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Introduction

Why Project Management?

Chapter Objectives

After completing this chapter, you should be able to:

- 1.1 Understand why project management is becoming such a powerful and popular practice in business.
- 1.2 Recognize the basic properties of projects, including their definition.
- 1.3 Understand why effective project management is such a challenge.
- 1.4 Understand and explain the project life cycle, its stages, and the activities that typically occur at each stage in the project.
- 1.5 Understand the concept of project “success,” including various definitions of success, as well as the alternative models of success.
- 1.6 Understand the purpose of project management maturity models and the process of benchmarking in organizations.
- 1.7 Recognize how mastery of the discipline of project management enhances critical employability skills for university graduates.

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.*¹

PROJECT PROFILE

Development Projects that are Transforming Africa

The African continent is on the verge of massive changes, and projects are helping to raise the standard of living for its inhabitants. The current population of 1.2 billion is expected to double by 2050, growing at some 42 million people per year. Managing the means to accommodate this expansion is the goal of a number of governmental agencies, non-governmental organizations (NGOs), and international bodies. In order to bring prosperity to a continent that has suffered through decades of misrule, colonial exploitation, and regional conflicts, dozens of important infrastructure projects are being undertaken to improve standards of living and accommodate the needs of this rapidly-increasing population. Among the major infrastructure projects that offer great promise are:

1. The North-South Corridor – In 2009, the Common Market of Eastern and Southern Africa began work on a series of road and railways designed to link seven countries and covering more than 6,000 miles. At a cost of over \$1 billion,



FIGURE 1.1 South Africa's Jasper Solar Farm

Source: Mikeleddy/Shutterstock

the North-South Corridor is expected to improve the flow of people and goods across national boundaries, generating commerce and trade.

2. **Technology Hubs** – A Chinese development firm, Zendai Property, announced in 2013 the investment of \$8 billion to build a hub for Chinese firms investing in African infrastructure. This hub, named Modderfontein New City, is being constructed outside of Johannesburg, South Africa. Kenya is getting its own technology hub, a \$14.5 billion software center named Konza Technology City, which is situated outside Nairobi, the Kenyan capital. The Kenyan government refers to Konza as the start of the “silicon savannah.”
3. **Tanzania's Bagamoyo Port** is slated to become Africa's largest port, with a capability of handling more than 20 million containers each year. The Chinese construction firm that has invested \$11 billion in the project expects to have the port completed and operational by 2045.
4. **Giant Dams** – The Grand Ethiopian Renaissance Dam (budgeted at \$4.8 billion) is intended to provide hydroelectric power to Ethiopia and several neighboring countries. Congo's Grand Inga Dam, with its expected cost of over \$100 billion, will become the largest energy-generating dam in the world and is slated for completion in 2025.
5. **South Africa's Jasper Solar Farm** – Opened in 2015, the solar farm produces enough energy to power 80,000 homes. It is the largest solar power project on the African continent.
6. **The “New Suez Canal”** – Construction started on the expansion of the existing Suez Canal in 2014, with the goal of adding a new 22-mile shipping lane. The expansion is expected to double Egypt's annual revenue from canal traffic.
7. **Expansion of Cement Production** – Dangote Cement, headquartered in Lagos, Nigeria, in 2015 signed contracts with a Chinese firm to increase its cement manufacturing capacity across 15 countries to 100 million tons by 2020. This huge increase in cement production will fuel additional infrastructure projects on the African continent for decades to come.

Raising the standard of living for an entire continent with a large expected population increase is a challenging goal. In order to accommodate the needs of these population changes, as well as improve the living standards for the entire continent, it is vital that projects be undertaken that can provide value both commercially and environmentally. Successful project management offers the means to get the best out of “good intentions” by ensuring that these and other funded projects are implemented as efficiently and effectively as possible. When development projects are viewed as the roots for future expansion, it is easy to understand their importance. Future improvements in living standards depend on the current projects being done right, as the success of these projects will spawn the need and support the willingness of firms and governments to invest in subsequent projects.²

The Need for Projects

LO 1.1 Understand why project management is becoming such a powerful and popular practice in business.

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 10, or plan the 2018 Winter Olympic Games in Pyeongchang, South Korea, 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.”³ 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 rapidly pursue commercial opportunities. 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, companies had to pick their 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, Ericsson, 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.⁴

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.

What is a Project?

LO 1.2 Recognize the basic properties of projects, including their definition.

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.⁵ 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.⁶

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

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, such as money, people, equipment
- Are multifunctional (i.e., cut across several functional lines)⁸

[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.⁹

Probably the simplest definition is found in the Project Management Body of Knowledge (PMBok) guide of the Project Management Institute (PMI). The PMI is the world’s largest professional project management association, with more than 475,000 members worldwide as of 2017. In the PMBoK guide, a project is defined as “a temporary endeavor undertaken to create a unique product, service, or result” (p. 553).¹⁰

Let us examine the various elements of projects, as identified by this 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 input of numerous members of the organization. Project members may be from different departments, other organizational units, or 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 both the project and 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:¹¹

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 Samsung’s newest smartphone upgrade, successful organizations routinely ask for customers’ 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 its 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 this 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.”¹²

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 use of projects to push the development of a constantly-changing range of product and service offerings. When it was first introduced in 2003, the iPod was Apple’s portable MP3 player that could be integrated with Apple’s popular iTunes site to record and play music downloads. From its introduction in 2003 to 2015, when Apple stopped reporting sales of the product, consumers had bought more than 400 million iPods, generating \$65 billion in revenue for the firm. Customers have also purchased more than 45 billion songs through Apple’s iTunes online store. In fact, Apple’s iTunes division became the largest U.S. market for music sales; by 2015 it was accounting for 29% of all music sold in the United States and 64% of the digital music market. More recently, as steadily declining sales raised concern that the music downloads market has become saturated and less profitable, Apple introduced its Apple Music site to attract fans of music streaming, competing directly with Spotify and Pandora, among other music streaming services. By 2017 Apple Music had enrolled over 20 million subscribers, making it the second-largest streaming service in the world. Each of these steps demonstrates Apple’s commitment to using new project ventures as a means of avoiding a business as usual mentality, as it seeks to remain on the leading edge of the industry.¹³

TABLE 1.1 Differences Between Process and Project Management¹⁴

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

Source: R. J. Graham. (1992). “A Survival Guide for the Accidental Project Manager,” *Proceedings of the Annual Project Management Institute Symposium*. Drexel Hill, PA: Project Management Institute, pp. 355–61. Copyright and all rights reserved. Material from this publication has been reproduced with the permission of PMI.

A similar set of events is currently unfolding, centered on Apple's 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 and competing tablets like Microsoft's Surface Pro and Samsung's Galaxy to capture a share of this market that large bookstores have been forced to adapt their business models to the new electronic reality of book purchases 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 KPMG 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."¹⁵
- 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." According to the Gallup Business Review, the U.S. economy loses somewhere between \$50 and \$150 billion every year because of failed IT projects.¹⁶
- 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 £14 billion (over \$22 billion) on public sector IT, equivalent to building 7,000 new primary schools or 75 hospitals a year.¹⁷
- The United States National 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 did not work. A party familiar with the organization cites a "pervasive culture of tolerating the intolerable and accepting the unacceptable."¹⁸
- One out of six IT projects has an average cost overrun of 200% and a schedule overrun of 70%. Around 45% of companies admit that they are unclear about the business objectives of their IT projects. The Chaos Summary 2015 survey of 50,000 projects worldwide by The Standish Group reported similar findings: The majority of all projects were rated either as "challenged" due to late delivery, being over budget, or delivering less than required features, or "failed" when they 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 29%. Their statistics have remained remarkably steady since 1994.¹⁹
- The Special Inspector General for Afghanistan Reconstruction (SIGAR) reported that the U.S. spent more than \$110 billion on postwar reconstruction projects, with some estimates suggesting that over one-third of the costs of these projects was lost due to waste, fraud, and poor planning or project execution. In a recent interview, John Sopko, the Special Investigator General, noted that because of project waste along with contracting and performance errors, "We've built an Afghanistan they can't afford." As one example, he cites the \$400 million purchase of aircraft for an Afghanistan Air Force; aircraft the government couldn't use that were ultimately scrapped for a near total loss.²⁰

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.

PROJECT PROFILE

Royal Mail: Moving with the Times

Royal Mail, a postal service company whose experience spans over 500 years, has previously faced privatization on a number of occasions. After many governmental reviews and the amended EU Postal Services Directive in 2008, the company was finally floated on the London Stock Exchange in 2013, opening it up to competition. Subsequently, the company started to face a number of problems, including industrial relations issues and a decline in the use of postal mail due to increasing use of online communications tools.

Having to compete with the likes of Amazon and other package delivery services, Royal Mail was forced to look toward creating productivity efficiencies, developing better use of technology, and enhancing customer service while maintaining its day-to-day operations.

Because of the issues they faced, a Project Management Office was implemented in 2016 with the responsibility of creating change throughout the organization. The Association of Project Management guidelines were used to embed project management principles in the company, instigating over 100 projects that were centrally supported, focusing on

- development of a resource tool tailored to specific project management needs of the business.
- working within a specified budget for investment.
- following defined governance processes.
- considering complex stakeholder needs.²¹

As a result, the company modernized its services, and by 2018, a combination of these moves and the settlement of its industrial disputes saw the company's stock price rise by 51%, restoring it to the FTSE100.²² Royal Mail is a prime example of a company that has reaped the benefits of an effective project management system and continues to look for growth in developing global reach and e-commerce capabilities.



FIGURE 1.2 Royal Mail has successfully modernized its operations and improved the customer experience in recent years.

Source: Chrispictures/Shutterstock

Why are Projects Important?

LO 1.3 Understand why effective project management is such a challenge.

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.²³

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. This causes multiple problems in design and production as we continually seek to push the technical limits. Furthermore, 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.²⁴
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

London's Crossrail: Europe's Largest Construction Project

The thought of adding another commuter rail system to the already heavily-developed London metropolitan area may seem unnecessary to those who are unfamiliar with the congestion, lost time, and travel hassles associated with using public or private means to move around Britain's capital city. For residents and people living in the outskirts of London, however, the dream of a modern rail system that connects central London with its increasingly spread-out suburbs is a vision that goes back originally to 1948 post-war London.

The goal of the project is to build a 70-mile (100 km) rail line, including over 40 stations (10 brand new), at locations across suburban and urban London, from Reading in the west to Shenfield in the east. While the majority of the outlying stations will be above ground, a number of the stations will involve refurbishment or expansion of underground facilities in the city center. The construction is further complicated by the need to find a reasonable route through the middle of the city, avoiding current underground rail lines and stations.

Although Crossrail has long been on the public's wish list, planning for it has been a long, arduous process. Developing realistic cost estimates, managing the politics of opening new stations in some districts while ignoring similar requests in other locales, finding money in the budget to support such a massive project—these have all been difficult challenges that the Crossrail organization worked to meet. After nearly 40 years of development planning, and influenced by economic ups and downs, Crossrail finally broke ground in 2009.

Crossrail has given engineers an opportunity to develop new and innovative methods for project planning and monitoring of progress. For example, the entire network was first designed in a 3-D virtual environment; once the railway is up and running, a version of this 3-D model will help managers monitor, from a tablet, countless electrical components and systems across the network. "We've built two railways—one real, one virtual reality," says Rhys Williams, the head of mechanical, electrical, and public health for Crossrail. One of their goals is to show how transport networks can become safer, more efficient, and cheaper to maintain by using smart design coupled with the latest technology. Everything about Crossrail—the escalators and elevators, lighting, ventilation, communication, the railcars themselves—is being engineered to reduce energy use, improve safety, and streamline operations.

A critical component of the Crossrail project has been to embed the vision of sustainability through every component of the development process. Sustainability, for London's Crossrail, comes in four dimensions: 1) environmental, 2) economic, 3) social, and 4) archaeological. As part of the sustainability vision for Crossrail, the project is committed to:

- Minimizing the environmental impact of its construction through controlling efficient energy consumption, protecting the environment, and factoring in climate change possibilities over the planned 120-year life cycle of the railway.
- Creating a diverse supply chain of project suppliers that benefits both Crossrail and the supply chain organizations, while ensuring that materials used on the project are sustainably sourced.
- Creating a social legacy from the project, including health and safety commitments, developing a trained workforce, and promoting art programs that encourage neighborhoods and art schools to decorate the stations, and so forth.
- Respecting the long and significant history of the London area and employing archaeology to minimize disruptions or the ruining of significant buried sites. As an example, since the development of Crossrail in 2009 over 100 archaeologists have found more than 10,000 items from 40 sites, spanning 55 million years of London's history and pre-history. Although careful excavation of these sites slows progress on tunneling, it represents a commitment to London's past, just as the project is intended to improve the city's future.



FIGURE 1.3 A Crossrail station being built in central London

Source: Julius Lando/Alamy Stock Photo

The Crossrail construction involves an incredibly busy and diverse set of operations. Eight giant tunnel boring machines have just finished a five-year operation to create the underground sections of the rail line. In the meantime, other firms have developed and are actively testing rail cars, electronic components, and computer-linked systems for directing and monitoring rail traffic (as well as monitoring the operating behavior of the railcars themselves), all in preparation for when their parts of the project are due for development. Coordinating hundreds of suppliers, junior contractors, and public oversight groups has been an enormously complicated process. It has also required compromises and a willingness to adjust project plans to economic and political realities. For example, in 2010 the Government's Comprehensive Spending Review pushed to save on projected costs by revising the tunneling plan. In working to save over £1 billion from the budget, Crossrail services through the central section of the city are now projected to start in 2018 rather than 2017, followed by a phased introduction of services across the rest of the route. Although delaying the opening by a year, the decision allowed the Crossrail consortium (and the British government) to revise the projected project budget to £14.8 billion from £15.9 billion.

The title "Europe's Largest Construction Project" is one that carries enormous promise but also large risks. Getting all the elements right—making sure that the technology is top-notch, ensuring the myriad stakeholders' support, and pushing for sustainable operations—while keeping an eye on the project's budget and schedule to completion is tremendously complicated. Equally fascinating have been the steps undertaken to preserve ancient sites and important archaeological finds throughout the digging process. Once completed, however, Crossrail will be a superlative example of modern infrastructure projects aimed at improving the lifestyle of millions of city-dwellers.²⁵

Project management also serves as an excellent training ground for future senior executives in most organizations. One unique aspect of projects is how they blend technical and behavioral challenges. The technical side of project management requires managers to become skilled in project selection, budgeting and resource management, planning and scheduling, and tracking projects. Each of these skills will be discussed in subsequent chapters. At the same time, however, project managers face the equally strong challenge of managing the behavioral, or people, side of projects. Projects, being temporary endeavors, require project managers to bring together individuals from across the organization, quickly mold them into an effective team, manage conflict, provide leadership, and engage in negotiation and appropriate political behavior, all in the name of project success. Again, we will address these behavioral challenges in this text. One thing we know is that project managers who emphasize one challenge and ignore the other, whether they choose to focus on the technical or behavioral side of project management, are not nearly as successful as those who seek to become experts in both. Why is project management such a useful training ground for senior

executives? Because it provides the first true test of an individual’s ability to master both the technical and human challenges that characterize effective leaders in business. Project managers, and their projects, create the kind of value that companies need to survive and prosper.

Project Life Cycles

LO 1.4 Understand and explain the project life cycle, its stages, and the activities that typically occur at each stage in the project.

Imagine receiving a term paper assignment in a college class. Our first step would be to develop a sense of the assignment itself—what the professor is looking for, how long the paper should be, the number of references required, stylistic expectations, and so forth. Once we have familiarized ourselves with the assignment, our next step would be to develop a plan for how we intend to proceed with the project in order to complete it by the due date. We make a rough guess about how much time will be needed for the research, writing the first draft, proofreading the paper, and completing the final draft, and we use this information to create some tentative milestones for the various components of the assignment. Next, we begin to execute our plan, doing the library or online research, creating an outline, writing a draft, and so forth. Our goal is to complete the assignment on time, doing the work to our best possible ability. Finally, after turning in the paper, we file or discard our reference materials, return any books to the library, breathe a sigh of relief, and wait for the grade.

This example represents a simplified but useful illustration of a project’s life cycle. In this case, the project consisted of completing the term paper to the standards expected of the instructor in the time allowed. A **project life cycle** refers to the stages in a project’s development. Life cycles are important because they demonstrate the logic that governs a project. They also help us develop our plans for carrying out the project. They help us decide, for example, when we should devote resources to the project, how we should evaluate its progress, and so forth. Consider the simplified model of the project life cycle shown in Figure 1.4, which divides the life cycle into four distinct phases: conceptualization, planning, execution, and termination.

- *Conceptualization* refers to the development of the initial goal and technical specifications for a project. The scope of the work is determined, necessary resources (people, money, physical plant) identified, and important organizational contributors or **stakeholders** signed on.
- *Planning* is the stage in which all detailed specifications, schematics, schedules, and other plans are developed. The individual pieces of the project, often called *work packages*, are broken down, individual assignments made, and the process for completion clearly delineated. For example, in planning our approach to complete the term paper we determine all the necessary steps (research, drafts, editing, etc.) in the process.
- During *execution*, the actual “work” of the project is performed, the system developed, or the product created and fabricated. It is during the execution phase that the bulk of project team

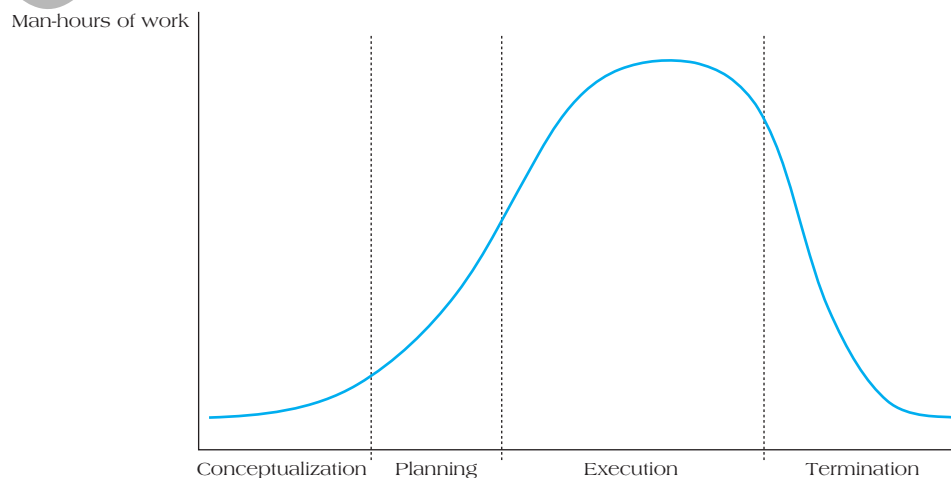


FIGURE 1.4 Project Life Cycle Stages

labor is performed. As Figure 1.4 shows, project costs (in man hours) ramp up rapidly during this stage.

- **Termination** occurs when the completed project is transferred to the customer, its resources reassigned, and the project formally closed out. As specific subactivities are completed, the project shrinks in scope and costs decline rapidly.

These stages are the waypoints at which the project team can evaluate both the project's performance and its overall status. Remember, however, that the life cycle is relevant only after the project has actually begun. The life cycle is signaled by the actual kickoff of project development, the development of plans and schedules, the performance of necessary work, and the completion of the project and reassignment of personnel. When we evaluate projects in terms of this life cycle model, we are given some clues regarding their subsequent resource requirements; that is, we begin to ask whether we have sufficient personnel, materials, and equipment to support the project. For example, when beginning to work on our term paper project we may discover that it is necessary to purchase a PC or hire someone to help with researching the topic. Thus, as we plan the project's life cycle we acquire important information regarding the resources that we will need. The life cycle model, then, serves the twofold function of project timing (schedule) and project requirements (resources), allowing team members to better focus on what and when resources are needed.

The project life cycle is also a useful means of visualizing the activities required and challenges to be faced during the life of a project. Figure 1.5 indicates some of these characteristics as they evolve during the course of completing a project.²⁶ As you can see, five components of a project may change over the course of its life cycle:

- **Client interest:** The level of enthusiasm or concern expressed by the project's intended customer. **Clients** can be either internal or external to the organization.
- **Project stake:** The amount of corporate investment in the project. The longer the life of the project, the greater the investment.
- **Resources:** The commitment of financial, human, and technical resources over the life of the project.
- **Creativity:** The degree of innovation required by the project, especially during certain development phases.
- **Uncertainty:** The degree of risk associated with the project. Riskiness here reflects the number of unknowns, including technical challenges that the project is likely to face. Uncertainty is highest at the beginning because many challenges have yet to be identified, let alone addressed.

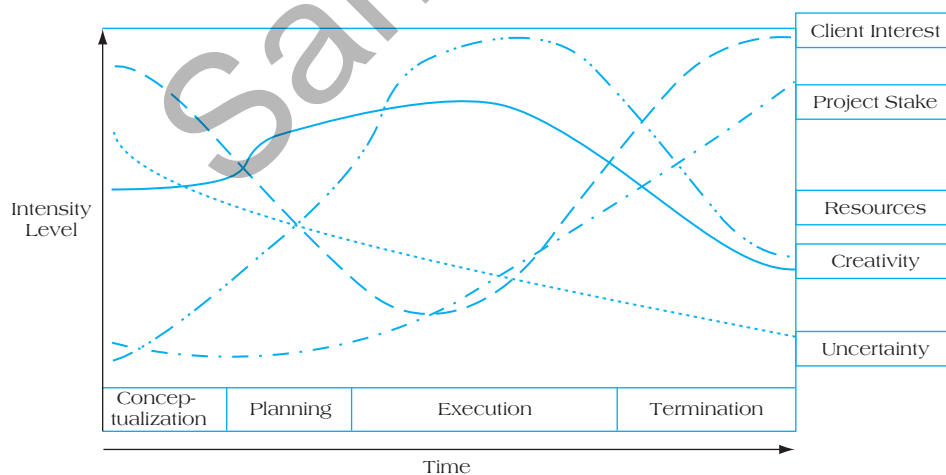


FIGURE 1.5 Project Life Cycles and Their Effects

Source: Victor Sohmen. (2002, July). "Project Termination: Why the Delay?" Paper presented at PMI Research Conference, Seattle, WA. Project Management Institute, Sohmen, Victor. "Project termination: Why the delay?" PMI Research Conference. Proceedings, p. 467–475. Paper presented at PMI Research Conference. Project Management Institute, Inc. (2002). Copyright and all rights reserved. Material from this publication has been reproduced with the permission of PMI.

Each of these factors has its own dynamic. Client interest, for example, follows a U-shaped curve, reflecting initial enthusiasm, lower levels of interest during development phases, and renewed interest as the project nears completion. Project stake increases dramatically as the project moves forward because an increasing commitment of resources is needed to support ongoing activities. Creativity, often viewed as innovative thought or applying a unique perspective, is high at the beginning of a project as the team and the project's client begin developing a shared vision of the project. As the project moves forward and uncertainty remains high, creativity also continues to be an important feature. In fact, it is not until the project is well into its execution phase, with defined goals, that creativity becomes less important. To return to our example of the term paper project, in many cases the "creativity" needed to visualize a unique or valuable approach to developing the project is needed early, as we identify our goals and plan the process of achieving them. Once identified, the execution phase, or writing the term paper, places less emphasis on creativity per se and more on the concrete steps needed to complete the project assignment.

The information simplified in Figure 1.5 is useful for developing a sense of the competing issues and challenges that a project team is likely to face over the life cycle of a project. Over time, while certain characteristics (creativity, resources, and uncertainty) begin to decrease, other elements (client interest and project stake) gain in importance. Balancing the requirements of these elements across the project life cycle is just one of the many demands placed on a project team.

BOX 1.1

Project Managers in Practice

Theresa Hinkler, R. Conrader Company

Theresa Hinkler is a Sales Manager for a small 40+ employees manufacturer of valves in Erie, PA. Her route to that position was long, with many twists and turns along the way.

Her need to be self-sufficient right out of high school, combined with a desire to obtain an education, led her through many jobs including stints as a bartender, assembler, aerobics instructor, and fitness trainer. She returned to Erie in her late 20's, taking a job in sales at Conrader Valves, and subsequently completed her BA in Business at Penn State.

In order to sell Conrader's products, Theresa felt she should know as much about them as possible, including how they were manufactured, the machining involved, and their assembly, testing, packaging, and shipping. Acquiring this understanding of process flow and supply chain management assisted her career greatly because it gave her a wealth of knowledge that helped hone her expertise about the company's products, industry, and customers. When Conrader's Production Manager position became available, top management found that she knew more than anyone about the manufacturing of the valves, which led to her move into this role. She remained involved in sales and customer interaction while simultaneously running the machine shop and assembly areas.

As Theresa transitioned to the production role, a large surge in new product sales and certification requirements challenged her to maintain high manufacturing volume along with efficiently bringing new products to market. Although at first not realizing it, she had begun developing and using a wide range of project management skills. Need-based methods, very much akin to formal project management, enabled her to manage in an increasingly efficient manner.

After three years, Theresa moved to Conrader's Sales Manager position. She had already developed a rapport with customers through interactions because of production planning. She defined the goals and needs of the customer, matching them with timelines. This understanding of company capabilities enabled her to seamlessly take customers' new product requirements through engineering, prototyping/testing, pilot runs, and final production. Once again, Theresa was utilizing project management skills that were unnamed and loosely defined.

In 2016, Theresa decided to further her education to enhance her skill sets on the job and to become more organized and project-oriented by enrolling in the Master's degree program for Project Management (MPM) at Penn State University. The educational experience not only reinforced many of the activities she was already performing, but also gave her and Conrader a solid basis to improve processes and tailor project needs to the company's organizational strategy. Project management methodologies Theresa learned helped her match project opportunities with the company's strategy for maximum benefits. Prior to her formal education in project management, projects were taken on ad hoc and without a formal system. As Theresa notes, "Many projects were thrown into the queue without proper prioritization. Being able to assess project opportunities from the perspective of the firm's overall strategy has allowed us to make better new product introduction choices and has also improved customer responsiveness. That's an advantage of a project management mindset."

There are many types of projects with which Theresa is involved, including new product development projects, certification projects, global outreach projects, new market projects, and product extension projects. The tools and components she has learned through Penn State's MPM program enabled her to tie essential elements of project management into Conrader's everyday processes in a more formal fashion. The additional structured elements have helped the company at large by making the process more transparent. As Theresa observed, "Sales involves so much more than generating revenue for the company. Every new product brought to fruition



FIGURE 1.6 Theresa Hinkler – R. Conrader Company

Source: Theresa Hinkler

and every product sold to new and existing companies involves a project management approach. There is critical planning, budgeting, and scheduling involved in sales. The compressor market is a ‘dog eat dog’ global business, so competitiveness is crucial. Incorporating project management processes into the business has improved the company’s competitive advantage and focused overall business efforts on success.”

Determinants of Project Success

LO 1.5 Understand the concept of project “success,” including various definitions of success, as well as the alternative models of success.

Definitions of successful projects can be surprisingly elusive.²⁷ How do we know when a project is successful? When it is profitable? If it comes in on budget? On time? When the developed product works or sells? When we achieve our long-term payback goals? Generally speaking, any definition of **project success** *must* take into consideration the elements that define the very nature of a project: that is, time (schedule adherence), budget, functionality/quality, and customer satisfaction. At one time, managers normally applied three criteria of project success:

- **Time.** Projects are constrained by a specified period of **time** during which they must be completed. They are not supposed to continue indefinitely. Thus, the first constraint that governs project management involves this basic requirement: The project should come in on or before its established schedule.

- **Budget.** A second key constraint for all projects is a limited **budget**. Projects must meet budgeted allowances in order to use resources as efficiently as possible. Companies do not write blank checks and hope for the best. Thus, the second limit on a project raises the question: was the project completed within budget guidelines?
- **Performance.** All projects are developed in order to adhere to some initially determined technical specifications. We know before we begin what the project is supposed to do or how the final product is supposed to operate. Measuring **performance**, then, means determining whether the finished product operates according to specifications. The project's clients naturally expect that the project being developed on their behalf will work as expected. Applying this third criterion is often referred to as conducting a quality check.

This so-called **triple constraint** was once the standard by which project performance was routinely assessed. Today, a fourth criterion has been added to these three (see Figure 1.7):

- **Client acceptance.** The principle of **client acceptance** argues that projects are developed with customers or clients in mind, and their purpose is to satisfy customers' needs. If client acceptance is a key variable, then we must also ask whether the completed project is acceptable to the customer for whom it was intended. Companies that strictly evaluate project success according to the original "triple constraint" may fail to apply the most important test of all: the client's satisfaction with the completed project.

We can also think of the criteria for project success in terms of internal versus external conditions. When project management was practiced primarily by construction and other heavy industries, its chief value was in maintaining internal organizational control over expenditures of money and time. The traditional triple-constraint model made perfect sense. It focused internally on efficiency and productivity measures. It provided a quantifiable measure of personnel evaluation, and it allowed accountants to control expenses.

More recently, however, the traditional triple-constraint model has come under increasing criticism as a measure of project success. The final product, for example, could be a failure, but if it has been delivered in time and on budget and satisfies its original specifications (however flawed), the project itself could still be declared a success. Adding the external criterion of client acceptance corrects such obvious shortcomings in the assessment process. First, it refocuses corporate attention outside the organization, toward the customer, who will probably be dissatisfied with a failed or flawed final product. Likewise, it recognizes that the final arbiter of project success is not the firm's accountants, but rather the marketplace. A project is successful only to the extent that it benefits the client who commissioned it. Finally, the criterion of client acceptance requires project managers and teams to create an atmosphere of openness and communication throughout the development of the project.

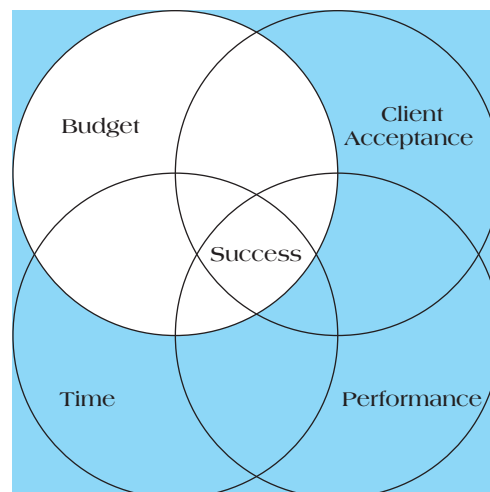


FIGURE 1.7 The New Quadruple Constraint

Consider one example. In his book, *What Customers Really Want*, author Scott McKain relates how a coach bus company that transports music stars was originally planning to spend a great deal on a project to improve the interior of its vehicles, because they believed that with these upgrades customers would be willing to pay more to lease or purchase their buses. However, prior to starting a full-blown overhaul of their fleet, the company's executives decided to ask past customers what they thought about this plan. Surprisingly, the company found that while its customers did want nice interiors, the single most important factor in selecting a coach company was the bus driver, who ideally would be a "nice guy," someone who could get the music stars to their destination safely, and who would also serve as a good ambassador for the band with fans. Based on this information, the company dropped its original project and instead initiated a driver education program to teach its drivers how to communicate more effectively with customers and how to retain and grow customer goodwill. The company also started compensating drivers according to how well they served the customer and how well they cultivated long-term relationships with them. Once the company did this, it moved from fourth in the marketplace to first, and grew from 28 to 56 coaches.²⁸

An additional approach to project assessment argues that another factor must always be taken into consideration: the promise that the delivered product can generate future opportunities, whether commercial or technical, for the organization.²⁹ In other words, it is not enough to assess a project according to its immediate success. We must also evaluate it in terms of its commercial success as well as its potential for generating new business and new opportunities. Figure 1.8 illustrates this scheme, which proposes four relevant dimensions of success:

- **Project efficiency:** Meeting budget and schedule expectations.
- **Impact on customer:** Meeting technical specifications, addressing customer needs, and creating a project that satisfies the client's needs.
- **Business success:** Determining whether the project achieved significant commercial success.
- **Preparing for the future:** Determining whether the project opened new markets or new product lines or helped to develop new technology.

This approach challenges the conventional triple-constraint principle for assessing project success. Corporations expect projects not only to be run efficiently, at the least, but also to be developed to meet customer needs, achieve commercial success, and serve as conduits to new business opportunities. Even in the case of a purely internal project (e.g., updating the software for a firm's order-entry system), project teams need to focus both on customer needs and an assessment of potential commercial or technical opportunities arising from their efforts.

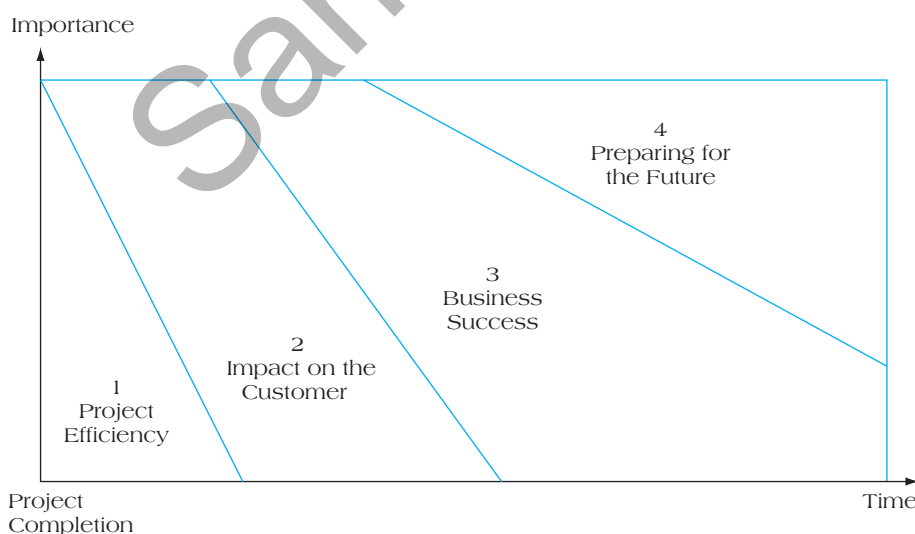


FIGURE 1.8 Four Dimensions of Project Success Importance

Source: A. J. Shenhar, O. Levy, and D. Dvir. (1997). "Mapping the Dimensions of Project Success," *Project Management Journal*, 28(2): 12. Copyright and all rights reserved. Material from this publication has been reproduced with the permission of PMI.

BOX 1.2

Project Management Research in Brief

Assessing Information Technology (IT) Project Success

As noted earlier in this chapter, IT projects have a notoriously checkered history when it comes to successful implementation. Part of the problem has been an inability to define the characteristics of a successful IT project in concrete terms. The criteria for IT project success are often quite vague, and without clear guidelines for project success it is hardly any wonder that so many of these projects do not live up to predevelopment expectations. In 1992 and again in 2003, two researchers, W. DeLone and E. McLean, analyzed several previous studies of IT projects to identify the key indicators of success. Their findings, synthesized from previous research, suggest that, at the very least, IT projects should be evaluated according to six criteria:

- **System quality.** The project team supplying the system must be able to assure the client that the implemented system will perform as intended. All systems should satisfy certain criteria: They should, for example, be easy to use, and they should supply quality information.
- **Information quality.** The information generated by the implemented IT must be the information required by users and be of sufficient quality that it is actionable. In other words, generated information should not require additional efforts to sift or sort the data. System users can perceive quality in the information they generate.
- **Use.** Once installed, the IT system must be used. Obviously, the reason for any IT system is its usefulness as a problem-solving, decision-aiding, and networking mechanism. The criterion of use assesses the actual utility of a system by determining the degree to which, once implemented, it is used by the customer.
- **User satisfaction.** Once the IT system is complete, the project team must determine user satisfaction. One of the thorniest issues in assessing IT project success has to do with making an accurate determination of user satisfaction with the system. Yet, because the user is the client and is ultimately the arbiter of whether or not the project was effective, it is vital that we attain some measure of the client's satisfaction with the system and its output.
- **Individual impact.** All systems should be easy to use and should supply quality information. But beyond satisfying these needs, is there a specific criterion for determining the usefulness of a system to the client who commissioned it? Is decision making faster or more accurate? Is information more retrievable, more affordable, or more easily assimilated? In short, does the system benefit users in the ways that are most important to those users?
- **Organizational impact.** Finally, the supplier of the system must be able to determine whether it has a positive impact throughout the client organization. Is there, for example, a collective or synergistic effect on the client corporation? Is there a sense of good feeling, or are there financial or operational metrics that demonstrate the effectiveness or quality of the system?

DeLone and McLean's work provides an important framework for establishing a sense of IT project success. Companies that are designing and implementing IT systems must pay early attention to each of these criteria and take necessary steps to ensure that the systems that they deliver satisfy them.³⁰

A final model, offered recently, also argues against the triple-constraint model as a measure of project success. According to Atkinson,³¹ all groups that are affected by a project (stakeholders) should have a hand in assessing its success. The context and type of a project may also be relevant in specifying the criteria that will most clearly define its success or failure. Table 1.2 shows the Atkinson model, which views the traditional "iron triangle" of cost, quality, and time as merely one set of components in a comprehensive set of measures. Of course, the means by which a project is

TABLE 1.2 Understanding Success Criteria

Iron Triangle	Information System	Benefits (Organization)	Benefits (Stakeholders)
Cost	Maintainability	Improved efficiency	Satisfied users
Quality	Reliability	Improved effectiveness	Social and environmental impact
Time	Validity	Increased profits	Personal development
	Information quality	Strategic goals	Professional learning, contractors' profits
	Use	Organization learning	Capital suppliers, content
		Reduced waste	Project team, economic impact to surrounding community

to be measured should be decided before the project is undertaken. A corporate axiom, “What gets measured, gets managed,” suggests that when teams understand the standards to which a project is being held, they will place more appropriate emphasis on the various aspects of project performance. Consider, for example, an information system setting. If the criteria of success are improved operating efficiency and satisfied users, and if quality is clearly identified as a key benefit of the finished product, the team will focus its efforts more strongly on these particular aspects of the project.

Developing Project Management Maturity

LO 1.6 Understand the purpose of project management maturity models and the process of benchmarking in organizations.

With the tremendous increase in project management practices among global organizations, a recent phenomenon has been the rise of project maturity models for project management organizations. **Project management maturity models** are used to allow organizations to benchmark the best practices of successful project management firms. Project management maturity models recognize that different organizations are currently at different levels of sophistication in their best practices for managing projects. For example, it would be reasonable to expect organizations such as Boeing (aircraft and defense systems) or Fluor (industrial construction) to be much more advanced in how they manage projects, given their lengthy histories of project initiatives, than companies that have only recently developed an emphasis on project-based work.

The purpose of **benchmarking** is to systematically manage the process improvements of project delivery by a single organization over a period of time.³² Because there are many diverse dimensions of project management practice, it is common for a new organization just introducing project management to its operations to ask, “Where do we start?” That is, “Which of the multiple project management processes should we investigate, model, and apply to our organization?” Maturity models provide the necessary framework to: first, analyze and critically evaluate current practices as they pertain to managing projects; second, compare those practices against those of chief competitors or some general industry standard; and, third, define a systematic route for improving these practices.

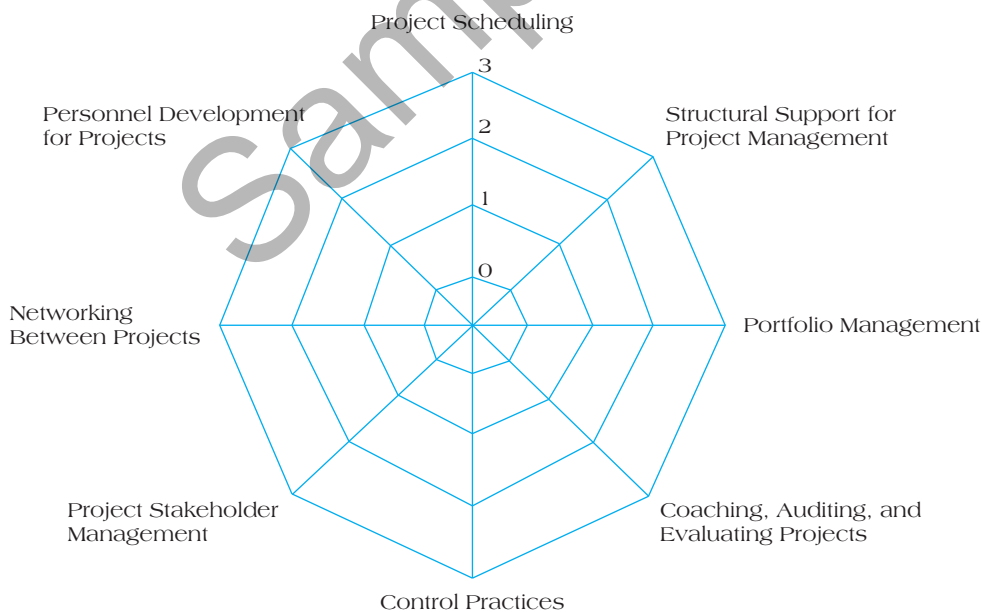


FIGURE 1.9 Spider Web Diagram for Measuring Project Maturity

Source: R. Gareis. (2001). “Competencies in the Project-Oriented Organization,” in D. Slevin, D. Cleland, and J. Pinto, *The Frontiers of Project Management Research*. Newtown Square, PA: Project Management Institute, pp. 213–24, figure on p. 216. Copyright and all rights reserved. Material from this publication has been reproduced with the permission of PMI.

If we accept the fact that the development of better project management practices is an evolutionary process, involving not a sudden leap to top performance but rather a systematic commitment to continuous improvement, maturity models offer the template for defining and then achieving such progressive improvement.³³ As a result, most effective project maturity models chart a set of standards that are currently accepted as state-of-the-art as well as a process for achieving significant movement toward these benchmarks. Figure 1.9 illustrates one approach to defining current project management practices a firm is using.³⁴ It employs a “spider web” methodology in which a set of significant project management practices have first been identified for organizations within a specific industry. In this example, a firm may identify eight components of project management practice that are key for success, based on an analysis of the firm’s own needs as well as through benchmarking against competing firms in the industry. Note that each of the rings in the diagram represents a critical evaluation of the manner in which the organization matches up with industry standards. Suppose we assigned the following meanings to the different ratings:

Ring Level	Meaning
0	Not defined or poor
1	Defined but substandard
2	Standardized
3	Industry leader or cutting edge

Following this example, we may decide that in terms of project team personnel development or project control systems our practices are poor relative to other competitors, and rate those skills as 0. On the other hand, perhaps our scheduling processes are top-notch, enabling us to rate them as a 3. Figure 1.10 shows an example of the same spider web diagram with our relative skill levels assigned across the eight key elements of project management which we have defined. This exercise helps us to form the basis for where we currently are in terms of project management sophistication, a key stage in any maturity model in which we seek to move to a higher level.

Once we have established a sense of our present project management abilities, as well as our shortcomings, the next step in the maturity model process is to begin charting a step-by-step, incremental path to our desired goal. Table 1.3 highlights some of the more common project maturity

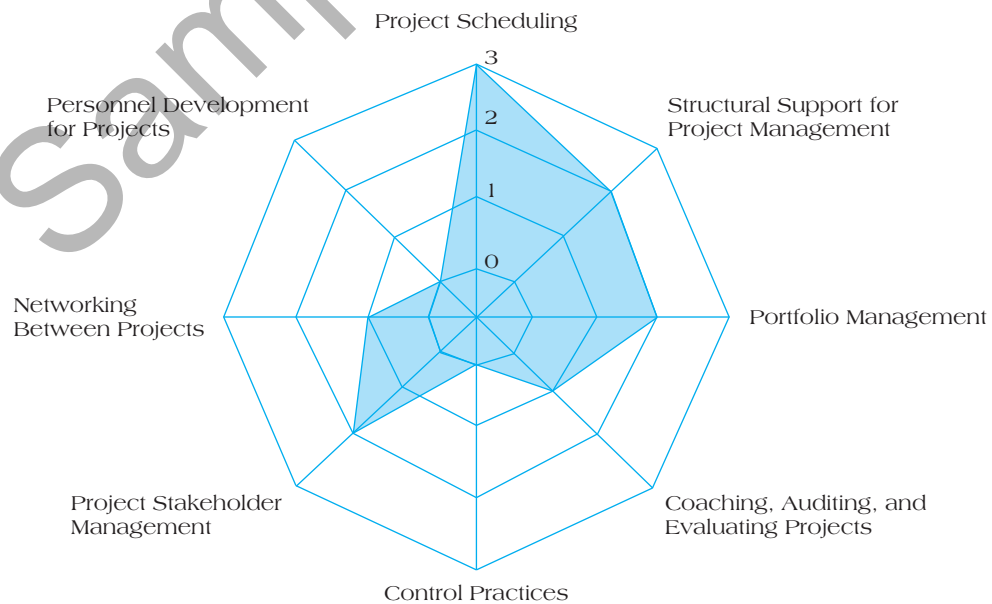


FIGURE 1.10 Spider Web Diagram with Embedded Organizational Evaluation

Source: R. Gareis. (2001). “Competencies in the Project-Oriented Organization,” in D. Slevin, D. Cleland, and J. Pinto, *The Frontiers of Project Management Research*. Newtown Square, PA: Project Management Institute, pp. 213–24, figure on p. 216. Copyright and all rights reserved. Material from this publication has been reproduced with the permission of PMI.