

THIRD EDITION

# METHODS OF IT PROJECT MANAGEMENT

JEFFREY L. BREWER  
KEVIN C. DITTMAN

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THIRD EDITION

by  
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and  
Kevin C. Dittman

**Purdue University Press**  
West Lafayette, Indiana

Names: Brewer, Jeffrey L., author. | Dittman, Kevin C., author.  
Title: Methods of IT project management / Jeffrey L. Brewer, PMP and Kevin C. Dittman.  
Description: Third Edition. | West Lafayette, Indiana : Purdue University Press, [2018] | Revised edition of the authors' Methods of IT project management, [2013] | Includes bibliographical references and index.  
Identifiers: LCCN 2018021592 | ISBN 9781557538321 (hardback : alk. paper) | ISBN 9781612495514 (epdf) | ISBN 9781612495521 (epub)  
Subjects: LCSH: Information technology—Management. | Information technology projects—Management. | Project management.  
Classification: LCC HD30.2 .B74 2018 | DDC 004.068/4—dc23 LC record available at <https://lccn.loc.gov/2018021592>

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This book was previously published by: Pearson Education, Inc.

ISBN-13: 978-1-55753-832-1  
ePDF ISBN: 978-1-61249-551-4  
ePUB ISBN: 978-1-61249-552-1

## **Dedication**

*To my wife Heidi for her patience,  
love, and understanding.*

*—Jeff*

*To my family with love.*

*—Kevin*



## ABOUT THE AUTHORS



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*Jeffrey L. Brewer* is an associate professor of Computer & Information Technology (CIT) at Purdue University. He received a B.S. degree in Computer Technology in 1982 from Purdue University and an M.S. degree in Management Information Systems from the University of Missouri, St. Louis in 1995. Professor Brewer's teaching and scholarly interests include systems analysis and design, computer-aided software engineering (CASE), agile development methodologies, IT project management, and telecare/ telemedicine technology solutions. Jeff obtained his PMP certification in 2002. Before returning to Purdue, he spent 19 years working in several different industry environments, including specialty retail, manufacturing, and medical association management. He spent most of those 19 years in a project manager role.



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# PREFACE

Information technology (IT) is relatively new as a discipline and relatively new to adopting the concept that project managers need special training and play a unique, important, and strategic role in an organization. Today, more than ever before, organizations are dependent on the successful execution of projects to survive. The profitability of an organization is affected by how successful its projects are and how well they are managed. Due to the size, complexity, and number of IT projects today, organizations face ever-increasing challenges.

The United States spends \$2.3 trillion on projects every year, or one-quarter its gross domestic product, and the world as a whole spends nearly \$10 trillion of its \$40.7 trillion gross product on projects of all kinds. IT spending in the U.S. forecast to reach nearly \$920 billion in 2017 and top the \$1 trillion mark by 2020.

The Project Management Institute's (PMI) 2016 "Pulse of the Profession: The High Cost of Low Performance" report reveals that organizations around the world waste an average of \$122 million for every \$1 billion spent on projects as a result of poor project management practices. This represents an increase of 12 percent over the previous year. The report's findings show that organizations that effectively use formal project, program, and portfolio management practices waste 13 times less than organizations that don't.

Two-thirds of CEOs (based on a Forrester study) believe IT will make a greater contribution to their industry in the next 10 years than in any prior decade.

One key reason for the complexity of IT projects is that IT changes rapidly, creating a shortage of the required IT skill sets. As a result, organizations are forced to pay premiums to acquire the needed talent through permanent hires, contracting, or outsourcing. In the past, these resources were required to be onsite (at the organization's office) to work on the project team. Technology advances have enabled today's IT employee to work from home or work in another part of the country or even in separate countries without ever needing to go to the office. Geographically dispersed project teams present unique challenges for the success of a project. For organizations to prosper today, they must embrace project management principles to increase productivity and return on investment (ROI) in order to create a competitive advantage locally and globally. The world, in many ways, has become a much smaller place.

## THE PURPOSE OF THIS BOOK

Throughout the United States and much of the rest of the industrialized world, project management practitioners have recognized the need to improve project management in order to improve project success and have done so. Examples of initiatives include the formation of project management certification programs and training, project management offices and mentoring programs in many corporations, the advent of university and college courses dedicated to project management, and, in December 2008, the development of "The Project Management Manifesto in America" by 16 recognized project management experts. An initiative has been directed at then President Obama's administration to promote better project management. Why? In addition to the 2008/2009 rash of bank and corporate failures and bailouts, the infamous Standish Group CHAOS reports provide some insights. Starting back in 1995, the Standish Group documented a dismal track record of IT pro-

ject success of only 16.2 percent, with billions of dollars wasted on canceled projects. An updated study in 2006 indicated a slight improvement, with a 35 percent success rate. Based on this information, most would agree that the IT industry has a long way to go. But how do these facts relate to the profession of project management? The same CHAOS studies also list the top reasons for project failures (many discussed throughout this text), and to no one's surprise, most were project management related. However, the Standish Group report also concluded that better project management is one of the key factors responsible for many of the significant improvements and is a key criterion for project success.

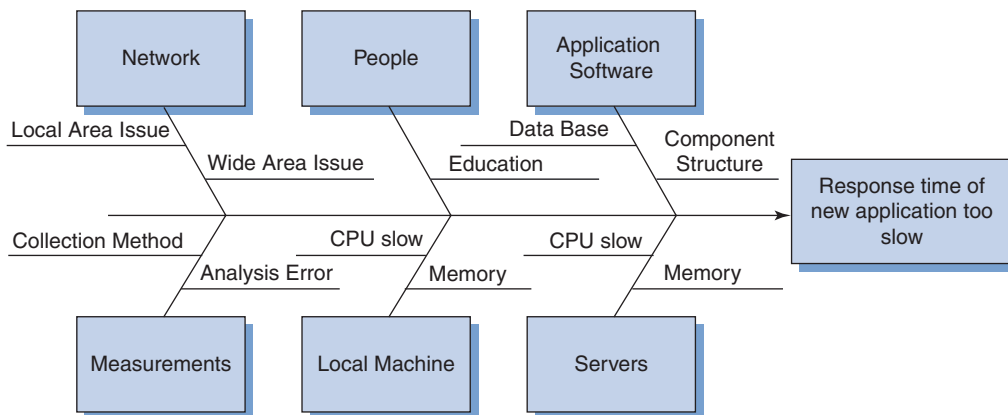
This leads us to the question of why we wrote this book. As authors, we each have over 35 years of project management experience in the IT field. We have seen the “good, the bad, and the ugly” when it comes to IT projects, and we have the scars to prove it. We started offering project management courses at Purdue University in fall 1999, first at the graduate level, and in spring 2002 at the undergraduate level. Our goal was to provide students an educational experience consisting not only of the concepts, techniques, and methods found in the leading project management reference books but also practical knowledge—lessons learned, if you will—that students could apply immediately at their place of employment. In order to achieve this goal, we needed to find the right resources to assist in our endeavor. First and foremost we selected the Project Management Institute's (PMI's) project management body of knowledge (PMBOK) to use as our guide in providing a project management foundation and to serve as our base for educational content and our framework. Next, we strove to find the ideal textbook that not only covered the PMBOK in detail but presented it such that a practitioner could use it as a guide out in the field—a book that covered the material according to the sequence of the project management life cycle (process oriented, not concept oriented). Finally, we wanted a book that not only presented the concepts but instructed students on the techniques and provided relevant examples on how to do them. Basically, we wanted a textbook that actually guided the reader in applying project management concepts and techniques. We tried several fine books, but none of them was what we ideally were looking for, so we decided to write our own, which you are now holding. Our objective was to have a single textbook that students can use that is written in a lively, conversational tone. Based on our past experience with previous textbooks, we have found that the more traditional, academic tone tends to lose students' interest. Our conversational approach (along with the numerous examples) works well with a wider variety of students.

## **THIS BOOK'S IT FOCUS**

As you may have found, there are many textbooks written on the subject of project management. *Methods of IT Project Management* is different from most others because it presents project management with an IT focus, for the following reasons:

- More and more information systems, IT, management of information systems, and computer science students are required or want to take a project management course, and their instructors are looking for a relevant textbook.
- There is an increasing population of IT professionals who are or strive to be project managers and are looking for information to assist them in their field.
- Many of the techniques used in project management, as well as the methods of their use, are very different from those used in other industries, such as the construction industry or the medical industry.

Unlike many other textbooks, all the examples (such as the one presented below), case studies, discussions, and questions in this textbook are presented with an IT concentration. As authors, we believe that using IT-relevant instruments to demonstrate what we are trying to communicate enhances student understanding and learning.



## BASED ON THE 2017 SIXTH EDITION GUIDE TO THE PMBOK

We as authors have recognized the increased demand for project management education and the need for a textbook that addresses the practical application of the subject matter as well as content that is based on the PMBOK. The PMBOK, a globally recognized standard for managing projects in today's marketplace, was developed by the PMI, which currently has more than 480,000 members and manages the leading professional certification program. Individuals obtaining this PMI certification are referred to as project management professionals (PMPs). *Methods of IT Project Management* is based on the most current version of *A Guide to the PMBOK*—the sixth edition, released by PMI in October of 2017.

## WHO THIS BOOK IS FOR

*Methods of IT Project Management* is intended to be the primary text for a practical course in managing an IT project. Such courses are normally taught in colleges and universities at the senior or graduate level. The course is taught to both technical (IS, IT, MIS, CS) and business majors. The textbook implements the learning outcomes outlined in the IS'2002 Information Systems Model Curriculum, jointly developed by the Association of Computing Machinery (ACM), the Association for Information Systems (AIS), and the Association for Information Technology Professionals (AITP) (IS 2002.10 Project Management and Practice). This book also implements the learning outcomes outlined in the body of knowledge defined by ACM/SIGITE (Association of Computing Machinery Special Interest Group for Information Technology Education) SIA4.0 Project Management.

Before using *Methods of IT Project Management*, students should have a basic knowledge of the IT discipline. While not required or assumed, courses in systems analysis and design, programming, database design, and telecommunications can significantly enhance the learning experience provided by this textbook.

## LIFE CYCLE APPROACH

The focus of the textbook follows the PMBOK sample life cycle. We believe that covering the material in this sequence, as opposed to covering the material by knowledge area, allows students to more fully understand the concepts and more readily apply the material, as they would in real-life projects. This approach is also beneficial to courses in which the students work on a live project while they cover the material. The goal is for students to learn project management concepts and methods and at the same time develop skills they can use immediately during and upon completion of the course.

## A RESOURCE FOR THE PMP EXAM

The PMP certification issued by PMI is the world's leading project management certification. Not only are individuals who possess PMP credentials recognized for their skills and knowledge, but the credentials can lead to increased earnings, job opportunities, and advancement. We have recognized the importance of the credentials by dedicating Appendix C to preparing for the PMP exam. This appendix contains helpful advice on studying for and passing the PMP exam, along with practice study questions.

## REPOSITORY OF PROJECT MANAGEMENT TEMPLATES

We know how important it is to have access to the templates referenced in the book to be used for assignments, case projects, or exams. Therefore, all the templates referenced in the book are provided in a single place in Appendix B for your convenience, and they can be obtained from the publisher.

## HOW THIS BOOK IS ORGANIZED

*Methods of IT Project Management* is divided into four parts and three appendixes. Past experience indicates that instructors can omit and re-sequence chapters as they feel will work best for the audience. Every effort has been made to decouple chapters from one another as much as possible to make possible this re-sequencing the material—even to the extent of reintroducing selected concepts and terminology.

Part I, "Project Management Overview," provides an introduction to the project management discipline, the project management methodology, and the PMBOK. These chapters introduce the history of project management, the role of the project manager, systems thinking and concepts, the project management life cycle, and the project management framework, which includes the PMBOK knowledge areas and component processes. Part I can be covered relatively quickly.

Part II, "Project Initiation and Planning Methods," covers the project initiation and planning phases of the project management life cycle. Coverage includes selecting a project, creating the project charter, creating the project plan, defining the project scope, building the project team, determining the project schedule and budget, setting quality standards, planning for project risks, and planning for procurement.

Part III, "Project Execution and Control Methods," covers project plan execution, quality assurance, team development and management, information distribution, stake-

holder management, and project procurement execution. It includes coverage of change control, cost control, quality control, and performance reporting.

Part IV, “Project Closeout Methods and Advanced Topics,” covers the life cycle activities, tools, and techniques used at the end of a project. It also includes coverage of project management offices, outsourcing, ethics, virtual teams, and two maturity models: the Capability Maturity Model Integrated (CMMI) and the Organizational Project Management Maturity Model (OPM3).

Part V, “Appendixes,” provides a Microsoft Project help guide, a list of the project management templates used throughout the text, and coverage of the PMP certification exam.

## **PEDAGOGICAL QUALITIES**

### **Pedagogical Use of Color and Framework**

*Methods of IT Project Management* uses two colors throughout the text and uses a matrix that reflects our framework for applying project management (depicted on the next page) based on the latest version of the PMBOK. We created the framework to provide a comprehensive snapshot of the PMBOK’s knowledge areas and process groups and for students to use as a point of reference. This feature, which distinguishes this textbook from others, presents the framework graphic preceding each PMBOK chapter in order to provide a visual reference for the content covered in that chapter. It creates a great roadmap for student learning, helping them see where they have been and where they are going. It also functions as a great study aid in preparing for knowledge assessment activities such as exams and quizzes.

### **Learning Objectives and End-of-Chapter Summaries**

Designed as study aids, the learning objectives in each chapter reflect what students should be able to understand and accomplish after completing the chapter. Each end-of-chapter summary reviews the key areas of the chapter and provides insight into the areas where students should focus their attention.

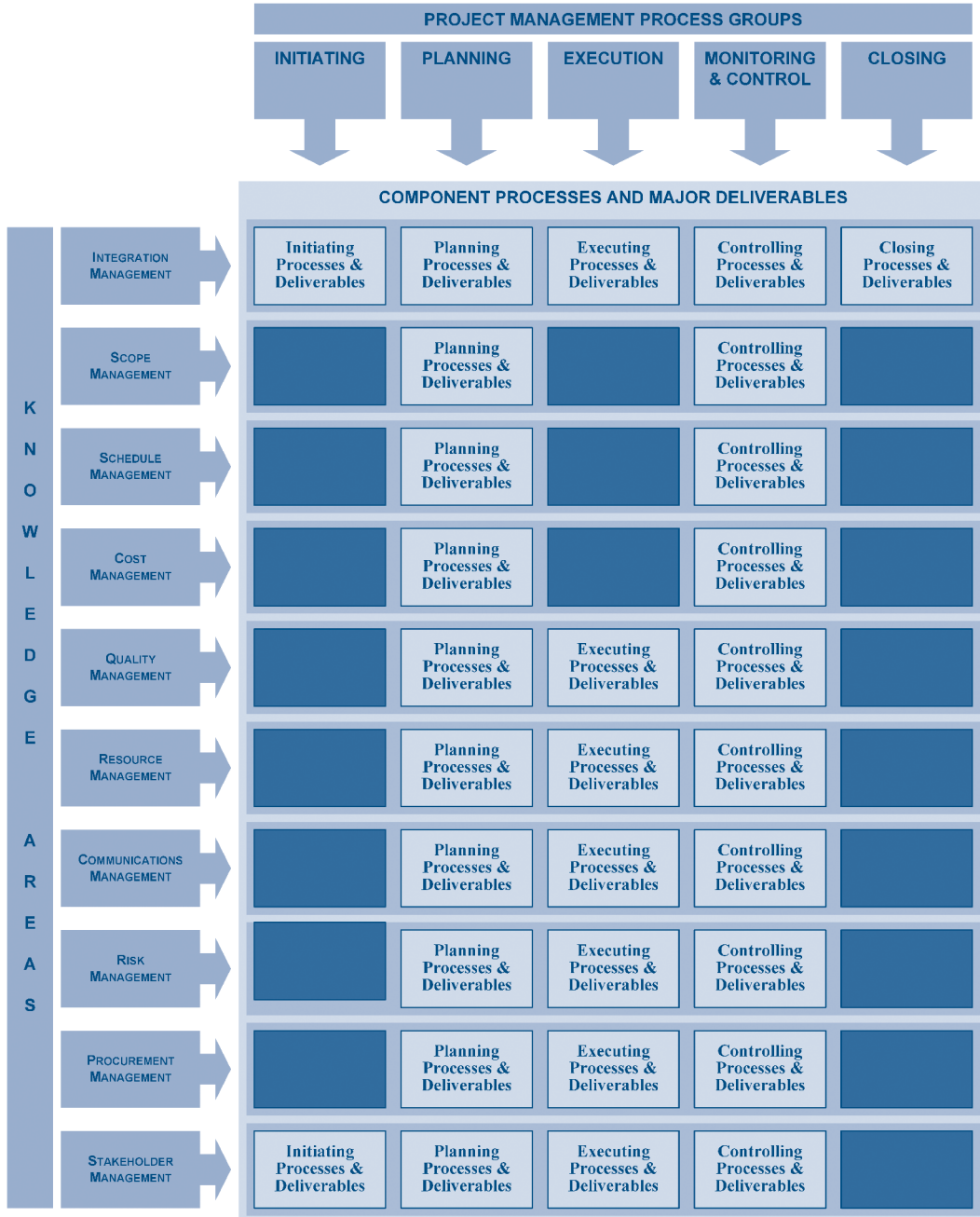
### **End-of-Chapter Review Questions, End-of-Chapter Problems and Exercises, and End-of-Chapter Projects and Research**

*Methods of IT Project Management* provides multiple means to assess learning, aid thinking, and provide additional opportunities for research and learning—through end-of-chapter review questions, end-of-chapter problems and exercises, and end-of-chapter projects and research.

### **Running Case Study**

Each chapter opens with the “The Project Management Chronicles” feature, a running case study that introduces the concepts and techniques discussed within the chapter. This case study, based on a fictitious project management consulting company, walks students





through the trials and tribulations of leading a project. This serious but sometimes comical journey is based on real-life experiences and projects, emphasizes the human aspect of the job, and discusses and demonstrates best practices.

### Minicases

At the end of each chapter is one or more minicases based on the running case study. Each minicase provides additional opportunities for students to apply project management concepts and techniques and also provides thought-provoking scenarios to challenge more advanced students. It provides material suitable for excellent class discussions and debates.

### Suggested Readings

At the end of each chapter is a list of recommended readings that offer additional references for further research. Many of the exercises direct students to those areas in order to complete the exercise.

## PROVEN STRATEGIES AND HINTS TO SUCCESS IN AN AGILE WORLD

A new section added in the second edition, “Proven Strategies and Hints To Success in an Agile World” provides the reader strategies and best practices proven by experts in the field at real companies to aid project managers in delivering successful projects. In many cases, these come from real case studies of live projects.

### Key Terms

Each chapter provides definitions and descriptions of some of the key terms related to project management. Every discipline tends to develop its own unique jargon and acronyms. This can become frustrating for students who are unfamiliar with a term. By highlighting key terms in text and providing their definitions in the Glossary, this textbook augments the learning process; the student doesn’t have to take a break to look up a definition of an unfamiliar term or skip the term altogether, without knowing what it means.

### Proven Strategies and Hints to Success in an Agile World

A new section added in the second edition, it provided the reader with strategies and best practices proven by experts in the field at real companies to work and aid project managers in delivering successful projects. In many cases, these came from real case studies based on live projects. This section has been updated, note the slight name change, to concentrate on strategies that are being utilized to support agile project methodologies.

## SUPPLEMENTS AND INSTRUCTIONAL RESOURCES

It is our goal to provide adopters with a complete course, not just a textbook. *Methods of IT Project Management* includes the supplements described on the following pages.

## For the Instructor

**ALL OF THE FOLLOWING SUPPLEMENTS CAN BE PROVIDED BY CONTACTING THE PUBLISHER:** The instructor's guide, templates, PowerPoint presentations, and the image library (text art).

**INSTRUCTOR'S GUIDE** The instructor's guide includes course-planning materials, chapter-planning guidelines, teaching notes, and answers to end-of-chapter problems, exercises, and minicases.

**POWERPOINT PRESENTATIONS** You'll find a slide show repository in Microsoft PowerPoint (complete with instructor notes that provide teaching guidelines and tips). Instructors can (1) pick and choose the slides they wish to use, (2) customize slides to their own preferences, and (3) add new slides. Slides can be organized into electronic presentations or printed as transparencies or transparency masters.

PART

1

# Project Management Overview



# 1

# Introduction to Project Management

## THE PROJECT MANAGEMENT CHRONICLES

### R & S Amusements Services

#### Entry 1

##### *Case Study*

This is the continuing account of Jeff Dunbar and Kevin Pullen, senior project management consultants for Premier Project Management Services (PPMS). PPMS is a leading provider of training, mentoring, and consulting services to organizations throughout the United States. The company's headquarters is located in West Lafayette, Indiana, but PPMS maintains regional offices in the areas where it has large client bases, including Orlando, Chicago, and Denver.

R & S Amusements Services has hired PPMS to lead the effort of modernizing its computing resources in order to stay competitive and profitable, as well as to continue to meet the demands of its customers.

Tom Demarco, a noted scholar in the information technology (IT) industry, said it best: "project management is more than concepts, tools, techniques, and methods. It is about people working with people." (Demarco, 1997) Although experience is the best teacher, you can learn a great deal by observing other project managers in action. Mr. Kent Clawson, senior partner for PPMS, has kindly consented to let you watch two of his top managers on a typical project.

Jeff Dunbar, a certified project management professional (PMP), has volunteered for this assignment. He has 23 years of project management experience and has successfully completed many IT projects. Jeff received his certification from the Project Management Institute (PMI), which is the leading provider of education and knowledge and is considered a pioneer in the field of project management. PMI's membership consists of more than 500,000 professionals, representing more than 207 countries. PMI professionals come from virtually every major industry, including aerospace, automotive, business management, construction, engineering, financial services, IT, pharmaceuticals, health care, and telecommunications.

Kevin Pullen, also a certified PMP, has agreed to work with Jeff on this project. He has 20 years of project management experience and has also been extremely successful.

Both individuals are highly skilled and bring different strengths to the table, which should provide you with a valuable learning experience.

Jeff and Kevin are meeting with the client today, and they have invited you to observe the meeting. It'll be a good way for you to get acquainted with the project and R & S Amusements Services.

*Setting In the office of Reid Lewis, president of R & S Amusements Services*

**REID** Good Morning Jeff! It's so nice to see you again. How have you been?

**JEFF** Fine, thank you. And you?

**REID** Couldn't be better.

**JEFF** Mr. Lewis, this is my colleague Kevin Pullen, who will be assisting me on this project.

**KEVIN** Pleased to meet you, Mr. Lewis.

**REID** Nice to meet you, Kevin, and please call me Reid. Kevin, I don't know how much Jeff has told you about this opportunity, but allow me to give you a little background about the business.

**KEVIN** Super. Please go right ahead.

**REID** As you know, we are in the business of distributing amusement machines—pool tables, jukeboxes, video games, pinball games, and the like—to area businesses, with the intent of making money for both the business location and us. I started in the business in 1947, with three machines, and now R & S Amusements Services has grown to be one of the largest amusement machine operators in the Midwest. We employ 125 full- and part-time employees, and we service more than 500 business establishments—our customers. The types of establishments include arcades, restaurants, taverns, clubs, bowling alleys, campgrounds, and numerous others. At each of these establishments, we have installed one or more amusement machines from our current inventory of more than 6,500.

**KEVIN** That's quite an accomplishment! Could you please explain how this makes you money?

**REID** Sure! The basis of my business is this: We are in the entertainment business. We provide amusement machines to various business locations for their customers to enjoy. Their customers pay money to play a game or listen to music while at the location. The money earned by the machines is divided by the business location and us. That is our fee for installing and maintaining the machines.

**JEFF** Is the money divided evenly?

**REID** Depends on the contract. With every business location we deal with, we enter into a contract. Basically, it is an agreement between the business establishment and us, on what services we will provide, at what cost, and the time period of the contract. The nature of the business and the value of the machines factor into what the percentage split is.

**KEVIN** Do you mainly service the greater Lafayette area?

**REID** You could say our headquarters is here but we service almost the entire state of Indiana. We have regional offices in Fort Wayne and Bloomington, Indiana, and I'm looking seriously into opening an office in Cincinnati, Ohio.

**JEFF** I had no idea amusement machines could be so profitable.

**REID** The peak years were when the Pac-Man video games were first released. That craze was unbelievable. Now, with competition from home video game systems, personal computers, and the Internet, we have to be more creative and intelligent to be competitive and make a profit. This is the primary reason you gentlemen are here.

**KEVIN** Please explain.

- REID** There is more to the business than emptying quarters or dollars bills out of a machine's cash can—that's what we call the storage device that holds the money that is deposited into a machine. *(Jeff and Kevin laugh)* Even that is a complicated process. You have to plan how often a location will be collected from (weekly, biweekly, or monthly) and on what day. Then you have to determine which locations will be collected from on the same day so that it is most economical for us in terms of travel time and labor expense of the collector. The collector usually has to count the money at the location's site and then divide the proceeds based on the contract and give the location its share. At the end of the day, the money the collector brings in is audited to ensure that no mistakes were made.
- JEFF** That in itself sounds like a sophisticated process.
- REID** Yes, but it's all the other logistical operations that allow the business to operate smoothly and efficiently that can be extremely challenging.
- JEFF** Such as?
- REID** The purchasing of new machines and the disposal of the old ones and the repair of machines that break down or need to be upgraded. The solicitation of new customers and the management of those relationships to ensure both sides are happy. The tracking of inventory is also an issue—not only of the machines—but also of parts and other support equipment. The ordering and management of our music inventory—the CDs that are installed in jukeboxes, and believe it or not, we still have people who want the old 45s jukeboxes. Also, there are issues with the management of the prize inventory for redemption games and those games such as cranes and the like where you can win prizes such as stuffed animals.
- KEVIN** What do you mean by *redemption*?
- REID** Some machines are on a redemption basis—you know, the games that dispense a certain number of tickets based on how many points you score. Then you can redeem all your winning tickets for fabulous prizes—such as candy, bubblegum, a lava lamp. *(They all laugh)* Kids love it—it is a big money maker at skating rinks, bowling alleys, and arcades.
- In addition, we sponsor dart and pool leagues and the associated tournaments. Let me explain. One of our most popular games at bars is an electronic dart board game. Typically, the most popular establishments in a town will host a league of 10 or more teams (each team consisting of five individuals) to entice people to come in and play darts, with the hope that they will also spend money to enjoy the location's food and beverages. It's very similar to a bowling alley hosting a bowling league. We benefit because the players have to pay each time they play the dart game. The locations themselves don't have the resources or know-how to manage the league, so we do it for them—for a fee. I have four employees dedicated just to managing leagues. It is a lot of work. At the end of the season, we host an area tournament, and the winners advance to national tournaments, usually held in Las Vegas.
- KEVIN** I would never have guessed that this business was so involved.
- REID** And I haven't even mentioned things like human resource functions such as payroll, or finance functions such as accounts payable. It is really quite impressive and mind-boggling, if you think about it. *(Both Jeff and Kevin nod their heads)*
- The bottom line is that we are doing a very poor job of taking advantage of IT to help us manage and run the business. We have some software to help us. Five years ago we purchased a package to track and manage our machine inventory. It does the job, but it's very limited in meeting the needs of an organization our size.
- JEFF** Have you contacted the company that wrote the software about upgrading it to meet your needs?
- REID** We tried, but they went out of business two years ago.



**KEVIN** That's not good.

**REID** Now you are beginning to see the situation we are in. You probably won't believe it, but most of our business functions are still manual. We track our collections in Excel spreadsheets, for heaven's sake! We produce all our reports in Microsoft Word.

**JEFF** It's amazing that you have done so well.

**REID** Yes, but we won't continue to do well unless we make some major changes. The economy is not as strong as it used to be, and our profits are down. We need to take advantage of what IT can do for us to decrease costs and generate revenue—such as creating a web site for our business so that we can attract new customers and our existing customers can go and get information such as collection history and the like.

**KEVIN** You may be one of the few businesses of your size that doesn't have a web site of some sort.

**REID** Yes, we are behind the times, and it's downright embarrassing sometimes. But I don't have a staff knowledgeable of these sorts of things, nor do I know who to hire to build software for me. That brings me back to why you gentlemen are here. As I was telling Jeff over the phone a few days ago, I was having lunch with a couple of my friends from Purdue University last week, and I was complaining to them about all my problems. They told me how critical it is to find people who are knowledgeable about these sorts of projects and to do them right in order to be successful. When I asked them where I would find such people, they recommended that I get in touch with PPMS, which has experts in this type of thing; they were highly complimentary of you, Jeff, and you, too, Kevin. That's why I specifically requested both of you, in case you didn't know.

**JEFF** That's very flattering.

**REID** Now, if I can be frank, what qualifies you gentlemen to be the right people to help me and my company?

**JEFF** Good question. First, let me explain that everything that you have described that you want to do is a series of projects that involves IT. A project is a temporary endeavor with a purpose of creating a unique product. We are in the business of managing projects like yours. In fact, we are highly successful at it.

**REID** What makes you so successful?

**KEVIN** We have created a standard set of processes—or a methodology, if you will—that is based on the PMI's *Guide to the Project Management Body of Knowledge (PMBOK)*. The *Guide to the PMBOK* is a document that contains knowledge and practices that can be applied to most projects, no matter what the discipline. Our standard processes, which have been tested and used on dozens of IT projects and refined over time, enable us to be consistent in our approach to planning, executing, and controlling projects in order to meet customer expectations in terms of content and quality.

**REID** So what you are telling me is that you have, for lack of better words, a project management recipe book for doing projects?

**JEFF** That's a good analogy, and I'll expand why: By having a recipe that is proven, we can repeat it several times, knowing what the outcome will be—project success! In addition, both Kevin and I are PMI-certified project managers. To obtain that certification, you must not only have achieved a certain level score on an examination, but you actually have to demonstrate that you have applied project management skills over several years. We have had a lot of experience in these types of projects, Reid, and we will definitely do our best in doing what you believe needs to be done.

**REID** I have every reason to believe you will, but you will need to help me determine what needs to be done first.

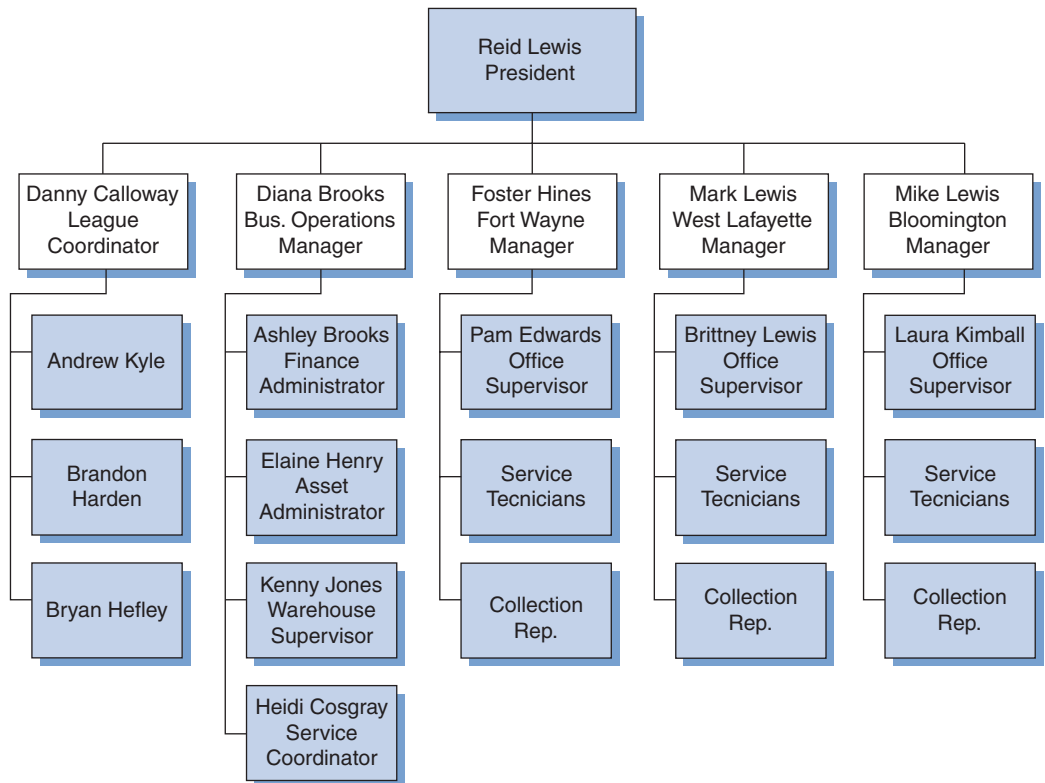
**JEFF** Reid, because we are running short on time, can we schedule another meeting to continue this conversation and start planning how we are going to accomplish your goals?

**REID** Absolutely! I will invite a few other key players, Diana Brooks and Mark Lewis, to get their input.

**KEVIN** That would be great! Would you happen to have an organization chart so we can become more familiar with the company and the responsibilities of the various employees?

**REID** Yes, I do. I will have my secretary email you a copy.

**JEFF** Thanks for your time, Reid. See you in a couple days.



## HOW TO USE THE DEMONSTRATION CASE

*You've just been introduced to a case study that will be continued throughout this book. The purpose of the continuing case is to show you that tools and techniques alone do not make a project manager successful. Project management involves a commitment to work for and with a number of people.*

*Each chapter of this book begins with a "The Project Management Chronicles" feature about R & S Amusements Services that introduces new ideas, tools, and/or techniques that are examined in that chapter. Jeff and Kevin will work closely with the client as well as with their team to manage the project to meet its objectives. They will use current best practices and follow procedures and processes that are used by today's most successful organizations when building information systems.*

## CHAPTER PREVIEW AND OBJECTIVES

Projects exist in everything we do, from trips to the grocery store to building enterprise-level information systems. This chapter introduces you to projects and project management. Before you can begin to understand how to run effective successful projects, you must understand what a project is and the context in which it exists. You will understand projects and project management when you:

- Can define what a project is and is not
- Can define project management
- Understand the history of project management
- Understand the skills necessary to lead projects
- Understand the organizational structures where projects exist

## AN INTRODUCTION TO PROJECT MANAGEMENT

Projects have always been and will always be an integral part of the everyday lives of individuals and corporations. For individuals, projects may involve the planning and execution of weekend outings, family dinners, spring break trips to exotic places, and even something as simple as preparing a grocery list, which includes allocating a grocery budget and then going to the store to purchase the needed items. Your success with the project of going to the grocery store maybe judged on whether you were able to buy everything you needed, within your allotted time frame, and whether you stayed under budget. Failing to meet one or more of these criteria may mean making certain trade-offs, such as deciding to have hot dogs because you don't have the budget for steak or buying an entrée you can prepare in the microwave because you don't have enough time to prepare a full four-course meal. Managing trade-offs is common in an individual's everyday life, and it is also critical in the daily function of an organization.

Organizations are dependent on the successful execution of projects to survive now more than ever. The profitability of an organization is affected by how successful its projects are and how well they are managed. As of January 1, 2018, the United States federal government began formally recognizing the work that project managers do and their contributions to the economy. The U.S. Department of Labor's Bureau of Labor Statistics added "project management specialist" to its Standard Occupation Classification System (SOC). The SOC reflects the current occupational composition of the U.S. workforce. It forms the basis for the monthly U.S. jobs report (BLS, 2018).

Due to the size, complexity, and quantity of information technology (IT) projects today, organizations face ever-increasing challenges, as indicated by the following:

- The United States spends \$2.3 trillion on projects every year, or one-quarter its gross domestic product, and the world as a whole spends nearly \$10 trillion of its \$40.7 gross product on projects of all kinds.
- The Project Management Institute's (PMI) 2016 "Pulse of the Profession: The High Cost of Low Performance" report reveals that organizations around the world waste an average of \$122 million for every \$1 billion spent on projects as a result of poor project management practices. This represents an increase of 12 percent over the previous year. The report's findings show that organizations that effectively use formal project, program, and portfolio management practices waste 13 times less than organizations that don't.

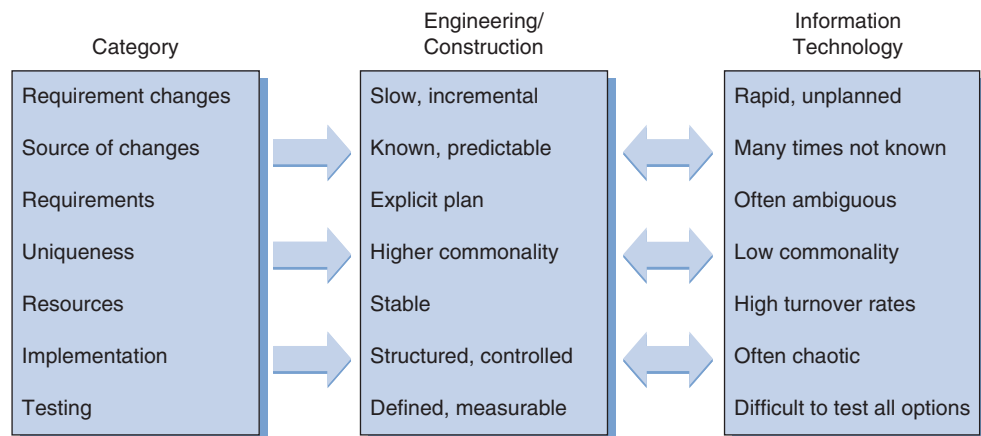
- From the International Data Corporation (IDC), worldwide revenues for Information Technology products and services are forecast to reach nearly \$2.4 trillion in 2017, an increase of 3.5% over 2016. IDC estimates that global IT spending will grow to nearly \$2.65 trillion in 2020. This represents a compound annual growth rate of 3.3% for the 2015–2020 forecast period.
- IT spending in the U.S. forecast to reach nearly \$920 billion in 2017 and top the \$1 trillion mark by 2020.
- Cybersecurity and the Internet of Things (IoT) are the two biggest growth areas within IT forecasted over the next several years. Overall spending on cybersecurity projects will jump from \$90 billion in 2017 to \$113 billion by 2020 (Rockwood, K. 2017). IDC report that IoT to grow 16.7% each year reaching over \$1.4 trillion globally by 2021.
- Two-thirds of CEOs (based on a Forester study) believe IT will make a greater contribution to their industry in the next 10 years than any prior decades.

One key reason for the complexity of IT projects is that technology changes quickly, creating a shortage of the required IT skill sets. As a result, organizations are forced to pay premiums to acquire the needed talent through permanent hires, contracting, or even outsourcing. In the past, these resources were required to be onsite (at the organization's office) to work on the project team. Technology advances have enabled today's IT employee to be able to work from home or work in another part of the country or even in separate countries without

## PROVEN STRATEGIES AND HINTS TO SUCCESS

Another reason for the increased complexity is that systems users demand more and more functionality and capabilities in the products that our projects provide. Using Glass's Law<sup>1</sup> as applied to IT: "For every 25% increase in the business functionality of a service, there is a 100% increase in the complexity of that service. For every 25% increase in the connections of a system, there is a 100% increase in the complexity of that system."

<sup>1</sup>Glass's Law comes from Robert Glass's *Facts and Fallacies of Software Engineering*. He did not discover the law. He actually described it from a paper by Scott Woodfield, but Glass did more than anybody to publicize the law.



**FIGURE 1-1** Project Differences Between Disciplines

ever needing to go into the office. Geographically dispersed project teams present their own challenges for the success of a project. For organizations to prosper today, they must embrace project management principles to increase productivity and return on investment (ROI) in order to create a competitive advantage locally and globally. The world, in many ways, has become a much smaller place.

This textbook focuses on project management with an IT focus because many of the techniques used and the methods of use are very different from those in other industries, such as construction or health care. We will examine these differences, including the following, throughout the text (see Figure 1-1):

- Traditionally high turnover rates of IT workers
- Level of uniqueness and complexity of each project due to rapid changes in technology
- Difficulty of visualizing software for the developer and the customer
- Difficulty getting accurate customer requirements
- Rate of change in requirements
- Difficulty testing all the possible states of software
- Need for constant training to keep team members current with the technology

Because of the nature of these differences, IT organizations are now changing their approach to IT projects, making organizational structure changes in order to become leaner, adaptable, and better at handling change. Moving to a more supportive model for project management is one way to do this. We will continue our discussion of contemporary IT organizational structures and their impact later in this chapter.

The Project Management Institute (PMI) defines a number of benefits for organizations that use structured project management techniques (we will talk more about PMI throughout this text):

- Improvement in customer satisfaction
- Better cost performance and higher return on investment
- Better schedule performance, better allocation of time commitments, and better utilization of resources, as well as higher productivity
- Increased quality, reducing rework
- Increase in delivering-required features

## THE HISTORY OF PROJECT MANAGEMENT

The origins of project management can be traced back to the days of constructing the great pyramids in Egypt; however, the U.S. Department of Defense (DOD) is credited with bringing formal project management processes and tools to the forefront in the United States. Many people believe the Manhattan Project in the early 1940s (involved in the development of the first atomic bomb) was the first application of modern project management because it had a separate project manager and a technical manager; however, others would argue that the roots of current project management tools and practices date to the late 1950s. Finding itself behind in the “space race” when the Soviet Union launched the *Sputnik 1* satellite on October 4, 1957, the DOD devised a means to speed up the delivery of military projects. The result was a discipline that included the definition of roles, tools, and processes that direct a project to achieve the specified goals. First and foremost was defining someone with sole accountability for a project to serve as a single point of contact; so the modern