

FOURTH EDITION

# PROJECT MANAGEMENT

ACHIEVING COMPETITIVE ADVANTAGE

JEFFREY K. PINTO

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ACHIEVING COMPETITIVE ADVANTAGE

**Jeffrey K. Pinto**

*Pennsylvania State University*

**PEARSON**

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*To Mary Beth, my wife, with the most profound thanks and love for her unwavering support. And, to our children, Emily, AJ, and Joseph—three “projects” that are definitely over budget but that are performing far better than I could have hoped!*

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# PREFACE

Project management has become central to operations in industries as diverse as construction and information technology, architecture and hospitality, and engineering and new product development; therefore, this text simultaneously embraces the general principles of project management while addressing specific examples across the wide assortment of its applications. This text approaches each chapter from the perspective of both the material that is general to all disciplines and project types and that which is more specific to alternative forms of projects. One way this is accomplished is through the use of specific, discipline-based examples to illustrate general principles as well as the inclusion of cases and Project Profiles that focus on more specific topics (e.g., Chapter 5's treatment of IT "death march" projects).

Students in project management classes come from a wide and diverse cross section of university majors and career tracks. Schools of health, business, architecture, engineering, information systems, and hospitality are all adding project management courses to their catalogs in response to the demands from organizations and professional groups that see their value for students' future careers. Why has project management become a discipline of such tremendous interest and application? The simple truth is that we live in a "projectized" world. Everywhere we look we see people engaged in project management. In fact, project management has become an integral part of practically every firm's business model.

This text takes a holistic, integrated approach to managing projects, exploring both technical and managerial challenges. It not only emphasizes individual project execution, but also provides a strategic perspective, demonstrating the means with which to manage projects at both the program and portfolio levels.

At one time, project management was almost exclusively the property of civil and construction engineering programs where it was taught in a highly quantitative, technical manner. "Master the science of project management," we once argued, "and the 'art' of project management will be equally clear to you." Project management today is a complex, "management" challenge requiring not only technical skills but a broad-based set of people skills as well. Project management has become the management of technology, people, culture, stakeholders, and other diverse elements necessary to successfully complete a project. It requires knowledge of leadership, team building, conflict resolution, negotiation, and influence in equal measure with the traditional, technical skill set. Thus, this textbook broadens our focus beyond the traditional project management activities of planning and scheduling, project control, and termination, to a more general, inclusive, and, hence, more valuable perspective of the project management process.

## WHAT'S NEW IN THE FOURTH EDITION?

### New Features

- Agile Project Management
- Project Charters
- MS Project 2013 Step-by-Step Tutorials
- Appendix—Project Execution Plan Template
- New Project Managers in Practice Profiles
- Risk Breakdown Structures
- Extreme Programming
- Updated Problems in Chapters
- New Project Management Research in Brief: "Does Agile Work?"
- All MS Project Examples and Screen Captures Updated to MS Project 2013
- All Project Management Body of Knowledge (PMBOK) Referencing Updated to 5<sup>th</sup> Edition
- Quarterly Updates for All Book Adopters on Latest Cases and Examples in Project Management

## Updated Project Profiles

### *Chapter 1 Introduction: Why Project Management?*

- Development Projects in Lagos, Nigeria
- “Throwing Good Money after Bad”: The BBC’s Digital Media Initiative

### *Chapter 2 The Organizational Context: Strategy, Structure, and Culture*

- Tesla’s \$5 Billion Gamble
- Electronic Arts and the Power of Strong Culture in Design Teams

### *Chapter 3 Project Selection and Portfolio Management*

- Project Selection Procedures: A Cross-Industry Sampler

### *Chapter 4 Leadership and the Project Manager*

- Leading by Example for the London Olympics—Sir John Armit
- Dr. E. Sreedharan, India’s Project Management Guru

### *Chapter 5 Scope Management*

- “We look like fools.” Oregon’s Failed Rollout of Their Obamacare Website
- Boeing’s Virtual Fence
- California’s High-Speed Rail Project—What’s the Latest News?
- The Expeditionary Fighting Vehicle

### *Chapter 6 Project Team Building, Conflict, and Negotiation*

- Engineers without Borders: Project Teams Impacting Lives

### *Chapter 7 Risk Management*

- The Building That Melted Cars
- Bank of America Completely Misjudges Its Customers
- Collapse of Shanghai Apartment Building
- The Spanish Navy Pays Nearly \$3 Billion for a Submarine That Will Sink Like a Stone

### *Chapter 8 Cost Estimation and Budgeting*

- Sochi Olympics—What’s the Cost of National Prestige?
- The Hidden Costs of Infrastructure ProjectsThe Case of Building Dams

### *Chapter 9 Project Scheduling: Networks, Duration Estimation, and Critical Path*

- After 20 Years and More than \$50 Billion, Oil Is No Closer to the Surface: The Caspian Kashagan Project

### *Chapter 10 Project Scheduling: Lagging, Crashing, and Activity Networks*

- Enlarging the Panama Canal

### *Chapter 11 Critical Chain Project Scheduling*

- Developing Projects through Kickstarter—Do Delivery Dates Mean Anything?
- Eli Lilly Pharmaceutical’s Commitment to Critical Chain Project Scheduling

### *Chapter 12 Resource Management*

- Hong Kong Connects to the World’s Longest Natural Gas Pipeline

### *Chapter 13 Project Evaluation and Control*

- New York City’s CityTime Project
- Boeing’s 787 Dreamliner: Failure to Launch (with update)
- Earned Value Management at Northrop Grumman

### *Chapter 14 Project Closeout and Termination*

- Duke Energy and Its Cancelled Levy County Nuclear Power Plant
- Aftermath of a “Feeding Frenzy”—Dubai and Cancelled Construction Projects
- New Jersey Kills Hudson River Tunnel Project
- The Navy Scraps Development of Its Showpiece Warship—Until the Next Bad Idea

## OUR FOCUS

This textbook employs a managerial, business-oriented approach to the management of projects. Thus we have integrated Project Profiles into the text.

- **Project Profiles**—Each chapter contains one or more Project Profiles that highlight current examples of project management in action. Some of the profiles reflect on significant



achievements; others detail famous (and not-so-famous) examples of project failures. Because they cover diverse ground (IT projects, construction, new product development, and so forth), there should be at least one profile per chapter that is meaningful to the class's focus. There is a deliberate effort made to offer a combination of project success stories and project failures. While successful projects can be instructive, we often learn far more from examining the variety of reasons why projects fail. As much as possible, these stories of success and failure are intended to match up with the chapters to which they are attached. For example, as we study the uses of projects to implement corporate strategy, it is useful to consider Elon Musk's \$5 billion dollar decision to develop a "gigafactory" to produce batteries for his Tesla automobiles.

The book blends project management within the context of the operations of any successful organization, whether publicly held, private, or not-for-profit. We illustrate this through the use of end-of-chapter cases.

- **Cases**—At the end of each chapter are some final cases that take specific examples of the material covered in the chapter and apply them in the alternate format of case studies. Some of the cases are fictitious, but the majority of them are based on real situations, even where aliases mask the real names of organizations. These cases include discussion questions that can be used either for homework or to facilitate classroom discussions. There are several "classic" project cases as well, highlighting some famous (and infamous) examples of projects whose experiences have shaped our understanding of the discipline and its best practices.

Further, we explore both the challenges in the management of individual projects as well as broadening out this context to include strategic, portfolio-level concepts. To do this, we ask students to develop a project plan using MS Project 2013.

- **Integrated Project Exercises**—Many of the chapters include an end-of-chapter feature that is unique to this text: the opportunity to develop a detailed project plan. A very beneficial exercise in project management classes is to require students, either in teams or individually, to learn the mechanics of developing a detailed and comprehensive project plan, including scope, scheduling, risk assessment, budgeting, and cost estimation. The Integrated Project exercises afford students the opportunity to develop such a plan by assigning these activities and illustrating a completed project (ABCups, Inc.) in each chapter. Thus, students are assigned their project planning activities and have a template that helps them complete these exercises.

And finally, we have integrated the standards set forth by the world's largest governing body for project management. The Project Management Institute (PMI) created the Project Management Body of Knowledge (PMBOK), which is generally regarded as one of the most comprehensive frameworks for identifying the critical knowledge areas that project managers must understand if they are to master their discipline. The PMBOK has become the basis for the Project Management Professional (PMP) certification offered by PMI for professional project managers.

- **Integration with the PMBOK**—As a means to demonstrate the coverage of the critical PMBOK elements, readers will find that the chapters in this text identify and cross-list the corresponding knowledge areas from the latest, fifth edition of PMBOK. Further, all terms (including the Glossary) are taken directly from the most recent edition of the PMBOK.
- **Inclusion of Sample PMP Certification Exam Questions**—The Project Management Professional (PMP) certification represents the highest standard of professional qualification for a practicing project manager and is administered by the Project Management Institute. As of 2014, there were more than 600,000 PMPs worldwide. In order to attain PMP certification, it is necessary for candidates to undergo a comprehensive exam that tests their knowledge of all components of the PMBOK. This text includes a set of sample PMP certification exam questions at the end of most of the chapters, in order to give readers an idea of the types of questions typically asked on the exam and how those topics are treated in this book.

## OTHER POINTS OF DISTINCTION

The textbook places special emphasis on blending current theory, practice, research, and case studies in such a manner that readers are given a multiple-perspective exposure to the project management process. A number of in-chapter features are designed to enhance student learning, including:

- **MS Project Exercises**—An additional feature of the text is the inclusion at the end of several chapters of some sample problems or activities that require students to generate MS Project output files. For example, in Chapter 9 on scheduling, students must create an MS Project network diagram. Likewise, other reports can be assigned to help students become minimally adept at interacting with this program. It is not the purpose of this text to fully develop these skills but rather to plant the seeds for future application.
- **Research in Brief**—A unique feature of this text is to include short (usually one-page) text boxes that highlight the results of current research on the topics of interest. Students often find it useful to read about actual studies that highlight the text material and provide additional information that expands their learning. Although not every chapter includes a “Research in Brief” box, most have one and, in some cases, two examples of this feature.
- **Project Managers in Practice**—An addition to this text is the inclusion of several short profiles of real, practicing project managers from a variety of corporate and project settings. These profiles have been added to give students a sense of the types of real-world challenges project managers routinely face, the wide range of projects they are called to manage, and the satisfactions and career opportunities available to students interested in pursuing project management as a career.
- **Internet Exercises**—Each chapter contains a set of Internet exercises that require students to search the Web for key information and perform other activities that lead to student learning through outside-of-class, hands-on activities. Internet exercises are a useful supplement, particularly in the area of project management, because so much is available on the World Wide Web relating to projects, including cases, news releases, and Internet-based tools for analyzing project activities.
- **MS Project 2013 Tutorials**—Appendix B at the end of the text features two in-depth tutorials that instruct students in the rudiments of developing a project schedule, resource leveling, and critical path development. A second tutorial instructs students in methods for updating the project plan, generating output files such as earned value metrics, and tracking ongoing project activities. These tutorials are not intended to substitute for fuller instruction in this valuable software, but they do provide a critical means for initial familiarization with the package.
- **Project Execution Plan Template**—Appendix C provides a template for developing a fully evolved project execution plan. Instructors using previous versions of this text noted the value in requiring that students be able to create a project plan and requested a more comprehensive template that could be employed. This template addresses the critical elements of project scope, as well as offers a method for putting these details in a logical sequence.

## Instructor Resources

At the Instructor Resource Center, [www.pearsonhighered.com/irc](http://www.pearsonhighered.com/irc), instructors can easily register to gain access to a variety of instructor resources available with this text in downloadable format. If assistance is needed, our dedicated technical support team is ready to help with the media supplements that accompany this text. Visit <http://247.pearsoned.com> for answers to frequently asked questions and toll-free user support phone numbers.

The following supplements are available with this text:

- **Instructor’s Solutions Manual**
- **Test Bank**
- **TestGen® Computerized Test Bank**
- **PowerPoint Presentation**

## ACKNOWLEDGMENTS

In acknowledging the contributions of past and present colleagues to the creation of this text, I must first convey my deepest thanks and appreciation for the 30-year association with my original mentor, Dr. Dennis Slevin of the University of Pittsburgh's Katz Graduate School of Business. My collaboration with Denny on numerous projects has been fruitful and extremely gratifying, both professionally and personally. In addition, Dr. David Cleland's friendship and partnership in several ventures has been a great source of satisfaction through the years. A frequent collaborator who has had a massive influence on my thinking and approach to understanding project management is Professor Peter W.G. Morris, lately of University College London. Working with him has been a genuine joy and constant source of inspiration. Additional mentors and colleagues who have strongly influenced my thinking include Samuel Mantel, Jr., Rodney Turner, Erik Larson, David Frame, Francis Hartman, Jonas Soderlund, Young Kwak, Rolf Lundin, Lynn Crawford, Graham Winch, Terry Williams, Francis Webster, Terry Cooke-Davies, Hans Thamhain, and Karlos Artto. Each of these individuals has had a profound impact on the manner in which I view, study, and write about project management. Sadly, 2014 saw the passing of three of these outstanding project management scholars—Hans Thamhain, Sam Mantel and Francis Hartman. I hope that my efforts help, in some small part, to keep their vision and contributions alive.

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## FEEDBACK

The textbook team and I would appreciate hearing from you. Let us know what you think about this textbook by writing to [college.marketing@pearson.com](mailto:college.marketing@pearson.com). Please include “Feedback about Pinto” in the subject line.

If you have questions related to this product, please contact our customer service department online at <http://247pearsoned.custhelp.com>.

Finally, it is important to reflect on an additional salient issue as you begin your study of project management: *Most of you will be running a project long before you are given wider management responsibilities in your organizations.* Successful project managers are the lifeblood of organizations and bear the imprint of the fast track. I wish you great success!

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# 1



## Introduction

### Why Project Management?

#### *Chapter Outline*

##### PROJECT PROFILE

Development Projects in Lagos, Nigeria

##### INTRODUCTION

##### 1.1 WHAT IS A PROJECT?

General Project Characteristics

##### 1.2 WHY ARE PROJECTS IMPORTANT?

##### PROJECT PROFILE

“Throwing Good Money after Bad”:  
The BBC’s Digital Media Initiative

##### 1.3 PROJECT LIFE CYCLES

##### PROJECT MANAGERS IN PRACTICE

Stephanie Smith, Westinghouse Electric  
Company

##### 1.4 DETERMINANTS OF PROJECT SUCCESS

Project Management Research in Brief  
Assessing Information Technology (IT) Project  
Success

##### 1.5 DEVELOPING PROJECT MANAGEMENT MATURITY

##### 1.6 PROJECT ELEMENTS AND TEXT ORGANIZATION

Summary

Key Terms

Discussion Questions

Case Study 1.1 MegaTech, Inc.

Case Study 1.2 The IT Department at Hamelin  
Hospital

Case Study 1.3 Disney’s Expedition Everest

Case Study 1.4 Rescue of Chilean Miners

Internet Exercises

PMP Certification Sample Questions

Notes

#### *Chapter Objectives*

**After completing this chapter, you should be able to:**

1. Understand why project management is becoming such a powerful and popular practice in business.
2. Recognize the basic properties of projects, including their definition.
3. Understand why effective project management is such a challenge.
4. Differentiate between project management practices and more traditional, process-oriented business functions.
5. Recognize the key motivators that are pushing companies to adopt project management practices.
6. Understand and explain the project life cycle, its stages, and the activities that typically occur at each stage in the project.
7. Understand the concept of project “success,” including various definitions of success, as well as the alternative models of success.

8. Understand the purpose of project management maturity models and the process of benchmarking in organizations.
9. Identify the relevant maturity stages that organizations go through to become proficient in their use of project management techniques.

### PROJECT MANAGEMENT BODY OF KNOWLEDGE CORE CONCEPTS COVERED IN THIS CHAPTER

1. Definition of a Project (PMBok sec. 1.2)
2. Definition of Project Management (PMBok sec. 1.3)
3. Relationship to Other Management Disciplines (PMBok sec. 1.4)
4. Project Phases and the Project Life Cycle (PMBok sec. 2.1)

*The world acquires value only through its extremes and endures only through moderation; extremists make the world great, the moderates give it stability.<sup>1</sup>*

## PROJECT PROFILE

### Development Projects in Lagos, Nigeria

Lagos is the capital of Nigeria and home to an estimated 15–20 million people, making its population larger than London or Beijing. As the largest and fastest-growing city in sub-Saharan Africa (estimates are that 600,000 people are added to Lagos' population each year), Lagos is in desperate need of developing and maintaining infrastructure to support its population, while supporting its claim as a high-technology hub on the African continent. Considering that about 85% of the world's population resides in the developing world and transitioning economies, and nearly two-thirds of that population is below the age of 35, the need for infrastructure to support critical human needs is immense. About 70% of the city's population is believed to live in slums, while a 2006 United Nations report estimated that only 10% of households in the Lagos Metropolitan area were directly connected to a municipal water supply. In spite of these problems, Nigeria is Africa's biggest economy, driven by economic growth in Lagos, home to film and fashion industries, financial markets, and consumer goods manufacturers.

The list of critical items on the list for urban improvement is large. For example, for a city of more than 15 million, electricity is scarcely to be found. Lagos power stations only generate a mere 2,000 megawatts of electricity—less than half of that available for a single city block in midtown Manhattan! "We have about two hours, maybe, of public power a day," says Kola Karim, CEO of Nigeria's Shoreline Energy International. "It's unbearable." Everywhere in the city people are using gasoline or diesel generators to supply power when the inevitable rolling blackouts resume.

Additionally, Lagos is critically short on housing. To overcome this shortage people of Lagos resort to living in shanty towns, one such shanty town is Makoko. Makoko is situated on the mainland's Lagos lagoon. Home to several hundred thousand inhabitants, Makoko lacks access to basic services, including clean drinking water, electricity, and waste disposal, and is prone to severe environmental and health hazards. Consisting of rickety dwellings on stilts perched over the foul-smelling lagoon, Makoko is one of the many chaotic human settlements that have sprouted in Lagos in recent years. As these cities spread out and move too close to major bridges or electrical towers, the government periodically sends in troops to demolish portions of the floating village.

How did the city get to this point? A big reason was a lack of forethought and development planning. In metropolitan Lagos there are 20,000 people per square kilometer with thousands more arriving each day. Given the physical constraints of the city, originally built on a narrow strip of land and bordering the ocean, there is just not enough space to absorb the new inhabitants. Urban planning, as we know it today, simply did not exist and the city swelled organically, without forethought or a sense of direction. Thus, Lagos has no urban transportation system, few functioning traffic lights, and a crumbling and outdated road system.

The problems do not stop there. Land prices in Lagos are extremely high, due to lack of space for commercial development. However, because of the unreliable electricity supply that makes elevator use questionable, there are few high-rise apartments or office buildings in the city. Banks have been reluctant to invest in real estate transactions because of past failures and general economic instability. Faced with the need to drastically change the direction of the city, Babatunde Fashola, Lagos' visionary governor who took power in 2010, has launched a series

of urban development projects to address a variety of the city's needs. Fashola has announced \$50 billion in new infrastructure projects for Lagos, to be developed over the next 10 years. These new project initiatives include the following:

### Lagos Metro Blue Line

The blue line is a major cosmopolitan light-rail transport project to connect districts in Nigeria's largest city. Designed to ease congestion and speed up journey times for the city's inhabitants, the Blue Line will run between Marina and Okokomaiko, stopping at 13 stations, and is part of the Lagos Rail Mass Transit program implemented by the government. Originally proposed in 2008, funding issues have pushed the launch of the Blue Line back to at least 2015. The Line is set to cost \$1.2 billion and will be funded by the Lagos State Government.

### Eko Atlantic

Eko Atlantic is an ambitious land reclamation project, a pioneering residential and business development located on Victoria Island, along its upmarket Bar Beach coastline. The project is being built on three and a half square miles of land reclaimed from the Atlantic Ocean and is expected to provide accommodation for 250,000 people and employment opportunities for a further 150,000. The complex will function as a city-within-a-city, including recreational facilities, business and shopping districts, and modern conveniences.

### Bus Rapid-Transit System

To ease the crush of public transportation, the Bus Rapid Transport (BRT) system was introduced 10 years ago to streamline and modernize the motley collection of buses that had transported residents around the city. Lagos has long suffered from an unregulated transportation system in which a variety of different "buses," ranging from battered minibuses to old, yellow-painted school buses, competed for customers. Fares were also unregulated, leaving



**FIGURE 1.1** Traffic Congestion in Lagos, Nigeria

Source: Femi Ipaye/Xinhua Press/Corbis

(continued)

drivers free to charge whatever fares they chose. “They might charge \$1 in the morning for one trip one way and by afternoon they can go to \$3,” says Dayo Mobereola, managing director of the Lagos Metropolitan Area Transport Authority, noting that commuters spend on average 40% of their income on transportation. Before the project was announced, the city had projected that it would transport 60,000 passengers daily, but now it transports over 200,000 passengers daily. The BRT system has reduced waiting times at bus stops, the travel time across the city, all at a reduced rate when compared to the old system.

### Schools, Bridges, and Power Plants

Part of the aggressive infrastructure modernization includes improving traffic by building the first suspension bridge in West Africa, as well as adding a number of new schools around the city. Two new power plants are also slated to be constructed, bringing a more dependable source of power to the city, including powering street lights to ease crime and other problems. The city has even launched a fleet of brand new garbage trucks to deal with the 10,000 tons of waste generated every day.

Lagos’ modernization efforts in recent years have come not a moment too soon in support of its citizens. As Professor Falade observed, these efforts to modernize the city’s facilities are a breath of fresh air. “The difference is clear, the evidence is the improved landscape of Lagos in the urban regeneration project.”<sup>2</sup>

## INTRODUCTION

Projects are one of the principal means by which we change our world. Whether the goal is to split the atom, tunnel under the English Channel, introduce Windows 9, or plan the next Summer Olympic Games in Rio de Janeiro, the means through which to achieve these challenges remains the same: project management. Project management has become one of the most popular tools for organizations, both public and private, to improve internal operations, respond rapidly to external opportunities, achieve technological breakthroughs, streamline new product development, and more robustly manage the challenges arising from the business environment. Consider what Tom Peters, best-selling author and management consultant, has to say about project management and its place in business: “Projects, rather than repetitive tasks, are now the basis for most value-added in business.”<sup>3</sup> Project management has become a critical component of successful business operations in worldwide organizations.

One of the key features of modern business is the nature of the opportunities and threats posed by external events. As never before, companies face international competition and the need to pursue commercial opportunities rapidly. They must modify and introduce products constantly, respond to customers as fast as possible, and maintain competitive cost and operating levels. Does performing all these tasks seem impossible? At one time, it was. Conventional wisdom held that a company could compete using a low-cost strategy *or* as a product innovator *or* with a focus on customer service. In short, we had to pick our competitive niches and concede others their claim to market share. In the past 20 years, however, everything turned upside down. Companies such as General Electric, Apple, Ericksson, Boeing, and Oracle became increasingly effective at realizing all of these goals rather than settling for just one. These companies seemed to be successful in every aspect of the competitive model: They were fast to market *and* efficient, cost-conscious *and* customer-focused. How were they performing the impossible?

Obviously, there is no one answer to this complex question. There is no doubt, however, that these companies shared at least one characteristic: They had developed and committed themselves to project management as a competitive tool. Old middle managers, reported *Fortune* magazine,

are dinosaurs, [and] a new class of manager mammal is evolving to fill the niche they once ruled: project managers. Unlike his biological counterpart, the project manager is more agile and adaptable than the beast he’s displacing, more likely to live by his wits than throwing his weight around.<sup>4</sup>

Effective project managers will remain an indispensable commodity for successful organizations in the coming years. More and more companies are coming to this conclusion and adopting



project management as a way of life. Indeed, companies in such diverse industries as construction, heavy manufacturing, insurance, health care, finance, public utilities, and software are becoming project savvy and expecting their employees to do the same.

## 1.1 WHAT IS A PROJECT?

Although there are a number of general definitions of the term **project**, we must recognize at the outset that projects are distinct from other organizational processes. As a rule, a **process** refers to ongoing, day-to-day activities in which an organization engages while producing goods or services. Processes use existing systems, properties, and capabilities in a continuous, fairly repetitive manner.<sup>5</sup> Projects, on the other hand, take place outside the normal, process-oriented world of the firm. Certainly, in some organizations, such as construction, day-to-day processes center on the creation and development of projects. Nevertheless, for the majority of organizations, project management activities remain unique and separate from the manner in which more routine, process-driven work is performed. Project work is continuously evolving, establishes its own work rules, and is the antithesis of repetition in the workplace. As a result, it represents an exciting alternative to business as usual for many companies. The challenges are great, but so are the rewards of success.

First, we need a clear understanding of the properties that make projects and project management so unique. Consider the following definitions of projects:

A project is a unique venture with a beginning and end, conducted by people to meet established goals within parameters of cost, schedule, and quality.<sup>6</sup>

Projects [are] goal-oriented, involve the coordinated undertaking of interrelated activities, are of finite duration, and are all, to a degree, unique.<sup>7</sup>

A project can be considered to be any series of activities and tasks that:

- Have a specific objective to be completed within certain specifications
- Have defined start and end dates
- Have funding limits (if applicable)
- Consume human and nonhuman resources (i.e., money, people, equipment)
- Are multifunctional (i.e., cut across several functional lines)<sup>8</sup>

[A project is] [o]rganized work toward a predefined goal or objective that requires resources and effort, a unique (and therefore risky) venture having a budget and schedule.<sup>9</sup>

Probably the simplest definition is found in the Project Management Body of Knowledge (PMBoK) guide of the Project Management Institute (PMI). PMI is the world's largest professional project management association, with more than 450,000 members worldwide as of 2014. In the PMBoK guide, a project is defined as "a temporary endeavor undertaken to create a unique product, service, or result" (p. 553).<sup>10</sup>

Let us examine the various elements of projects, as identified by these set of definitions.

- **Projects are complex, one-time processes.** A project arises for a specific purpose or to meet a stated goal. It is complex because it typically requires the coordinated inputs of numerous members of the organization. Project members may be from different departments or other organizational units or from one functional area. For example, a project to develop a new software application for a retail company may require only the output of members of the Information Systems group working with the marketing staff. On the other hand, some projects, such as new product introductions, work best with representation from many functions, including marketing, engineering, production, and design. Because a project is intended to fulfill a stated goal, it is temporary. It exists only until its goal has been met, and at that point, it is dissolved.
- **Projects are limited by budget, schedule, and resources.** Project work requires that members work with limited financial and human resources for a specified time period. They do not run indefinitely. Once the assignment is completed, the project team disbands. Until that point, all its activities are constrained by limitations on budget and personnel availability. Projects are "resource-constrained" activities.
- **Projects are developed to resolve a clear goal or set of goals.** There is no such thing as a project team with an ongoing, nonspecific purpose. The project's goals, or **deliverables**,

define the nature of the project and that of its team. Projects are designed to yield a tangible result, either as a new product or service. Whether the goal is to build a bridge, implement a new accounts receivable system, or win a presidential election, the goal must be specific and the project organized to achieve a stated aim.

- **Projects are customer-focused.** Whether the project is responding to the needs of an internal organizational unit (e.g., accounting) or intended to exploit a market opportunity external to the organization, the underlying purpose of any project is to satisfy customer needs. In the past, this goal was sometimes overlooked. Projects were considered successful if they attained technical, budgetary, and scheduling goals. More and more, however, companies have realized that the primary goal of a project is customer satisfaction. If that goal is neglected, a firm runs the risk of “doing the wrong things well”—pursuing projects that may be done efficiently but that ignore customer needs or fail commercially.

### General Project Characteristics

Using these definitional elements, we can create a sense of the key attributes that all projects share. These characteristics are not only useful for better understanding projects, but also offer the basis for seeing how project-based work differs from other activities most organizations undertake. Projects represent a special type of undertaking by any organization. Not surprisingly, the challenges in performing them right are sometimes daunting. Nevertheless, given the manner in which business continues to evolve on a worldwide scale, becoming “project savvy” is no longer a luxury: It is rapidly becoming a necessity.

Projects are characterized by the following properties:<sup>11</sup>

1. **Projects are ad hoc endeavors with a clear life cycle.** Projects are nontraditional; they are activities that are initiated as needed, operate for a specified time period over a fairly well understood development cycle, and are then disbanded. They are temporary operations.
2. **Projects are building blocks in the design and execution of organizational strategies.** As we will see in later chapters, projects allow organizations to implement companywide strategies. They are the principal means by which companies operationalize corporate-level objectives. In effect, projects are the vehicles for realizing company goals. For example, Intel’s strategy for market penetration with ever newer, smaller, and faster computer chips is realized through its commitment to a steady stream of research and development projects that allows the company to continually explore the technological boundaries of electrical and computer engineering.
3. **Projects are responsible for the newest and most improved products, services, and organizational processes.** Projects are tools for innovation. Because they complement (and often transform) traditional process-oriented activities, many companies rely on projects as vehicles for going beyond conventional activities. Projects are the stepping-stones by which we move forward.
4. **Projects provide a philosophy and strategy for the management of change.** “Change” is an abstract concept until we establish the means by which we can make real alterations in the things we do and produce. Projects allow organizations to go beyond simple statements of intent and to achieve actual innovation. For example, whether it is Chevrolet’s Volt electric car or Apple’s newest iPhone upgrade, successful organizations routinely ask for customer input and feedback to better understand their likes and dislikes. As the vehicle of change, the manner in which a company develops its projects has much to say about its ability to innovate and commitment to change.
5. **Project management entails crossing functional and organizational boundaries.** Projects epitomize internal organizational collaboration by bringing together people from various functions across the company. A project aimed at new product development may require the combined work of engineering, finance, marketing, design, and so forth. Likewise, in the global business environment, many companies have crossed organizational boundaries by forming long-term partnerships with other firms in order to maximize opportunities while emphasizing efficiency and keeping a lid on costs. Projects are among the most common means of promoting collaboration, both across functions and across organizations.
6. **The traditional management functions of planning, organizing, motivation, directing, and control apply to project management.** Project managers must be technically well versed,

proficient at administrative functions, willing and able to assume leadership roles, and, above all, goal-oriented: The project manager is the person most responsible for keeping track of the big picture. The nature of project management responsibilities should never be underestimated because these responsibilities are both diverse and critical to project success.

7. *The principal outcomes of a project are the satisfaction of customer requirements within the constraints of technical, cost, and schedule objectives.* Projects are defined by their limitations. They have finite budgets, definite schedules, and carefully stated specifications for completion. For example, a term paper assignment in a college class might include details regarding form, length, number of primary and secondary sources to cite, and so forth. Likewise, in the Disney's Expedition Everest case example at the end of the chapter, the executive leading the change process established clear guidelines regarding performance expectations. All these constraints both limit and narrowly define the focus of the project and the options available to the project team. It is the very task of managing successful project development within such specific constraints that makes the field so challenging.
8. *Projects are terminated upon successful completion of performance objectives—or earlier in their life cycle, if results no longer promise an operational or strategic advantage.* As we have seen, projects differ from conventional processes in that they are defined by limited life cycles. They are initiated, completed, and dissolved. As important alternatives to conventional organizational activities, they are sometimes called “temporary organizations.”<sup>12</sup>

Projects, then, differ from better-known organizational activities, which often involve repetitive processes. The traditional model of most firms views organizational activities as consistently performing a discrete set of activities. For example, a retail-clothing establishment buys, stocks, and sells clothes in a continuous cycle. A steel plant orders raw materials, makes steel, and ships finished products, again in a recurring cycle. The nature of these operations focuses our attention on a “process orientation,” that is, the need to perform work as efficiently as possible in an ongoing manner. When its processes are well understood, the organization always seeks better, more efficient ways of doing the same essential tasks. Projects, because they are discrete activities, violate the idea of repetition. They are temporary activities that operate outside formal channels. They may bring together a disparate collection of team members with different kinds of functional expertise. Projects function under conditions of uncertainty, and usually have the effect of “shaking up” normal corporate activities. Because of their unique characteristics, they do not conform to common standards of operations; they do things differently and often reveal new and better ways of doing things. Table 1.1 offers some other distinctions between project-based work and the more traditional, process-based activities. Note a recurring theme: Projects operate in radical ways that consistently violate the standard, process-based view of organizations.

Consider Apple's development of the iPod, a portable MP3 player that can be integrated with Apple's popular iTunes site to record and play music downloads. Apple, headed by its former chairman, the late Steven Jobs, recognized the potential in the MP3 market, given the enormous popularity (and, some would say, notoriety) of file-sharing and downloading music through

**TABLE 1.1 Differences Between Process and Project Management<sup>13</sup>**

Process	Project
Repeat process or product	New process or product
Several objectives	One objective
Ongoing	One shot—limited life
People are homogenous	More heterogeneous
Well-established systems in place to integrate efforts	Systems must be created to integrate efforts
Greater certainty of performance, cost, schedule	Greater uncertainty of performance, cost, schedule
Part of line organization	Outside of line organization
Bastions of established practice	Violates established practice
Supports status quo	Upsets status quo

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the Internet. The company hoped to capitalize on the need for a customer-friendly MP3 player, while offering a legitimate alternative to illegal music downloading. Since its introduction in 2003, consumers have bought nearly 400 million iPods and purchased more than 25 billion songs through Apple's iTunes online store. In fact, Apple's iTunes division is now the largest U.S. market for music sales, accounting for 29% of all music sold in the United States and 64% of the digital music market.

In an interview, Jobs acknowledged that Apple's business needed some shaking up, given the steady but unspectacular growth in sales of its flagship Macintosh personal computer, still holding approximately 13% of the overall PC market. The iPod, as a unique venture within Apple, became a billion-dollar business for the company in only its second year of existence. So popular has the iPod become for Apple that the firm created a separate business unit, moving the product and its support staff away from the Mac group. "Needless to say, iPod has become incredibly popular, even among people who aren't diehard Apple fanatics," industry analyst Paolo Pescatore told *NewsFactor*, noting that Apple recently introduced a smaller version of the product with great success. "In short, they have been very successful thus far, and I would guess they are looking at this realignment as a way to ensure that success will continue."<sup>14</sup>

A similar set of events are currently unfolding, centered on Apple's introduction and successive upgrades of its iPad tablet. Among the numerous features offered by the iPad is the ability to download books (including college textbooks) directly from publishers, effectively eliminating the traditional middlemen—bookstores—from the process. So radical are the implications of the iPad that competitors have introduced their own models (such as Samsung's Galaxy tablet) to capture a share of this market. Meanwhile, large bookstores are hoping to adapt their business models to the new electronic reality of book purchase by offering their own readers (for example, Kindle for Amazon). Some experts are suggesting that within a decade, tablets and other electronic readers will make traditional books obsolete, capturing the majority of the publishing market. These are just some examples of the way that project-driven technological change, such as that at Apple, is reshaping the competitive landscape.

Given the enthusiasm with which **project management** is being embraced by so many organizations, we should note that the same factors that make project management a unique undertaking are also among the main reasons why successful project management is so difficult. The track record of project management is by no means one of uninterrupted success, in part because many companies encounter deep-rooted resistance to the kinds of changes needed to accommodate a "project philosophy." Indeed, recent research into the success rates for projects offers some grim conclusions:

- A study of more than 300 large companies conducted by the consulting firm Peat Marwick found that software and/or hardware development projects fail at the rate of 65%. Of companies studied, 65% reported projects that went grossly over budget, fell behind schedule, did not perform as expected, or all of the above. Half of the managers responding indicated that these findings were considered "normal."<sup>15</sup>
- A study by the META Group found that "more than half of all (information technology) IT projects become runaways—overshooting their budgets and timetables while failing to deliver fully on their goals."<sup>16</sup>
- Joe Harley, the Chief Information Officer at the Department for Work and Pensions for the UK government, stated that "only 30%" of technology-based projects and programs are a success—at a time when taxes are funding an annual budget of £14bn (over \$22 billion) on public sector IT, equivalent to building 7,000 new primary schools or 75 hospitals a year.<sup>17</sup>
- The United States Nuclear Security Administration has racked up \$16 billion in cost overruns on 10 major projects that are a combined 38 years behind schedule, the Government Accountability Office reports. For example, at Los Alamos National Laboratory, a seven-year, \$213 million upgrade to the security system that protects the lab's most sensitive nuclear bomb-making facilities does not work. A party familiar with the organization cites a "pervasive culture of tolerating the intolerable and accepting the unacceptable."<sup>18</sup>
- According to the 2004 PriceWaterhouseCoopers Survey of 10,640 projects valued at \$7.2 billion, across a broad range of industries, large and small, only 2.5% of global businesses achieved 100% project success, and more than 50% of global business projects failed. The Chaos Summary 2013 survey by The Standish Group reported similar findings: The majority of all projects were

either “challenged” (due to late delivery, being over budget, or delivering less than required features) or “failed” and were canceled prior to completion, or the product developed was never used. Researchers have concluded that the average success rate of business-critical application development projects is 39%. Their statistics have remained remarkably steady since 1994.<sup>19</sup>

- The Special Inspector General for Iraq Reconstruction (SIGIR) reported that more than \$8 billion of the \$53 billion the Pentagon spent on thousands of Iraqi reconstruction projects was lost due to “fraud, waste, and abuse.” Hundreds were eventually canceled, with 42% of the terminated projects ended because of mismanagement or shoddy construction. As part of their final 2013 report, SIGIR noted: “We found that incomplete and unstandardized databases left us unable to identify the specific use of billions of dollars spent on projects.”<sup>20</sup>

These findings underscore an important point: Although project management is becoming popular, it is not easy to assimilate into the conventional processes of most firms. For every firm discovering the benefits of projects, many more underestimate the problems involved in becoming “project savvy.”

These studies also point to a core truth about project management: We should not overestimate the benefits to be gained from project management while underestimating the commitment required to make a project work. There are no magic bullets or quick fixes in the discipline. Like any other valuable activity, project management requires preparation, knowledge, training, and commitment to basic principles. Organizations wanting to make use of project-based work must recognize, as Table 1.1 demonstrates, that its very strength often causes it to operate in direct contradiction to standard, process-oriented business practices.

## 1.2 WHY ARE PROJECTS IMPORTANT?

There are a number of reasons why projects and project management can be crucial in helping an organization achieve its strategic goals. David Cleland, a noted project management researcher, suggests that many of these reasons arise from the very pressures that organizations find themselves facing.<sup>21</sup>

1. **Shortened product life cycles.** The days when a company could offer a new product and depend on having years of competitive domination are gone. Increasingly, the life cycle of new products is measured in terms of months or even weeks, rather than years. One has only to look at new products in electronics or computer hardware and software to observe this trend. Interestingly, we are seeing similar signs in traditional service-sector firms, which also have recognized the need for agility in offering and upgrading new services at an increasingly rapid pace.
2. **Narrow product launch windows.** Another time-related issue concerns the nature of opportunity. Organizations are aware of the dangers of missing the optimum point at which to launch a new product and must take a proactive view toward the timing of product introductions. For example, while reaping the profits from the successful sale of Product A, smart firms are already plotting the best point at which to launch Product B, either as a product upgrade or a new offering. Because of fierce competition, these optimal launch opportunities are measured in terms of months. Miss your launch window, even by a matter of weeks, and you run the risk of rolling out an also-ran.
3. **Increasingly complex and technical products.** It has been well-documented that the average automobile today has more computing power than the Apollo 11 space capsule that allowed astronauts to walk on the moon. This illustrates a clear point: the world today is complex. Products are complicated, technically sophisticated, and difficult to produce efficiently. The public’s appetite for “the next big thing” continues unabated and substantially unsatisfied. We want the new models of our consumer goods to be better, bigger (or smaller), faster, and more complex than the old ones. Firms constantly upgrade product and service lines to feed this demand. That causes multiple problems in design and production as we continually seek to push the technical limits. Further, in anticipating future demand, many firms embark on expensive programs of research and development while attempting to discern consumer tastes. The effect can be to erroneously create expensive and technically sophisticated

projects that we assume the customer will want. For example, Rauma Corporation of Finland developed a state-of-the-art “loader” for the logging industry. Rauma’s engineers loaded the product with the latest computerized gadgetry and technologies that gave the machine a space-age feel. Unfortunately, the chief customer for the product worked in remote regions of Indonesia, with logistics problems that made servicing and repairing the loaders impractical. Machines that broke down had to be airlifted more than 1,000 miles to service centers. Since the inception of this project, sales of the logging machinery have been disappointing. The project was an expensive failure for Rauma and serves to illustrate an important point: Unless companies find a way to maintain control of the process, an “engineering for engineering’s sake” mentality can quickly run out of control.<sup>22</sup>

4. **Global markets.** The early twenty-first century has seen the emergence of enormous new markets for almost every type of product and service. Former closed or socialist societies, as well as rapidly developing economies such as Brazil, China, Vietnam, and India, have added huge numbers of consumers and competitors to the global business arena. The increased globalization of the economy, coupled with enhanced methods for quickly interacting with customers and suppliers, has created a new set of challenges for business. These challenges also encompass unique opportunities for those firms that can quickly adjust to this new reality. In the global setting, project management techniques provide companies with the ability to link multiple business partners, and respond quickly to market demand and supplier needs, while remaining agile enough to anticipate and respond to rapid shifts in consumer tastes. Using project management, successful organizations of the future will recognize and learn to rapidly exploit the prospects offered by a global business environment.
5. **An economic period marked by low inflation.** One of the key indicators of economic health is the fact that inflation has been kept under control. In most of the developed Western economies, low inflation has helped to trigger a long period of economic expansion, while also helping provide the impetus for emerging economies, such as those in India and China, to expand rapidly. Unfortunately, low inflation also limits the ability of businesses to maintain profitability by passing along cost increases. Companies cannot continue to increase profit margins through simply raising prices for their products or services. Successful firms in the future will be those that enhance profits by streamlining internal processes—those that save money by “doing it better” than the competition. As a tool designed to realize goals like internal efficiency, project management is a means by which to bolster profits.

These are just some of the more obvious challenges facing business today. The key point is that the forces giving rise to these challenges are not likely to abate in the near future. In order to meet these challenges, large, successful companies such as General Electric, 3M, Apple, Samsung, Bechtel, and Microsoft have made project management a key aspect of their operating philosophies.

## PROJECT PROFILE

### “Throwing Good Money after Bad”: the BBC’s Digital Media Initiative

The British Broadcasting Corporation (BBC) recently announced the cancellation of a major Information Technology (IT) project intended to update their vast broadcast operations. The project, called the Digital Media Initiative (DMI), was originally budgeted at £81.7 million (\$140 million) and was developed to eliminate the outdated filing systems and use of old-fashioned, analog videotape with its expensive archival storage. The BBC is one of the world’s largest and most widely recognized news and media organizations; it is publically funded and under British government oversight. The DMI project was intended to save the organization millions annually by eliminating the cost of expensive and outdated storage facilities, while moving all media content to a modern, digital format. As an example of a large-scale IT project, the plan for DMI involved media asset management, archive storage and retrieval systems, and media sharing capabilities.

The DMI project was begun in 2008 when the BBC contracted with technology service provider Siemens, with consulting expertise to be provided by Deloitte. Interestingly, the BBC never put the contract out for competitive bidding, reasoning that it already had a 10-year support contract with Siemens and trusted Siemens’ judgment on project development. As part of this “hands-off” attitude, executives at the BBC gave Siemens full control of the project, and