

Chapter 1. Introduction to Project Management

Learning Objectives

Introduction

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

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

- Worldwide IT spending was \$3.5 trillion in 2017, a 2.4 percent increase from 2016 spending. Communications services accounted for 40 percent of the spending.*
- The Project Management Institute reported that the number of project-related jobs reached almost 66 million in 2017, and demand continues to increase. “By 2027, employers will need 87.7 million individuals working in project management-oriented roles.”*
- The unemployment rate for IT professionals is generally half the rate of the overall labor market in the United States. The U.S. Bureau of Labor Statistics estimates the rate to be only 2 percent, and project management is one of the ten hottest tech skills.*
- In 2017, the average annual salary (without bonuses) for someone in the project

management profession was \$112,00 per year in the United States and \$130,866 in Switzerland, the highest-paid country. Salaries of survey respondents across 37 countries were 23 percent higher for those with the Project Management Professional (PMP®) credential than those without it.*

- The top skills employers look for in new college graduates are all related to project management: team work, decision making, problem-solving, and verbal communications.*
- Organizations waste \$97 million for every \$1 billion spent on projects, according to PMI's Pulse of the Profession® report. Excelling at project management definitely affects the bottom line.*

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

What Went Wrong?

In 1995, the Standish Group published an often-quoted study titled "The CHAOS Report." This consulting firm surveyed 365 IT executive managers in the United States who managed more than 8,380 IT application projects. As the title of the study suggests, the projects were in a state of chaos. U.S. companies spent more than \$250 billion each year in the early 1990s on approximately 175,000 IT application development projects. Examples of these projects included creating a new database for a state department of motor vehicles, developing a new system for car rental and hotel reservations, and implementing a client-server architecture for the banking industry. The study reported that the overall success rate of IT projects was *only* 16.2 percent. The surveyors defined success as meeting project goals on time and on budget. The study also found that more than 31 percent of IT projects were canceled before completion, costing U.S. companies and government agencies more than \$81 billion. The study authors were adamant about the need for better project management in the IT industry. They explained, "Software development projects are in chaos, and we can no longer imitate the three monkeys—hear no failures, see no failures, speak no failures."* Although this study was done 20 years ago, it was significant in making senior executives pay attention to the importance

of IT project management.

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

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

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

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

What Is a Project?

To discuss project management, it is important to understand the concept of a project. A **project** is “a temporary endeavor undertaken to create a unique product, service, or result.”* Operations, on the other hand, is work done in organizations to sustain the business. It

focuses on the ongoing production of goods and services. Projects are different from operations in that they end when their objectives have been reached or the project has been terminated. It is important to note that people focusing on operations and projects must work together for a smooth transition. For example, in software development, [DevOps](#) is a fairly new term used to describe a culture of collaboration between software development and operations teams to build, test, and release reliable software more quickly.

Examples of IT Projects

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

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

enterprise resource management approach.

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

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

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

Media Snapshot

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

As of March 2017, Android users could download 2.8 million different apps, and Apple users could download 2.2 million. “In 2016, the global mobile internet user penetration has exceeded half the world’s population, while the average daily time spent accessing online content from a mobile device, such as a smartphone, a tablet computer or

wearable, has reached 185 minutes daily among Millennials, 110 minutes for Generation X and 43 daily minutes for Boomers.”*

Project Attributes

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

- *A project has a unique purpose.* Every project should have a well-defined objective. For example, Anne Roberts, the director of the Project Management Office in the chapter’s opening case, might sponsor an IT collaboration project to develop a list and initial analysis of potential IT projects that might improve operations for the company. The unique purpose of this project would be to create a collaborative report with ideas from people throughout the company. The results would provide the basis for further discussions and selecting projects to implement. As you can see from this example, projects result in a unique product, service, or result.
- *A project is temporary.* A project has a definite beginning and end. In the IT collaboration project, Anne might form a team of people to work immediately on the project, and then expect a report and an executive presentation of the results in one month.
- *A project drives change and enables value creation.* A project is initiated to bring about a change in order to meet a need or desire. Its purpose is to achieve a specific objective which changes the context (a living situation, in this house project example) from a current state to a more desired or valued future state.
- *A project is developed using progressive elaboration.* Projects are often defined broadly when they begin, and as time passes, the specific details of the project become clearer. Therefore, projects should be developed in increments. A project team should develop initial plans and then update them with more detail based on new information.
- *A project requires resources, often from various areas.* Resources include people, hardware, software, and other assets. Many projects cross departmental or other boundaries to achieve their unique purposes. For the IT collaboration project, people from IT, marketing, sales, distribution, and other areas of the company would need to work together to develop ideas.
- *A project should have a primary customer or sponsor.* Most projects have many interested parties or stakeholders, but for a project to succeed someone must take the primary role of sponsorship. The [project sponsor](#) usually provides the direction and funding for the project. Executive support is crucial to project success, as described in later chapters.

Anne Roberts would be the sponsor for the IT collaboration project.

- *A project involves uncertainty.* Because every project is unique, it is sometimes difficult to define its objectives clearly, estimate how long it will take to complete, or determine how much it will cost. External factors also cause uncertainty, such as a supplier going out of business or a project team member needing unplanned time off. This uncertainty is one of the main reasons project management is so challenging, especially on projects involving new technologies.

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

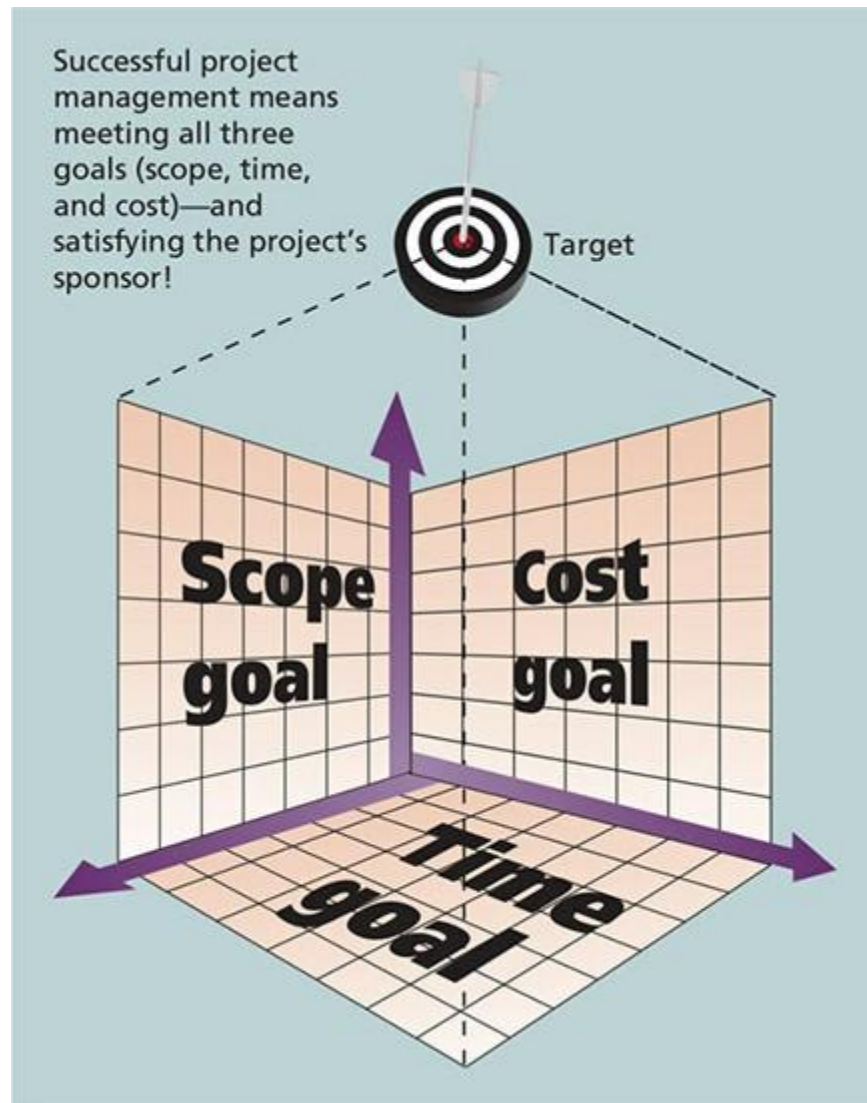
Project Constraints

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

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

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

Figure 1-1. Project constraints



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

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

To generate project ideas for the IT collaboration project, suppose that the project manager sent an e-mail survey to all employees, as planned. The initial time and cost estimate may have been one week and \$5,000 to collect ideas using this e-mail survey. Now, suppose that the e-mail survey generated only a few good project ideas, but the scope goal was to collect at least 30 good ideas. Should the project team use a different method like focus groups or interviews to collect ideas? Even though it was not in the initial scope, time, or cost estimates, it would really help the project. Because good ideas are crucial to project success, it would make sense to inform the project sponsor that adjustments are needed.

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

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

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

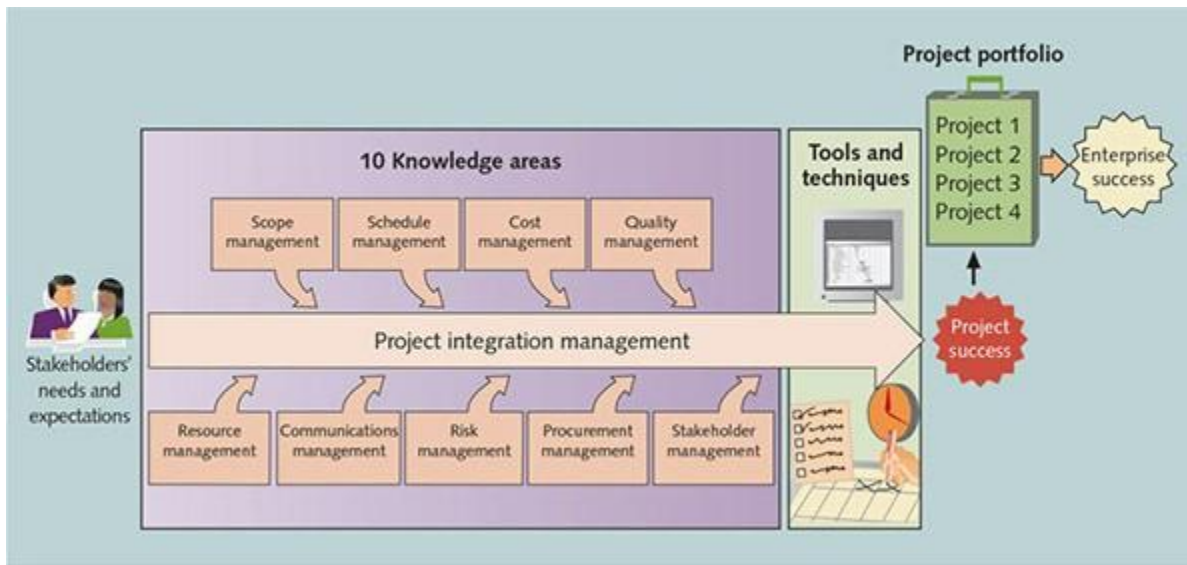
What Is Project Management?

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

Figure 1-2 illustrates a framework to help you understand project management. Key elements of this framework include the project stakeholders, project management knowledge

areas, project management tools and techniques, and the contribution of successful projects to the enterprise.

Figure 1-2. Project management framework



Project Stakeholders

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

- The project sponsors would be the potential new homeowners who would be paying for the house. They could be on a very tight budget, so would expect the contractor to provide a realistic idea of what type of home they could afford given their budget constraints. They would also need a realistic idea of when they could move in. Regardless of budget, they would expect the contractor to provide accurate estimates for the building costs. The new homeowners would have to make important decisions to keep the costs of the house within their budget. Can they afford to finish the basement right away? If they can afford to finish the basement, will it affect the projected move-in date? In this example, the project sponsors are also the customers and users of the product, which is the house.
- The house may require financing by a bank or other financial institution like a credit union, which will secure a legal interest (lien) in the property and the finished home. This institution is an example of a legal stakeholder who must be informed of any changes to the plans or schedule because the project is part of a legal contract.

- The project manager in this example would normally be the general contractor responsible for building the house. The project manager needs to work with all the project stakeholders to meet their needs and expectations.
- The project team for building the house would include several construction workers, electricians, and carpenters. These stakeholders would need to know exactly what work they must do and when they need to do it. They would need to know if the required materials and equipment will be at the construction site or if they are expected to provide the materials and equipment. Their work would need to be coordinated because many interrelated factors are involved. For example, the carpenter cannot put in kitchen cabinets until the walls are completed.
- Support staff might include the buyers' employers, the general contractor's administrative assistant, and people who support other stakeholders. The buyers' employers might expect their employees to complete their work but allow some flexibility so they can visit the building site or take phone calls related to building the house. The contractor's administrative assistant would support the project by coordinating meetings between the buyers, the contractor, suppliers, and other parties.
- Building a house requires many suppliers. The suppliers would provide the wood, windows, flooring, appliances, and other materials. Suppliers would expect exact details on the items they need to provide, and where and when to deliver those items.
- A project might have opponents. In this example, a neighbor might oppose the project because the workers make so much noise that she cannot concentrate on her work at home, or the noise might wake her sleeping children. She might interrupt the workers to voice her complaints or even file a formal complaint. Or, the neighborhood might have association rules concerning new home design and construction. If the homeowners do not follow these rules, they might have to halt construction due to legal issues. Even without such complaints, the home must comply with certain building codes and other restrictions; these considerations may also result in changes to the project's requirements, making the local government a stakeholder in the project.

As you can see from this example, projects have many different stakeholders, and they often have different interests. Stakeholders' needs and expectations are important in the beginning and throughout the life of a project. Successful project managers develop good relationships with project stakeholders to understand and meet their needs and expectations.

Project Management Knowledge Areas

[Project management knowledge areas](#) describe the key competencies that project

managers must develop. The center of Figure 1-2 shows the 10 knowledge areas of project management.

1. Project scope management involves defining and managing all the work required to complete the project successfully.
2. Project schedule management (formerly called project time management) includes estimating how long it will take to complete the work, developing an acceptable project schedule, and ensuring timely completion of the project.
3. Project cost management consists of preparing and managing the budget for the project.
4. Project quality management ensures that the project will satisfy the stated or implied needs for which it was undertaken.
5. Project resource management is concerned with making effective use of the people and physical resources involved with the project.
6. Project communications management involves generating, collecting, disseminating, and storing project information.
7. Project risk management includes identifying, analyzing, and responding to risks related to the project.
8. Project procurement management involves acquiring or procuring goods and services for a project from outside the performing organization.
9. Project stakeholder management includes identifying and analyzing stakeholder needs while managing and controlling their engagement throughout the life of the project.
10. Project integration management is an overarching function that affects and is affected by all of the other knowledge areas.

Project managers must have knowledge and skills in all 10 of these areas. This text includes an entire chapter on each of these knowledge areas because all of them are crucial to project success.

Project Management Tools and Techniques

Thomas Carlyle, a famous historian and author, stated, “Man is a tool-using animal. Without tools he is nothing, with tools he is all.” As the world continues to become more complex, it is even more important for people to develop and use tools, especially for managing important

projects. [Project management tools and techniques](#) assist project managers and their teams in carrying out work in all 10 knowledge areas. For example, some popular time-management tools and techniques include Gantt charts, project network diagrams, and critical path analysis. Table 1-1 lists some commonly used tools and techniques by knowledge area. You will learn more about these and other tools and techniques throughout this text.

Table 1-1. **Common project management tools and techniques by knowledge area**

| Knowledge Area/Category | Tools and Techniques | Super Tools |
|-------------------------------|-----------------------------------|-----------------------------|
| <i>Integration management</i> | Project selection methods | Project management software |
| | Project management methodologies | Change requests |
| | Stakeholder analyses | Lessons-learned reports |
| | Work requests | |
| | Project charters | |
| | Project management plans | |
| | Change control boards | |
| | Project review meetings | |
| <i>Scope management</i> | Statements of work | Scope statements |
| | Scope management plans | Work breakdown structures |
| | Scope verification techniques | Requirements analyses |
| | Scope change controls | |
| <i>Schedule management</i> | Project network diagrams | Gantt charts |
| | Critical path analysis | |
| | Crashing | |
| | Fast tracking | |
| | Schedule performance measurements | |
| <i>Cost management</i> | Project budgets | |
| | Net present value | |
| | Return on investment | |
| | Payback analysis | |

| | | |
|--|------------------------------|--|
| | Earned value management | |
| | Project portfolio management | |
| | Cost estimates | |
| | Cost management plans | |
| | Cost baselines | |

Quality management

| | | |
|--|------------------------|--|
| | Quality metrics | |
| | Checklists | |
| | Quality control charts | |
| | Pareto diagrams | |
| | Fishbone diagrams | |
| | Maturity models | |
| | Statistical methods | |
| | Test plans | |

Resource management

| | | |
|--|------------------------------------|--|
| | Motivation techniques | |
| | Empathic listening | |
| | Responsibility assignment matrices | |
| | Project organizational charts | |
| | Resource histograms | |
| | Team building exercises | |

Communications management

| | | |
|--|---------------------------------|-------------------|
| | Communications management plans | Kick-off meetings |
| | Conflict management | Progress reports |
| | Communications media selection | |
| | Status reports | |
| | Virtual communications | |
| | Templates | |
| | Project websites | |

Risk management

| | | |
|--|-----------------------------|--|
| | Risk management plans | |
| | Risk registers | |
| | Probability/impact matrices | |

Procurement management

Make-or-buy analyses

Contracts

Requests for proposals or quotes

Source selections

Supplier evaluation matrices

A survey of 753 project and program managers was conducted to rate several project management tools. Respondents rated tools on a scale of 1–5 (low to high) based on the extent of their use and the potential of the tools to help improve project success. “Super tools” were defined as those that had high use and high potential for improving project success. These super tools included software for task scheduling (such as project management software), scope statements, requirement analyses, and lessons-learned reports. Tools that are already used extensively and have been found to improve project performance include progress reports, kick-off meetings, Gantt charts, and change requests.

These super tools appear in column 3 of **Table 1-1**.^{*} Note that project stakeholder management was not a separate knowledge area at the time of this survey.

The *PMBOK® Guide – Sixth Edition* now lists tools and techniques based on their purpose, as follows:

- *Data gathering*: benchmarking, brainstorming, check sheets, checklists, focus groups, interviews, market research, questionnaires and surveys, and statistical sampling
- *Data analysis*: alternatives analysis, assessment of other risk parameters, assumption and constraint analysis, cost of quality, cost-benefit analysis, decision tree analysis, document analysis, earned value analysis, and several other tools fit in this category
- *Data representation*: affinity diagrams, cause-and-effect diagrams, control charts, flow charts, hierarchical charts, histograms, logical data models, matrix diagrams, matrix-based charts, mind mapping, probability and impact matrix, scatter diagrams, stakeholder engagement assessment matrix, stakeholder mapping/representation, and text-oriented formats
- *Decision making*: multi-criteria decision analysis and voting

- *Communication*: feedback and presentations

- *Interpersonal and team skills*: active listening, communication styles assessment, conflict management, cultural awareness, decision making, emotional intelligence, facilitation, influencing, leadership, meeting management, motivation, negotiation, networking, nominal group, observation/conversation, political awareness, team building
- *Ungrouped*: several other tools fit in this category

These long lists of tools and techniques can be overwhelming. This text will focus on those used most often and with the most potential, providing the context and detailed examples for using them. It is crucial for project managers and their team members to determine which tools will be most useful for their particular projects. Selecting the appropriate tools and techniques (as well the processes, inputs, outputs, and life cycle phases, discussed later in this book) is part of project tailoring. Project management should be tailored to meet the unique needs of projects, organizations, and most importantly, people. After all, projects are done by, and for, people.

Despite its advantages, project management is not a silver bullet that guarantees success on all projects. Some projects, such as those involving new technologies, have a higher degree of uncertainty, so it is more difficult to meet their scope, schedule, and cost goals. Project management is a very broad, often complex discipline. What works on one project may not work on another, so it is essential for project managers to continue to develop their knowledge and skills in managing projects. It is also important to learn from the mistakes and successes of past projects.

What Went Right?

Follow-up studies by the Standish Group (see the previously quoted “CHAOS” study in the What Went Wrong? passage) showed improvement in the statistics for IT projects:

- The number of successful projects (those completed on time, on budget with a satisfactory result) was 29 percent in 2015 based on a sample of over 50,000 software development projects worldwide. The number of failed projects (those canceled or not used after implementation) was 19 percent. That leaves 52 percent of projects as challenged (over budget, late, and/or poorly implemented). These numbers include projects of all sizes and methodologies.
- The 2015 CHAOS study also summarized the success rates of projects by size, showing that 62 percent of small projects were successful from 2011 to 2015 compared to only 2 percent of grand, 6 percent of large, 9 percent of medium, and 21 percent of moderate size projects. Small projects are obviously easier to complete successfully.

- Agile approaches were also measured across all project sizes from 2011 to 2015, showing that 39 percent of all agile projects were successful compared to 11 percent of waterfall projects. For small projects, 58 percent of agile projects were successful compared to 44 percent of waterfall projects. About 10,000 projects were included for these statistics.*

According to the PMI research, across all industries, the average percentage of projects that are deemed failures is 14 percent; the average for IT projects deemed failures in 2016 also is 14 percent.*

Project Success

How do you define the success or failure of a project? The list that follows outlines a few common criteria for measuring the success of a project, illustrating each with an example of upgrading 500 desktop computers within three months for \$300,000:

1. *The project met scope, time, and cost goals.* If all 500 computers were upgraded and met other scope requirements, the work was completed in three months or less, and the cost was \$300,000 or less, you could consider the project successful. The Standish Group studies used this definition of success, but several people question this simple definition of project success and the methods used for collecting the data. (Search for articles by Robert L. Glass to read more about this debate.)
2. *The project satisfied the customer/sponsor.* Even if the project met initial scope, time, and cost goals, the users of the computers or their managers might not be satisfied. Perhaps the project manager or team members never returned calls or were rude. Perhaps users had their daily work disrupted during the upgrades or had to work extra hours due to the upgrades. If the customers were not happy with important aspects of the project, it would be deemed a failure. Conversely, a project might not meet initial scope, time, and cost goals, but the customer could still be very satisfied. Perhaps the project team took longer and spent more money than planned, but they were very polite and helped the users and managers solve several work-related problems. Many organizations implement a customer satisfaction rating system to measure project success instead of tracking only scope, time, and cost performance.
3. *The results of the project met its main objective, such as making or saving a certain amount of money, providing a good return on investment, or simply making the sponsors happy.* Even if the project cost more than estimated, it took longer to complete, and the project team was hard to work with, the project would be successful if users were happy with the

upgraded computers, based on this criterion. As another example, suppose that the sponsor approved the upgrade project to provide a good return on investment by speeding up work and therefore generating more profits. If those goals were met, the sponsor would deem the project a success, regardless of other factors involved.

Why do some IT projects succeed and others fail? **Table 1-2** summarizes the results of the 2015 CHAOS study. The factors that contribute most to the success of IT projects are listed in order of importance. Executive sponsorship is the most important factor, followed by emotional maturity of the organization. A few of the top success factors relate to good scope management, such as having clear business objectives and optimization. Project management expertise continues to be a key success factor. In fact, experienced project managers, who can often help influence all of these factors to improve the probability of project success, led 97 percent of successful projects, based on an earlier CHAOS study.

Table 1-2. **What helps projects succeed?**

| Factors of Success | Points |
|------------------------------|--------|
| Executive sponsorship | 15 |
| Emotional maturity | 15 |
| User involvement | 15 |
| Optimization | 15 |
| Skilled resources | 10 |
| Agile process | 7 |
| Modest execution | 6 |
| Project management expertise | 5 |
| Clear business objectives | 4 |

Source: The Standish Group, “CHAOS Manifesto 2015” (2015).

A U.S. government report listed the top three reasons why federal technology projects succeed:

1. Adequate funding
2. Staff expertise
3. Engagement from all stakeholders

Notice that the CHAOS study list does not include adequate funding. Most nongovernment companies must either find adequate funds for important projects or cancel projects if they

cannot be funded or get an adequate return. Government projects often require that funds be allocated a year or more before they even start, and estimates often fall short. “The government has struggled when acquiring technology thanks to the convoluted nature of the federal contracting process and the shortage of qualified contracting officers and technical personnel. Critics argue that federal agencies get little return for the \$80 billion the government spends annually on IT.....‘History has shown that government IT projects frequently face challenges of meeting cost, schedule or performance goals,’ said Sen. Susan Collins (R-Maine) in a statement.”*

It is interesting to compare success factors for IT projects in the United States with those in other countries. A survey of 247 information systems project practitioners in mainland found that relationship management is viewed as a top success factor for information systems in China, while it is not mentioned in U.S. studies. The study also suggested that having competent team members is less important in China than in the United States. The Chinese, like the Americans, included top management support, user involvement, and a competent project manager as vital to project success.*

It is also important to look beyond individual project success rates and focus on how organizations as a whole can improve project performance. Research comparing companies that excel in project delivery—the “winners”—with those that do not found four significant best practices:

1. *Use an integrated toolbox.* Companies that consistently succeed in managing projects clearly define what needs to be done in a project, by whom, when, and how. They use an integrated toolbox, including project management tools, methods, and techniques. They carefully select tools, align them with project and business goals, link them to metrics, and provide them to project managers to deliver positive results.
2. *Grow project leaders.* The winners know that strong project managers—referred to as project leaders—are crucial to project success. They also know that a good project leader needs to be a business leader as well, with strong interpersonal and intrapersonal skills. Companies that excel in project management often grow or develop their project leaders internally, providing them with career opportunities, training, and mentoring.
3. *Develop a streamlined project delivery process.* Winning companies have examined every step in the project delivery process, analyzed fluctuations in workloads, searched for ways to reduce variation, and eliminated bottlenecks to create a repeatable delivery process. All projects go through clear stages and clearly define key milestones. All project leaders use a shared road map, focusing on key business aspects of their projects while integrating goals across all parts of the organization.

4. *Measure project health using metrics.* Companies that excel in project delivery use performance metrics to quantify progress. They focus on a handful of important measurements and apply them to all projects. Metrics often include customer satisfaction, return on investment, and percentage of schedule buffer consumed.*

Project managers play an important role in making projects, and therefore organizations, successful. Project managers work with the project sponsors, the project team, and other stakeholders to meet project goals. They also work with sponsors to define success for particular projects. Good project managers do not assume that their definition of success is the same as the sponsors'. They take the time to understand their sponsors' expectations and then track project performance based on important success criteria.

Program and Project Portfolio Management

About one-quarter of the world's gross domestic product is spent on projects. Projects make up a significant portion of work in most business organizations or enterprises, and managing those projects successfully is crucial to enterprise success. Two important concepts that help projects meet enterprise goals are the use of programs and project portfolio management.

Programs

A **program** is "a group of related projects, subsidiary programs, and program activities managed in a coordinated manner to obtain benefits and control not available from managing them individually."* As you can imagine, it is often more economical to group projects together to help streamline management, staffing, purchasing, and other work. Programs are not large projects; a **megaproject** is a very large project that typically costs over US\$1 billion, affects over one million people, and lasts several years. For examples, the Panama Canal Expansion Project was a megaproject that took 11 years and \$5.25 billion to complete. The following are examples of common programs in the IT field.

- *Infrastructure:* An IT department often has a program for IT infrastructure projects. This program could encompass several projects, such as providing more wireless Internet access, upgrading hardware and software, enhancing computer security, and developing and maintaining corporate standards for IT.
- *Applications development:* This program could include several projects, such as updating an enterprise resource planning (ERP) system, purchasing a new off-the-shelf billing system, or developing a new capability for a customer relationship management system.
- *User support:* In addition to the many operational tasks related to user support, many IT departments have several projects to support users. For example, a project might

provide a better e-mail system or develop technical training for users.

A [program manager](#) provides leadership and direction for the project managers heading the projects within a program. Program managers also coordinate the efforts of project teams, functional groups, suppliers, and operations staff supporting the projects to ensure that products and processes are implemented to maximize benefits. Program managers are responsible for more than the delivery of project results; they are change agents responsible for the success of products and processes developed by those projects. For example, the NASA International Space Station Program is led by a program manager who oversees all U.S. projects involved with the station and is accountable for achieving their objectives, funding, and contribution to scientific knowledge.

Program managers often have review meetings with all their project managers to share important information and coordinate important aspects of each project. Many program managers worked as project managers earlier in their careers, and they enjoy sharing their wisdom and expertise with their project managers. Effective program managers recognize that managing a program is much more complex than managing a single project. They recognize that technical and project management skills are not enough—program managers must also possess strong business knowledge, leadership capabilities, and communication skills.

Project Portfolio Management

In many organizations, project managers also support an emerging business strategy of [project portfolio management](#) or [portfolio management](#), as called in this text, in which organizations group and manage projects and programs as a portfolio of investments that contribute to the entire enterprise's success. Portfolio managers help their organizations make wise investment decisions by helping to select and analyze projects from a strategic perspective. Portfolio managers may or may not have previous experience as project or program managers. It is most important that they have strong financial and analytical skills and understand how projects and programs can contribute to meeting strategic goals.

Figure 1-3 illustrates the differences between project management and project portfolio management. Notice that the main distinction is a focus on meeting tactical or strategic goals. Tactical goals are generally more specific and short term than strategic goals, which emphasize long-term goals for an organization. Individual projects often address tactical goals, whereas portfolio management addresses strategic goals. Project management addresses questions like “Are we carrying out projects well?”, “Are projects on time and on budget?”, and “Do project stakeholders know what they should be doing?”

Figure 1-3. Project management compared to project portfolio management



Portfolio management addresses questions like “Are we working on the right projects?”, “Are we investing in the right areas?”, and “Do we have the right resources to be competitive?” PMI defines a **portfolio** as “projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives.”*

Many organizations use a more disciplined approach to portfolio management by developing guidelines and software tools to assist in it. The Project Management Institute (described later in this chapter) first published the *Organizational Project Management Maturity Model (OPM3®) Knowledge Foundation* in 2003.* OPM3® describes the importance of not only managing individual projects or programs well but also following organizational project management to align projects, programs, and portfolios with strategic goals. OPM3® is a standard that organizations can use to measure their organizational project management maturity against a comprehensive set of best practices.

Best Practice

A **best practice** is “an optimal way recognized by industry to achieve a stated goal or objective.”* Rosabeth Moss Kanter, a professor at Harvard Business School and well-known author and consultant, says that visionary leaders know “the best practice secret: Stretching to learn from the best of the best in any sector can make a big vision more

likely to succeed.”* Kanter also emphasizes the need to have measurable standards for best practices. An organization can measure performance against its own past, against peers, and, even better, against potential. Kanter suggests that organizations need to continue to reach for higher standards. She suggests the following exercise regimen for business leaders who want to adapt best practices in an intelligent way to help their own organizations:

- Reach high. Stretch. Raise standards and aspirations. Find the best of the best and then use it as inspiration for reaching full potential.
- Help everyone in your organization become a professional. Empower people to manage themselves through benchmarks and standards based on best practice exchange.
- Look everywhere. Go far afield. Think of the whole world as your laboratory for learning.

Robert Butrick, author of *The Project Workout*, wrote an article on best practices in project management for the *Ultimate Business Library’s Best Practice* book. He suggests that organizations need to follow basic principles of project management, including these two mentioned earlier in this chapter:

- Make sure your projects are driven by your strategy. Be able to demonstrate how each project you undertake fits your business strategy, and screen out unwanted projects as soon as possible.
- Engage your stakeholders. Ignoring stakeholders often leads to project failure. Be sure to engage stakeholders at all stages of a project, and encourage teamwork and commitment at all times.*

Table 1-3 provides a comparative overview of project, program, and portfolio management. **Organizational project management** is a “framework in which portfolio, program, and project management are integrated with organizational enablers in order to achieve strategic objectives.”*

| | Projects | Programs | Portfolios |
|------------|--|--|---|
| Definition | A project is a temporary endeavor undertaken to create a unique product, | A program is a group of related projects, subsidiary programs, and program | A portfolio is a collection of projects, programs, subsidiary portfolios, and |

service, or result.

activities that are managed in a coordinated way to obtain benefits not available from managing them individually.

operations managed as a group to achieve strategic objectives.

| | | | |
|-------------------|---|---|---|
| Management | Project managers manage the project team to meet the project objectives. | Programs are managed by program managers who ensure that program benefits are delivered as expected, by coordinating the activities of a program's components. | Portfolio managers may manage or coordinate portfolio management staff, or program and project staff that may have reporting responsibilities into the aggregate portfolio. |
| Monitoring | Project managers monitor and control the work of producing the products, services, or results that the project was undertaken to produce. | Program managers monitor the progress of program components to ensure that the overall goals, schedules, budget, and benefits of the program are met. | Portfolio managers monitor strategic changes and aggregate resource allocation, performance results, and risk of the portfolio. |
| Success | Success is measured by product and project quality, timeliness, budget compliance, and degree of customer satisfaction. | A program's success is measured by the program's ability to deliver its intended benefits to an organization, and by the program's efficiency and effectiveness in delivering those benefits. | Success is measured in terms of the aggregate investment performance and benefit realization of the portfolio. |

Source: Project Management Institute, Inc., *A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Sixth Edition (2017)*.

Organizational Project Management

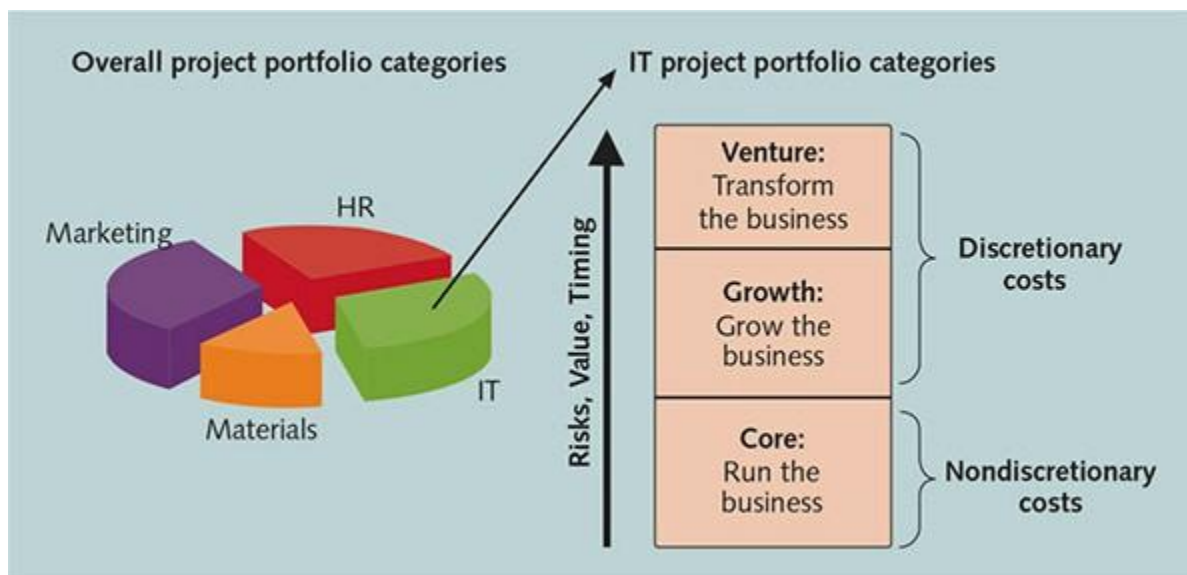
Organizations group projects into portfolios to help them make better investment decisions, such as increasing, decreasing, discontinuing, or changing specific projects or programs based on their financial performance, risks, resource utilization, and similar factors that affect business value. If a construction firm has much higher profit margins on apartment buildings than single-family homes, for example, it might choose to pursue more apartment building projects. The firm might also create a new project to investigate ways to increase profits for single-family home projects. On the other hand, if the company has too many projects focused on financial performance and not enough focused on improving its work force, the portfolio manager might suggest initiating more projects to support that strategic goal. Just like a personal financial portfolio, a business's portfolio should be diversified to account for risk.

By grouping projects into portfolios, organizations can better tie their projects to meeting strategic goals. Portfolio management can also help organizations do a better job of managing its human resources by hiring, training, and retaining workers to support the projects in the organization's portfolio. For example, if the construction firm needs more people with experience in building apartment buildings, they can make necessary adjustments by hiring or training current workers in the necessary skills.

As you can imagine, project portfolio management is not an easy task. **Figure 1-4** illustrates one approach for project portfolio management in which one large portfolio exists for the entire organization. This allows top management to view and manage all projects at an enterprise level. Sections of the portfolio are then broken down to improve the management of projects in each sector. For example, a company might have the main portfolio categories shown in the left part of Figure 1-4—marketing, materials, IT, and human resources (HR)—and divide each of those categories further to address its unique concerns. The right part of this figure shows how the IT projects could be categorized in more detail to assist in their management. In this example, there are three basic IT project portfolio categories:

- *Venture*: Projects in this category help transform the business. For example, the large retail chain described in the opening case might have an IT project to provide kiosks in stores and similar functionality on the Internet where customers and suppliers could quickly provide feedback on products or services. This project could help transform the business by developing closer partnerships with customers and suppliers.
- *Growth*: Projects in this category would help the company increase its revenues. For example, a company might have an IT project to provide information on its corporate website in a new language, such as Chinese or Japanese. This capability could help the company grow its business in those countries.
- *Core*: Projects in this category must be accomplished to run the business. For example, an IT project to provide computers for new employees would fall under this category.

Figure 1-4. Sample project portfolio approach



In **Figure 1-4**, the costs of Core IT projects are nondiscretionary, which means that the

company has no choice in whether to fund them. Core IT Projects must be funded for the company to stay in business. Projects in the Venture or Growth category are discretionary costs because the company can use its own discretion or judgment in deciding whether to fund them; these projects are not critical to the company fulfilling its mission. The arrow in the center of Figure 1-4 indicates that the risks and value of projects normally increase as you move from Core to Growth to Venture projects. In addition, timeliness becomes increasingly important; growth and venture projects, more than core projects, must be done within a certain time frame to be effective. However, some core projects can also be high risk, have high value, and require good timing. As you can see, many factors are involved in portfolio management.