



Contemporary Project Management

Timothy J. Kloppenborg

Contemporary Project Management, 3e includes both time-tested and cutting-edge project management techniques that are invaluable to you as a student or practitioner. Check out some of the features of this text:

- **Agile Approach to Project Planning and Management.** The text fully integrates the agile approach and uses a margin icon and alternate font color to emphasize the difference between agile and traditional project management methods.
- **PMBOK® Guide Approach.** This edition covers all knowledge areas and processes from the fifth edition of the *PMBOK® Guide* and now includes ten *PMBOK® Guide*-type questions at the end of each chapter. All glossary definitions also reflect the fifth edition of the *PMBOK® Guide*.
- **Real Project Management Examples.** Each chapter contains examples from practitioners at actual companies in the U.S. and abroad.
- **Actual Projects as Learning Vehicles.** At the end of each chapter, there is an example project with a list of deliverables. Microsoft® Word and Excel templates for many project management techniques are also available on the textbook companion site.
- **Full Integration of Microsoft® Project Professional 2013.** Using screen captures, the text shows step-by-step instructions for automating project management techniques and processes in Microsoft® Project 2013.

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Contemporary Project Management

Third Edition



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Third Edition



organize / plan / perform

MS Project 2013 Instructions in *Contemporary Project Management 3e*

<u>Chapter</u>	<u>MS Project</u>
4	Introduction to MS Project 2013 Toolbars, ribbons, and window panes Initialize MS Project for Use Auto schedule, start date, identifying information, summary row Create Milestone Schedule Key milestones, projected finish dates, information
6	Set up Work Breakdown Structure (WBS) Understand WBS definitions and displays, enter summaries, create the outline, Insert row number column, Hide/show desired amount of detail
7	Set up Schedule in MS Project Define organization's holidays, turn off change highlighting, understand types of project data Build Logical Network Diagram Enter tasks and milestones, define dependencies, understand network diagram presentation, verify accuracy Understand Critical Path Assign duration estimates, identify critical path Display and Print Schedules
8	Define Resources Resource views, max units, resource calendars Assigning Resources In split view enter work, select resource, modify assignments Identify Over allocated Resources Resource usage and Detailed Gantt views together Dealing with Over Allocations Manual leveling and judgment
9	Develop Bottom-up Project Budget Assignment costs, activity costs, various cost perspectives Develop Summary Project Budget
11	Baseline Project Plan
14	Report Progress How MS Project recalculates based upon actual performance, current and future impacts of variances, define the performance update process (what, when, and how) Update the Project Schedule Acquire performance data, set and display status date, Enter duration- based performance data, reschedule remaining work, revise estimates
15	Close Project Complete schedule, archive schedule, capture and publish lessons learned

PMBOK® Guide 5e Coverage in Contemporary Project Management 3e

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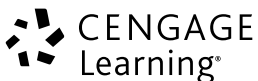
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Organize / Plan / Perform

THIRD EDITION

TIMOTHY J. KLOPPENBORG

Xavier University



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Timothy J. Kloppenborg

Product Director: Joe Sabatino

Product Manager: Clara Goosman

Content Developer: Kendra Brown

Product Assistant: Brad Sullender

Marketing Manager: Heather Mooney

Project Manager: Vanavan Jayaraman,
Integra Software Services Pvt. Ltd.

Media Developer: Chris Valentine

Manufacturing Planner: Ron Montgomery

Sr. Rights Acquisitions Specialist: John Hill

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Preface

While project managers today still need to use many techniques that have stood the test of twenty to fifty years, they increasingly also need to understand the business need for a project, sort through multiple conflicting stakeholder demands, and know how to deal with rapid change, a myriad of communication issues, global and virtual project teams, modern approaches to quality improvement, and many other issues that are more challenging than in projects of previous times.

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 2013 and the fifth edition of the *Guide to the Project Management Body of Knowledge (PMBOK® Guide)*. 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, agile planning and execution, 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 the topics of contemporary project management. It was also developed 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 student learning, practitioner realism, and academic research and teaching perspectives to be simultaneously considered.

The practical examples and practitioner reviewers came from many industries and from many sizes and types of projects to promote the scalability and universality of contemporary project management techniques.

New to This Edition

- **Agile approach.** The agile approach to project planning and management in which planning and implementing are done incrementally is introduced in Chapter 1. Throughout the book when the agile approach is different from the traditional, a margin icon and alternate color print are used to emphasize the difference. In this book's contemporary approach to project management in practice, agile and traditional are both used extensively.
- **Updated to reflect the fifth edition of the PMBOK® Guide.** All fifth edition PMBOK® Guide knowledge areas and processes are specifically included. The end of each chapter now contains ten PMBOK® Guide-type questions that are typical of what would be seen on PMP® and CAPM® exams. Appendix A gives study suggestions for the CAPM® and PMP® exams.
- **New examples throughout the text.** Each chapter starts with a motivating example for why the student would want to read the chapter and ends with an example of how a company actually used some tools and/or concepts from the chapter. There are many smaller examples throughout each chapter that illustrate specific points. Many of these are new examples from around the world and from many different industries such as the Fiesta® San Antonio Commission (Texas) and an IT rollout

within a system of regional schools in Germany (Chapter 5); the rollout of a project management tool to a South African banking group (Chapter 7); the Panama Canal expansion (Chapter 10); the determination of supplier ratings at General Tool Company in Ohio (Chapter 11); and the control, monitoring, and reporting of projects at Cincinnati Children's Hospital Medical Center (Chapter 14).

- **Microsoft® Project Professional 2013 fully integrated into the fabric of eight chapters.** Though techniques are demonstrated in a by-hand fashion, a demonstration of how to automate them using Microsoft® Project Professional 2013 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.
- **Project deliverables.** A list of project deliverables that can be used for students assignments are included after the expanded table of contents. Many instructors may choose some but not all of these depending on class organization.
- **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.

Distinctive Features

- **PMBOK® Guide approach.** This consistency with the established standard gives students a significant leg up if they decide to become certified Project Management Professionals (PMPs®) or Certified Associates in Project Management (CAPMs®). All glossary definitions are from the PMBOK® Guide.
- **Actual project as learning vehicle.** One 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 decade while working with the local PMI® chapter, which provides a panel of PMP® judges to evaluate projects from a practical point of view. 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 after the detailed table of contents.
- **Student oriented, measurable learning objectives.** Each chapter begins with a listing of the most important points students should learn and identifies the PMBOK® topics covered in the chapter. The chapter material, end-of-chapter questions and problems, PowerPoint® slides, and test questions have all been updated to correlate to specific objectives.
- **Blend of classical and modern methods.** Proven methods developed over the past half century are combined with exciting new methods that are emerging from both industry and research.
- **Executive, managerial, and associate roles.** This book covers the responsibilities of many individuals who can have an impact on projects so aspiring project managers can understand not only their own roles, but also those of people with whom they need to deal.
- **Balanced scorecard approach.** Many factors are included in how project success is measured and how project results are determined. An adaptation of the balanced scorecard helps students understand how these fit together.
- **Integrated example project.** An example project has been developed to demonstrate many of the techniques throughout the book. That way students can see how the various project planning and control tools develop and work together.

Organization of Topics

The book is divided into three major parts. Part 1, **Organizing Projects**, deals with both the environment in which projects are conducted and getting a project officially approved.

- Chapter 1 introduces contemporary project management by first tracing the history of project management, then discussing what makes a project different from an ongoing operation. Various frameworks that help one understand projects—such as the PMBOK® Guide—are introduced, as well as the executive-, managerial-, and associate-level roles.
- 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 selects a contractor company to conduct a project, and how a contractor company secures project opportunities from client companies.
- Chapter 3 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 4 presents project charters in a step-by-step fashion. Short, powerful charters help all key participants to develop a common understanding of all 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 2013 is used to show milestone schedules within charters.

Part 2, **Planning Projects**, deals with all aspects of project planning as defined in the *PMBOK® Guide*.

- Chapter 5 introduces methods for understanding and prioritizing various stakeholder demands and for building constructive relationships with stakeholders. Since many projects are less successful than desired due to poor communications, detailed communication planning techniques are introduced along with meeting management.
- Chapter 6 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 2013.
- Chapter 7 is the first scheduling chapter. It shows how to schedule activities by identifying, sequencing, and estimating the durations for each activity. Then critical path project schedules are developed, methods are shown for dealing with uncertainty in time estimates, Gantt charts are introduced for easier communications, and Microsoft® Project Professional 2013 is used to automate the schedule development and communications.
- Chapter 8 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 2013.
- Chapter 9 deals with project budgeting. Estimating cost, budgeting cost, and establishing cost controls are demonstrated. Microsoft® Project Professional 2013 is used for developing both bottom-up and summary project budgets.

- Chapter 10 demonstrates project risk planning. It includes risk management planning methods for identifying risks, establishing a risk register, qualitatively analyzing 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 11 starts by covering project quality planning. This includes explaining the development of modern quality concepts and how they distill into core project quality demands. Then the chapter covers how to develop a project quality plan and how to utilize the simple project quality tools. It then ties all of the planning chapters together with discussions of a project kick-off meeting, a baselined project plan, and the ways Microsoft® Project Professional 2013 can be used to establish and maintain the baseline.

Part 3, **Performing Projects**, discusses the various aspects that must be managed simultaneously while the project is being conducted.

- Chapter 12 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 13 deals with leading and managing both the project team and stakeholders. 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 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 the customer issue. Financial issues are scope, cost, and schedule, including how to use Microsoft® Project Professional 2013 for control.
- Chapter 15 deals with how to end a project—either early or on time. Included are 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.

Instructor Resources

To access the instructor resources go to www.cengage.com/login, log in with your faculty account username and password, and use ISBN 9781285433356 to search for and to add instructor resources to your account. Key support materials—instructor’s manual with solutions, test bank, data set solutions, regular and exhibit-only 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 based on his years of experience facilitating the student learning experience in his own project management classes (undergraduate, MBA, hybrid, and continuing education on six continents), each chapter of the instructor’s manual includes an overview of learning objectives, detailed chapter outlines, teaching recommendations, and many detailed 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 and the major topical heading within the textbook that it relates to, 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. All question content is now tagged according to Tier I (Business Program Interdisciplinary Learning Outcomes), Bloom's Taxonomy, and difficulty level.
- **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; 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 Presentation.** Prepared by Deborah Tesch of Xavier University, the PowerPoint presentations provide comprehensive coverage of each chapter's essential concepts in a clean, concise format. Key exhibits from the textbook are also included as an exhibit-only presentation to enhance in-class illustration and discussion of important concepts. Instructors can easily customize the PowerPoint presentation to better fit the needs of their classroom.

Student Resources

Students can access the following resources by going to www.cengagebrain.com and searching 9781285433356

- **Student Data Sets.** The data sets contain Excel data that is used in the completion of select end-of-chapter problems. There are also templates in Word and Excel for completing various project planning and control tools.
- **Other Project Management Resources.** Additional material on the website includes definitions of strengths written from a project management perspective as assessed by Gallup's StrengthsFinder assessment and classic examples that were used in previous editions of this text.

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Center for Quality of
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College | David Schmitz,
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Engineering |
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SUNY Farmingdale State
College |
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Six Sigma Black Belt | Abe Meilich,
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California State
University—Long
Beach | Bruce Miller,
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George Washington
University | Ali Mir,
William Paterson
University | William R. Sherrard,
San Diego State
University |
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Eastern Michigan
University | Brian M. Smith,
Eastern University |
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University | Warren Opfer,
Life Science Services
International | Kimberlee D. Snyder,
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Ball Aerospace | Peerasit Patanakul,
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—Timothy J. Kloppenborg

About the Author

Timothy J. Kloppenborg is a Castellini Distinguished 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 over 100 publications including *Strategic Leadership of Portfolio and Project Management*, *Project Leadership* and *Managing Project Quality*. His articles have appeared in *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*. Tim has been active with Project Management Institute for 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 as Duke Energy, Ernst and Young LLP, Greater Cincinnati Water Works, Kroger, Procter and 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 B.S. in business administration from Benedictine College, an MBA from Western Illinois University, and a Ph.D. in Operations Management from University of Cincinnati.

PART **1**

ORGANIZING PROJECTS

organize / plan / perform

Chapter 1

Introduction to Project Management

Chapter 2

Project Selection and Prioritization

Chapter 3

Organizational Capability: Structure, Culture, and Roles

Chapter 4

Chartering Projects

CHAPTER 1

Introduction to Project Management

CHAPTER OBJECTIVES

After completing this chapter, you should be able to:

- Define a project 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.
- Identify project roles and distinguish key responsibilities for each.



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I have returned from a successful climb of Mt. 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

PMBOK® Guide

Topics:

- Project management introduction
- Project life cycle
- Stakeholders
- Project management processes

we demonstrated to act on our earlier decision to curtail summit attempts after the agreed-to turn-around time or in severe weather.

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. So, what is a project?

A **project** is “a temporary endeavor undertaken to create a unique product, service, or result.”¹ A project requires an organized set of work efforts that are planned in a level of detail that is progressively elaborated upon 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 output often is a collection of a primary deliverable along with supporting deliverables such as a house as the primary deliverable and warranties and instructions for use as supporting deliverables. Each project typically has a unique combination of **stakeholders**—“an individual, group, or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project.”² 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.

Project management is “the application of knowledge, skills, tools and techniques to project activities to meet project requirements.”³ This includes work processes that initiate, plan, execute, control, and close work. During these processes, tradeoffs must be made among the following factors:

- Scope (size)
- Quality (acceptability of the results)
- Cost
- Schedule
- Resources
- Risks⁴

When project managers successfully make these tradeoffs, 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. Project management knowledge, skills, and methods can be applied and modified for most projects regardless of size or application.

1-2 History of Project Management

Projects of all sizes have been undertaken throughout history. Early construction projects included the ancient pyramids, medieval cathedrals, and Indian cities and 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 have consisted of building houses and starting businesses. Throughout most of history, projects were conducted, but there was very little systematic planning and control. Some early projects were accomplished at great human and financial cost. Others took exceedingly long periods of time to complete.

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 primarily involved 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. People engaged in banking, insurance, retailing, hospital administration, 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 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.

The use of project management has grown quite rapidly and is likely to continue growing. With increased international competition, customers demand to have 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.

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.

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 such as building a house. 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 of 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.

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 communication and leadership activities. Hard skills can include risk analysis, quality control, scheduling, budgeting, and

so forth. 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 the judgment about when each is needed. A wise project manager may purposefully recruit an assistant that excels in his area of weakness. Training, experience, and mentoring can also be instrumental in developing necessary 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... the manager of any group that actually makes a product or performs a service.”⁵ 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 in order to persuade subordinates to focus on the project when other work also beckons.

1-3d Project Life Cycle

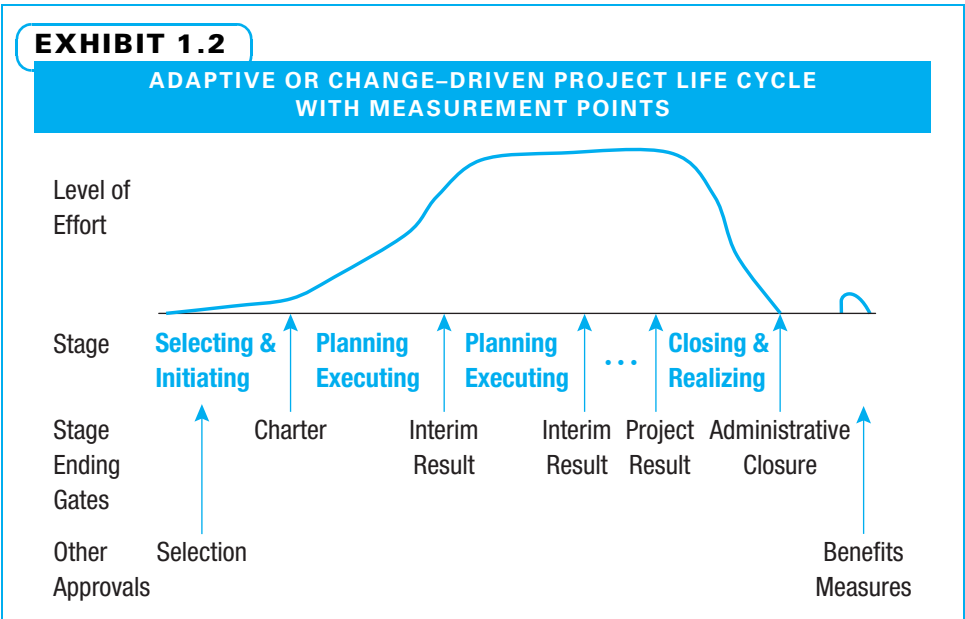
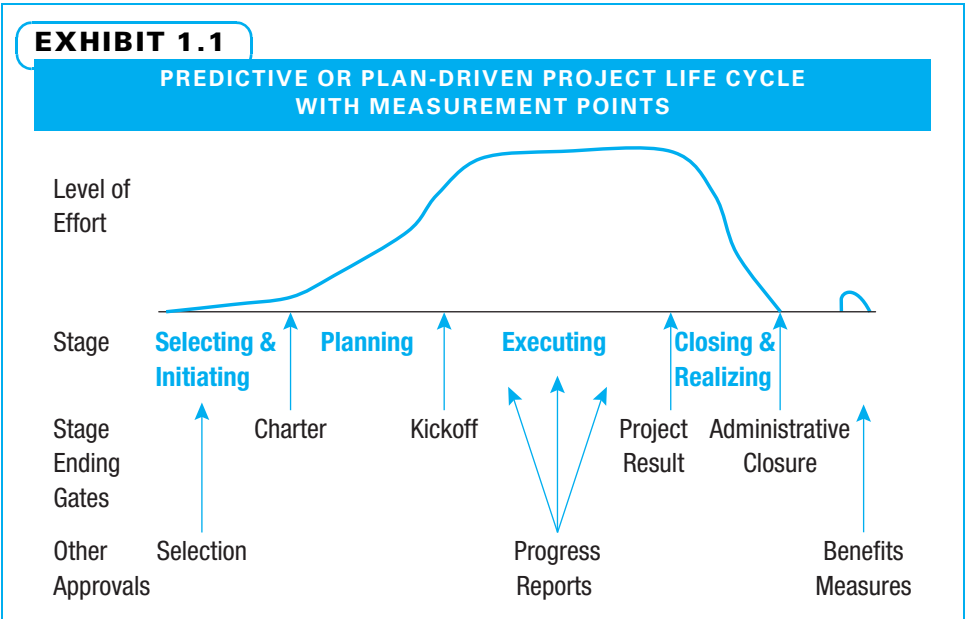
All projects go through predictable stages called a project life cycle. A **project life cycle** is “the series of phases that a project goes through from its initiation to its closure.”⁶ An organization’s control needs are to be assured that the work of the project is proceeding in a satisfactory manner and that the results are likely to serve its 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 that is 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 3. In this book we will use the following project stages (as seen in the chapter opener Project Life Cycle diagram for all of the following chapters.):

- **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.
- **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 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

AGILE

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. 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*. *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.



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.⁷ In both exhibits, the approval to move from selecting and initiating to planning, for instance, is the approval of a charter. Second, in many industries, the project life cycle is highly formalized and very specific. For example, in information systems, the executing stage is often described as two stages: writing code and testing code. In the construction industry, the executing stage is often described as the three stages of design, erection, and finishing. 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. This book will present examples of company-specific life cycle models, but for clarity will use the predictive or plan-driven model shown in Exhibit 1.1 when describing concepts except when we discuss agile with the adaptive or change-driven model. Third, in addition to stage-ending approvals, frequently projects are measured at additional points such as selection, progress reporting, and benefits realization, as shown in Exhibit 1.1.

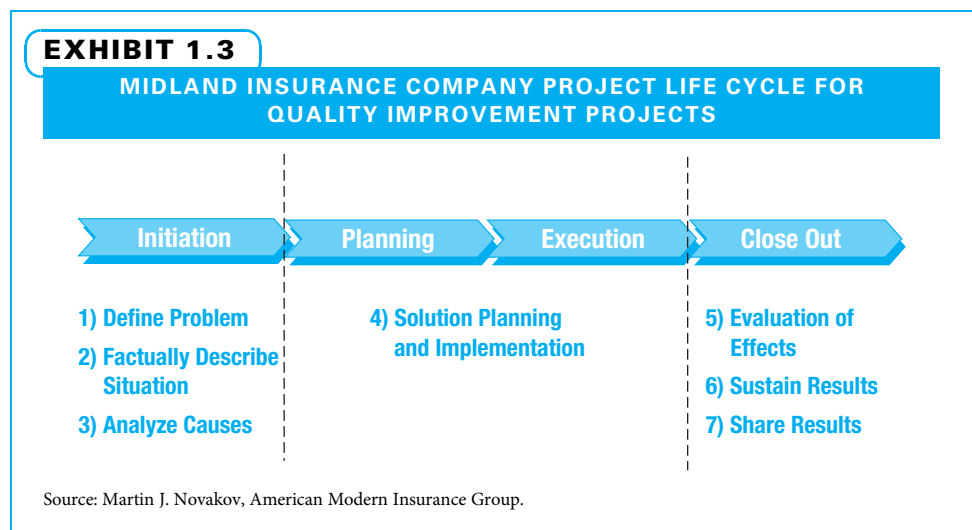
1-4 Understanding Projects

Several frameworks that can help a person better understand project management are described below: the Project Management Institute (PMI); the *Project Management Body of Knowledge (PMBOK® Guide)*; methods of selecting and prioritizing projects, project goals and constraints; project success and failure; use of Microsoft Project to help plan and measure projects, and various ways to classify projects.

1-4a Project Management Institute

Project management has professional organizations just as do many other professions and industry groups. The biggest of these by far is the Project Management Institute.

It was founded in 1969, grew at a modest pace until the early 1990s, and has grown quite rapidly since. As of March 2013, PMI had well over 650,000 members and credential holders in 185 countries. PMI publishes and regularly updates *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*. All of the definitions in this book come from the *PMBOK® Guide*, fifth edition.⁸ PMI has established a professional certification entitled Project Management Professional (PMP). To be certified as a PMP,



a person needs to have the required experience and education, pass an examination on the *PMBOK® Guide*, and sign and be bound by a code of professional conduct. PMI has also established a second certification—Certified Associate in Project Management (CAPM)—that is geared toward junior people working on projects before they are eligible to become PMPs. PMI also has established additional credentials, practice standards, and extensions of the *PMBOK® Guide* in areas such as program management, agile, risk, scheduling, resource estimating, work breakdown structures, construction, and government.⁹

1-4b Project Management Body of Knowledge (PMBOK®)

The Project Management Body of Knowledge consists of a project life cycle (see earlier “Project Life Cycle” section), 5 process groups, and 10 knowledge areas. A **project management process group** is “a logical grouping of the project management inputs, tools and techniques, and outputs.”¹⁰ The five process groups, paraphrased from the *PMBOK® Guide*, are as follows:

1. **Initiating**—“define a project or a new phase by obtaining authorization”
2. **Planning**—“establish the project scope, refine objectives and define actions to attain objectives”
3. **Executing**—“complete the work defined to satisfy project specifications”
4. **Monitoring and controlling**—“track, review, and regulate progress and performance, identify changes required, and initiate changes”
5. **Closing**—“finalize all activities to formally close project or phase”¹¹

The 10 knowledge areas, paraphrased from the *PMBOK® Guide*, are as follows:

1. **Integration management**—“processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities”¹²
2. **Scope management**—“processes to ensure that the project includes all the work required, and only the work required, to complete the project successfully”¹³
3. **Time management**—“processes to manage timely completion of the project”¹⁴
4. **Cost management**—“processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so that the project can be completed within the approved budget”¹⁵
5. **Quality management**—“processes and activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken”¹⁶
6. **Human resources management**—“processes that organize, manage, and lead the project team”¹⁷
7. **Communications management**—“processes to ensure timely and appropriate planning, collection, creation, distribution, storage, retrieval, management, control, monitoring, and ultimate disposition of project information”¹⁸
8. **Risk management**—“processes of conducting risk management planning, identification, analysis, response planning, and control... to increase the likelihood and impact of positive events and decrease the likelihood and impact of negative events in the project”¹⁹
9. **Procurement management**—“processes to purchase or acquire products, services, or results from outside the project team”²⁰
10. **Stakeholder management**—“processes to identify the people, groups, or organizations, that could impact or be impacted by the project, analyze their expectations and impact, and develop strategies for engaging them and managing conflicting interests”²¹