Contemporary Project Management

FOURTH EDITION

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MS Project 2016 Instructions in *Contemporary Project Management 4e*

Chapter	MS Project
3	MS Project 2016 Introduction
	Ribbon, Quick Access Toolbar, view panes, Zoom Slider, Shortcuts, Scheduling Mode Selector
	Setting Up Your First Project
	Auto schedule, start date, identifying information, summary row
	Create Milestone Schedule
	Key milestones, zero duration, must finish on, information
7	Set Up a Work Breakdown Structure (WBS)
	Understand the WBS definitions and displays
	Enter WBS Elements (tasks), Create the outline,
	Insert WBS Code Identifier column, Hide or show subtasks detail
8	Using MS Project for Critical Path Schedules
	Set Up the Project Schedule
	Set or update the project start date, Define organization's working and nonworking time
	Build the Network Diagram and Identify the Critical Path
	Enter tasks and milestones, edit the timescale, understand and define task dependencies, assign task duration estimates, identify the critical path, understand the network diagram view
	Display and Print Schedules
9	Define Resources
	Resource views, max units, resource calendars
	Assigning Resources
	Basic assignment, modify an assignment
	Identify Overallocated Resources
	Resource usage and Detailed Gantt views together
	Overallocated Resources
	Finding overallocated resources, dealing with overallocations
	Crashing a Critical Path Activity
10	Develop Bottom-up Project Budget
	Assignment costs, task costs, various cost perspectives
	Develop Summary Project Budget
12	Baseline the Project Plan
	First time baseline, subsequent baselines, viewing variances
14	Using MS Project to Monitor and Control Projects
	What Makes a Schedule Useful?
	How MS Project recalculates based on reported actuals, current and future impacts of variances, define the performance update process (who, what, when)
	Steps to Update the Project Schedule
	Acquire performance data, set and display status date, Enter duration-based performance data, reschedule remaining work, revise future estimates
15	Close Project
	Creating project progress reports, sharing reports, export a report to MS Excel, archive project work, capture and publish lessons learned

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PMBOK® Guide 6e Coverage in *Contemporary Project Management 4e*

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Source: Adapted from *A Guide to the Project Management Body of Knowledge (PMBOK® Guide), 6th ed.* (Newtown Square, PA: Project Management Institute, Inc., 2017): 31.

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Contemporary Project Management

ORGANIZE LEAD PLAN PERFORM

FOURTH EDITION

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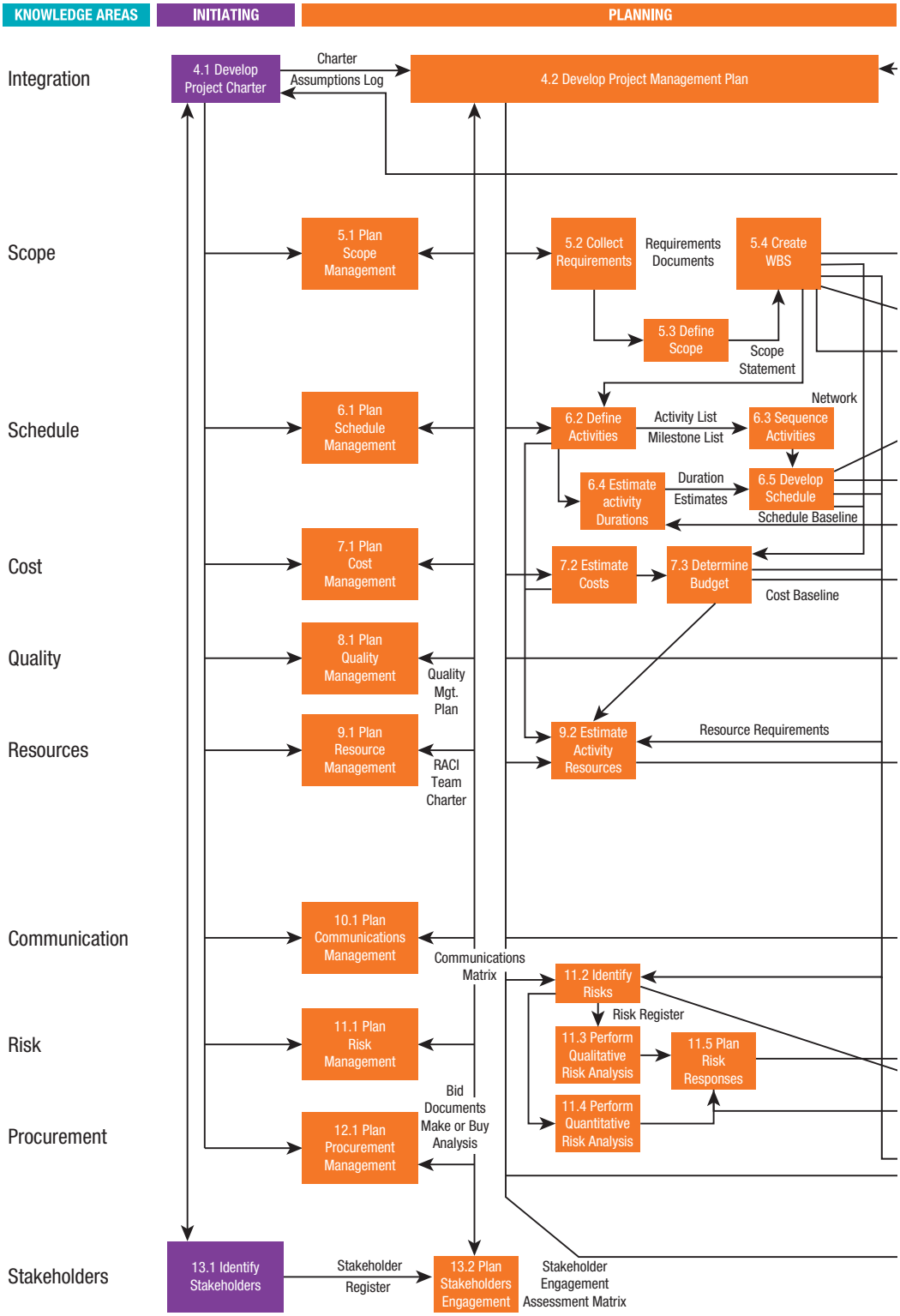
	Project Resource Assignment Matrix

Flowchart of PMBOK Processes



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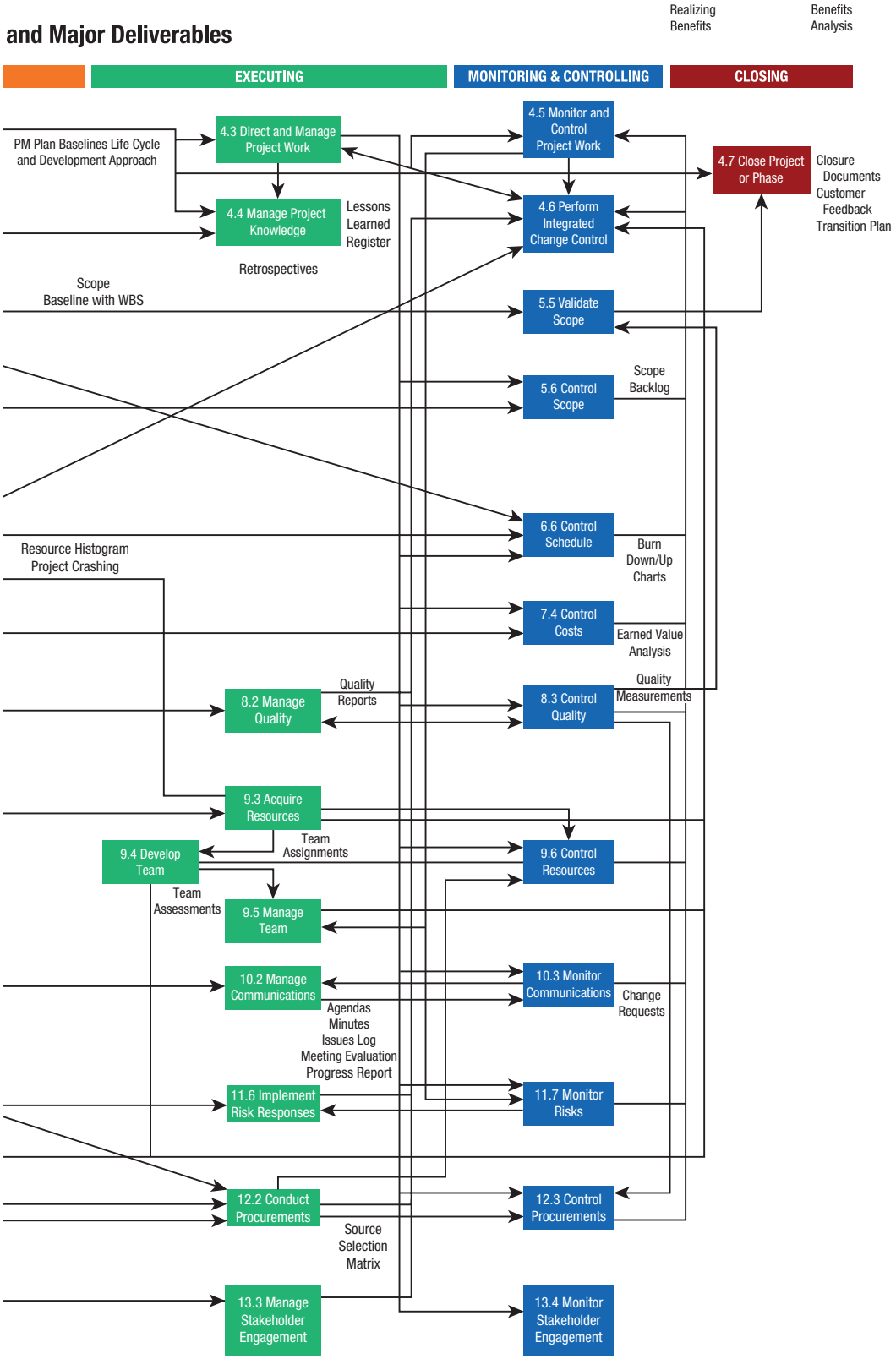

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Preface

While project managers today still need to use many techniques that have stood the test of several decades, they increasingly also must recognize the business need for a project, sort through multiple conflicting stakeholder demands. They must know how to deal with rapid change, a myriad of communication issues, global and virtual project teams, modern approaches to quality improvement, when to tailor their project management approach to include methods and behaviors from Agile, and many other issues that are more challenging than those in projects of the past.

Contemporary project management utilizes the tried-and-true project management techniques along with modern improvements such as the most current versions of Microsoft® Project Professional 2016, the sixth edition of the *Guide to the Project Management Body of Knowledge (PMBOK® Guide),* and many approaches derived from adaptive (Agile) project management. Contemporary project management also uses many tools and understandings that come from modern approaches to quality and communications, expanded role definitions, leadership principles, human strengths, and many other sources. Contemporary project management is scalable, using simple versions of important techniques on small projects and more involved versions on more complex projects.

Distinctive Approach

This book covers contemporary project management topics using contemporary project management methods. For example, when considering the topic of dealing with multiple stakeholders, every chapter was reviewed by students, practitioners, and academics. This allowed simultaneous consideration of student learning, practitioner realism, and academic research and teaching perspectives.

The practical examples and practitioner reviewers came from a variety of industries, different parts of the world, and from many sizes and types of projects in order to emphasize the scalability and universality of contemporary project management techniques.

New to This Edition

- ***Core, behavioral, and technical learning objectives***. We have expanded the number of learning objectives and classified them as core, behavioral, or technical. About half of the objectives are core: what we believe every student of project management should learn. A professor could teach a solid project management introductory class by deeply using only the core objectives. On the other hand, there are measurable student objectives for either a behavioral or a technical approach. All suggested student assignments and questions are tied specifically to one of the learning objectives. A professor could use this text for a two-semester sequence that emphasizes both in-depth behavioral and technical approaches.
- ***Videos***. Exclusively available to those using the MindTap product for this book, we have created dozens of short (average time, five minutes) videos to show the art of many of the techniques. These demonstrate the use of many of the techniques in a by-hand or spreadsheet fashion as well as using Microsoft Project 2016. Several questions that can be assigned to students are included with the videos that

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demonstrate how to use Microsoft Project to complement learning. Answers (sometimes definitive, sometimes representative, depending on the nature of the technique) are included in the instructor's manual (IM).

- ***Extensive flowchart to help the sixth edition of the* PMBOK® Guide *come to life***. All sixth edition *PMBOK® Guide* knowledge areas, processes, and process groups, plus major deliverables from each process and the primary workflows between them, are specifically included in an interactive, color-coded flowchart that is included in full inside the back cover of the text. We also start each chapter by showing the portion of the flowchart that is covered in that chapter. We now use definitions both from the *PMBOK® Guide, Sixth Edition* and also from more than a dozen Project Management Institute specialized Practice Guides and Standards. The end of each chapter contains specific suggestions for PMP® and CAPM® test preparation pertaining to the chapter's topics plus ten *PMBOK® Guide*-type questions that are typical of what would be seen on PMP® and CAPM® exams. Appendix A gives general study suggestions for the CAPM® and PMP® exams.
- ***Project deliverables***. A list of 38 project deliverables that can be used as assignments for students and in-class exercises are included in Appendix D. Each deliverable is specifically tied to a student learning objective and shown on the *PMBOK® Guide* flowchart. About half of these are core, while the others are behavioral or technical. Examples of completed deliverables are included in the text. Teaching suggestions and grading rubrics are included in the IM. Appendix D identifies the type of objective, chapter covered, and *PMBOK® Guide* process, knowledge area, and process group in which the deliverable is typically created on a real project.
- ***Substantial increase in Agile coverage***. Agile techniques and methods are considered much more often than even three years ago. As such, many experienced project managers who have also become Agile proponents have contributed to the increased Agile coverage in this book. At multiple points in most chapters, if Agile methods or suggested behaviors are different from traditional project management, these variations are noted. We use an Agile icon to draw attention to these. We also have created Appendix B, which is a bulleted list of the approximately 180 differences between Agile and traditional project management that are discussed in the book. This extensive coverage allows a professor to teach project management emphasizing an Agile approach, if desired. It also allows a professor to develop an Agile project management course.
- ***Two new continuing project examples***. We have created two project examples that are included in all 15 chapters of the text. One project is a construction project by a for-profit company that is planned and managed in a traditional fashion. The other is a development project at a nonprofit that is planned and managed in a more (but not exclusively) Agile fashion. In Chapter 1, we introduce both these case studies. After that, we alternate chapters, with each chapter showing what one project did using the concepts and techniques of a chapter and posing questions for the students to answer about the other project. Answers to the questions are in the IM. This can be another useful vehicle for students to practice their skills and to generate class discussion.

Distinctive Features

- **PMBOK® Guide, Sixth Edition *approach***. This consistency with the current standard gives students a significant leg up if they decide to become certified Project Management Professionals (PMPs®) or Certified Associates in Project Management

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(CAPMs®). This text includes an color-coded *PMBOK® Guide, Sixth Edition* flowchart, all definitions consistent with PMI guides and standards, CAPM and PMP test preparation suggestions, and test practice questions.

- ***Actual project as learning vehicle***. A section at the end of each chapter lists deliverables for students to create (in teams or individually) for a real project. These assignments have been refined over the last two decades while working with the local PMI® chapter, which provided a panel of PMP® judges to evaluate projects from a practical point of view. Included in the IM are extensive tools and suggestions developed over the last 20 years for instructors, guiding them as they have students learn in the best possible way—with real projects. Students are encouraged to keep clean copies of all deliverables so they can demonstrate their project skills in job interviews. A listing of these deliverables is included in Appendix D.
- ***Student-oriented, measurable learning objectives***. Each chapter begins with a list of the core objectives for the chapter along with more in-depth behavioral and/or technical objectives for most chapters. The chapter also starts with showing the PMBOK® topics covered in the chapter. The chapter material, end-of-chapter questions and problems, PowerPoint® slides, all deliverables, and test questions have all been updated to correlate to specific objectives.
- ***Microsoft® Project Professional 2016 fully integrated into the fabric of eight chapters***. Microsoft® Project Professional 2016 is shown in a step-by-step manner with numerous screen captures. On all screen captures, critical path activities are shown in contrasting color for emphasis. We have created videos to demonstrate these techniques and developed questions tied to specific learning objectives that can be assigned to the videos to test student learning.
- ***Blend of traditional and modern methods***. Proven methods developed over the past half century are combined with exciting new methods, including Agile, that are emerging from both industry and research. This book covers the responsibilities of many individuals who can have an impact on projects both as they are practiced in traditional and in Agile environments, so aspiring project managers can understand not only their own roles, but also those of people with whom they need to interact.
- ***Integrated example projects***. A variety of experienced project leaders from around the world have contributed examples to demonstrate many of the techniques and concepts throughout the book. These highly experienced and credentialed managers have worked closely with the authors to ensure that the examples demonstrate ideas discussed in the chapter. The variety of industries, locations, and sizes of the projects help the students to visualize both how universal project management is and how to appropriately scale the planning and management activities.

Organization of Topics

The book is divided into four major parts. Part 1, **Organizing Projects,** deals with getting a project officially approved.

- Chapter 1 introduces contemporary project management by first tracing the history of project management and then discussing what makes a project different from an ongoing operation. Various frameworks that help one understand projects—such as the *PMBOK® Guide* and Agile—are introduced, as well as the executive-, managerial-, and associate-level roles in managing projects.
- Chapter 2 discusses how projects support and are an outgrowth of strategic planning, how a portfolio of projects is selected and prioritized, how a client company

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selects a contractor company to conduct a project, and how a contractor company secures project opportunities from client companies.

- Chapter 3 presents project charters in a step-by-step fashion. Short, powerful charters help all key participants to develop a common understanding of key project issues and components at a high level and then to formally commit to the project. Charters have become nearly universal in initiating projects in recent years. Microsoft® Project Professional 2016 is utilized to show milestone schedules within charters.

Part 2, **Leading Projects**, deals with understanding the project environment and roles and dealing effectively with team members and stakeholders.

- Chapter 4 deals with organizational capability issues of structure, life cycle, culture, and roles. The choices parent organizations make in each of these provide both opportunities and limitations to how projects can be conducted.
- Chapter 5 deals with leading and managing the project team. It includes acquiring and developing the project team, assessing both potential and actual performance of team members and the team as a whole, various types of power a project manager can use, and how to deal productively with project conflict.
- Chapter 6 introduces methods for understanding and prioritizing various stakeholder demands and for building constructive relationships with stakeholders. Since many projects are less successful due to poor communications, detailed communication planning techniques are introduced along with suggestions for managing meetings, an important channel of communication.

Part 3, **Planning Projects,** deals with all aspects of project planning as defined in the*PMBOK® Guide*. It proceeds in the most logical order possible to maximize effectiveness and stress continuity, so that each chapter builds on the previous ones, and students can appreciate the interplay between the various knowledge areas and processes.

- Chapter 7 helps students understand how to determine the amount of work the project entails. Specifically covered are methods for determining the scope of both the project work and outputs, the work breakdown structure (WBS) that is used to ensure nothing is left out, and how the WBS is portrayed using Microsoft® Project Professional 2016.
- Chapter 8 is the first scheduling chapter. It shows how to schedule project activities by identifying, sequencing, and estimating the durations for each activity. Then, critical path project schedules are developed, and methods are shown for dealing with uncertainty in time estimates, Gantt charts are introduced for easier communications, and Microsoft® Project Professional 2016 is used to automate the schedule development and communications.
- Chapter 9 is the second scheduling chapter. Once the critical path schedule is determined, staff management plans are developed, project team composition issues are considered, resources are assigned to activities, and resource overloads are identified and handled. Schedule compression techniques of crashing and fast tracking are demonstrated, and multiple alternative scheduling techniques including Agile are introduced. Resource scheduling is demonstrated with Microsoft® Project Professional 2016.
- Chapter 10 deals with project budgeting. Estimating cost, budgeting cost, and establishing cost controls are demonstrated. Microsoft® Project Professional 2016 is used for developing both bottom-up and summary project budgets.
- Chapter 11 demonstrates project risk planning. It includes risk management planning methods for identifying risks, establishing a risk register, qualitatively analyzing

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risks for probability and impact, quantitatively analyzing risks if needed, and deciding how to respond to each risk with contingency plans for major risks and awareness for minor risks.
- Chapter 12 starts by covering project quality planning. This includes explaining the development of modern quality concepts and how they distill into core project quality demands. Next, the chapter covers how to develop a project quality plan. It then ties all of the planning chapters together with discussions of a project kickoff meeting, a baselined project plan, and the ways Microsoft® Project Professional 2016 can be used to establish and maintain the baseline.

Part 4, **Performing Projects,** discusses the various aspects that must be managed simultaneously while the project is being conducted.

- Chapter 13 deals with project supply chain management issues. Some of these issues, such as developing the procurement management plan, qualifying and selecting vendors, and determining the type of contract to use are planning issues, but for simplicity, they are covered in one chapter with sections on how to conduct and control procurements and to improve the project supply chain.
- Chapter 14 is concerned with determining project results. This chapter starts with a balanced scorecard approach to controlling projects. Internal project issues covered include risk, change, and communication. Quality is also covered, with an emphasis on achieving client satisfaction. Financial issues discussed are scope, cost, and schedule, including how to use Microsoft® Project Professional 2016 for control.
- Chapter 15 deals with how to end a project—either early or on time. This includes validating to ensure all scope is complete, formally closing procurements and the project, knowledge management, and ensuring the project participants are rewarded and the clients have the support they need to realize intended benefits when using the project deliverables.

MindTap

MindTap is a complete digital solution for your project management course. It has enhancements that take students from learning basic concepts to actively engaging in critical thinking applications, while learning Project 2016 skills for their future careers.

The MindTap product for this book features videos from the authors that explain tricky concepts, videos that explain the finer points of what you can do with Project 2016, and quizzes and homework assignments with detailed feedback so that students will have a better understanding of why an answer is right or wrong.

Instructor Resources

To access the instructor resources, go to www.cengage.com/login, log in with your SSO account username and password, and search this book's ISBN (9781337406451) to add instructor resources to your account. Key support materials—instructor's manual with solutions, test bank in Word and Blackboard formats, data set solutions, and PowerPoint® presentations—provide instructors with a comprehensive capability for customizing their classroom experience. All student resources are also available on the instructor companion site.

- ***Instructor's Manual with Solutions***. Prepared by Tim Kloppenborg and updated by Kate Wells, based on their years of experience facilitating the student learning experience in their own project management classes (undergraduate, MBA, Masters in

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Health Informatics, and continuing education on six continents), with teaching in classroom, hybrid, and online formats, each chapter of the instructor's manual includes an overview of core, behavioral, and technical learning objectives, detailed chapter outlines, teaching recommendations for both classroom and online, and many specific suggestions for implementing community-based projects into your project management class. Solutions are also provided for all of the end-of-chapter content.

- ***Microsoft® Word Test Bank.*** Prepared for this edition by Joyce D. Brown, PMP® and Thomas F. McCabe, PMP® of the University of Connecticut, this comprehensive test bank builds upon the original test bank created by Kevin Grant of the University of Texas at San Antonio. The test bank is organized around each chapter's learning objectives. All test questions are consistent with the PMBOK®. Every test item is labeled according to its difficulty level, the learning objective within the textbook to which it relates, and its Blooms Taxonomy level, allowing instructors to quickly construct effective tests that emphasize the concepts most significant for their courses. The test bank includes true/false, multiple choice, essay, and quantitative problems for each chapter.
- ***Cognero™ Test Bank***. Cengage Learning Testing Powered by Cognero™ is a flexible, online system that allows you to author, edit, and manage test bank content from multiple Cengage Learning solutions; create multiple test versions in an instant; and deliver tests from your LMS, your classroom, or wherever you want. The Cognero™ test bank contains the same questions that are in the Microsoft® Word test bank.
- ***PowerPoint Presentations***. Prepared by Kate Wells, the PowerPoint presentations provide comprehensive coverage of each chapter's essential concepts in a clean, concise format. Instructors can easily customize the PowerPoint presentations to better fit the needs of their classroom.
- ***Templates***. Electronic templates for many of the techniques (student deliverables) are available on the textbook companion website. These Microsoft® Word and Excel documents can be downloaded and filled in for ease of student learning and for consistency of instructor grading.

Student Resources

Students can access the following resources by going to www.cengagebrain.com and searching 9781337406451. The companion website for this book has Excel and Word Project templates, data sets for selected chapters, and instructions for how to get access to a trial version of Microsoft Online Professional Trial. (Note that while we are happy to provide instructions for accessing this trial, Microsoft controls that access and we are not responsible for it being removed in the future.)

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- PMI's undergraduate curriculum guidelines development team,
- PMI's Global Accreditation Center,

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- Multiple chapters of the Project Management Institute,
- The Cincinnati and Louisville sections of the Center for Quality of Management,
- Project Management Executive Forum, and
- Agile Cincinnati.

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—Timothy J. Kloppenborg

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Timothy J. Kloppenborg is an Emeritus Professor of Management at Williams College of Business, Xavier University. He previously held faculty positions at University of North Carolina Charlotte and Air Force Institute of Technology and has worked temporarily at Southern Cross University and Tecnológico de Monterrey. He has authored over 100 publications, including 10 books, such as *Strategic Leadership of Portfolio and Project Management, Project Leadership,* and *Managing Project Quality*. His articles have appeared in *MIT Sloan Management Review*, *Project Management Journal, Journal of Management Education, Journal of General Management, SAM Advanced Management Journal, Information Systems Education Journal, Journal of Managerial Issues, Quality Progress, Management Research News,* and *Journal of Small Business Strategy*. In his capacity as the founding collection editor of portfolio and project management books for Business Expert Press, he has edited 14 books with more in the pipeline. Tim has been active with the Project Management Institute for over 30 years and a PMP® since 1991. He is a retired U.S. Air Force Reserve officer who served in transportation, procurement, and quality assurance. Dr. Kloppenborg has worked with over 150 volunteer organizations, many directly and others through supervising student projects. He has hands-on and consulting project management experience on six continents in construction, information systems, research and development, and quality improvement projects with organizations such Duke Energy, Ernst and Young LLP, Greater Cincinnati Water Works, Kroger, Procter & Gamble, TriHealth, and Texas Children's Hospital. Dr. Kloppenborg has developed and delivered innovative corporate training, undergraduate, MBA, and Executive MBA classes in project management, leadership, teamwork, and quality improvement and he teaches PMP Prep classes. He holds a BS in business administration from Benedictine College, an MBA from Western Illinois University, and a PhD in Operations Management from University of Cincinnati.

Dr. Vittal Anantatmula is a professor in the College of Business, Western Carolina University and a campus of University of North Carolina. He is also the Director of Graduate Programs in Project Management and was a recipient of excellence in teaching and research awards. Dr. Anantatmula is a Global Guest Professor at Keio University, Yokohama, Japan. He is a director and board member of the Project Management Institute Global Accreditation Center (PMI-GAC). He serves on the editorial board of several scholarly journals. At Western Carolina University, he was recognized with the University Scholar Award in 2017. He has won several other awards for excellence in both research and teaching.

Prior to joining Western Carolina University, he taught at The George Washington University. He worked in the petroleum and power industries for several years as an electrical engineer and project manager and as a consultant in several international organizations, including the World Bank. Dr. Anantatmula has authored more than 60 publications, five books, and about 50 conference papers. Two of his conference papers received the best paper award. His work has been published in scholarly journals, including *Project Management Journal, Journal of Knowledge Management, Journal of Management in Engineering, Journal of Information and Knowledge Management Systems,* and

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Kathryn N. Wells holds a master's degree in Education, as well as degrees in Organizational Communication and Spanish. Kate has a passion for teaching, in both academic and corporate settings. In addition to over a decade's experience in project management education, Kate is a top-producing real estate agent with Keller Williams. Her blend of experience in real estate—including working with many investors—and classroom teaching gives her a unique perspective and insights into many components of project management, including Planning, Communication, Stakeholder Management, and Project Control.

In addition to her work on *Contemporary Project Management,* Kate is the lead author of *Project Management Essentials* (2015) and co-author of *Project Management for Archaeology* (2017), both published by Business Expert Press. She has trained and consulted with several organizations around the world and has occasionally been contracted to provide translations of project management educational materials (Spanish to English). Some of her clients include the University of Cincinnati, Children's Hospital of Cincinnati, Givaudan International, and Tec de Monterrey University—where Kate has repeatedly served as visiting faculty at multiple campuses in Mexico. Kate is a certified project management professional (PMP).

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PART 1

ORGANIZING PROJECTS

ORGANIZE | LEAD | PLAN | PERFORM

Chapter 1
Introduction to Project Management

Chapter 2
Project Selection and Prioritization

Chapter 3
Chartering Projects

Organizing for success in project management includes several basic frameworks for understanding projects and tools to select, prioritize, resource, and initiate projects. Basic frameworks described in Chapter 1 include how the work of project management can be categorized by knowledge area and process group, how project success is determined, and how both plan-driven and adaptive approaches are frequently used. Chapter 2 describes how projects are investments meant to help achieve organizational goals. Tools are demonstrated to select, prioritize, and resource projects. Chapter 3 describes how charters are essential to initiating projects and then demonstrates how to construct each portion of a charter.

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CHAPTER 1

Introduction to Project Management

CHAPTER OBJECTIVES

After completing this chapter, you should be able to:

CORE OBJECTIVES:

- Define a project and project management in your own words, using characteristics that are common to most projects, and describe reasons why more organizations are using project management.
- Describe major activities and deliverables at each project life cycle stage.
- List and define the ten knowledge areas and five process groups of the project management body of knowledge (*PMBOK*®).
- Delineate measures of project success and failure, and reasons for both.
- Contrast predictive or plan-driven and adaptive or change-driven project life cycle approaches.

BEHAVIORAL OBJECTIVES:

- Identify project roles and distinguish key responsibilities for project team members.
- Describe the importance of collaborative effort during the project life cycle.

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I have returned from a successful climb of Mount Aconcagua in Argentina; at 22,841 feet, it is the highest peak in the world outside of the Himalayas. While there, seven other climbers died; we not only survived, but our experience was so positive that we have partnered to climb together again.

During the three decades that I've been climbing mountains, I've also been managing projects. An element has emerged as essential for success in both of these activities: the element of discipline. By discipline, I am referring to doing what I already know needs to be done. Without this attribute, even the most knowledgeable and experienced will have difficulty avoiding failure.

The deaths on Aconcagua are an extreme example of the consequences associated with a lack of discipline. The unfortunate climbers, who knew that the predicted storms would produce very hazardous conditions, decided to attempt the summit instead of waiting. They did not have the discipline that we demonstrated to act on our earlier decision to curtail summit attempts after the agreed-to turnaround time or in severe weather.

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PMBOK® 6E COVERAGE	
***PMBOK*® 6E**	**OUTPUTS**
1.2 Foundational Elements	Project Customer Trade-off Matrix
2.4 Organizational Systems	Project Success Definition
3.3 The Project Manager's Sphere of Influence	
3.4 Project Manager Competencies	
3.5 Performing Integration	

PMBOK® GUIDE

Topics:

- Project management introduction
- Project life cycle
- Stakeholders
- Project management process
- Project integration management

CHAPTER OUTPUTS

- Customer Trade-off Matrix
- Project Success Definition

I've experienced similar circumstances in project management. Often I have found myself under pressure to cast aside or shortcut project management practices that I have come to rely on. For me, these practices have become the pillars of my own project management discipline. One of these pillars, planning, seems to be particularly susceptible to challenge. Managing projects at the Central Intelligence Agency for three decades, I adjusted to the annual cycle for obtaining funding. This cycle occasionally involved being given relatively short notice near the end of the year that funds unspent by some other department were up for grabs to whoever could quickly make a convincing business case. While some may interpret this as a circumstance requiring shortcutting the necessary amount of planning in order to capture some of the briefly available funds, I understood that my discipline required me to find a way to do the needed planning and to act quickly. I understood that to do otherwise would likely propel me toward becoming one of the two-thirds of the projects identified by the Standish Group in their 2009 CHAOS report as not successful. I understood that the top 2 percent of project managers, referred to as Alpha Project Managers in a 2006 book of the same name, spend twice as much time planning as the other 98 percent of project managers. The approach that I took allowed me to maintain the discipline for my planning pillar. I preplanned a couple of projects and had them ready at the end of the year to be submitted should a momentary funding opportunity arise.

A key to success in project management, as well as in mountain climbing, is to identify the pillars that will be practiced with discipline. This book offers an excellent set of project management methods from which we can identify those pillars that we will decide to practice with the required levels of discipline. I believe that project management is about applying common sense with uncommon discipline.

—Michael O'Brochta, PMP, founder of Zozer Inc. and previously senior project manager at the Central Intelligence Agency

1-1 What Is a Project?

Frequently, a business is faced with making a change, such as improving an existing work process, constructing a building, installing a new computer system, merging with another company, moving to a new location, developing a new product, entering a new market, and so on. These changes are best planned and managed as projects.

Often, these changes are initiated due to operational necessity or to meet strategic goals, such as the following:

- Market demand
- Customer request

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- Technological advance
- Legal requirements or regulatory compliance
- Replace obsolete equipment, technology, system, or physical facility
- Crisis situation
- Social need

So, what is a project?

A **project** is a new, time-bound effort that has a definite beginning and a definite ending with several related and/or interdependent tasks to create a unique product or service. The word *temporary* is used to denote project duration; however, it does not mean that project duration is short; in fact, it can range from a few weeks to several years. Temporary also does not apply to the project deliverable, although project teams are certainly temporary.

A project requires an organized set of work efforts that are planned with a level of detail that is progressively elaborated on as more information is discovered. Projects are subject to limitations of time and resources such as money and people. Projects should follow a planned and organized approach with a defined beginning and ending. Project plans and goals become more specific as early work is completed. The project output often is a collection of a primary deliverable along with supporting deliverables such as a house as the primary deliverable and warrantees and instructions for use as supporting deliverables.

Taking all these issues into consideration, a project can be defined as "*a time-bound effort constrained by performance specifications, resources, and budget to create a unique product or service*."

Each project typically has a unique combination of stakeholders. **Stakeholders** are people and groups who can impact the project or might be impacted by either the work or results of the project. Projects often require a variety of people to work together for a limited time, and all participants need to understand that completing the project will require effort in addition to their other assigned work. These people become members of the project team and usually represent diverse functions and disciplines.

Project management is the art and science of using knowledge, skills, tools, and techniques efficiently and effectively to meet stakeholder needs and expectations. This includes work processes that initiate, plan, execute, control, and close work. During these processes, trade-offs must be made among the following factors:

- Scope (size and features)
- Quality (acceptability of the results)
- Cost
- Schedule
- Resources
- Risks

When project managers successfully make these trade-offs, the project results meet the agreed-upon requirements, are useful to the customers, and promote the organization. Project management includes both administrative tasks for planning, documenting, and controlling work and leadership tasks for visioning, motivating, and promoting work associates. The underlying principle of project management discipline is to make effective and efficient use of all resources and it is this principle that influences some of these trade-off decisions. Project management knowledge, skills, and methods can be applied and modified for most projects regardless of size or application.

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1-2 History of Project Management

Projects of all sizes have been undertaken throughout history. Early construction projects included the ancient pyramids, medieval cathedrals, Indian cities, and Native American pueblos. Other large early projects involved waging wars and building empires. In the development of the United States, projects included laying railroads, developing farms, and building cities. Many smaller projects consisted of building houses and starting businesses. Projects were conducted throughout most of the world's history, but there was very little documentation. Therefore, there is no evidence of systematic planning and control. It is known that some early projects were accomplished at great human and financial cost and that others took exceedingly long periods of time to complete. For example, the Panama Canal was started in 1881 and completed in 1914.

Project management eventually emerged as a formal discipline to be studied and practiced. In the 1950s and 1960s, techniques for planning and controlling schedules and costs were developed, primarily on huge aerospace and construction projects. During this time, project management was primarily involved in determining project schedules based on understanding the order in which work activities had to be completed. Many large manufacturing, research and development, government, and construction projects used and refined management techniques. In the 1980s and 1990s, several software companies offered ever more powerful and easier ways to plan and control project costs and schedules. Risk management techniques that were originally developed on complex projects have increasingly been applied in a simplified form to less complex projects.

In the last few years, people have realized more and more that communication and leadership play major roles in project success. Rapid growth and changes in the information technology and telecommunications industries especially have fueled massive growth in the use of project management in the 1990s and early 2000s. Simultaneously, systems and processes were developed for electronic documentation of the historical data of projects using information systems (IS) and knowledge management tools.

People who are engaged in a wide variety of industries, including banking, insurance, retailing, hospital administration, healthcare, and many other service industries, are now turning to project management to help them plan and manage efforts to meet their unique demands. Project planning and management techniques that were originally developed for large, complex projects can be modified and used to better plan and manage even smaller projects. Now, project management is commonly used on projects of many sizes and types in a wide variety of manufacturing, government, service, and nonprofit organizations.

Further, in today's global economy, geographically dispersed virtual project teams are becoming a familiar entity in many organizations. Managing a project is challenging in the current global economy due to the exponential growth of information technology and ever-increasing market demand that organizations offer products and services efficiently and quickly. Understanding the characteristics of global projects for improving global project performance is of critical importance.

The use of project management has grown quite rapidly and is likely to continue growing. With increased international competition and a borderless global economy, customers want their products and services developed and delivered better, faster, and cheaper. Because project management techniques are designed to manage scope, quality, cost, and schedule, they are ideally suited to this purpose.

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Throughout this book, we will present concepts and techniques that are either unique to Agile projects or are emphasized more on Agile projects. Many of these ideas can be used to improve practice on traditional projects.

In 2001, a group of thought leaders became frustrated with the use of traditional, plan-driven project management for software projects and as a result, they wrote a document called *The Agile Manifesto*.[1] The four core values of Agile as shown below are completely consistent with our approach to Contemporary Project Management. *Agile* will be defined in Chapter 3, but throughout the book, a margin icon will indicate ideas from Agile, and the text will be in color.

- Value individuals more than processes.
- Value working software more than documentation.
- Value customer collaboration more than negotiation.
- Value response to change over following a plan.

1-3 How Can Project Work Be Described?

Project work can be described in the following ways:

- Projects are temporary and unique, while other work, commonly called operations, is more continuous.
- Project managers need certain "soft skills" and "hard skills" to be effective.
- Project managers frequently have more responsibility than authority.
- Projects go through predictable stages called a life cycle.

Managing a project requires identifying requirements, establishing clear and achievable objectives, balancing competing demands of quality, scope, cost, and time, and meeting customer expectations by making adjustments to all aspects of the project. Due to uniqueness, projects are often associated with uncertainties and unknowns that present many challenges to managing project work.

1-3a Projects versus Operations

All work can be described as fitting into one of two types: projects or operations. Projects as stated above are temporary, and no two are identical. Some projects may be extremely different from any other work an organization has performed up to that time, such as planning a merger with another company. Other projects may have both routine and unique aspects, for example, building a house; such projects can be termed process oriented. These projects are associated with fewer unknowns and uncertainties.

Operations, on the other hand, consist of the ongoing work needed to ensure that an organization continues to function effectively. Operations managers can often use checklists to guide much of their work. Project managers can use project management methods to help determine what to do, but they rarely have checklists that identify all the activities they need to accomplish. Some work may be difficult to classify as totally project or totally operations. However, if project management methods and concepts help one to better plan and manage work, it does not really matter how the work is classified.

Both the projects and the operations are associated with processes. A process is described as a series of actions designed to bring about the consistent and similar result or service. A process is usually designed to improve productivity. Thus, processes are repetitive and produce consistent and similar results, whereas projects are unique: each project delivers results that are distinct from other projects. However, one must remember that project management discipline includes various processes (planning, risk management, communication

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management, etc.) that facilitate managing projects and product- or service-oriented processes such as scope definition, scope management, and quality management.

1-3b Soft Skills and Hard Skills

To effectively manage and lead in a project environment, a person needs to develop both "soft" and "hard" skills. **Soft skills** include the ability to work in teams, interpersonal skills, communication, conflict resolution, negotiation, and leadership activities. **Hard skills** can include risk analysis, quality control, scheduling, budgeting, change control, planning other related activities, and project execution. Soft and hard skills go hand in hand. Some people have a stronger natural ability and a better comfort level in one or the other, but to be successful as a project manager, a person needs to develop both, along with the judgment about when each is needed. A wise project manager may purposefully recruit an assistant who excels in his area of weakness. Training, experience, and mentoring can also be instrumental in developing necessary skills.

Soft skills such as interpersonal relations, conflict resolution, and communication are of critical importance in managing people. As such, of all the resources, managing human resources presents more challenges. Managing and leading people are the most challenging aspects of a managing a project and the project team. These challenges underline the importance of soft skills.

1-3c Authority and Responsibility

A project manager will frequently be held accountable for work that she cannot order people to perform. Projects are most effectively managed with one person being assigned accountability. However, that person often needs to negotiate with a **functional manager**, who is "someone with management authority over an organizational unit."[2] Functional managers negotiate for workers to perform the project work in a timely fashion. Since the workers know their regular manager often has other tasks for them and will be their primary rater, they are tempted to concentrate first on the work that will earn rewards. Hence, a project manager needs to develop strong communication and leadership skills to extract cooperation from functional managers and to persuade project team members to focus on the project when other work also beckons. Often, it is the project manager's responsibility that the work be performed, but at the same time, he or she has no formal authority over the project team members.

1-3d Project Life Cycle

All projects go through predictable stages called a project life cycle. A **project life cycle** is "the series of phases that a project goes through from its initiation to its closure."[3] An organization needs the assurance that the work of the project is proceeding in a satisfactory manner, that the results are aligned with the original plan, and they are likely to serve the customer's intended purpose. The project customer is the person or organization that will use the project's product, service, or result. Customers can be internal to the organization (that is, part of the company performing the project) or external to the organization.

Many different project life cycle models are used for different types of projects, such as information systems, improvement, research and development, and construction. The variations these pose will be explored in Chapter 4. In this book, we will use the following project stages:

- *Selecting and initiating*—starts when an idea for a project first emerges and the project is selected and planned at a high level, and ends when key participants commit to it in broad terms.

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- *Planning*—starts after the initial commitment, includes detailed planning, and ends when all stakeholders accept the entire detailed plan.
- *Executing*—starts when the plan is accepted, and includes authorizing, executing, monitoring, and controlling work until the customer accepts the project deliverables.
- *Closing and realizing*—includes all activities after customer acceptance to ensure the project is completed, lessons are learned, resources are reassigned, contributions are recognized, and benefits are realized.

The pace of work and amount of money spent may vary considerably from one life cycle stage to another. Often, the selecting is performed periodically for all projects at a division or corporate level, and then initiating is rather quick—just enough to ensure that a project makes sense and key participants will commit to it. The planning stage can become rather detailed and will normally require quite a bit more work. The execution stage or stages are the time when the majority of the hands-on project tasks are accomplished. This tends to be a time of considerable work. Closing is a time when loose ends are tied up and the work level decreases significantly, but realizing benefits from the project occurs over time, may be measured months after project completion, and may be done by people other than those who performed the project. Occasionally, some of these phases overlap with each other, depending on the project complexity, urgency of the deliverable, and ambiguity associated with the project scope.

AGILE

See Exhibit 1.1 for a predictive or plan-driven project life cycle and Exhibit 1.2 for an adaptive or change-driven project life cycle. The primary difference is that in the first, the product is well understood and all planning precedes all executing, while in the second, early results lead into planning later work. The extreme of predictive is sometimes called *waterfall* and the extreme of adaptive is sometimes called *Agile*.

EXHIBIT 1.1

PREDICTIVE OR PLAN-DRIVEN PROJECT LIFE CYCLE WITH MEASUREMENT POINTS

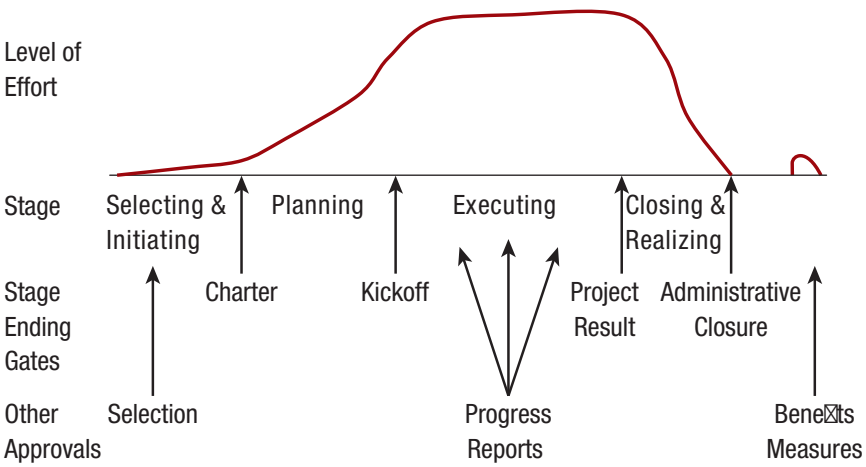

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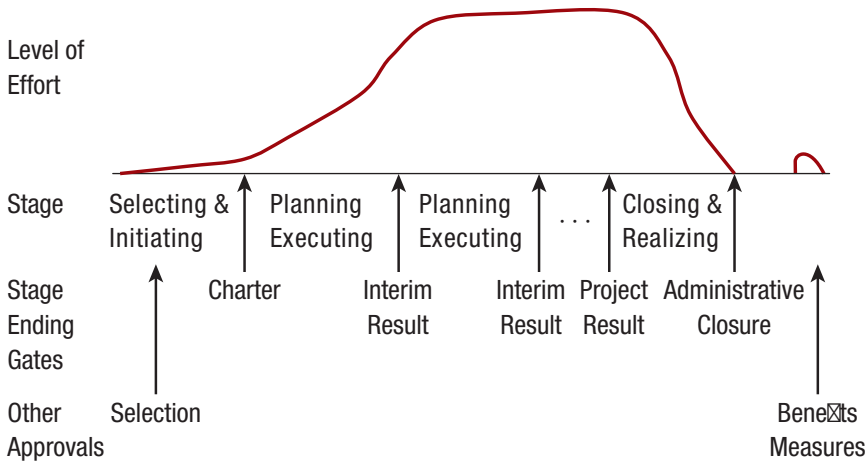
EXHIBIT 1.2

ADAPTIVE OR CHANGE-DRIVEN PROJECT LIFE CYCLE WITH MEASUREMENT POINTS



Three other points should be made concerning the project life cycle. First, most companies with well-developed project management systems insist that a project must pass an approval of some kind to move from one stage to the next.[4] In both exhibits, the approval to move from selecting and initiating to planning, for instance, is the approval of a charter. Second, in some industries, the project life cycle is highly formalized and very specific. For example, in the construction industry, the executing stage is often described as the three stages of design, erection, and finishing. Third, many companies even have their own project life cycle model, such as the one Midland Insurance Company has developed for quality improvement projects, as shown in Exhibit 1.3.

EXHIBIT 1.3

MIDLAND INSURANCE COMPANY PROJECT LIFE CYCLE FOR QUALITY IMPROVEMENT PROJECTS

Source: Martin *J. Novakov, American Modern Insurance Group.*

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