

INFORMATION TECHNOLOGY PROJECT MANAGEMENT

SCHWALBE

9TH EDITION



INFORMATION TECHNOLOGY PROJECT MANAGEMENT

Ninth Edition

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Australia • Brazil • Mexico • Singapore • United Kingdom • United States

Information Technology Project Management, Ninth Edition

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WCN: 01-100-101

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Library of Congress Control Number: 2018944898

Student Edition:

ISBN-13: 978-1-337-10135-6

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20 Channel Center Street
Boston, MA 02210
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Printed in the United States of America

Print Number: 01

Print Year: 2018

For Dan, Anne, Bobby, and Scott

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PREFACE

The future of many organizations depends on their ability to harness the power of information technology, and good project managers continue to be in high demand. Colleges have responded to this need by establishing courses in project management and making them part of the information technology, management, engineering, and other curricula. Corporations are investing in continuing education to help develop and deepen the effectiveness of project managers and project teams. This text provides a much-needed framework for teaching courses in project management, especially those that emphasize managing information technology projects. The first eight editions of this text were extremely well received by people in academia and the workplace. The Ninth Edition builds on the strengths of the previous editions and adds new, important information and features.

It's impossible to read a newspaper, magazine, or web page without hearing about the impact of information technology on our society. Information is traveling faster and being shared by more people than ever before. You can buy just about anything online, surf the web on a mobile phone, or use a wireless Internet connection just about anywhere. Companies have linked their systems together to help them fill orders on time and better serve their customers. Software companies are continually developing new products to help streamline our work and get better results. When technology works well, it is almost invisible. But did it ever occur to you to ask, "Who makes these complex technologies and systems happen?"

Because you're reading this text, you must have an interest in the "behind-the-scenes" aspects of technology. If I've done my job well, you'll begin to see the many innovations society is currently enjoying as the result of thousands of successful information technology projects. In this text, you'll read about IT projects in organizations around the world that went well, including the National University Hospital in Singapore, which used critical chain scheduling to decrease patient admission times by more than 50 percent; retailer Zulily, one of a growing number of organizations developing software in-house to meet their need for speed and innovation; Dell's green computing project that saves energy and millions of dollars; Google's driverless car project, striving to reduce traffic accidents and save lives; and many more.

Of course, not all projects are successful. Factors such as time, money, and unrealistic expectations, among many others, can sabotage a promising effort if it is not properly managed. In this text, you'll also learn from the mistakes made on many projects that were not successful.

I have written this book in an effort to educate you, tomorrow's project managers, about what will help make a project succeed—and what can make it fail. You'll also see how projects are used in everyday media, such as television and film, and how companies use best practices in project management. Many readers tell me how much they enjoy reading these real-world examples in the What Went Right?, What Went Wrong?, Media Snapshot, Global Issues, and Best Practice features. As practitioners know, there is no

“one size fits all” solution to managing projects. By seeing how different organizations in different industries successfully implement project management, you can help your organization do the same.

Although project management has been an established field for many years, managing information technology projects requires ideas and information that go beyond standard practices. For example, many information technology projects fail because of a lack of executive support, poor user involvement, and unclear business objectives. This book includes many suggestions for dealing with these issues. New technologies can also aid in managing information technology projects, and examples of using software to assist in project management are included throughout the book.

Information Technology Project Management, Ninth Edition, is the only textbook to apply all ten project management knowledge areas and all five process groups to information technology projects. As you will learn, the project management knowledge areas are project integration, scope, time, cost, quality, human resource, communications, risk, procurement, and stakeholder management. The five process groups are initiating, planning, executing, monitoring and controlling, and closing.

This text builds on the *PMBOK® Guide – Sixth Edition*, an American National Standard, to provide a solid framework and context for managing information technology projects.

In addition to the physical text, several resources are available online. Appendix A, Guide to Using Microsoft Project 2016, is provided online. When a new version of the software is released, a new appendix will be available. Additional case studies, including the one from the Seventh Edition, Manage Your Health, are available, as well as over fifty template files that students can use to create their own project management documents. The author’s personal website (www.kathyschwalbe.com or www.pmttexts.com) also provides additional, up-to-date resources and links related to the field of project management, including topics like Agile, PMP® and CAPM® certification, simulation software, leadership, mind mapping, sample student projects, and more.

Information Technology Project Management, Ninth Edition, provides practical lessons in project management for students and practitioners alike. By weaving together theory and practice, this text presents an understandable, integrated view of the many concepts, skills, tools, and techniques of information technology project management. The comprehensive design of the text provides a strong foundation for students and practitioners in project management.

New to the Ninth Edition

Building on the success of previous editions, *Information Technology Project Management, Ninth Edition* introduces a uniquely effective combination of features. The main changes in the Ninth Edition include the following:

Many updates based on the *PMBOK® Guide – Sixth Edition*.

- A new section in chapters 4-13 called “Considerations for Agile/Adaptive Environments.”
- A new feature called “Advice for Young Professionals.”
- Updated and additional exercises to enhance student learning and give instructors more options for in-class or out-of-class work.

- Additional content on important topics like leadership and agile.
- New examples that highlight IT project management at work in real, newsworthy companies. These timely, relevant examples help illustrate the realworld applications and impact of key project management concepts. They also serve as mini-case stories, suitable for class discussion.
- Many recent studies of IT project management and related topics. Summaries of classic, updated, and the most current research throughout the text build a rich context for essential IT project management concepts.
- User feedback is incorporated. Based on feedback from reviewers, students, instructors, practitioners, and translators, you'll see a variety of changes that help clarify information.

Many people have been practicing some form of project management with little or no formal study in this area. New books and articles are written each year as we discover more about the field and as project management software continues to advance. Because the project management field and the technology industry change rapidly, you cannot assume that what worked even a few years ago is still the best approach today. This text provides up-to-date information on how good project management and effective use of software can help you manage projects, especially information technology projects. Distinct features of this text include its relationship to the Project Management Body of Knowledge, its value in preparing for certification, its detailed guide for using Microsoft Project 2016, its inclusion of running case studies and online templates, its emphasis on IT projects, its coverage of several software tools that assist with project management, and its Companion website.

Based on PMBOK® Guide – Sixth Edition and Preparing for Certification

The Project Management Institute (PMI) created the Guide to the Project Management Body of Knowledge (the *PMBOK® Guide*) as a framework and starting point for understanding project management. It includes an introduction to project management, brief descriptions of all 10 project management knowledge areas, and a glossary of terms. The *PMBOK® Guide* is, however, just that—a guide. This text uses the *PMBOK® Guide – Sixth Edition* (2017) as a foundation, but goes beyond it by providing more details, discussing the how and why of the knowledge areas, highlighting additional topics, and providing a real-world context for IT project management. This text is an excellent resource for preparing for PMI certifications, such as the Project Management Professional (PMP®) and Certified Associate in Project Management (CAPM®).

Detailed Guide to Microsoft Project 2016

Software has become a critical tool for helping project managers and their teams effectively manage information technology projects. *Information Technology Project Management, Ninth Edition*, includes a detailed guide in Appendix A (available on the Companion website for this text) for using the leading project management software on the market—Microsoft Project 2016. Examples that use Project 2016 and other software tools are integrated throughout the text. Appendix A, Guide to Using Microsoft Project 2016, teaches you in a systematic way to use this powerful software to help in project scope, schedule, cost, resource, and communications management.

Emphasis on IT Projects and Use of Software Tools

Most of the examples of projects in this text are based on IT projects. Research studies and advice are specific to managing IT projects, and include expanded information on agile. Each of the knowledge area chapters includes examples as well as a separate section describing how software can be used to assist in managing that knowledge area. For example, Chapter 5, Project Scope Management, includes examples of using mind maps created with MindView software to create a work breakdown structure. Chapter 11, Project Risk Management, shows an example of using Monte Carlo simulation software to help quantify project risk.

Exercises, Running Cases, Templates, and Sample Documents

Based on feedback from readers, the Ninth Edition continues to provide challenging exercises and running cases to help students apply concepts in each chapter. The text includes more than 50 templates and examples of real project documents that students can use to help them apply their skills to their own projects.

Students can access all of these materials for free through

ACCESSING MINDTAP

To access the IT Project Management MindTap, open a browser and go to www.cengage.com. Click Sign In to navigate to the login page. Click Create an Account to begin the registration process. You will need the course link, access code, or course key to register your product.

Organization and Content

Information Technology Project Management, Ninth Edition, is organized into three main sections, which provide a framework for project management, a detailed description of each project management knowledge area, and an appendix of practical information for applying project management. The first three chapters form the first section, which introduces the project management framework and sets the stage for the remaining chapters.

Chapters 4 through 13 form the second section, which describes each of the project management knowledge areas—project integration, scope, schedule, cost, quality, resource, communications, risk, procurement, and stakeholder management—in the context of information technology projects. An entire chapter is dedicated to each knowledge area. Each of these chapters includes sections that map to their major processes as described in the *PMBOK® Guide – Sixth Edition*. For example, the chapter on project quality management includes sections on planning quality management, managing quality, and controlling quality. Additional sections highlight other important concepts related to each knowledge area, such as Six Sigma, testing, maturity models, and using software to assist in project quality management. Each chapter also includes detailed examples of key project management tools and techniques as applied to information technology projects. For example, the chapter on project integration management includes samples of various project-selection techniques, such as net present value analyses, ROI calculations, payback analyses, and weighted scoring models. The project scope management chapter includes a sample project charter, a project scope statement, and several work breakdown structures for information technology projects.

Appendix A, provided online to keep it up-to-date, forms the third section of the text, which provides practical information to help you learn how to use the most popular project management software available today. By following the detailed, step-by-step guide in Appendix A, which includes more than 60 screen illustrations, you will learn how to use Project 2016. You can download a free trial from the Microsoft website, use your school or company license, or purchase this powerful software.

Pedagogical Features

Several pedagogical features are included in this text to enhance presentation of the materials so that you can more easily understand the concepts and apply them. Throughout the text, emphasis is placed on applying concepts to current, real-world information technology project management.

Opening Case and Case Wrap-Up

To set the stage, each chapter begins with an opening case related to the material presented in that chapter. These real-life case scenarios, most of which are based on the author's experiences, spark student interest and introduce important concepts in a real-world context. As project management concepts and techniques are discussed, they are applied to the opening case and other similar scenarios. Each chapter then closes with a case wrap-up—with some ending successfully and some failing—to further illustrate the real world of project management.

What Went Right? and What Went Wrong?

Failures, as much as successes, can be valuable learning experiences. Each chapter of the text includes one or more examples of real information technology projects that went right, as well as examples of projects that went wrong. These examples further illustrate the importance of mastering key concepts in each chapter.

Media Snapshot

The world is full of projects. Television shows, movies, newspapers, websites, and other media highlight project results that are good and bad. Relating project management concepts to the types of projects highlighted in the media helps you understand the importance of this growing field. Why not get excited about studying project management by seeing its concepts at work in popular television shows, movies, or other media?

Best Practice

Every chapter includes an example of a best practice related to topics in that chapter. For example, Chapter 1 describes best practices written by Robert Butrick, author of *The Project Workout*, from the *Ultimate Business Library's Best Practice* book. He instructs organizations to ensure that their projects are driven by their strategy and to engage project stakeholders.

Global Issues

Every chapter includes an example of global issues of importance today. For example, Chapter 2 describes some of the problems with outsourcing, such as rioting in Beijing when customers could not buy the latest iPhones. Chapter 12 describes the recent development of urban onshoring, one response to problems with offshoring.

Advice for Young Professionals

A new feature in each chapter provides practical advice as you begin your career in IT and/or project management. For example, Chapter 1 provides insight to help you determine if you should pursue a career as a project manager.

Key Terms

The fields of information technology and project management include many unique terms that are vital to creating a workable language when the two fields are combined. Key terms are displayed in boldface and are defined the first time they appear. A list of key terms is provided in alphabetical order at the end of each chapter and a glossary is provided on the Companion web site for text.

Application Software

Learning becomes much more dynamic with hands-on practice using the top project management software tool in the industry, Microsoft Project 2016, as well as other tools, such as spreadsheet software and the Internet. Each chapter offers many opportunities to get hands-on experience and build new software skills. This text is written from the point of view that reading about something only gets you so far—to really understand project management, you have to do it for yourself. In addition to the exercises and running cases at the end of each chapter, several challenging exercises are provided at the end of Appendix A, Guide to Using Microsoft Project 2016.

Student and Instructor Resources

Student and Instructor Companion Websites

The free Student Companion Website accessed through www.cengage.com provides the template files mentioned in the text, Project 2016 files, a case study describing initiating through closing the ResNet project for Northwest Airlines (now part of Delta), and additional running cases that instructors can assign to students to practice their skills. There is also a link to the author's website, which provides up-to-date resources on important topics like agile, certifications, and more.

The Instructor Companion Website, also accessed with a single sign-on (SSO) account through www.cengage.com, contains even more resources only for instructors:

- **Instructor's Manual** The Instructor's Manual that accompanies this textbook includes additional instructional material to assist in class preparation, such as suggestions for lecture topics and additional discussion questions.
- **Solution Files** Solutions to end-of-chapter questions are available on the Instructor Companion Website.

- **PowerPoint Presentations** This text comes with Microsoft PowerPoint slides for each chapter. These slides are included as a teaching aid for classroom presentation, to make available to students on the network for chapter review, or to print for classroom distribution. Instructors can add their own slides for additional topics they introduce to the class.
- **Test Banks** In addition to the Test Bank available online through Cognero (see below), the Test Bank is also available in a number of file formats on the Instructor Companion Website. Each chapter's bank of questions includes dozens of True/False, Multiple Choice, and Essay questions. Instructors can retrieve the appropriate file formats to administer tests through their schools' learning management systems (Blackboard, Canvas, Moodle, Desire2Learn, etc.), or they can opt for Word documents.

Test Banks in Cognero

The Test Bank for *Information Technology Project Management, Ninth Edition*, is available online in the Cognero system. Cengage Learning Testing Powered by Cognero is a flexible, online system that allows instructors to:

- Author, edit, and manage test bank content.
- Use searchable metadata to ensure tests are complete and compliant.
- Create multiple test versions in an instant.
- Deliver tests from your learning management system (LMS), classroom, or wherever you want.

Cengage Learning Testing Powered by Cognero works on any operating system or browser with no special installs or downloads needed. With its intuitive tools and familiar desktop drop-down menus, Cognero enables instructors to easily create and edit tests from school or home—anywhere with Internet access.

IT Project Management MindTap

MindTap for *Information Technology Project Management, Ninth Edition* is a personalized, fully online, digital learning platform of content, assignments, and services that engages students and encourages them to think critically, while allowing instructors to easily set their course through simple customization options.

MindTap is designed to help students master the skills they need in today's workforce. Research shows employers need critical thinkers, troubleshooters, and creative problem solvers to stay relevant in our fast paced, technology-driven world. MindTap helps you achieve this with assignments and activities that provide hands-on practice, real-life relevance, and certification test prep. Students are guided through assignments that help them master basic knowledge and understanding before moving on to more challenging problems.

MindTap is designed around learning objectives and provides the analytics and reporting to easily see where the class stands in terms of progress, engagement, and completion rates. Students can access eBook content in the MindTap Reader, which offers highlighting, note-taking, search and audio, as well as mobile access. Learn more at www.cengage.com/mindtap/.

ACKNOWLEDGMENTS

I never would have taken on the project of writing this book, including all the prior editions, without the help of many people. I thank the staff at Cengage, including Jaymie Falconi, Michele Stulga, Maria Garguilo, Amber Hill, and Kathy Kucharek, for their dedication and hard work in helping me produce this book and in doing such an excellent job of marketing it.

I thank my many colleagues and experts in the field who contributed information to this book. Joseph W. Kestel, PMP®, provided outstanding feedback on the agile information in this text based on his personal experience in leading agile projects. David Jones, Rachel Hollstadt, Cliff Sprague, Michael Branch, Barb Most, Jodi Curtis, Rita Mulcahy, Karen Boucher, Bill Munroe, Tess Galati, Joan Knutson, Neal Whitten, Brenda Taylor, Quentin Fleming, Jesse Freese, Nick Matteucci, Nick Erndt, Dragan Milosevic, Bob Borlink, Arvid Lee, Kathy Christenson, Peeter Kivestu, and many other people provided excellent materials included in this book. I enjoy the network of project managers, authors, and consultants in this field who are passionate about improving the theory and practice of project management.

I also thank my students and colleagues at Augsburg College and the University of Minnesota for providing feedback on the earlier editions of this book. I received many valuable comments from them on ways to improve the text and structure of my courses. I learn something new about project management and teaching all the time by interacting with students, faculty, and staff.

I also thank the faculty reviewers for providing excellent feedback for me in writing this book over the years. I thank the many instructors and readers who have contacted me directly with praise as well as suggestions for improving this text. I appreciate the feedback and do my best to incorporate as much as I can. In particular, I'd like to thank the following:

Jody Allen, Mid-America Christian University
 William Baker, Southern New Hampshire University
 Tonya Barrier, Missouri State University
 Kevin Daimi, University of Detroit Mercy
 Antonio Drommi, University of Detroit Mercy
 Roger Engle, Franklin University
 Lisa Foster, Walsh College of Business & Accountancy
 Esther Frankel, Santa Barbara City College
 Guy Garrett, Gulf Coast State College
 James Gibbs, Mount St. Joseph University
 Christa Glassman, Buffalo State College
 Thomas Haigh, University of Wisconsin, Milwaukee
 Scott Hilberg, Towson University
 Kay Hammond, Lindenwood University
 Sam Hijazi, Saint Leo University
 Henry Jackson, Schreiner University
 Karen Johnson, Indiana University Northwest
 Donna Karch, The College of St. Scholastica
 Carol Kaszynski, Inver Hills Community College
 Cyril Keiffer, Owens Community College
 Thomas King, Pennsylvania State University

Jeff Landry, University of South Alabama
Sang Joon Lee, Mississippi State University
Sunita Lodwig, University of South Florida
Max McQuighan, Anne Arundel Community College
Barbara Miller, Zane State College
Kimberly Mitchell, Illinois State University
Tim Moriarty, Waubonsee Community College
Brandon Olson, The College of St. Scholastica
Olga Petkova, Central Connecticut State University
April Reed, East Carolina University
Jason Riley, Sam Houston State University
Paula Ruby, Arkansas State University
Carl Scott, University of Houston
Ferris Sticksel, Webster University
David Syverson, Embry-Riddle Aeronautical University
Arthur Thomas, Syracuse University
Angela Trego, Utah Valley University
Barbara Warner, Wake Technical Community College
Steven White, Anne Arundel Community College
Dr. David Williamson, Colorado State University

Most of all, I am grateful to my family. Without their support, I never could have written this book. My wonderful husband, Dan, has always supported me in my career, and he helps me keep up-to-date with software development because he is a lead architect for Milner Technologies, Inc. (formerly ComSquared Systems, Inc.). Our three children, Anne, Bobby, and Scott, think it's cool that their mom writes books and speaks at conferences. They also see me managing projects all the time. Anne, now 34, a research analyst for The New Teacher Project, teases me for being the only quilter she knows who treats each quilt as a project. (Maybe that's why I get so many done!) After her colleagues at The Minnesota Evaluation Studies Institute at the University of Minnesota heard about my work and books, they hired me to teach a workshop on project management to evaluators, which was sold out. Our two sons are working as software developers and may become IT project managers soon. Our children understand the main reason I write—I have a passion for educating future leaders of the world, including them.

As always, I am eager to receive your feedback on this book. Please send comments to me at schwalbe@augsborg.edu.

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department. She also provides training and consulting services to several organizations and speaks at numerous conferences. Kathy's first job out of college was as a project manager in the Air Force. She worked for 10 years in industry before entering academia in 1991. She was an Air Force officer, project manager, systems analyst, senior engineer, and information technology consultant. Kathy is an active member of PMI, having served as the Student Chapter Liaison for the Minnesota chapter, VP of Education for the Minnesota chapter, Editor of the ISSIG Review, Director of Communications for PMI's Information Systems Specific Interest Group, member of PMI's test-writing team, and writer for the community posts. Kathy earned her Ph.D. in Higher Education at the University of Minnesota, her MBA at Northeastern University's High Technology MBA program, and her B.S. in mathematics at the University of Notre Dame. She was named Educator of the Year in 2011 by the Association of Information Technology Professionals (AITP) Education Special Interest Group (EDSIG). Kathy lives in Minnesota with her husband. Visit her personal website at www.kathyschwalbe.com or www.pmtxts.com.

Other books by Kathy Schwalbe:

An Introduction to Project Management, Sixth Edition (Minneapolis: Schwalbe Publishing, 2017).

Healthcare Project Management, Second Edition, co-authored with Dan Furlong (Minneapolis: Schwalbe Publishing, 2017).

CHAPTER 1

INTRODUCTION TO PROJECT MANAGEMENT

LEARNING OBJECTIVES

After reading this chapter, you will be able to:

- Articulate the growing need for better project management, especially for information technology (IT) projects
- Explain what a project is, provide examples of IT projects, list various attributes of projects, and describe constraints of project management
- Define project management and discuss key elements of the project management framework, including project stakeholders, the project management knowledge areas, common tools and techniques, and project success
- Discuss the relationship between project, program, and portfolio management and the contributions each makes to enterprise success
- Summarize the role of project managers by describing what they do, what skills they need, the talent triangle, and career opportunities for IT project managers
- Recall key aspects of the project management profession, including important components of its history, the role of professional organizations like the Project Management Institute (PMI), the importance of certification and ethics, and the advancement of project management software

OPENING CASE

Anne Roberts, the director of the Project Management Office for Information Technology at a large retail chain, stood in front of 500 people in the large corporate auditorium to explain the company's new strategies during a monthly all-hands meeting. She was also streaming live video to thousands of other employees at other locations, suppliers, and stockholders throughout the world. The company had come a long way in implementing new information systems to improve inventory control, sell products online, streamline the sales and distribution processes, and improve customer service. However, a recent security breach had alarmed investors and the stock price plummeted. People were anxious to hear about the company's new strategies.

Anne began to address the audience, "Good morning. As you know, competition is fierce in our industry. We have made a lot of progress the last few years to become a more agile organization, especially in valuing people over process and responding to change over following a plan. We all have to work together to overcome recent problems.

Our two most important goals include providing the best computer security possible and improving online collaboration tools for our employees, suppliers, and customers. Our challenge is to work even smarter to deliver solutions that provide the most benefit for the company by leveraging the power of information technology. If we succeed, we'll continue to be a world-class corporation."

"And if we fail?" someone asked from the audience.

"Let's just say that failure is not an option," Anne replied.

INTRODUCTION

Many people and organizations today have a new—or renewed—interest in project management. Until the 1980s, project management primarily focused on providing schedule and resource data to top management in the military, computer, and construction industries. Today's project management involves much more, and people in every industry and every country manage projects. Project management is a distinct profession with degree programs, certifications, and excellent career opportunities.

New technologies have become a significant factor in many businesses. Computer hardware, software, networks, and the use of interdisciplinary and global work teams have radically changed the work environment. The following statistics demonstrate the significance of project management in today's society, especially for projects involving information technology (IT):

- Worldwide IT spending was \$3.5 trillion in 2017, a 2.4 percent increase from 2016 spending. Communications services accounted for 40 percent of the spending.¹
- The Project Management Institute reported that the number of project-related jobs reached almost 66 million in 2017, and demand continues to increase. "By 2027, employers will need 87.7 million individuals working in project management-oriented roles."²

- The unemployment rate for IT professionals is generally half the rate of the overall labor market in the United States. The U.S. Bureau of Labor Statistics estimates the rate to be only 2 percent, and project management is one of the ten hottest tech skills.³
- In 2017, the average annual salary (without bonuses) for someone in the project management profession was \$112,000 per year in the United States and \$130,866 in Switzerland, the highest-paid country. Salaries of survey respondents across 37 countries were 23 percent higher for those with the Project Management Professional (PMP®) credential than those without it.⁴
- The top skills employers look for in new college graduates are all related to project management: team work, decision making, problem-solving, and verbal communications.⁵
- Organizations waste \$97 million for every \$1 billion spent on projects, according to PMI's Pulse of the Profession® report. Excelling at project management definitely affects the bottom line.⁶

The complexity and importance of IT projects, which involve using hardware, software, and networks to create a product, service, or result, have evolved dramatically. Today's companies, governments, and nonprofit organizations are recognizing that to be successful, they need to use modern project management techniques, especially for IT projects. Individuals are realizing that to remain competitive in the workplace, they must develop skills to become good project team members and project managers. They also realize that many of the concepts of project management will help them in their everyday lives as they work with people and technology on a day-to-day basis.



WHAT WENT WRONG?

In 1995, the Standish Group published an often-quoted study titled “The CHAOS Report.” This consulting firm surveyed 365 IT executive managers in the United States who managed more than 8,380 IT application projects. As the title of the study suggests, the projects were in a state of chaos. U.S. companies spent more than \$250 billion each year in the early 1990s on approximately 175,000 IT application development projects. Examples of these projects included creating a new database for a state department of motor vehicles, developing a new system for car rental and hotel reservations, and implementing a client-server architecture for the banking industry. The study reported that the overall success rate of IT projects was *only* 16.2 percent. The surveyors defined success as meeting project goals on time and on budget. The study also found that more than 31 percent of IT projects were canceled before completion, costing U.S. companies and government agencies more than \$81 billion. The study authors were adamant about the need for better project management in the IT industry. They explained, “Software development projects are in chaos, and we can no longer imitate the three monkeys—hear no failures, see no failures, speak no failures.”⁷ Although this study was

(continued)

done 20 years ago, it was significant in making senior executives pay attention to the importance of IT project management.

In another large study, PricewaterhouseCoopers surveyed 200 companies from 30 different countries about their project management maturity and found that *over half of all projects fail*. The study also found that only 2.5 percent of corporations consistently meet their targets for scope, time, and cost goals for all types of projects.⁸

Although several researchers question the methodology of such studies, the results have prompted managers throughout the world to examine ways to improve their practices in managing projects. Many organizations assert that using project management techniques provides advantages, such as the following:

- Better control of financial, physical, and human resources
- Improved customer relations
- Shorter development times
- Lower costs and improved productivity
- Higher quality and increased reliability
- Higher profit margins
- Better internal coordination
- Positive impact on meeting strategic goals
- Higher worker morale

This chapter introduces projects and project management, explains how projects fit into programs and portfolio management, discusses the role of the project manager, and provides important background information on this growing profession. Although project management applies to many different industries and types of projects, this text focuses on applying project management to IT projects.

WHAT IS A PROJECT?

To discuss project management, it is important to understand the concept of a project. A **project** is “a temporary endeavor undertaken to create a unique product, service, or result.”⁹ Operations, on the other hand, is work done in organizations to sustain the business. It focuses on the ongoing production of goods and services. Projects are different from operations in that they end when their objectives have been reached or the project has been terminated. It is important to note that people focusing on operations and projects must work together for a smooth transition. For example, in software development, **DevOps** is a fairly new term used to describe a culture of collaboration between software development and operations teams to build, test, and release reliable software more quickly.

Examples of IT Projects

Projects can be large or small and involve one person or thousands of people. They can be done in one day or take years to complete. As described earlier, IT projects involve using hardware, software, and networks to create a product, service, or result. Examples of IT projects include the following:

- A large network of healthcare providers updates its information systems and procedures to reduce hospital acquired diseases.
- A team of students creates a smartphone application and sells it online.
- A company develops a driverless car.
- A college upgrades its technology infrastructure to provide wireless Internet access across the whole campus as well as online access to all academic and student service information.
- A company implements a new system to increase sales force productivity and customer relationship management that will work on various laptops, smartphones, and tablets.
- A television network implements a system to allow viewers to vote for contestants and provide other feedback on programs via social media sites.
- A government group develops a system to track child immunizations.
- A large group of volunteers from organizations throughout the world develops standards for environmentally friendly or green IT.
- A global bank acquires other financial institutions and needs to consolidate systems and procedures.
- Government regulations require monitoring of pollutants in air and water.
- A multinational firm decides to consolidate its information systems into an integrated enterprise resource management approach.

Gartner, Inc., a prestigious consulting firm, identified the top 10 strategic technologies for 2018. A few of these technologies include the following:

- Artificial Intelligence (AI) Foundation: Creating systems that learn, adapt, and potentially act autonomously can enhance decision making and improve the customer experience.
- Intelligent Things: AI is driving advances for new intelligent things, including autonomous vehicles, robots, and drones as well as Internet of Things like thermostats, lights, and home appliances.
- Cloud to the Edge: Edge computing pushes data handling to the edge of the network, closer to the source of the data. Instead of sending data to the cloud server or central data center for processing, the device connects through a local gateway device, allowing faster analytics and reduced network pressure.
- Immersive Experience: Virtual, augmented, and mixed reality are changing the way that people perceive and interact with the digital world. “The virtual reality (VR) and augmented reality (AR) market is currently adolescent and fragmented. Interest is high, resulting in many novelty VR applications that deliver little real business value outside of advanced entertainment, such as video games and 360-degree spherical videos. To drive real tangible business benefit, enterprises must examine specific real-life scenarios where VR and AR can be applied to make employees more productive and enhance the design, training and visualization processes.”¹⁰

As you can see, a wide variety of projects use information technologies, and organizations rely on them for success.



MEDIA SNAPSHOT

One of Gartner's top 10 strategic technologies for 2012 included application stores and marketplaces for smartphones and tablets. Gartner predicted that by 2014 there would be more than 70 billion mobile application downloads every year, but the actual number was almost double!¹¹ Facebook is by far the most downloaded app, and the most popular category of all apps continues to be games.

As of March 2017, Android users could download 2.8 million different apps, and Apple users could download 2.2 million. "In 2016, the global mobile internet user penetration has exceeded half the world's population, while the average daily time spent accessing online content from a mobile device, such as a smartphone, a tablet computer or wearable, has reached 185 minutes daily among Millennials, 110 minutes for Generation X and 43 daily minutes for Boomers."¹²

Project Attributes

Projects come in all shapes and sizes. The following attributes help define a project further:

- *A project has a unique purpose.* Every project should have a well-defined objective. For example, Anne Roberts, the director of the Project Management Office in the chapter's opening case, might sponsor an IT collaboration project to develop a list and initial analysis of potential IT projects that might improve operations for the company. The unique purpose of this project would be to create a collaborative report with ideas from people throughout the company. The results would provide the basis for further discussions and selecting projects to implement. As you can see from this example, projects result in a unique product, service, or result.
- *A project is temporary.* A project has a definite beginning and end. In the IT collaboration project, Anne might form a team of people to work immediately on the project, and then expect a report and an executive presentation of the results in one month.
- *A project drives change and enables value creation.* A project is initiated to bring about a change in order to meet a need or desire. Its purpose is to achieve a specific objective which changes the context (a living situation, in this house project example) from a current state to a more desired or valued future state.
- *A project is developed using progressive elaboration.* Projects are often defined broadly when they begin, and as time passes, the specific details of the project become clearer. Therefore, projects should be developed in increments. A project team should develop initial plans and then update them with more detail based on new information.

- *A project requires resources, often from various areas.* Resources include people, hardware, software, and other assets. Many projects cross departmental or other boundaries to achieve their unique purposes. For the IT collaboration project, people from IT, marketing, sales, distribution, and other areas of the company would need to work together to develop ideas.
- *A project should have a primary customer or sponsor.* Most projects have many interested parties or stakeholders, but for a project to succeed someone must take the primary role of sponsorship. The **project sponsor** usually provides the direction and funding for the project. Executive support is crucial to project success, as described in later chapters. Anne Roberts would be the sponsor for the IT collaboration project.
- *A project involves uncertainty.* Because every project is unique, it is sometimes difficult to define its objectives clearly, estimate how long it will take to complete, or determine how much it will cost. External factors also cause uncertainty, such as a supplier going out of business or a project team member needing unplanned time off. This uncertainty is one of the main reasons project management is so challenging, especially on projects involving new technologies.

An effective **project manager** is crucial to a project's success. Project managers work with the project sponsors, team, and the other people involved to achieve project goals.

Project Constraints

Every project is constrained in different ways, often by its scope, time, and cost goals. These limitations are sometimes referred to in project management as the **triple constraint**. To create a successful project, a project manager must consider scope, time, and cost and balance these three often-competing goals:

- *Scope:* What work will be done as part of the project? What unique product, service, or result does the customer or sponsor expect from the project? How will the scope be verified?
- *Time:* How long should it take to complete the project? What is the project's schedule? How will the team track actual schedule performance? Who can approve changes to the schedule?
- *Cost:* What should it cost to complete the project? What is the project's budget? How will costs be tracked? Who can authorize changes to the budget?

Figure 1-1 illustrates the three dimensions of the triple constraint. Each area—scope, time, and cost—has a target at the beginning of the project. For example, the IT collaboration project might have an initial scope of producing a 40- to 50-page report and a one-hour presentation on about 30 potential IT projects. The project manager might further define project scope to include providing a description of each potential project, an investigation of what other companies have implemented for similar projects, a rough time and cost estimate, and assessments of the risk and potential payoff as high, medium, or low. The initial time estimate for this project might be one month, and the cost estimate might be \$45,000–\$50,000. These expectations provide targets for the scope, time, and cost dimensions of the project.

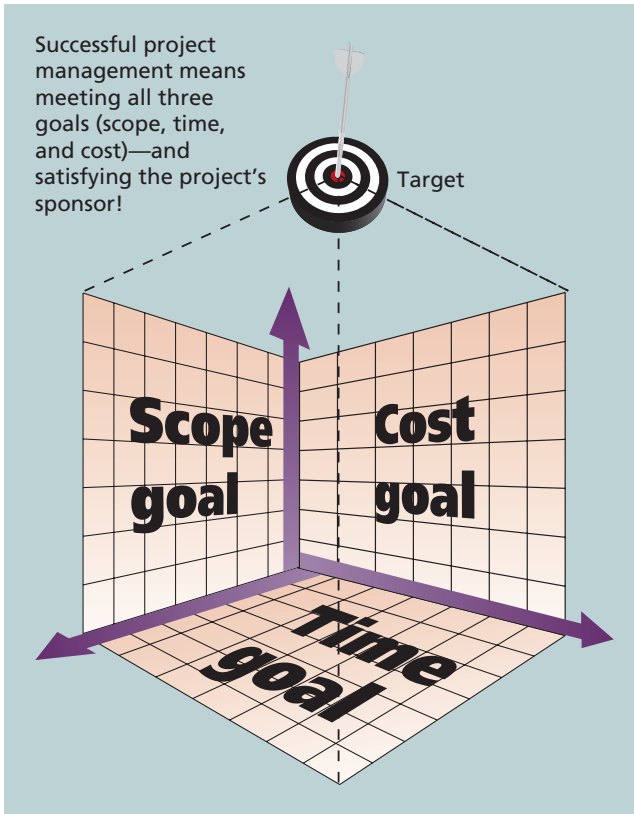


FIGURE 1-1 Project constraints

Note that the scope and cost goals in this example include ranges—the report can be 40 to 50 pages long and the project can cost between \$45,000 and \$50,000. Because projects involve uncertainty and limited resources, projects rarely finish according to their original scope, time, and cost goals. Instead of discrete target goals, it is often more realistic to set a range for goals, such as spending between \$45,000 and \$50,000 and having a 40- to 50-page report. These goals might require hitting the target, but not the bull's eye.

Managing the triple constraint involves making trade-offs between scope, time, and cost goals for a project. For example, you might need to increase the budget for a project to meet scope and time goals. Alternatively, you might have to reduce the scope of a project to meet time and cost goals. Experienced project managers know that you must decide which aspect of the triple constraint is most important. If time is most important, you must often change the initial scope and cost goals to meet the schedule. If scope goals are most important, you may need to adjust time and cost goals.

To generate project ideas for the IT collaboration project, suppose that the project manager sent an e-mail survey to all employees, as planned. The initial time and cost estimate may have been one week and \$5,000 to collect ideas using this e-mail survey. Now, suppose that the e-mail survey generated only a few good project ideas, but the scope goal was to collect at least 30 good ideas. Should the project team use a different method like

focus groups or interviews to collect ideas? Even though it was not in the initial scope, time, or cost estimates, it would really help the project. Because good ideas are crucial to project success, it would make sense to inform the project sponsor that adjustments are needed.

Although the triple constraint describes how the basic elements of a project interrelate, other elements can also play significant roles. Quality is often a key factor in projects, as is customer or sponsor satisfaction. Some people, in fact, refer to the *quadruple constraint* of project management, which includes quality as well as scope, time, and cost. A project team may meet scope, time, and cost goals but might fail to meet quality standards and satisfy the sponsor. For example, Anne Roberts may receive a 50-page report describing 30 potential IT projects and hear a presentation that summarizes the report. The project team may have completed the work on time and within the cost constraint, but the quality may have been unacceptable.

Other factors might also be crucial to a particular project. On some projects, resources are the main concern. For example, the entertainment industry often needs particular actors for movies or television shows. Project goals must be adjusted based on when particular people are available. Risk can also affect major project decisions. A company might wait to start a project until the risks are at an acceptable level. The project manager should be communicating with the sponsor throughout the project to make sure it is meeting expectations. Chapter 10, Project Communications Management, and Chapter 13, Project Stakeholder Management, address communicating with stakeholders and understanding their expectations in greater detail.

How can you avoid the problems that occur when you meet scope, time, and cost goals, but lose sight of customer satisfaction? The answer is *good project management, which includes more than managing project constraints*.

WHAT IS PROJECT MANAGEMENT?

Project management is “the application of knowledge, skills, tools, and techniques to project activities to meet project requirements.”¹³ Project managers must not only strive to meet specific scope, time, cost, and quality goals of projects, but also facilitate the entire process to meet the needs and expectations of people involved in project activities or affected by them.

Figure 1-2 illustrates a framework to help you understand project management. Key elements of this framework include the project stakeholders, project management knowledge areas, project management tools and techniques, and the contribution of successful projects to the enterprise.

Project Stakeholders

Stakeholders are the people involved in or affected by project activities, and include the project sponsor, project team, support staff, customers, users, suppliers, and even opponents of the project. These stakeholders often have very different needs and expectations. A familiar example of a project is building a new house. There are several stakeholders in a home construction project.

- The project sponsors would be the potential new homeowners who would be paying for the house. They could be on a very tight budget, so would expect the contractor to provide a realistic idea of what type of home they