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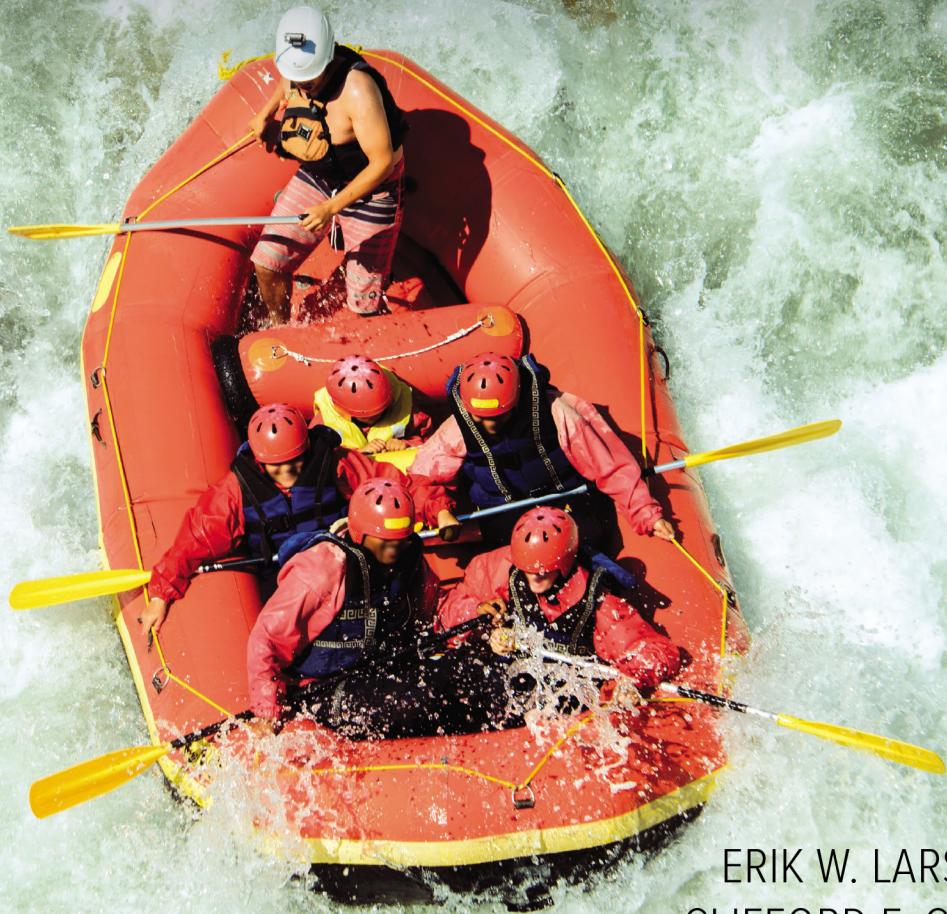
A SOCIO-TECHNICAL APPROACH

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McGraw Hill

Project Management

A Socio-Technical Approach

2024 Release

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PROJECT MANAGEMENT

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Jordan Cunningham, a student at *Eastern Washington University*

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"Man's mind, once stretched by a new idea, never regains its original dimensions."

Oliver Wendell Holmes, Jr.

To my family, who have always encircled me with love and encouragement—my parents (Samuel and Charlotte), my wife (Mary), my sons and their wives (Kevin and Dawn, Robert and Sally), and their children (Ryan, Carly, Connor, and Lauren).

C.F.G.

"The reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man."

Bernard Shaw, Man and Superman

To Ann, whose love and support have brought out the best in me. To our girls Mary, Rachel, and Tor-Tor for the joy and pride they give me. And to our grandkids, Mr. B, Livvy, Jasper Jones!, Ya Ya, Juni, and Calliwumpas, whose future depends upon effective project management. Finally, to my muse, Neil—walk on!

E.W.L.

"You can do anything you set your mind to."

Benjamin Franklin

To my parents (Penphim and Ophas) for their unconditional love, their support, their faith in me, and allowing me to choose the direction of my life. To my Thai and U.S. teachers, instructors, professors, and mentors, I am forever indebted. Thanks to all of you for instilling within me not only knowledge but also motivation to achieve and always do my best. The examples all of you set are with me as a guide forever.

P.S.

Preface

Our motivation in writing this text continues to be to provide a realistic, socio-technical view of project management. In the past, textbooks on project management focused almost exclusively on the tools and processes used to manage projects and not the human dimension. This baffled us, since people, not tools, complete projects! While we firmly believe that mastering tools and processes is essential to successful project management, we also believe that the effectiveness of these tools and methods is shaped and determined by the prevailing culture of the organization and interpersonal dynamics of the people involved. Thus, we try to provide a holistic view that focuses on both the technical and social dimensions and how they interact to determine the fate of projects.

Audience

This text is written for a wide audience. It covers concepts and skills that are used by managers to propose, plan, budget, manage and lead project teams to successful completions of their projects. The text should prove useful to students and prospective project managers in helping them understand why organizations have developed a formal project management process to gain a competitive advantage. Readers will find the concepts and techniques discussed in enough detail to be immediately useful in new-project situations. Practicing project managers will find the text to be a valuable guide and reference when dealing with typical problems that arise in the course of a project. Managers will also find the text useful in understanding the role of projects in the missions of their organizations. Analysts will find the text useful in helping to explain the data needed for project implementation as well as the operations of inherited or purchased software.

Members of the Project Management Institute will find the text is well structured to meet the needs of those wishing to prepare for PMP (Project Management Professional) or CAPM (Certified Associate in Project Management) certification exams. The text has in-depth coverage of the most critical topics found in PMI's *Project Management Body of Knowledge* (PMBOK) and its supplement guidebook, *Process Groups: A Practice Guide*. People at all levels in the organization assigned to work on projects will find the text useful not only in providing them with a rationale for the use of project management processes but also because of the insights they will gain into how to enhance their contributions to project success.

Our emphasis is not only on how the management process works but also, and more importantly, on *why* it works. The concepts, principles, and techniques are universally applicable. That is, the text does not specialize by industry type or project scope. Instead, the text is written for the individual who will be required to manage a variety of projects in a variety of organizational settings. In the case of some small projects, a few of the steps of the techniques can be omitted, but the conceptual framework applies to all organizations in which projects are important to survival. The approach can be used in pure project organizations such as construction, research organizations, and engineering consultancy firms. At the same time, this approach will benefit organizations that carry out many small projects while the daily effort of delivering products or services continues.

Content

In this and other editions, we continue to try to resist the forces that engender scope creep and focus only on essential tools and concepts that are being used in the real world. We have been guided by feedback from reviewers, practitioners, teachers, and students. Some changes are minor and incremental, designed to clarify and reduce confusion. Other changes are significant. They represent new developments in the field or better ways of teaching project management principles. Below are major changes to the ninth edition (2024 Release).

- The title of the text has been changed to ***Project Management: A Socio-Technical Approach.*** This more accurately captures the emphasis not only on the techniques associated with project management but also on what ultimately determines success—people and how they use these techniques to complete projects. All material has been reviewed and revised based on the latest edition of *Project Management Body of Knowledge* (PMBOK), Seventh Edition, 2020. Note that the newest edition represents a *major shift* in PMBOK toward focusing not only on terms and processes but also behavioral issues associated with managing projects. This has been the focus of this text from the beginning.
- The impact of COVID-19 pandemic on project execution is discussed throughout the text.
- Some of the Snapshots from Practice have been expanded to more fully cover the examples.
- New student exercises and cases have been added to chapters.
- The Snapshot from Practice boxes feature a number of new examples of project management in action.
- The Instructor's Manual contains a listing of current YouTube videos that correspond to key concepts and Snapshots from Practice.

Overall the text addresses the major questions and challenges the authors have encountered over their 80 combined years of teaching project management and consulting with practicing project managers in domestic and foreign environments. These questions include the following: How should projects be prioritized? What factors contribute to project failure or success? How do project managers orchestrate the complex network of relationships involving vendors, subcontractors, project team members, senior management, functional managers, and customers that affect project success? What project management system can be set up to gain some measure of control? How are projects managed when the customers are not sure what they want? How do project managers work with people from foreign cultures?

Project managers must deal with all these concerns to be effective. All of these issues and problems represent linkages to a socio-technical project management perspective. This text focuses not only project management methodology but also on the behavioral skills and cultural awareness necessary to be successful. The chapter content of the text has been placed within an overall framework that integrates these topics in a holistic manner. Cases and snapshots are included from the experiences of practicing managers. The future for project managers is exciting. Careers will be built on successfully managing projects.

Student Learning Aids

Student resources include study outlines, online quizzes, PowerPoint slides, videos, Microsoft Project Video Tutorials, and web links. These can be found in Connect.

Acknowledgments

Erik W. Larson

Clifford F. Gray

Pinyarat Sirisomboonsuk

Guided Tour

2 Organization Strategy and Project Selection

Established Learning Objectives

Learning objectives are listed both at the beginning of each chapter and are called out as marginal elements throughout the narrative in each chapter.

2.1 Why Project Managers Need to Understand Strategy

LO 2-1

Explain why it is important for project managers to understand their organization's strategy.

Project management historically has been preoccupied solely wit execution of projects. Strategy was considered to be under the purv agement. This is old-school thinking. New-school thinking reco management is at the apex of strategy and operations. Shenhar s when he states, "It is time to expand the traditional role of the proje operational to a more strategic perspective. In the modern evolving ect managers will be focused on business aspects, and their role wi ting the job done to achieving the business results and winning in t

There are two main reasons project managers need to underst tion's mission and strategy. The first reason is so they can make ap and adjustments. For example, how a project manager would res tion to modify the design of a product to enhance performance w upon whether his/her company strives to be a product leader thro to achieve operational excellence through low-cost solutions. Sin ect manager would respond to delays may vary depending upon A project manager will authorize overtime if his/her firm places a pr the market first. Another project manager will accept the delay if spe

End-of-Chapter Content

Both static and algorithmic end-of-chapter content, including Review Questions and Exercises, are assignable in Connect.

SmartBook

The SmartBook has been updated with new highlights and probes for optimal student learning.

Snapshots

The Snapshot from Practice boxes have been updated to include a number of new examples of project management in action. New discussion questions based on the Snapshots have been added to the end-of-chapter material and are assignable in Connect.

SNAPSHOT FROM PRACTICE 2.2   Crisis IT*

In May 2007, Frontier Airlines Holdings hired Gerry Coady as chief information officer (CIO). Nearly a year later the airline filed for bankruptcy under Chapter 11. In an interview, Coady describes how he managed IT projects during the bankruptcy and recession crisis of 2008–2009.

Fundamentally, Coady faced a situation of too many projects and too few resources. Coady used a strategy of focusing on reducing the number of projects in the portfolio. He put together a steering committee of senior management that reviewed several hundred projects. The end result was a reduction to less than 30 projects remaining in the portfolio.

Matej Kastelic/kasto/123RF

HOW CAN YOU GET TO A BACKLOG OF OVER 100 PROJECTS?

"There are never enough resources to get everything done." Backlogs build over time. Sacred cow projects get included in the selection system. Projects proposed

"by the time you get to the 20s the margin of differentiation gets narrower and narrower." Of the remaining projects, project sponsors had to have solid justification why their project was important. Reduction of the number of projects placed emphasis on high-value projects.

New and Updated Cases

Included at the end of each chapter are between one and five cases that demonstrate key ideas from the text and help students understand how project management comes into play in the real world. Cases have been reviewed and updated across the eighth edition.

Instructor and Student Resources

Instructors and students can access all of the supplementary resources for the eighth edition within Connect.

Note to Student

You will find the content of this text highly practical, relevant, and current. The concepts discussed are relatively simple and intuitive. As you study each chapter we suggest you try to grasp not only how things work but also why things work. You are encouraged to use the text as a handbook as you move through the three levels of competency:

I know.

I can do.

I can adapt to new situations.

The field of project management is growing in importance and at an exponential rate. It is nearly impossible to imagine a future management career that does not include management of projects. Resumes of managers will soon be primarily a description of their participation in and contributions to projects.

Good luck on your journey through the text and on your future projects.

Chapter-by-Chapter Revisions for the 2024 Release Edition

Chapter 1: Modern Project Management

- New Snapshot: PMI's 50 Most Influential Projects: 1969–2019.
- New Appendix: A Guide to the Project Management Body of Knowledge (PMBOK Guide) Seventh Edition and Its Ancillaries.

Chapter 2: Organization Strategy and Project Selection

- Revised Snapshot: IBM's Watson Project
- New Snapshot: Is This the End of Airbnb?
- New segment on behavioral biases that affect project selection.
- Snapshot: Project Code Names revised.

Chapter 3: Organization: Structure and Culture

- New Snapshot: *2021 PMO of the Year* Moffitt Cancer Center.

Chapter 4: Defining the Project

- Requirements is now discussed under defining a project.
- New Snapshot: The Bradley Fighting Vehicle.

Chapter 5: Estimating Project Times and Costs

- New segment on four aspects of estimating.

Chapter 6: Developing a Project Schedule

- Snapshot: Concurrent Engineering (Fast Tracking) updated.
- A new project network exercise.

Chapter 7: Managing Risk

- An example of how pandemic created an opportunity for project is included in the text.
- Minor revisions made to tables to provide better clarity.

Chapter 8: Scheduling Resources and Costs

- New case: *Midnight Sun II Project.*

Chapter 9: Reducing Project Duration

- Snapshot 9.1: *Smartphone* Wars updated.
- New Snapshot: *Operation Warp Speed.*

Chapter 10: Being an Effective Project Manager

- Reliance on virtual communication methods is discussed.
- New Snapshot: *Fighting Zoom Fatigue*.

Chapter 11: Managing Project Teams

- Managing Virtual Teams section has been updated and expanded.
- Managing hybrid teams where people work part time at home is discussed.

Chapter 12: Outsourcing: Managing Interorganizational Relations

- New case: *Umdanso Project*.

Chapter 13: Progress and Performance Measurement and Evaluation

- Snapshot: *Guidelines for Setting Milestones* has been revised.
- New Snapshot: *Oregon State University's Regional Coastal Research Vessels (RCRV) Project*.

Chapter 14: Project Closure

- Discussion of project retrospectives has been updated and revised.
- New Research Highlight: *Why Is It Difficult to Pull the Plug on Projects?*

Chapter 15: Agile Project Management

- Introduction revised.
- Discussion of hybrid project management is expanded.

Chapter 16: International Projects

- New Snapshot: *Avoiding Communication Catastrophes When Emailing Across Cultures*.

Appendix Two: Computer Project Exercises

- Updated two computer exercises.

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Brief Contents

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1

Modern Project Management

LEARNING OBJECTIVES

After reading this chapter you should be able to:

1-1 Understand why project management (PM) is crucial in today's world.

1-2 Distinguish a project from routine operations.

1-3 Identify the different stages of a project life cycle.

1-4 Describe how Agile PM is different from traditional PM.

1-5 Understand that managing projects involves balancing the technical and sociocultural dimensions of the project.

OUTLINE
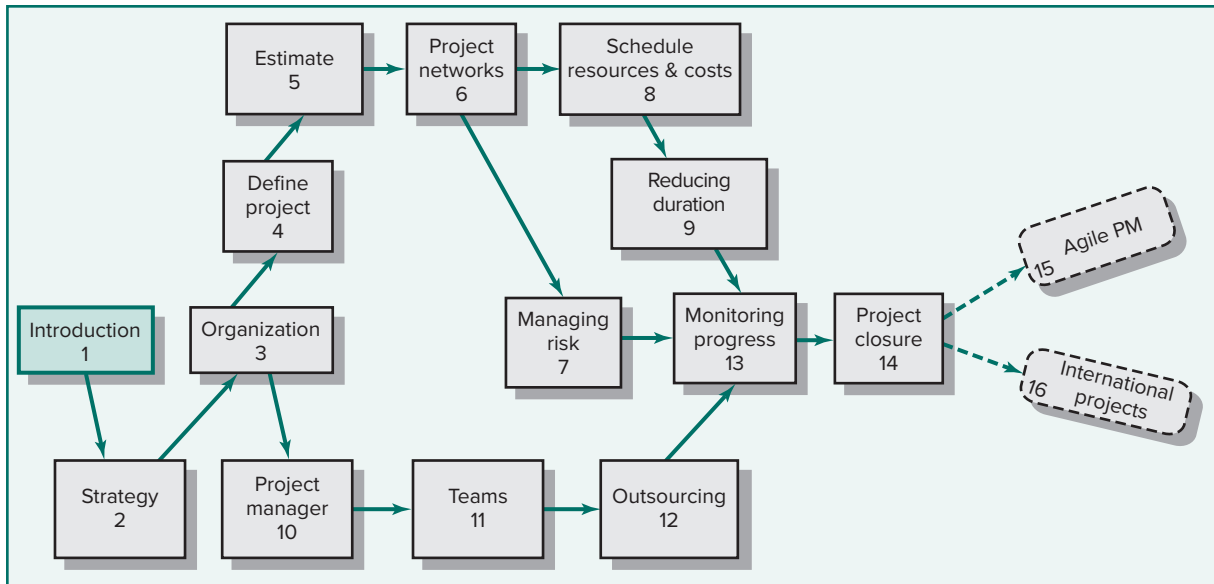
All of humankind's greatest accomplishments—from building the great pyramids to discovering a cure for polio to putting a footprint on the moon—began as a project.

LO 1-1

Understand why project management (PM) is crucial in today's world.

Ever since the first edition, we have opened our text with the line: "This is a good time to be reading a book about project management." This is more true today than ever before. Business leaders and experts have recognized that project management is critical to sustainable economic growth. New jobs and competitive advantage are achieved by constant innovation, developing new products and services, and improving both productivity and quality of work. This is the world of project management. Project management provides people with a powerful set of tools that improves their ability to plan, implement, and manage activities to accomplish specific objectives. But project management is more than just a set of tools; it is a contact sport that requires building collaborative relationships among a diverse cast of stakeholders. Exciting opportunities await people skilled in project management.

The project approach has long been the style of doing business in the construction industry, U.S. Department of Defense contracts, and Hollywood, as well as big consulting firms. Now, project management has spread to all avenues of work. Today, project teams carry out everything from port expansions to hospital restructuring to upgrading information systems. They are creating next-generation fuel-efficient vehicles, developing sustainable sources of energy, and exploring the farthest reaches of outer space. The impact of project management is most profound in high-tech industries, where the new folk heroes are young professionals whose Herculean efforts lead to the constant flow of new hardware and software products.

Project management is not limited to the private sector. Project management is also a vehicle for doing good deeds and solving social problems. Endeavors such as providing emergency aid to areas hit by natural disasters, devising a strategy for reducing crime and drug abuse within a city, or organizing a community effort to renovate a

public playground would and do benefit from the application of modern project management techniques.

Perhaps the best indicator of demand for project management can be seen in the rapid expansion of the Project Management Institute (PMI), a professional organization for project managers. PMI membership has grown from 93,000 in 2002 to more than 686,000 in 2021. See Snapshot from Practice 1.1: The Project Management Institute for information regarding professional certification in project management.

It's nearly impossible to pick up a newspaper or business periodical and not find something about projects. This is no surprise! Approximately $2.5 trillion (about 25 percent of the U.S. gross national product) is spent on projects each year in the United States alone. Other countries are increasingly spending more on projects. Millions of people around the world consider project management the major task in their profession.

Many people who excel at managing projects never have the title of project manager. They include accountants, lawyers, administrators, scientists, contractors, coaches, public health officials, teachers, and community advocates whose success depends upon being able to lead and manage project work. For some, the very nature of their work is project driven. Projects may be cases for lawyers, audits for accountants, events for artists, and renovations for contractors. For others, projects may be a small but

SNAPSHOT FROM PRACTICE 1.1   The Project Management Institute*

The Project Management Institute (PMI) was founded in 1969 as an international society for project managers. Today, PMI has members from more than 200 countries/territories and more than 686,000 members. PMI professionals come from virtually every major industry, including aerospace, automotive, business management, construction, engineering, financial services, information technology, pharmaceuticals, healthcare, and telecommunications.

PMI provides certification as a **Project Management Professional (PMP)**—someone who has documented sufficient project experience, agreed to follow the PMI code of professional conduct, and demonstrated mastery of the field of project management by passing a comprehensive examination based on the Project Management Body of Knowledge (PMBOK), which is in its 6th edition. The number of people earning PMP status has grown dramatically in recent years. In 1996, there were fewer than 3,000 certified Project Management Professionals. By 2023, more than 1.3 million people have passed the PMP exam.

Just as the CPA exam is a standard for accountants, passing the PMP exam may become the standard for project managers. Some companies are requiring that all their project managers be PMP certified. Moreover, many job postings are restricted to PMPs. Job seekers, in general, are finding that being PMP certified is an advantage in the marketplace.

PMI added a certification as a **Certified Associate in Project Management (CAPM).** CAPM is designed for project team members and entry-level project managers, as well as qualified undergraduate and graduate students who want a credential to recognize their mastery of the project management body of knowledge. CAPM does not require the extensive project management experience associated with the PMP. In fact, students often qualify for taking the CAPM exam by taking a course on project management. For more details on PMP and CAPM, google PMI to find the current website for the Project Management Institute.

This text provides a solid foundation for passing either exam. However, we personally found it necessary to study a good PMP/CAPM exam "prep book" to pass the exam. This is recommended, given the format and nature of the exam. Project management is not a multiple choice profession.

critical part of their work. For example, a high school teacher who teaches four classes a day is responsible for coaching a group of students to compete in a national debate competition. A store manager who oversees daily operations is charged with developing an employee retention program. A sales account executive is given the additional assignment of team lead to launch daily deals into a new city. A public health official who manages a clinic is also responsible for organizing a Homeless Youth Connect event. For these and others, project management is not a title but a critical job requirement. It is hard to think of a profession or a career path that would not benefit from being good at managing projects.

Not only is project management critical to most careers, but also the skill set is transferable across most businesses and professions. Project management fundamentals are universal. The same project management methodology that is used to develop a new product can be adapted to create new services, organize events, refurbish aging operations, and so forth. In a world where it is estimated that each person is likely to experience three to four career changes, managing projects is a talent worthy of development.

The significance of project management can also be seen in the classroom. Twenty years ago, major universities offered one or two classes in project management, primarily for engineers. Today, most universities offer multiple sections of project management classes, with the core group of engineers being supplemented by business students majoring in marketing, management information systems (MIS), and finance,

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SNAPSHOT FROM PRACTICE 1.2
A Dozen Examples of Projects Given to Recent College Graduates

1. **Business information:** Join a project team charged with installing a new data security system.
2. **Physical education:** Design and develop a new fitness program for senior citizens that combines principles of yoga and aerobics.
3. **Marketing:** Execute a sales program for a new home air purifier.
4. **Industrial engineering:** Manage a team to create a value chain report for every aspect of a key product from design to customer delivery.
5. **Chemistry:** Develop a quality control program for an organization's drug production facilities.
6. **Management:** Implement a new store layout design.
7. **Pre-med neurology student:** Join a project team linking mind mapping to an imbedded prosthetic that will offer people with blindness an option to improve their vision.
8. **Sports communication:** Join the athletics staff at Montana State University to promote women's basketball.
9. **Systems engineer:** Become a project team member of a project to develop data mining of medical papers and studies related to drug efficacy.
10. **Accounting:** Work on an audit of a major client.
11. **Public health:** Research and design a medical marijuana educational program.
12. **English:** Create a web-based user manual for a new electronics product.

John Fedele/Blend Images

as well as students from other disciplines such as oceanography, health sciences, computer sciences, and liberal arts. These students are finding that their exposure to project management is providing them with distinct advantages when it comes time to look for jobs. More and more employers are looking for graduates with project management skills. See Snapshot from Practice 1.2: A Dozen Examples of Projects Given to Recent College Graduates for examples of projects given to recent college graduates. The logical starting point for developing these skills is understanding the uniqueness of a project and of project managers.

1.1 What Is a Project?

LO 1-2

Distinguish a project from routine operations.

What do the following headlines have in common?

Millions Watch World Cup Finals
Citywide WiFi System Set to Go Live
Hospitals Respond to New Healthcare Reforms
Apple's New iPhone Hits the Market
City Receives Stimulus Funds to Expand Light Rail System

All of these events are projects.

Holly Hildreth/McGraw Hill

The Project Management Institute provides the following definition of a project:

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

Like most organizational efforts, the major goal of a project is to satisfy a customer's need. Beyond this fundamental similarity, the characteristics of a project help differentiate it from other endeavors of the organization. The major characteristics of a project are as follows:

1. An established objective.
2. A defined lifespan with a beginning and an end.
3. Usually, the involvement of several departments and professionals.
4. Typically, doing something that has never been done before.
5. Specific time, cost, and performance requirements.

First, projects have a defined objective—whether it is constructing a 12-story apartment complex by January 1 or releasing version 2.0 of a specific software package as quickly as possible. This singular purpose is often lacking in daily organizational life in which workers perform repetitive operations each day.

Second, because there is a specified objective, projects have a defined endpoint, which is contrary to the ongoing duties and responsibilities of traditional jobs. Instead of staying in one job, individuals often move from project to project, working with different groups of people. For example, after helping to install a security system, an IT engineer may be assigned to develop a database for a different client.

Third, unlike much organizational work that is segmented according to functional specialty, projects typically require the combined efforts of a variety of specialists. Instead of working in separate offices under separate managers, project participants, whether they be engineers, financial analysts, marketing professionals, or quality control specialists, work together under the guidance of a project manager to complete a project.

The fourth characteristic of a project is that it is nonroutine and has some unique elements. This is not an either/or issue but a matter of degree. Obviously, accomplishing something that has never been done before, such as building an electric automobile or landing two mechanical rovers on Mars, requires solving previously unsolved problems and using breakthrough technology. On the other hand, even basic construction projects that involve established sets of routines and procedures require some degree of customization that makes them unique. See Snapshot from Practice 1.3: London Calling: Seattle Seahawks versus Oakland Raiders for an unusual change in routine.

Finally, specific time, cost, and performance requirements bind projects. Projects are evaluated according to accomplishment, cost, and time spent. These triple constraints impose a higher degree of accountability than typically found in most jobs. These three also highlight one of the primary functions of project management, which is balancing the trade-offs among time, cost, and performance while ultimately satisfying the customer.

What a Project Is Not

Projects should not be confused with everyday work. A project is not routine, repetitive work! Ordinary daily work typically requires doing the same or similar work over and over, while a project is done only once; a new product or service exists when the project is completed. Examine the list in Table 1.1 that compares routine, repetitive work and projects. Recognizing the difference is important because too often resources can be used up on daily operations, which may not contribute to longer-range organization strategies that require innovative new products.

SNAPSHOT FROM PRACTICE 1.3

London Calling: Seattle Seahawks versus Oakland Raiders*

On October 7, 2018, the National Football League (NFL) Seattle Seahawks walked off the field having played their best game of the season, only to fall short to the undefeated Los Angeles Rams, 33-31. Next on the schedule was an away game with the Oakland Raiders. Instead of heading about 670 miles south to Oakland, California, however, the Seahawks flew nearly 5,000 miles to London, England, eight time zones away, to spread the gospel of the NFL.

Sending an NFL team overseas during the season is no easy task. Advanced planning is critical. Players need passports. Accommodations have to be found and transportation arranged. The equipment staff sends supplies months in advance. All total, the Seahawks ended up shipping 21,000 pounds of gear and products, including 1,150 rolls of athletic tape, 2 tons of medical supplies, 350 power adapters, and 500 pairs of shoes!

Two of the biggest challenges the "Hawks" faced were jet lag and distractions. Many of the players and staff had never been overseas. London would be a strange, exciting experience. With this in mind, head coach Pete Carroll decided to fly early to London on Wednesday, October 10. This would allow players to better adjust their sleep patterns while providing some free time to explore London.

WEDNESDAY, OCTOBER 10

The Seahawks boarded a chartered jet that included 45 sleeping pods in first class for the veteran players. Coach Carroll and his staff sat in the first row of business class. Rookies and members of the practice squad sat behind them. Regardless of class, everyone got the same menu: beef filet, Cajun chicken, or herb-roasted salmon.

Typically, on flights to the east, Sam Ramsden, the team's director of health and player performance, tells players to stay awake so they will be tired and sleep well when they arrive. For the London trip, though, Ramsden reversed the program: he told players to sleep as much as possible on the flight so that when they arrived in London on Thursday afternoon, they would have enough energy to stay up until 9 or 10 p.m. and then get a full night's rest. "We try to protect their circadian rhythms as much as possible," Ramsden said. Circadian rhythm (also known as body clock) is a natural, internal system that's designed to regulate feelings of sleepiness and wakefulness over a 24-hour period.

Ramsden's staff gave each player special sleep kits that included blackout eye masks. Some players took melatonin or Ambien, while others used headphones that played the sounds of wind and rushing water to induce sleep.

THURSDAY, OCTOBER 11

The Seahawks landed on Thursday about 1:30 p.m. (5:30 a.m. Seattle time). Buses took them to a golf course resort north of London.

At night, the players let off some steam at a Topgolf facility. Here organized into groups of four, they tried to hit golf balls into giant holes to score points. Jeers rang out every time they were wildly off target.

FRIDAY, OCTOBER 12

After several hours of meetings and a practice, players were free to explore London. They scattered to the various corners of London. On returning to the resort before the 11:00 p.m. curfew, a few of the players complained about the warm English beer.

The Oakland Raiders arrived in London at 1:00 p.m., 53 hours before game time.

SATURDAY, OCTOBER 13

Coach Carroll likes to take his players to the stadium the day before a road game so they can visualize conditions ahead of time. At 1:30 p.m., the Seahawks drove to Wembley, where they saw their fully Seahawk-equipped locker room and the field, the most famous soccer pitch in England. The field appeared slick, so the equipment manager had longer screw-in cleats available for the players. The Hawks returned to their resort for their normal pregame evening routine.

GAMEDAY, OCTOBER 14

During the course of the game, the TV announcers commented several times that the Raiders seemed sluggish, while the Seahawks were sharp and focused. The Seahawks dominated the game, winning 27–3.

David Lee/Shutterstock

*G. Bell, "Seahawks Arrive in London. Why Twins Shaquill and Shaquem Griffin Did Not Travel Here Equally," thenewstribune.com, October 11, 2018. K. Belson, "Four Thousand Miles for the W," nytimes.com, October 20, 2018; Accessed 10/22/18.

TABLE 1.1 **Comparison of Routine Work with Projects**

Routine, Repetitive Work	Projects
Taking class notes	Writing a term paper
Daily entering sales receipts into the accounting ledger	Setting up a sales kiosk for a professional accounting meeting
Responding to a supply-chain request	Developing a supply-chain information system
Practicing scales on the piano	Writing a new piano piece
Routine manufacture of an Apple iPod	Designing an iPod that is approximately 2×4 inches, interfaces with PC, and stores 10,000 songs
Attaching tags on a manufactured product	Wire-tag projects for GE and Walmart

Program versus Project

In practice, the terms *project* and *program* cause confusion. They are often used synonymously. *A* **program** *is a group of related projects designed to accomplish a common goal over an extended period of time.* Each project within a program has a project manager. The major differences lie in scale and time span.

Program management is the process of *managing* a group of ongoing, interdependent, related *projects* in a coordinated way to achieve strategic objectives. For example, a pharmaceutical organization could have a program for curing cancer. The cancer program includes and coordinates *all* cancer projects that continue over an extended time horizon (Gray, 2011). Coordinating all cancer projects under the oversight of a cancer team provides benefits not available from managing them individually. This cancer team also oversees the selection and prioritizing of cancer projects that are included in their special "Cancer" portfolio. Although each project retains its own goals and scope, the project manager and team are also motivated by the higher program goal. Program goals are closely related to broad strategic organization goals.

The Project Life Cycle

Another way of illustrating the unique nature of project work is in terms of the **project life cycle.** The life cycle recognizes that projects have a limited lifespan and that there are predictable changes in the level of effort and focus over the life of the project. There are a number of different life-cycle models in project management literature. Many are unique to a specific industry or type of project. For example, a new-software development project may consist of five phases: definition, design, code, integration/test, and maintenance. A generic cycle is depicted in Figure 1.1.

The project life cycle typically passes sequentially through four stages: defining, planning, executing, and closing. The starting point begins the moment the project is given the go-ahead. Project effort starts slowly, builds to a peak, and then declines to delivery of the project to the customer.

1. **Defining stage.** Specifications of the project are defined; project objectives are established; teams are formed; major responsibilities are assigned.
2. **Planning stage.** The level of effort increases, and plans are developed to determine what the project will entail, when it will be scheduled, whom it will benefit, what quality level should be maintained, and what the budget will be.
3. **Executing stage.** A major portion of the project work takes place—both physical and mental. The physical product is produced (e.g., a bridge, a report, a software program). Time, cost, and specification measures are used for control. Is the project

FIGURE 1.1
Project Life Cycle

Defining	Planning	Executing	Closing
1. Goals	1. Schedules	1. Status reports	1. Train customer
2. Specifications	2. Budgets	2. Changes	2. Transfer documents
3. Tasks	3. Resources	3. Quality	3. Release resources
4. Responsibilities	4. Risks	4. Forecasts	4. Evaluation
	5. Staffing		5. Lessons learned
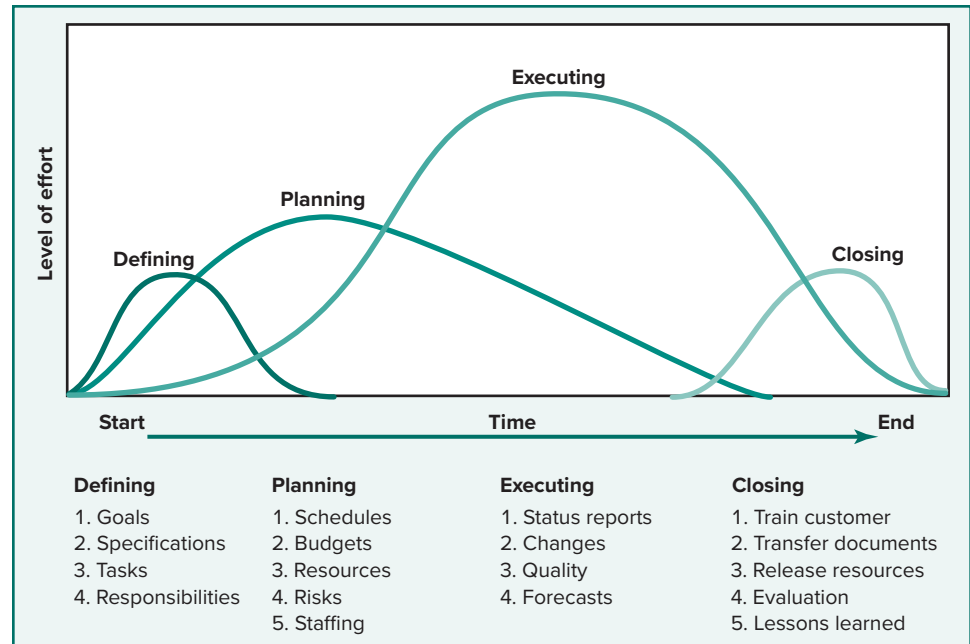
on schedule, on budget, and meeting specifications? What are the forecasts of each of these measures? What revisions/changes are necessary?

4. **Closing stage.** Closing includes three activities: delivering the project product to the customer, redeploying project resources, and conducting a post-project review. Delivery of the project might include customer training and transferring documents. Redeployment usually involves releasing project equipment/materials to other projects and finding new assignments for team members. Post-project reviews include not only assessing performance but also capturing lessons learned.

In practice, the project life cycle is used by some project groups to depict the timing of major tasks over the life of the project. For example, the design team might plan a major commitment of resources in the defining stage, while the quality team would expect their major effort to increase in the latter stages of the project life cycle. Because most organizations have a portfolio of projects going on concurrently, each at a different stage of each project's life cycle, careful planning and management at the organization and project levels are imperative.

The Project Manager

At first glance, project managers perform the same functions as other managers. That is, they plan, schedule, motivate, and control. However, what makes them unique is that they manage temporary, nonrepetitive activities to complete a fixed-life project. Unlike functional managers, who take over existing operations, project managers create a project team and organization where none existed before. They must decide what and how things should be done instead of simply managing set processes. They must meet the challenges of each phase of the project life cycle and even oversee the dissolution of their operation when the project is completed.

Project managers must work with a diverse troupe of characters to complete projects. They are typically the direct link to the customer and must manage the tension