



Information Technology PROJECT MANAGEMENT | 7e

Kathy Schwalbe

INFORMATION TECHNOLOGY PROJECT MANAGEMENT

INFORMATION TECHNOLOGY PROJECT MANAGEMENT

Seventh Edition

Kathy Schwalbe, Ph.D., PMP
Augsburg College



Australia • Brazil • Japan • Korea • Mexico • Singapore • Spain • United Kingdom • United States

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**Information Technology Project Management,
Seventh Edition**

Kathy Schwalbe

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Library of Congress Control Number: 2012946635

Student Edition:

ISBN-13: 978-1-133-52685-8

ISBN-10: 1-133-52685-3

Instructor's Edition:

ISBN-13: 978-1-133-52687-2

ISBN-10: 1-133-52687-X

Course Technology

20 Channel Center Street

Boston, MA 02210

USA

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For Dan, Anne, Bobby, and Scott

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Appendix B

(Available on CengageBrain.com)

Appendix C

(Available on CengageBrain.com)

Glossary

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I.1

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 effective 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 six editions of this text were extremely well received by people in academia and the workplace. The Seventh 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 at your local coffee shop. 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 around the world that went well, including Mittal Steel Poland's Implementation of SAP that unified IT systems to improve business and financial processes; Dell Earth and other green computing projects that save energy and millions of dollars; Six Sigma projects such as the project to improve case load management at Baptist St. Anthony's Hospital in Amarillo, Texas; the systems infrastructure project at the Boots Company in the United Kingdom that takes advantage of supplier competition to cut costs and improve services; 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, and Best Practice features. As practitioners know, there is no "one size fits all" solution to

managing projects. By seeing how different organizations 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 project management. For example, many information technology projects fail because of a lack of user input, incomplete and changing requirements, and a lack of executive support. This book includes 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, Seventh Edition, is the only textbook to apply all 10 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, Fifth Edition*, an American National Standard, to provide a solid framework and context for managing information technology projects. It also includes an appendix, Guide to Using Microsoft Project 2010, that many readers find invaluable. A second appendix provides advice on earning and maintaining Project Management Professional (PMP) certification from the Project Management Institute (PMI) as well as information on other certification programs, such as CompTIA's Project+ certification. A third appendix provides additional case studies and information on using simulation and mind-mapping software to help readers apply their project management skills.

Information Technology Project Management, Seventh 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 SEVENTH EDITION

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

- Several changes were made to synchronize the Seventh Edition with the *PMBOK® Guide, Fifth Edition*. Changes were made based on the exposure draft released in February 2012. The biggest change was the addition of a tenth knowledge area, Project Stakeholder Management. This text includes a new chapter to address this important topic.
- Includes additional information on agile project management. Chapter 2 includes general information on this popular concept, and Chapter 3 provides a second case study illustrating the outputs produced for the JWD Consulting project when using an agile approach. For example, you can see a sample product backlog, a sprint backlog, a burndown chart, and key artifacts or outputs produced when using Scrum, the most popular agile method.

- Appendix C, Additional Cases and Software, provides information about using several simulation software tools. Several suppliers offer discounts to users of this text. A new section provides instructions for accessing a special 60-day trial of MindView Business software. This software provides the capability to create mind maps, a powerful tool for creating a SWOT analysis or work breakdown structure. The software also allows users to convert a mind map into a Gantt chart.
- A new feature, Global Issues, provides examples of how project management concepts and practices affect people around the globe.
- Updated examples are provided throughout the text. You'll notice several new examples in the Seventh Edition that explain recent events in managing real information technology projects. Several of the What Went Right?, What Went Wrong?, Media Snapshot, and Best Practice examples have been updated to keep you current. Additional examples and results of new studies are included throughout the text, with appropriate citations.
- User feedback is incorporated. Based on feedback from reviewers, students, instructors, practitioners, and translators, you'll see several additional changes to help clarify information. (This book has been translated into Chinese, Japanese, Russian, and Czech.)
- A new CourseMate site for the Seventh Edition (www.cengagebrain.com) provides access to informative links from the end notes, lecture notes, interactive quizzes, templates, additional running cases, suggested readings, and many other items to enhance your learning.

ACCESSING THE COURSEMATE SITE

To access the CourseMate site, open a Web browser and go to www.cengagebrain.com. Search by ISBN, author name, or title, and click Create My Account to begin the registration process.

APPROACH

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 of project management, and 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. Six distinct features of this text include its relationship to the Project Management Body of Knowledge, its detailed guide for using Microsoft Project 2010, its value in preparing for Project Management Professional and other certification exams, its inclusion of running case studies and online templates, its companion (premium) Web site, and its inclusion of a 60-day trial of MindView Business software.

Based on *PMBOK® Guide, Fifth Edition*

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, Fifth Edition* exposure draft (2012) as a foundation, but goes beyond it by providing more details, highlighting additional topics, and providing a real-world context for project management. *Information Technology Project Management, Seventh Edition*, explains project management specifically as it applies to managing information technology projects in the 21st century. It includes several unique features to bring you the excitement of this dynamic field. (For more information on features, see the Pedagogical Features section.)

Detailed Guide for How to Use Microsoft Project 2010

Software has advanced tremendously in recent years, and it is important for project managers and their teams to use software to help manage information technology projects. *Information Technology Project Management, Seventh Edition*, includes a detailed guide in Appendix A for using the leading project management software on the market—Microsoft Project 2010. Examples that use Project and other software tools are integrated throughout the text. Appendix A, Guide to Using Microsoft Project 2010, teaches you in a systematic way to use this powerful software to help in project scope, time, cost, human resource, and communications management.

Resource for PMP and Other Certification Exams

Professional certification is an important factor in recognizing and ensuring quality in a profession. PMI provides certification as a Project Management Professional (PMP), and this text is an excellent resource for studying for the certification exam as well as the entry-level Certified Associate in Project Management (CAPM) exam. This text will also help you pass other certification exams, such as CompTIA's Project+ exam. Having working experience on projects does not mean you can easily pass the PMP or other certification exams.

I like to tell my students a story about taking a driver's license test after moving to Minnesota. I had been driving safely and without accidents for over 16 years, so I thought I could just walk in and take the test. I was impressed by the sophisticated computer system used to administer the test. The questions were displayed on a large touch-screen monitor, often with an image or video to illustrate traffic signs or driving situations. I became concerned when I had no idea how to answer several questions, and I was perplexed when the test seemed to stop and a message appeared: "Please see the person at the service counter." This was a polite way of saying I had failed the test! After controlling my embarrassment, I picked up one of the Minnesota driving test brochures, studied it for an hour or two that night, and passed the test the next day.

The point of this story is to emphasize the importance of studying information from the organization that creates the test and not to be overconfident that your experience is enough. Because this text is based on PMI's *PMBOK® Guide, Fifth Edition*, it provides a valuable reference for studying for PMP certification. It is also

an excellent reference for CompTIA's Project+ exam. I have earned both of these certifications and kept them in mind when writing this text.

Exercises, Running Cases, Templates, Sample Documents, and Optional Simulation Software

Based on feedback from readers, the Seventh Edition continues to provide challenging exercises and running cases to help students apply concepts in each chapter. The text includes more than 50 templates, examples of real project documents, and information on several simulation software tools that you can use to practice your skills in managing a project. All of these features help the subject matter come alive and have more meaning.

ORGANIZATION AND CONTENT

Information Technology Project Management, Seventh Edition, is organized into three main sections to provide a framework for project management, a detailed description of each project management knowledge area, and three appendices to provide 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 of the text, which describes each of the project management knowledge areas—project integration, scope, time, cost, quality, human 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, Fifth Edition*. For example, the chapter on project quality management includes sections on planning quality management, performing quality assurance, 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 documents, 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.

Appendices A through C form the third section of the text, which provides practical information to help you apply project management skills to real or practice projects. 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 2010. Appendix B summarizes what you need to know to earn PMP or other certifications related to project management. Appendix C provides additional running cases and information on using simulation and mind-mapping software to help you practice your new skills.

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.

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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, Web sites, 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 people excited about studying project management by showing them how to recognize its concepts 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.

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. Definitions of key terms are provided in alphabetical order at the end of each chapter and in a glossary at the end of the text.

Application Software

Learning becomes much more dynamic with hands-on practice using the top project management software tool in the industry, Microsoft Project 2010, as well as other tools, such as spreadsheet software and the Internet. Each chapter offers you 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 and in Appendix C, several challenging exercises are provided at the end of Appendix A, Guide to Using Microsoft Project 2010.

S U P P L E M E N T S

The following supplemental materials are available when this text is used in a classroom setting. All of the teaching tools available with this text are provided to the instructor on a single CD-ROM or can be accessed with your single sign on (SSO) account at *login.Cengage.com/sso*.

- **Electronic Instructor's Manual** The Instructor's Manual that accompanies this textbook includes additional instructional material to assist in class preparation, including suggestions for lecture topics and additional discussion questions.

- **Exam View**[®] This textbook is accompanied by Exam View, a powerful testing software package that allows instructors to create and administer printed, computer (LAN-based), and Internet exams. Exam View includes hundreds of questions that correspond to the topics covered in this text, enabling students to generate detailed study guides that include page references for further review. The computer-based and Internet testing components allow students to take exams at their computers, and save the instructor time by grading each exam automatically.
- **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.
- **Solution Files** Solutions to end-of-chapter questions are available on the Instructor Resource CD-ROM and at the Cengage Learning Web site at *login.cengage.com/sso*. The solutions are password-protected.

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 Learning for their dedication and hard work in helping me produce this book and in doing such an excellent job of marketing it. Kate Mason, Aimee Poirier, Dan Seiter, Jennifer Feltri-George, Divya Divakaran, and many more people did a great job in planning and executing all of the work involved in producing this book.

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 new 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 faculty reviewers for providing excellent feedback for me in writing this edition: Brian Cameron, Pennsylvania State University; Jennelle Davis, ECPI University; Wendy Gem Davis, ECPI University; Marcus Goncalves, Boston University; Sue McDaniel, Bellevue University; Dawn Owens, Bellevue University; Arthur Thomas, Syracuse University; and Johnathan Yerby, Macon State College. I also want to thank the many reviewers of the earlier editions of this text. 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.

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 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 28, 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!) 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@augsbu.edu.

Kathy Schwalbe, Ph.D., PMP
Professor, Department of Business Administration
Augsburg College

ABOUT THE AUTHOR



Kathy Schwalbe is a Professor in the Department of Business Administration at Augsburg College in Minneapolis, where she teaches courses in project management, problem solving for business, systems analysis and design, information systems projects, and electronic commerce. Kathy was also an adjunct faculty member at the University of Minnesota, where she taught a graduate-level course in project management in the engineering department. She provides training and consulting services to organizations and speaks at conferences. She also writes and self-publishes additional books on project management.

Kathy worked for 10 years in industry before entering academia in 1991. She was an Air Force officer, systems analyst, project manager, senior engineer, and information technology consultant. Kathy is an active member of PMI, having served as the Student Chapter Liaison for the Minnesota chapter of PMI, VP of Education for the Minnesota chapter, Director of Communications and Editor of the Information Systems Specific Interest Group (ISSIG) Review, and member of PMI's test-writing team. 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 by the Association of IT Professionals in 2011. Visit her Web site at www.kathyschwalbe.com.

INFORMATION TECHNOLOGY PROJECT MANAGEMENT

CHAPTER 1

INTRODUCTION TO PROJECT MANAGEMENT

LEARNING OBJECTIVES

After reading this chapter, you will be able to:

- Understand 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 the triple constraint of project management
- Describe 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
- Understand the role of project managers by describing what they do, what skills they need, and career opportunities for IT project managers
- Describe the project management profession, including 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 a large retail chain, stood in front of 500 people in the large corporate auditorium to explain the company's new strategies. She was also broadcasting to thousands of other employees, suppliers, and stockholders throughout the world using live video via the Internet. The company had come a long way in implementing new information systems to improve inventory control, sell products using the Web, streamline the sales and distribution processes, and improve customer service. However, the stock price was down, the nation's economy was weak, and people were anxious to hear about the company's new strategies.

Anne began to address the audience, "Good morning. As many of you know, our CEO promoted me to this position two years ago. Since then, we have completed many projects, including the advanced data networks project. That project enabled us to provide persistent broadband between headquarters and our retail stores throughout the world, allowing us to make timely decisions and continue our growth strategy. Our customers love that they can return items to any store, and any sales clerk can look up past sales information. Local store managers can make timely decisions using up-to-date information. Of course, we've had some project failures, too, and we need to continually assess our portfolio of projects to meet business needs. Two big IT initiatives this coming year include increasing online sales and providing enhanced online collaboration tools for our employees, suppliers, and customers. Our challenge is to work even smarter to decide what projects will most benefit the company, how we can continue to leverage the power of information technology to support our business, and how we can exploit our human capital to successfully plan and execute those projects. 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). Note that IT projects involve using hardware, software, and networks to create a product, service, or result.

- The overall information and communications technology (ICT) market grew by 6 percent to almost \$3 trillion in 2010. Spending on computer systems, peripherals, storage devices, mobile devices, and network equipment increased by 16 percent, the fastest rate of growth for hardware investment

since 1996. Storage spending grew by 14 percent, server spending by 9 percent, and PC spending by 11 percent.¹

- In the United States, the size of the IT workforce topped 4 million workers for the first time in 2008. Demand for talent is high, and several organizations throughout the world cannot grow as desired due to difficulties in hiring and recruiting the people they need.²
- The unemployment rate for IT professionals is generally half the rate of the overall labor market in the United States. Moody's Analytics publicly predicted the addition of about 150,000 tech jobs by the end of 2011 in the United States. "Fueled by explosive growth in mobile and cloud-based applications, as well as federally mandated electronic medical records reforms, this surge has been driven in part by a wave of Angry Birds, smartphones, DropBoxes and compliance requirements. American businesses are crying out for tech-savvy talent."³
- In 2011, the average salary for project management professionals in U.S. dollars was \$105,000 per year in the United States, \$139,497 in Australia, \$160,409 in Switzerland (the highest-paid country), and \$23,207 in China (the lowest-paid country). These average salaries do not include bonuses.⁴
- The number of people earning their Project Management Professional (PMP) certification continues to increase each year. CareerBuilder.com found that 44 percent of employers listed project management as a skill they looked for in new college graduates, behind only communication and technical skills.⁵
- A research report showed that the United States spends \$2.3 trillion on projects every year, an amount equal to 25 percent of the nation's gross domestic product. The world as a whole spends nearly \$10 trillion of its \$40.7 trillion gross product on projects of all kinds. More than 16 million people regard project management as their profession.⁶

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

continued

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

In a more recent 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, their popularity has prompted managers throughout the world to examine their practices in managing projects. Many organizations assert that using project management techniques provides advantages, such as:

- 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. Projects are different from operations in that they end when their objectives have been reached or the project has been terminated.

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 team of students creates a smartphone application and sells it online.
- A company develops a driverless car.
- A small software development team adds a new feature to an internal software application for the finance department.
- A college upgrades its technology infrastructure to provide wireless Internet access across the whole campus.
- A company develops a new system to increase sales force productivity and customer relationship management that will work on various laptops, smart-phones, 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 a smaller financial institution and needs to reconcile systems and procedures into a common entity.
- Government regulations require new reporting of commercial business data for a manufacturing company.
- 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 2012. A few of these technologies include the following:

- *Media tablets and beyond*: Gartner does not believe that a single platform or technology will dominate the market, but that tablet sales will soon surpass laptop sales. Companies must manage employees who bring their own smart-phones and tablet devices to work.
- *Mobile-centric applications and interfaces*: User interfaces will be mobile-centric, emphasizing touch, gesture, search, voice, and video. Applications themselves are likely to shift to become more focused and simple Web apps.
- *Contextual and social user experience*: A contextually aware interface anticipates a user's needs and provides the most appropriate and customized content, product, or service. The interfaces for applications will also resemble social networks.
- *Internet of things*: Internet usage will expand as sensors are added to physical items that are connected to the Internet. For example, Near Field Communication allows users to make payments, board airplanes, and perform other tasks by placing their phones in front of a reader.
- *Cloud computing*: Enterprises will move from trying to understand the cloud to making decisions on when to implement cloud services and where they need to build private clouds. IT will be challenged to bring operations and development groups closer together to approach the speed and efficiencies of public cloud service providers.¹⁰

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



MEDIA SNAPSHOT

Another one of Gartner's top 10 strategic technologies includes application stores and marketplaces for smartphones and tablets. Gartner predicts that by 2014, there will be more than 70 billion mobile application downloads every year.¹¹ As Apple counted down to 10 billion total app downloads in 2011, it unveiled a page in the iTunes Store that shows the top app downloads of all time, broken into several categories.¹² Many users search these categories to decide what apps to try. In January 2012, the top three iPhone apps in each category included the following:

- *Top free*: Temple Run, Angry Gran, and Zombie Farm
- *Top paid*: Words With Friends, Angry Birds, and Camera+
- *Top grossing*: Temple Run, DragonVale, and NBA Game Time

Notice that all of these apps can be considered unproductive in most work environments. All of them are games, except for Camera+, which helps you produce better pictures with your phone, and NBA Game Time, which lets you follow your favorite National Basketball Association teams.

For the iPad2, the top apps were as follows:

- *Top free*: Words With Friends HD, Where's My Water?, and Pages
- *Top paid*: CloudOn, Bejeweled Blitz, and Mystery Manor: Hidden Adventure

All but two of these iPad apps are games; Pages and CloudOn are productivity tools. Of course, business professionals use phone applications for productive purposes; the challenge is to develop useful apps and get workers to focus on them instead of the many distracting options available.

Project Attributes

As you can see, projects come in all shapes and sizes. The following attributes help to 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 projects. 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 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. For example, suppose that a

few people submitted ideas for the IT collaboration project, but they did not clearly address how the ideas would support the business strategy of improving operations. The project team might decide to prepare a questionnaire for people to fill in as they submit their ideas to improve the quality of the inputs.

- *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. The company might also hire outside consultants to provide input. Once the project team has selected key projects for implementation, they will probably require additional resources. To meet new project objectives, people from other companies—product suppliers and consulting companies—may be added. Resources, however, are limited and must be used effectively to meet project and other corporate goals.
- *A project should have a primary customer or sponsor.* Most projects have many interested parties or stakeholders, but someone must take the primary role of sponsorship. The **project sponsor** usually provides the direction and funding for the project. In this case, Anne Roberts would be the sponsor for the IT collaboration project. Once further IT projects are selected, however, the sponsors for those projects would be senior managers in charge of the main parts of the company affected by the projects. For example, a vice president of sales who initiates a project to improve direct product sales using the Internet might be the project sponsor. In this situation, Anne might become part of a project steering committee, helping other managers understand different project objectives, resolve priorities, research issues, or alter constraints within a given project or across multiple projects.
- *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, the project team, and the other people involved to meet 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 the targets for the scope, time, and cost dimensions of the project. Note that the scope and cost goals in this example include ranges—the report can be between 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 of goals, such as spending between \$45,000 and \$50,000 and having a 40- to 50-page report. These goals might mean hitting the target, but not the bull's eye.



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FIGURE 1-1 Project constraints

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.

For example, to generate project ideas, suppose that the project manager for the IT collaboration project 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 based on this e-mail survey. Now, suppose that the e-mail survey generated only a few good project ideas, and 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 strive not only to meet specific scope, time, cost, and quality goals of projects, they must also facilitate the entire process to meet the needs and expectations of people involved in project activities or affected by them.