholder register (described in 13.1.3.1)

New Tools:

Communication Skills: Skills that can be used for this process include, but are not limited to:

a. Communication competence
b. Feedback
c. Nonverbal
d. Presentations

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to:

a. Active listening
b. Conflict management (described in 9.5.2.1)
c. Cultural awareness (described in 10.1.2.6)
d. Meeting management
e. Networking
f. Political awareness

Meetings: These support the actions defined in the communications strategy and communications plan

New Outputs: None

10.3 Control Communications changed to Monitor Communications

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Monitoring and Controlling	**10.3 Control Communications**	**10.3 Monitor Communications**
Inputs	.1 Project management plan	.1 Project management plan
	~~.2 Project communications~~	.2 Project documents
	~~.3 Issue log~~	.3 Work performance data
	.4 Work performance data	.4 Enterprise environmental factors
	.5 Organizational process assets	.5 Organizational process assets
Tools & Techniques	~~.1 Information management systems~~	.1 Expert judgment
	.2 Expert judgment	.2 Project management information system

	.3 Meetings	.3 Data representation .4 Interpersonal and team skills .5 Meetings
Outputs	.1 Work performance information ~~.2 Change requests~~ .3 Project management plan updates .4 Project documents updates ~~.5 Organizational process assets updates~~	.1 Work performance information .2 Change requests .3 Project management plan updates .4 Project documents updates

New Inputs:

Project Documents: The project documents for this process include, but are not limited to:

a. Issue log (described in 4.3.3.3)
b. Lessons learned register (described in 4.4.3.1)
c. Project communications (described in 10.2.3.1)

Enterprise Environmental Factors: The facts that can influence this process include, but are not limited to:

a. Organizational culture, political climate and governance framework
b. Established communication channels, tools and systems
c. Global, regional, or local trends, practices, or habits
d. Geographic distribution of facilities and resources

New Tools:

Project Management Information System: The systems that provide a set of standard tools for project managers to capture, store and distribute information to internal and external stakeholders with the information they need according to the communications plan.

Data Analysis: This includes techniques which can be used for this process, but are not limited to a stakeholder engagement assessment matrix to assess requirements for additional communications through the review of changes between desired and current engagement and adjusting communications are necessary

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to observation/conversation to enable the project manager to identify:

a. Issues within the team
b. Conflicts between people
c. Individual performance issues

New Outputs: None

SECTION 11: Project Risk Management

11.1 Plan Risk Management

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**11.1 Plan Risk Management**	**11.1 Plan Risk Management**
Inputs	.1 Project management plan	.1 Project charter
	.2 Project charter	.2 Project management plan
	~~.3 Stakeholder register~~	.3 Project documents
	.4 Enterprise environmental factors	.4 Enterprise environmental factors
	.5 Organizational process assets	.5 Organizational process assets
Tools & Techniques	~~.1 Analytical techniques~~	.1 Expert judgment
	.2 Expert judgment	.2 Data analysis
	.3 Meetings	.3 Meetings
Outputs	.1 Risk management plan	.1 Risk management plan

New Inputs:

Project Documents: The project documents for this process include, but are not limited to the stakeholder register which contains details of the project's stakeholders and provides an overview of their project roles and their attitude toward risk on the project

New Tools:

Data Analysis: This includes techniques which can be used for this process, but are not limited to a stakeholder analysis to determine the risk appetite of project stakeholders.

New Outputs: None

11.2 Identify Risks

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**11.2 Identify Risks**	**11.2 Identify Risks**
Inputs	~~.1 Risk management plan~~	.1 Project management plan
	~~.2 Cost management plan~~	.2 Project documents
	~~.3 Schedule management plan~~	.3 Agreements
	~~.4 Quality management plan~~	.4 Procurement documentation
	~~.5 Human resource management plan~~	.5 Enterprise environmental factors
	~~.6 Scope baseline~~	.6 Organizational process assets
	~~.7 Activity cost estimates~~	
	~~.8 Activity duration estimates~~	
	~~.9 Stakeholder register~~	
	.10 Project documents	
	.11 Procurement ~~documents~~	
	.12 Enterprise environmental factors	
	.13 Organizational process assets	
Tools & Techniques	~~.1 Documentation reviews~~	.1 Expert judgment
	~~.2 Information gathering techniques~~	.2 Data gathering
	~~.3 Checklist analysis~~	.3 Data analysis
	~~.4 Assumptions analysis~~	.4 Interpersonal and team skills
	~~.5 Diagramming techniques~~	.5 Prompt lists
	~~.6 SWOT analysis~~	. Meetings
	.7 Expert judgment	
Outputs	.1 Risk register	.1 Risk register
		.2 Risk report
		.3 Project documents updates

New Inputs:

Project Management Plan: The project management plan components that can be helpful in this process include, but are not limited to:

a. Requirements management plan (described in 5.1.3.2)
b. Schedule management plan (described in 6.1.3.1)
c. Cost management plan (described in 7.1.3.1)
d. Resource management plan (described in 9.1.3.1)
e. Quality management plan (described in 8.1.3.1)
f. Risk management plan (described in 11.1.3.1)
g. Scope baseline (described in 5.4.3.1)
h. Schedule baseline (described in 6.5.3.1)
i. Cost baseline (described in 7.3.3.1)

Project Management Plan: If the project requires external procurement of resources, the agreements will contain the following information, but not limited to:

a. Milestone dates
b. Contract type
c. Acceptance criteria
d. Awards and penalties that can present threats or opportunities

New Tools:

Data Gathering: This includes techniques which can be used for this process, but are not limited to:

a. Brainstorming
b. Checklists
c. Interviews

Data Analysis: This includes techniques which can be used for this process, but are not limited to:

a. Root cause analysis
b. Assumption and constraint analysis
c. SWOT analysis
d. Document analysis (described in 5.2.2.3)

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to facilitation

Prompt list: A predetermined list of risk categories that are the lowest level of the risk breakdown structure and are used to help identify individuals risks for this process include, but are not limited to:

a. PESTLE (political, economic, social, technological, legal, environmental)
b. TECOP (technical, environmental, commercial, operations, political)
c. VUCA (volatility, uncertainty, complexity, ambiguity)

Meetings: Specialized meetings (often called a risk workshop) can be used for this process include, but are not limited to some type of brainstorming or facilitated workshop

New Outputs:

Risk report: Presents information on overall project risk, together with summary information on identified individual project risks. This information may include, but is not limited to:

a. Sources of overall project risk, indicate the most important drivers of overall project risk exposure
b. Summary information on identified individual project risks
    - Number of identified threats and opportunities
    - Distribution of risks across risk categories
    - Metrics and trends
c. Additional information depending on the reporting requirements specified in the risk management plan

Project Documents Updates: The project documents that may be updated as a result of this process include, but not limited to:

a. Assumption log (described in 4.1.3.2)
b. Issue log (described in 4.3.3.3)
c. Lessons learned register (described in 4.4.3.1)

11.3 Perform Qualitative Risk Analysis

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**11.3 Perform Qualitative Risk Analysis**	**11.3 Perform Qualitative Risk Analysis**
Inputs	~~.1 Risk management plan~~	.1 Project management plan
	~~.2 Scope baseline~~	.2 Project documents
	~~.3 Risk register~~	.3 Enterprise environmental factors
	.4 Enterprise environmental factors	.4 Organizational process assets
	.5 Organizational process assets	
Tools & Techniques	~~.1 Risk probability and impact assessment~~	.1 Expert judgment
	~~.2 Probability and impact matrix~~	.2 Data gathering
	~~.3 Risk data quality assessment~~	.3 Data analysis
	.4 Risk categorization	.4 Interpersonal and team skills

	~~.5 Risk urgency assessment~~	.5 Risk categorization
	.6 Expert judgment	.6 Data representation
		.7 Meetings
Outputs	.1 Project documents updates	.1 Project documents updates

New Inputs:

Project Management Plan: The project management plan components that can be helpful in this process includes, but not limited to the risk management plan. Of particular interest in this process are:

a. Roles and responsibilities for conducting risk management
b. Budget for risk management
c. Schedule activities for risk management
d. Risk categories, often defined in a risk breakdown structure
e. Definitions of probability and impact
f. Probability and impact matrix
g. Stakeholders' risk thresholds

Project Documents: The project documents for this process include, but are not limited to:

a. Assumption log (described in 4.1.3.2)
b. Risk register (described in 11.2.3.1)
c. Stakeholder register (described in 13.1.3.1)

New Tools:

Data Gathering: This includes techniques which can be used for this process, but are not limited to structured or semi-structured interviews to assess the probability and impacts of individual project risks

Data Analysis: This includes techniques which can be used for this process, but are not limited to:

a. Risk data quality assessment
b. Risk probability and impact assessment
c. Assessment of other risk parameters
    - Urgency
    - Proximity
    - Dormancy
    - Manageability
    - Controllability
    - Detectability
    - Connectivity
    - Strategic impact
    - Propinquity (the degree to which a risk is perceived to matter by either an individual or group)

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to facilitation.

Data Representation: A data representation technique that can be used during this process include, but not limited to: Probability and Impact matrix and Hierarchical-type charts

Meetings: Specialized meetings (often called a risk workshop) can be used for this process include, but are not limited to:

a. Review previously identified risks
b. Assessment probably and impact and possibly other risk parameters

New Outputs: None

11.4 Perform Quantitative Risk Analysis

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**11.4 Perform Quantitative Risk Analysis**	**11.4 Perform Quantitative Risk Analysis**
Inputs	~~.1 Risk management plan~~	.1 Project management plan
	~~.2 Cost management plan~~	.2 Project documents
	~~.3 Schedule management plan~~	.3 Enterprise environmental factors
	~~.4 Risk register~~	.4 Organizational process assets
	.5 Enterprise environmental factors	
	.6 Organizational process assets	
Tools & Techniques	.1 Data gathering ~~and representation techniques~~	.1 Expert judgment
	~~.2 Quantitative risk analysis and modeling techniques~~	.2 Data gathering
	.3 Expert judgment	.3 Interpersonal and team skills
		.4 Representations of uncertainty
		.5 Data analysis
Outputs	.1 Project documents updates	.1 Project documents updates

New Inputs:

Project Management Plan: The project management plan components that can be helpful in this process include, but not limited to:

a. Risk management plan (described in 11.1.3.1)
b. Scope baseline (described in 5.4.3.1)
c. Schedule baseline (described in 6.5.3.1)
d. Cost baseline (described in 7.3.3.1)

Project Documents: The project documents for this process include, but are not limited to:

a. Assumption log (described in 4.1.3.2)
b. Basis of estimates (described in 6.4.3.2)
c. Cost estimates (described in 7.2.3.1)
d. Cost forecasts (described in 7.4.3.2)
e. Duration estimates (described in 6.4.3.1)
f. Milestone list (described in 6.2.3.3)
g. Resource requirements (described in 9.2.3.1)
h. Risk register (described in 11.2.3.1)
i. Risk report (described in 11.2.3.2)
j. Schedule forecasts (described in 6.6.3.2)

New Tools:

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to facilitation.

Representations of Uncertainty: Individual project risks are input into a quantitative risk analysis model to reflect uncertainty which is represented as a probability distribution. The most commonly used are:

a. Triangular
b. Normal
c. Lognormal
d. Beta
e. Uniform
f. Discrete distributions

Data Analysis: This includes techniques which can be used for this process, but are not limited to:

a. Simulations
b. Sensitivity analysis
c. Decision tree analysis
d. Influence diagrams

New Outputs: None

11.5 Plan Risk Responses

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**11.5 Plan Risk Responses**	**11.5 Plan Risk Responses**
Inputs	~~.1 Risk management plan~~	.1 Project management plan
	~~.2 Risk register~~	.2 Project documents
		.3 Enterprise environmental factors
		.4 Organizational process assets
Tools & Techniques	.1 Strategies for ~~negative risks or~~ threats	.1 Expert judgment
	.2 Strategies for ~~positive risks or~~ opportunities	.2 Data gathering
	.3 Contingent response strategies	.3 Interpersonal and team skills
	.4 Expert judgment	.4 Strategies for threats
		.5 Strategies for opportunities
		.6 Contingent response strategies
		.7 Strategies for overall project risk
		.8 Data analysis
		.9 Decision making
Outputs	.1 Project management plan updates	.1 Change requests
	.2 Project documents updates	.2 Project management plan updates
		.3 Project documents updates

New Inputs:

Project Management Plan: Project management plan components that can be helpful in the process include, but not limited to:

a. Resource management plan (described in 9.1.3.1)
b. Risk management plan (described in 11.1.3.1)
c. Cost baseline (described in 7.3.3.1)

Project Documents: The project documents for this process include, but are not limited to:

a. Lessons learned register (described in 4.4.3.1)
b. Project schedule (described in 6.5.3.2)
c. Resource breakdown structure (described in 9.2.3.3)
d. Resource calendars (described in 9.2.1.2)

e. Risk register (described in 11.2.3.1)
f. Risk report (described in 11.2.3.2)
g. Stakeholder register (described in 13.1.3.1)

Enterprise Environment Factors: The factor that can influence this process include, but are not limited to the risk appetite and thresholds of key stakeholders.

Organizational Process Assets: The assets that can influence this process include, but are not limited to:

a. Templates for the risk management plan, risk register and risk report
b. Historical databases
c. Lessons learned repositories from similar completed projects

New Tools:

Data Gathering: This includes techniques which can be used for this process, but are not limited to interviews using either structured or semi-structured interviews.

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to facilitation.

Strategies for Overall Project Risk: The strategies for individual projects risks should also be planned and implemented to address overall project risks. The same risk response strategies that apply are:

a. Avoid
b. Exploit
c. Mitigate/Enhance
d. Accept

Data Analysis: A number of alternative risk response strategies may be considered. Data analysis techniques that can be used to select a preferred risk strategy include but are not limited to:

a. Alternatives analysis
b. Cost-benefit analysis

Decision Making: Decision making techniques that can be used to select the preferred risk response strategy include but are not limited to:

a. Alternatives analysis
b. Multicriteria decision analysis
c. Cost-benefit analysis

New Outputs:

Change Requests: Planned risk responses may result in a change request to the cost and schedule baselines or other components of the project management plan. Change requests are processed for review and disposition through the Perform Integrated Change Control process.

11.6 Implement Risk Responses

New Process

Implement Risk Responses: It ensures that agreed upon risk responses are executed as planned in order to address overall project risk exposure, minimize individual project threats, and maximize individual project opportunities.

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Executing		**11.6 Implement Risk Responses**
Inputs		.1 Project management plan .2 Project documents .3 Organizational process assets
Tools & Techniques		.1 Expert judgment . .2 Interpersonal and team skills .3Project management information system
Outputs		.1 Change requests .2 Project documents updates

New Inputs:

Project Management Plan: If the project requires external procurement of resources, the agreements will contain the following information, but not limited to the risk management plan.

Project Documents: The project documents for this process include, but are not limited to:

a. Lessons learned register (described in 4.4.3.1)
b. Risk register (described in 11.2.3.1)
c. Risk report (described in 11.2.3.2)

Organizational Process Assets: The assets that can influence this process include but are not limited to the lessons learned repository from similar completed projects that indicate the effectiveness of particular risk responses.

New Tools:

Expert Judgment: Expertise should be considered from individuals or groups with specialized knowledge to validate or modify risk responses if necessary, and decide how to implement them in the most efficient and effective manner.

. .

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to influencing to encourage nominated risk owners to take necessary action where required

Project Management Information System: System that includes schedule, resource and cost software to ensure that agreed-upon risk response plans and their associated activities are integrated into the project alongside other project activities

New Outputs:

Change Requests: Implementation of risk responses may result in a change request to the cost and schedule baselines or other components of the project management plan. Change requests are processed for review and disposition through the Perform Integrated Change Control process.

Project Documents Updates: The project documents that may be updated as a result of this process include, but not limited to:

a. Issue log (described in 4.3.3.3)
b. Lessons learned register (described in 4.4.3.1)
c. Risk register (described in 11.2.3.1)
d. Risk report (described in 11.2.3.2)

11.7 Control Risks changed to Monitor Risks

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Monitoring and Controlling	**11.6 Control Risks**	**11.7 Monitor Risks**
Inputs	.1 Project management plan	.1 Project management plan
	~~.2 Risk register~~	.2 Project documents
	.3 Work performance data	.3 Work performance data
	.4 Work performance reports	.4 Work performance reports
Tools & Techniques	~~.1 Risk reassessment~~	.1 Data analysis
	~~.2 Risk audits~~	.2 Audits
		.3 Meetings
	~~.3 Variance and trend analysis~~	

	~~.4 Technical performance measurement~~ ~~.5 Reserve analysis~~ .6 Meetings	
Outputs	.1 Work performance information .2 Change requests .3 Project management plan updates .4 Project documents updates .5 Organizational process assets updates	.1 Work performance information .2 Change requests .3 Project management plan updates .4 Project documents updates .5 Organizational process assets updates

New Inputs:

Project Documents: The project documents for this process include, but are not limited to:

a. Issue log (described in 4.3.3.3)
b. Lessons learned register (described in 4.4.3.1)
c. Risk register (described in 11.2.3.1)
d. Risk report (described in 11.2.3.2)

New Tools:

Data Analysis: This includes techniques which can be used for this process, but are not limited to:

a. Technical performance analysis
b. Reserve analysis

Audits: Risk audit are a type of audit that may be used to consider the effectiveness of the risk management process.

New Outputs: None

SECTION 12: Project Procurement Management

12.1 Plan Procurement Management

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**12.1 Plan Procurement Management**	**12.1 Plan Procurement Management**
Inputs	.1 Project management plan	.1 Project charter
	~~.2 Requirement documentation~~	.2 Business documents
	~~.3 Risk register~~	.3 Project management plan
	~~.4 Activity resource requirements~~	.4 Project documents
	~~.5 Project schedule~~	.5 Enterprise environmental factors
	~~.6 Activity cost estimates~~	.6 Organizational process assets
	~~.7 Stakeholder register~~	
	.8 Enterprise environmental factors	
	.9 Organizational process assets	
Tools & Techniques	~~.1 Make-or-buy analysis~~	.1 Expert judgment
	.2 Expert judgment	.2 Data gathering
	~~.3 Market research~~	.3 Data analysis
	.4 Meetings	.4 Source selection analysis
		.5 Meetings
Outputs	.1 Procurement management plan	.1 Procurement management plan
	.2 Procurement statement of work	.2 Procurement strategy
	~~.3 Procurement documents~~	.3 Bid documents
	.4 Source selection criteria	.4 Procurement statement of work
	.5 Make-or-buy decisions	.5 Source selection criteria
	.6 Change requests	.6 Make-or-buy decisions
	.7 Project documents updates	.7 Independent cost estimates
		.8 Change Request
		.9 Project documents updates
		.10 Organizational process assets updates

New Inputs:

Project Charter: The high-level project document includes, but is not limited to:

a. Objectives
b. Project description
c. Summary milestones
d. Preapproved financial resources

Business Documents: The business documents for this process include, but are not limited to:

a. Business case
b. Benefits management plan

Project Documents: The project documents for this process include, but are not limited to:

a. Milestone list (described in 6.2.3.3)
b. Project team assignments (described in 9.3.3.2)
c. Requirements documentation (described in 5.2.3.1)
    - Requirements management plan
    - Technical requirements that the seller is required to satisfy
    - Requirements with contractual and legal implications (including health, safety, security, performance, environmental, insurance, intellectual property rights, equal employment opportunity, licenses, permits and other nontechnical requirements
d. Requirements traceability matrix (described in 5.2.3.2)
e. Resource requirements (described in 9.2.3.1)
f. Risk register (described in 11.2.3.1)
g. Stakeholder register (described in 13.1.3.1)

New Tools:

Data Gathering: This includes techniques which can be used for this process, which include, but are not limited to market research.

Data Analysis: This includes techniques which can be used for this process, but are not limited to make-or-buy analysis which may use the following, but not limited to:

a. Return on investment (ROI)
b. Internal rate of return (IRR)
c. Discounted cash flow
d. Net present value (NPV)
e. Benefit/cost analysis (BCA)

Source Selection Analysis: Commonly used selection methods, which can be used for this process, but are not limited to:

a. Least cost
b. Qualifications only
c. Quality-based/highest technical proposal score
d. Quality and cost-based
e. Sole source
f. Fixed budget

New Outputs:

Procurement Strategy: Once a decision is made to acquire from outside the project the procurement strategy determines the project delivery method, the type of legally binding agreement(s) and how the procurement will advance through the procurement phases. Included in this strategy but not limited to:

a. Delivery methods
    - For professional services, this includes
        - buyer/services provider with no subcontracting
        - buyer/services provider with subcontracting allowed
        - joint venture between buyer and services provider
        - buyer/services provider acts as the representative
    - For industrial or commercial construction this includes, but not limited to
        - turnkey
        - design/build (DB)
        - design bid build (DBB)
        - design build operate (DBO)
        - build own operate transfer (BOOT)
b. Contract payment types
    - Fixed price
    - Cost plus
    - Incentives and awards
c. Procurement phases

Bid Documents: Commonly used documents for soliciting proposals from prospective sellers, which can be used for this process, but are not limited to:

a. Request for information (RFI)
b. Request for quote (RFQ)
c. Request for proposal (RFP)

Independent Cost Estimates: A cost estimate prepared either by the procuring organization or an outside professional estimator to service as a benchmark on proposed responses.

Organizational Process Assets Updates: Assets updated as a result of this process include but are not limited to information on qualified sellers

12.2 Conduct Procurements

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Executing	**12.2 Conduct Procurements**	**12.2 Conduct Procurements**
Inputs	~~.1 Procurement management plan~~	.1 Project management plan
	.2 Procurement ~~documents~~	.2 Project documents
	~~.3 Source selection criteria~~	.3 Procurement documentation
	.4 Seller proposals	.4 Seller proposals
	.5 Project documents	.5 Enterprise environmental factors
	~~.6 Make-or-buy decisions~~	.6 Organizational process assets
	~~.7 Procurement statement of work~~	
	.8 Organizational process assets	
Tools & Techniques	.1 Bidder conference	.1 Expert judgment
	~~.2 Proposal evaluation techniques~~	.2 Advertising
	~~.3 Independent estimates~~	.3 Bidder conferences
	.4 Expert judgment	.4 Data analysis
	.5 Advertising	.5 Interpersonal and team skills
	~~.6 Analytical techniques~~	
	~~.7 Procurement negotiations~~	
Outputs	.1 Selected sellers	.1 Selected sellers
	.2 Agreements	.2 Agreements
	~~.3 Resource calendars~~	.3 Change requests
	.4 Change requests	.4 Project management plan updates
	.5 Project management plan updates	.5 Project documents updates
	.6 Project documents updates	.6 Organizational process assets updates

New Inputs:

Project Management Plan: Project management plan components that can be helpful in this process include, but not limited to:

a. Scope management plan (described in 5.1.3.1)
b. Requirements management plan (described in 5.1.3.2)

c. Communications management plan (described in 10.1.3.1)
d. Risk management plan (described in 11.1.3.1)
e. Procurement management plan (described in 12.1.3.1)
f. Configuration management plan (described in 5.6.1.1)
g. Cost baseline (described in 7.3.3.1)

Enterprise Environment Factors: Factors that can influence this process include, but are not limited to:

a. Local laws and regulations regarding procurements
b. Local laws and regulations ensuring that the major procurements involve local providers and suppliers
c. External economic environment constraining procurement processes
d. Marketplace conditions
e. Information on relevant past experience with sellers, both good and bad
f. Prior agreements already in place
g. Contract management systems

New Tools:

Data Analysis: This includes techniques which can be used for this process, but are not limited to proposal evaluation which includes, but not limited to:

a. Ensuring that proposal is complete
b. Response has been received full to the
    - Bid documents
    - Procurement SOW
    - Source selection criteria
    - any other documents that went out in the bid package

Interpersonal and team skills: This includes techniques such as negotiation, which is a discussion with the objective of reaching an agreement.

New Outputs:

Organization Process Assets Updates: Assets that can be updated as a result of this process include, but are not limited to:

a. Listings of prospective and prequalified sellers
b. Information on relevant experience with sellers, both good and bad

---

12.3 Control Procurements

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Monitoring and Controlling	**12.3 Control Procurements**	**12.3 Control Procurements**
Inputs	.1 Project management plan	.1 Project management plan
	.2 Procurement ~~documents~~	.2 Project documents
	.3 Agreements	.3 Agreements
	.4 Approved change requests	.4 Procurement documentation
	~~.5 Work performance reports~~	.5 Approved change requests
	.6 Work performance data	.6 Work performance data
		.7 Enterprise environmental factors
		.8 Organizational process assets
Tools & Techniques	~~.1 Contract change control system~~	.1 Expert judgment
	~~.2 Procurement performance reviews~~	.2 Claims administration
	.3 Inspections and audits	.3 Data analysis
	.4 Performance reporting	.4 Inspection
	.5 Payment systems	.5 Audits
	.6 Claims administrations	
	~~.7 Records management system~~	
Outputs	.1 Work performance information	.1 Closed procurements
	.2 Change requests	.2 Work performance information
	.3 Project management plan updates	.3 Procurement documentation updates
	.4 Project documents updates	.4 Change requests
	.5 Organizational process assets updates	.5 Project management plan updates
		.6 Project documents updates
		.7 Organizational process assets updates

New Inputs:

Project Documents: The project documents for this process include, but are not limited to:

a. Assumption log (described in 4.1.3.2)
b. Lessons learned register (described in 4.4.3.1)

c. Milestone list (described in 6.2.3.3)
d. Quality reports (described in 8.2.3.1)
e. Requirements documentation (described in 5.2.3.1)
f. Requirements traceability matrix (described in 5.2.3.2)
g. Risk register (described in 11.2.3.1)
h. Stakeholder register (described in 13.1.3.1)

Enterprise Environmental Factors: Factors which can influence this process include, but are not limited to:

a. Marketplace conditions
b. Financial management system
c. Buying organization's code of ethics

Organization Process Assets: Assets which can influence this process include, but are not limited to procurement policies.

New Tools:

Data Analysis: This includes techniques which can be used for this process, but are not limited to:

a. Performance reviews
b. Earned value analysis (EVA) (described in 7.4.2.2)
c. Trend analysis (described in 4.5.2.2)

New Outputs:

Closed Procurements: The buyer, usually through its authorized procurement administrator, provides the seller with formal written notice that the contract has been completed. Requirements for formal procurement closure are usually defined in the terms and conditions of the contract and are included in the procurement management plan. Typically, all deliverables should have been provided on time and meet technical and quality requirements, there should be no outstanding claims or invoices, and all final payments should have been made. The project management team should have approved all deliverables prior to closure.

Procurement Documentation Updates: The documentation regarding procurements includes but it not limited to:

a. Supporting schedules
b. Requested unapproved contract changes
c. Approved change requests
d. Seller-developed technical documentation and other work performance information, such as deliverables, seller performance reports and warranties
e. Financial documents including invoices and payment records
f. Results of contract-related inspections

Close Procurements (5th Ed – Removed)

Note: This Close Procurements process in the 5th edition has been removed. The function of the Close Procurement process is now captured within Control Procurements and Close Project or Phase.

Research shows that few project managers have the authority to formally and legally close a contract. Project managers are responsible to determine that work is complete, records are indexed and archived, and responsibilities are transferred appropriately. Thus, work associated with Close Procurements is now within the Control Procurement processes.

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Closing	**12.4 Close Procurements**	
Inputs	~~.1 Project management plan~~	
	~~.2 Procurement documents~~	
Tools & Techniques	~~.1 Procurement audits~~	
	~~.2 Procurement negotiations~~	
	~~.3 Records management system~~	
Outputs	~~.1 Closed procurements~~	
	~~.2 Organizational process assets updates~~	

SECTION 13: Project Stakeholder Management

13.1 Identify Stakeholders

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Initiating	**13.1 Identify Stakeholders**	**13.1 Identify Stakeholders**
Inputs	1. Project charter	.1 Project charter
	~~2. Procurement documents~~	.2 Business documents
	3. Enterprise environmental factors	.3 Project management plan
	4. Organizational process assets	.4 Project documents
		.5 Agreements
		.6 Enterprise environmental factors
		.7 Organizational process assets
Tools & Techniques	~~.1 Stakeholder analysis~~	.1 Expert judgment
	.2 Expert judgment	.2 Data gathering
	.3 Meetings	.3 Data analysis
		.4 Data representation
		.5 Meetings
Outputs	.1 Stakeholder register	.1 Stakeholder register
		.2 Change requests
		.3 Project management plan updates
		.4 Project documents updates

New Inputs:

Business Documents: The business documents for this process include, but are not limited to:

a. Business case (described in 1.2.6.1)
b. Benefits management plan (described in 4.1.1.1)

Project Management Plan: Since the project management plan is not available when initially identifying stakeholders, once it has been developed, the components that can be helpful in this process include, but are not limited to:

a. Communications management plan (described in 10.1.3.1)

b. Stakeholder engagement plan (described in 13.2.3.1)

Project Documents: The project documents for this process include, but are not limited to:

a. Change log (described in 4.6.3.3)
b. Issue log (described in 4.3.3.3)
c. Requirements documentation (described in 5.2.3.1)

Agreements: The parties of a procurement agreement are project stakeholders

New Tools:

Data Gathering: This includes techniques which can be used for this process, but are not limited to:

a. Questionnaires and surveys (described in 5.2.2.2)
b. Brainstorming techniques (described in 4.1.2.2) including:
    - Brainstorming
    - Brain writing

Data Analysis: This includes stakeholder analysis techniques which can be used for this process, but are not limited to:

a. List of stakeholders and relevant information
b. Positions in the organization
c. Roles on the project
d. Expectations, attitudes, their level of support for the project and interest in information about the project
e. Stakeholder stakes include but not limited to a combination of:
    - Interest
    - Rights (legal or moral rights)
    - Ownership
    - Knowledge
    - Contribution
    - Power/interest, power/influence or impact/influence grid
    - Stakeholder cube with multiple dimensions
    - Salience model
    - Directions of influence (upward, downward, outward, sideward)
    - Prioritization
f. Document analysis (described in 5.2.2.3)

Data Representation: A data representation techniques that may be used in this process but is not limited to stakeholder mapping/representation:

a. Power/interest grid, power influence grid or impact/influence grid.

New Outputs:

Change Requests: During the first iteration of identifying stakeholders, there will not be any change requests. As stakeholder identification continues throughout the project, new stakeholders, or new

information about stakeholders, may result in a change request to the product, project management plan, or project documents. Change requests are processed for review and disposition through the Perform Integrated Change Control process.

Project Management Plan Updates: Components of the project management plan that may require a change request as a result of this process include, but not limited to:

a. Requirements management plan (described in 5.1.1.2)
b. Communications management plan (described in 10.1.3.1)
c. Risk management plan (described in 11.1.3.1)
d. Stakeholder engagement plan (described in 13.2.3.1)

Project Documents Updates: The project documents that may be updated as a result of this process include, but are not limited to:

a. Assumption log (described in 4.1.3.2)
b. Issue log (described in 4.3.3.3)
c. Risk register (described in 11.2.3.1)

13.2 Plan Stakeholder Management changed to Plan Stakeholder Engagement

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Planning	**13.2 Plan Stakeholder Management**	**13.2 Plan Stakeholder Engagement**
Inputs	.1 Project management plan	.1 Project charter
		.2 Project management plan
	~~.2 Stakeholder register~~	.3 Project documents
	.3 Enterprise environmental factors	.4 Agreements
	.4 Organizational process assets	.5 Enterprise environmental factors
		.6 Organizational process assets
Tools & Techniques	.1 Expert judgment	.1 Expert judgment
	.2 Meetings	.2 Data gathering
	~~.3 Analytical techniques~~	.3 Data analysis
		.4 Decision making
		.5 Data representation
		.6 Meetings
Outputs	.1 Stakeholder ~~management~~ plan	.1 Stakeholder engagement plan

New Inputs:

Project Documents: The project documents for this process include, but are not limited to:

a. Assumption log (described in 4.1.3.2)
b. Change log (described in 4.6.3.3)
c. Issue log (described in 4.3.3.3)
d. Project schedule (described in 6.5.3.2)
e. Risk register (described in 11.2.3.1)
f. Stakeholder register (described in 13.1.3.1)

Agreements: Coordination involves working with the procurement/contracting group in the organization to ensure contractors and suppliers are effectively managed.

New Tools:

Data Gathering: This includes techniques which can be used for this process, but are not limited to benchmarking, by comparing with information from other organizations or other projects that are considered to be world class.

Data Analysis: This includes techniques which can be used for this process, but are not limited to:

a. Assumptions and constraint analysis (described in 11.2.2.3)
b. Mind mapping (described in 5.2.2.3)
c. Root cause analysis (described in 8.2.2.2)
d. Stakeholder engagement assessment matrix
e. SWOT analysis (described in 11.2.2.3)

Decision Making: This includes techniques which can be used for this process, but are not limited to prioritization/ranking.

Data Representation: A data representation techniques that may be used in this process but is not limited to:

a. Mind mapping
b. Stakeholder engagement assessment matrix

New Outputs: None

13.3 Manage Stakeholder Engagement

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Executing	**13.3 Manage Stakeholder Engagement**	**13.3 Manage Stakeholder Engagement**
Inputs	~~.1 Stakeholder management plan~~	.1 Project management plan
	~~.2 Communications management plan~~	.2 Project documents
	~~.3 Change Log~~	.3 Enterprise environmental factors
	.4 Organizational process assets	.4 Organization Process assets
Tools & Techniques	.1 Communication ~~methods~~	.1 Expert judgment
	.2 Interpersonal skills	.2 Communication skills
	~~.3 Management skills~~	.3 Interpersonal and team skills
		.4 Ground rules
		.5 Meetings
Outputs	~~.1 Issue log~~	.1 Change requests
	.2 Change requests	.2 Project management plan updates
	.3 Project management plan updates	.3 Project documents updates
	.4 Project documents updates	
	~~.5 Organizational process assets updates~~	

New Inputs:

Project Management Plan: The components of the project management plan that would helpful in this process include, but not limited to:

a. Communications management plan (described in 10.1.3.1)
b. Risk management plan (described in 11.1.3.1)
c. Stakeholder engagement plan (described in 13.2.3.1)

Project Documents: The project documents for this process include, but are not limited to:

a. Change log (described in 4.6.3.3)
b. Issue log (described in 4.3.3.3)
c. Lessons learned register (described in 4.4.3.1)
d. Stakeholder register (described in 13.1.3.1)

Enterprise Environment Factors: Factors that can influence this process include, but are not limited to:

a. Organizational culture, political climate, and governance structure of the organization
b. Personnel administration policies
c. Stakeholder risk thresholds
d. Established communication channels
e. Global, regional, or local trends, practices, or habits
f. Geographic distribution of facilities and resources

New Tools:

Expert Judgment: Expertise should be considered from individuals or groups with specialized knowledge in the following topics:

a. Politics and power structures in the organization and outside the organization
b. Environment and culture of the organization and outside the organization
c. Analytical and assessment techniques to be used for stakeholder engagement processes
d. Communication methods and strategies
e. Characteristics of stakeholders, stakeholder groups and organizations involved in the current project that may have been involved in previous projects
f. Requirements management, vendor management and change management

Communication Skills: Skills that can be used for this process include, but are not limited to:

a. Communication competence
b. Feedback
c. Nonverbal
d. Presentations

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to:

a. Conflict management (described in 9.5.2.1)
b. Cultural awareness (described in 10.1.2.6)
c. Negotiation (described in 12.2.2.5)
d. Observation/conversation (described in 5.2.2.6)
e. Political awareness (described in 10.1.2.6)

Ground Rules: Ground rules set the expected behavior for project team members, as well as other stakeholders, with regard to stakeholder engagement

Meetings: Types of meetings that can be used in the process include, but are not limited to:

a. Decision making
b. Issue resolution
c. Lessons learned and retrospectives
d. Project kick-off
e. Sprint/iteration planning
f. Status updates

New Outputs: None

13.4 Control Stakeholder Engagement changed to Monitor Stakeholder Engagement

Process Group	PMBOK 5th Edition	PMBOK 6th Edition
Monitoring and Controlling	**13.4 Control Stakeholder Engagement**	**13.4 Monitor Stakeholder Engagement**
Inputs	.1 Project management plan	.1 Project management plan
	~~.2 Issue log~~	.2 Project documents
	.3 Work performance data	.3 Work performance data
	.4 Project documents	.4 Enterprise environmental factors
		.5 Organizational process assets
Tools & Techniques	~~.1 Information Management Systems~~	.1 Data analysis
	~~.2 Expert judgment~~	.2 Decision making
	.3 Meetings	.3 Data representation
		.4 Communication skills
		.5 Interpersonal and team skills
		.6 Meetings
Outputs	.1 Work performance information	.1 Work performance information
	.2 Change requests	.2 Change requests
	.3 Project management plan updates	.3 Project management plan updates
	.4 Project documents updates	.4 Project documents updates
	~~.5 Organizational process assets updates~~	

New Inputs:

Enterprise Environment Factors: Factors that can influence this process include, but are not limited to:

a. Organizational culture, political climate, and governance structure of the organization
b. Personnel administration policies
c. Stakeholder risk thresholds
d. Established communication channels
e. Global, regional, or local trends, practices, or habits
f. Geographic distribution of facilities and resources

Organizational Process Assets: Assets that can influence this process include, but are not limited to:

a. Corporate policies and procedures for social media, ethics and security
b. Corporate policies and procedures for issue, risk, change, and data management
c. Organizational communication requirements
d. Standardized guidelines for development, exchange, storage and retrieval of information
e. Historical information from previous projects

New Tools:

Data Analysis: This includes techniques which can be used for this process, but are not limited to:

a. Alternatives analysis (described in 9.2.2.5)
b. Root cause analysis (described in 8.2.2.2)
c. Stakeholder analysis (described in 13.1.2.3)
d. Stakeholder engagement assessment matrix (described in 13.2.2.3)

Decision making: The techniques that can be used this process include, but are not limited to:

a. Multicriteria decision analysis (described in 8.1.2.4)
b. Voting (described in 5.2.2.4)

Communication Skills: Techniques that can be used for this process include, but are not limited to:

a. Feedback (described in 10.2.2.3)
b. Presentations and other verbal communications (described in 10.2.2.3)

Data Representation: A data representation techniques that is used in this process includes but is not limited to stakeholder engagement.

Interpersonal and Team Skills: Skills that can be used for this process include, but are not limited to:

a. Active listening (described in 10.2.2.6)
b. Cultural awareness (described in 10.1.2.6)
c. Leadership (described in 9.5.2.1)
d. Networking (described in 10.2.2.6)
e. Political awareness (described in 10.1.2.6)

New Outputs: None

CONTRIBUTORS

Asad Naveed, PMP®, RMP®, MEF-CECP

Asad Naveed has over 20 years of experience in various industries like Telecommunications, Electronics, IT in USA, Middle East, Canada and Pakistan. He is adept in System Engineering & Planning, Testing & Commissioning, Training & Teaching, Technical Support, Project Management, Troubleshooting, Documentation, Standards, Market Research, Product Comparisons, Technology Management, Vendor Management, etc.

He has contributed in a number of Fortune 500 and other Companies (Lucent Technologies, Alcatel, IBM, Celestica, HBC, KFUPM, PTCL, PMI® and Telefocal) and widely travelled in Middle East, Europe, Asia, Africa, Oceania and North America.

Asad holds Master's and Bachelor's Degrees in Electrical Engineering from accredited universities. He is blessed with MEF-CECP, PMI-PMP® and PMI-RMP® Certifications. In addition, he has advanced certifications from Cisco, Sun and Lucent Technologies. He has strong qualities and skills in leadership, teamwork, analysis, negotiation and communication. He has provided trainings to a number of different clients in Africa, Middle East, Asia and Oceania. He is an expert trainer and prepares the student to pass PMP in first attempt. In addition, he has conducted a number of sessions for training on MS Project, Primavera, Contract Management, and related topics.

Currently he is engaged in multiple roles simultaneously. While contributing in telecom industry as General Manager, he is acting as Freelance trainer, providing PMP and Telecom Trainings, and acting as Visiting Faculty in CASE (Center for Advanced Studies in Engg), Islamabad, Pakistan.

Email: asadnaveed@hotmail.com
Web: www.projectias.com
LinkedIn: https://www.linkedin.com/in/asadnaveed1

Erjola Mimani, PMP®, PSM I

Erjola Mimani is a leading project management consultant from Albania.

She started out as a software developer in the field of enterprise resource planning, moving to management and then to management consulting.

Erjola combines her strong IT background and extensive management experience with exceptional communication skills to help organizations implement complex projects.

She has overseen development and implementation of business solutions for major domestic and international companies across industries, including KPMG, Vodafone, Deutsche Telecom, Coca-Cola, Raiffeisen Bank.

In recent years, Erjola has also turned to training, helping hundreds of professionals in Albania and the region improve their management skills.

Erjola has a bachelor degree in computer sciences, a master's degree in management. She is a certified PMP® professional.

Email: erjola.mimani@gmail.com
LinkedIn: https://www.linkedin.com/in/erjola-mimani/

Greta Blash, MA, PMP®, PMI-ACP, PMI-PBA, CSM

Greta Blash is a certified project management professional (PMP®) who also holds additional PMI® certifications as an agile certified professional (PMI-ACP®) and a professional business analyst (PMI-PBA®). She has extensive experience as an executive and consulting Information Technology (IT) professional, both domestically and internationally. She has provided consulting and training support in program, product and project management, consulting and training to global organizations world-wide. Her IT background includes data base design, data management and agile scrum, as well as customer-facing implementation requirements and conversions, including Business Intelligence and Customer Relationship Management (CRM) applications.

Greta has been active in PMI® for over 10 years and has served on numerous local PMI® chapter boards, as well as at a regional level supporting academic and military outreach initiatives. She has spoken at several PMI® Global events, as well as being a frequent speaker for PMI® chapters in Region 7. She most recently was selected as a SME on the new Business Analysis Body of Knowledge, as well as a key reviewer on the new foundational standards, including Program Management, Project Management, and Agile. She has just published the second edition of the book she jointly wrote with her husband, Steve Blash, *The Basics of Good Project Management*, based on a webinar jointly presented by the Orange County PMI® chapter and Cal Southern University, available now on YouTube.

Greta has an undergraduate degree in math and music and a graduate degree in Information Management. She has taught high school math, as well as the full graduate project management curriculum as part of a Masters of Project Management degree program. In her spare time, she enjoys compiling her extensive family history, traveling internationally, as well as being with her two daughters and four grandchildren.

Email: greta@facilitatedmethods.com
Web: http://facilitatedmethods.com
LinkedIn: https://www.linkedin.com/in/gretablash

Jason Saetrum, PMP®, ASQ® CSSBB, IASSC ATA™, MCP, Project+™ Certified

With over twenty-one years of experience, Jason Saetrum has managed teams of more than 600 hundred employees across globally dispersed locations. His professional experience includes IT, Contact Centers, Customer Service, Mining, Business and Operational design, Consulting, Training, and Investment Banking among many others. Currently, he has been busy with training certification courses on PMP®, Lean Six Sigma Green and Black Belt, and Microsoft® Office applications. In addition, he spends his time outside the classroom consulting and writing curricula for various training companies, including his own, Mental Steel, LLC.

You will soon find his new, direct to consumer, material on Amazon, MentalSteel.com, and on InstructorSeries.com.

Jason holds active certifications in PMP® from PMI®, Certified Six Sigma Black Belt (CSSBB) and Green Belt (CSSGB) from the American Society for Quality (ASQ®), Microsoft® Certified Professional (MCP) in Project 2013, Project+™ Certified from CompTIA®, an Accredited Training Associate (ATA™) with the International Association for Six Sigma Certification (IASSC), and holds a Bachelor's of Science in Business Administration from the University of Utah.

Email: jason@mentalsteel.com
Web: http://www.mentalsteel.com
LinkedIn: https://www.linkedin.com/in/thesolutionprovider

Kavya Gupta, PMP®

Kavya Gupta is a certified project management professional (PMP®) with an extensive experience in client servicing focusing particularly on leading operational improvement projects aiming to provide structured guidance in assessing the value of the customer service, ensuring a successful outcome for every client she works with. She's also an active member of Project Management Institute (PMI®).

Much of Kavya's professional experience has come from working with dynamic range of industrial domains such as Real Estate Management, Information Technology, Banking, Insurance and Telecommunication where she developed superior skills along with an outstanding commitment to customer service. Armed with these attributes, she has an attention to detail, excellent rapport-building skills and the vitality and energy she brings to each client engagement and is committed to exceeding client expectation through providing innovative solutions in helping them fulfil their requirements.

In her spare time, Kavya enjoys spending time with her family & friends, reading, cooking and seeking adventure in the outdoors. To know more about her, feel free to directly get in touch with her by sending her an email.

Email: kavyanagpal6@gmail.com
LinkedIn: https://www.linkedin.com/in/guptakavya/

Oliver Yarbrough, M.S., PMP®

Oliver Yarbrough is a speaker, author, trainer, and leading expert in project management, PMP® Exam Prep, and growth strategies to raise competitiveness.

His professional career includes positions with Fortune 500 companies such as Lucent Technologies, Staples, and Sprint, along with his own successful business ventures. Oliver's accolades include maintaining an internationally recognized Project Management Professional (PMP®) certification. Additionally, he has been featured in the Atlanta Business Chronicle's "People on the Move."

Recently, he completed his term as Vice President of the National Contract Management Association (NCMA) – Atlanta Chapter. Oliver is also an active member of the Project Management Institute (PMI®).

Web: http://www.oliveryarbrough.com
LinkedIn: https://www.linkedin.com/in/OliverYarbrough/

Samuel Odemo, B.Tech, PMP®

Samuel Odemo is an exceptional Facilitator and Project Controls Specialist.

He holds a Bachelor in Technology (B.Tech) in Industrial Mathematics and recently enrolled in the WQU Master of Science in Financial Engineering (MSFE) program.

Samuel has over 10 years' experience working with various private and corporate organizations in Nigeria.

A Strategic Projects Controls Professional with experience in planning and progress reporting as well as analysis and simulations of new schedules required to ensure timely and successful project delivery.

As part of his professional qualification, Samuel is a certified Project Management Professional (PMP®) by the Project Management Institute, USA. He is working towards certifications in Risk and Scheduling Management.

Recently selected for a Project Management Educational Foundation (PMIEF) Professional Development Scholarship for Scheduling.

In addition, he has Membership and Certification in Planning & Scheduling with the Guild of Project Controls.

Email: samuel.odemo@gmail.com
Blog: https://sayodemo.wordpress.com/
LinkedIn: https://www.linkedin.com/in/samuelodemo

Steve Blash, MA, PMP®, PMI-ACP

Steve Blash is a senior I. T. consultant at Facilitated Methods, who is a provider of training and consulting in agile, business analysis and project management. He is a certified Project Management Professional (PMP) ® and a Certified Agile Practitioner, (PMI-ACP) ® with exceptional Information Technology knowledge and has extensive agile, business analysis and project management experience managing all aspects of large complex projects. His roles on agile projects have been from managing a project to performing the role of an agile coach and scrum master. Areas of expertise include business agile methods, requirements analysis, lean, business intelligence, CRM, web analytics, IT infrastructure and wireless technology.

He has written numerous articles in ProjectTimes.com, BATimes.com and AllPM.com as well as for the local PMI chapter's newsletter. He also has a YouTube video on managing conflict, given several webinars and is co-author of the *Basics of Good Project Management* book. He is the past president of the Southern Nevada (Las Vegas) PMI® chapter (PMI-SNC) and has participated in, and spoken at a number of PMI® Global events, as well as a frequent speaker for Region 7 chapter meetings and conferences.

Steve has an undergraduate degree in Economics and a master's degree in Information Management. He has taught the full graduate project management curriculum as part of a Masters of Project Management degree program. In his spare time, he enjoys his garden, traveling internationally, and spending time with his two daughters and four grandchildren.

Email: steve@facilitatedmethods.com
Web: http://facilitatedmethods.com
LinkedIn: https://www.linkedin.com/in/steve-blash-pmp-pmi-acp-5453088

Varun Anand, PMP®, CSM

Mr. Varun Anand is an internationally renowned PMP trainer with more than 10 years of extensive work experience as a Program/Project Manager. His expertise encompasses a dynamic range of industrial domains such as E-Commerce, Automobile, Non-Profit, Mortgage, Infrastructure, Education, Insurance and Telecommunication. He is a business strategist who has managed a wide variety of multimillion-dollar projects focused on aligning business goals with technology solutions to drive process improvements, competitive advantage and bottom-line gains. Varun is also a Certified Scrum Master with extensive work experience with Agile/Scrum methodologies.

Varun's academic career started off with a Bachelor's in Engineering with a Computer Science major from Apeejay College of Engineering (Haryana, India), followed by a Masters in Engineering Management from University of Maryland, Baltimore County (Maryland, USA). Varun's professional career involved companies such as eBay, American Association of Retired Persons (AARP), Infosys and Genpact, where he became an asset for corresponding project teams by adding value through his profound expertise. Through his knowledge and a passion for education, he has trained thousands of people and has consequently gained wide respect in the project management industry.

Varun's extroverted personality is expressed in his day-to-day attitude of living life to the fullest. Since childhood, he has always been passionate about cricket and continues to play for different sports club in the US. Apart from being exceptional at PMP training, he is an ardent fan of watching movies and travelling with friends. To know more about him, feel free to directly get in touch with him by sending him an email.

Email: services@eduhubspot.com
Web: https://eduhubspot.com
LinkedIn: https://www.linkedin.com/in/varun-anand-pmp%C2%AE-csm-3a0b3159/
