

# INTRODUCTION TO PROJECT MANAGEMENT

## LEARNING OBJECTIVES

After reading this chapter, you will be able to:

- Understand the growing need for better project management, especially for information technology (IT) projects
- Explain what a project is, provide examples of IT projects, list various attributes of projects, and describe the triple constraint of project management
- Describe project management and discuss key elements of the project management framework, including project stakeholders, the project management knowledge areas, common tools and techniques, and project success
- Discuss the relationship between project, program, and portfolio management and the contributions each makes to enterprise success
- Understand the role of project managers by describing what they do, what skills they need, and career opportunities for IT project managers
- Describe the project management profession, including its history, the role of professional organizations like the Project Management Institute (PMI), the importance of certification and ethics, and the advancement of project management software

## OPENING CASE

Anne Roberts, the director of the Project Management Office for a large retail chain, stood in front of 500 people in the large corporate auditorium to explain the company's new strategies. She was also broadcasting to thousands of other employees, suppliers, and stockholders throughout the world using live video via the Internet. The company had come a long way in implementing new information systems to improve inventory control, sell products using the Web, streamline the sales and distribution processes, and improve customer service. However, the stock price was down, the nation's economy was weak, and people were anxious to hear about the company's new strategies.

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

"And if we fail?" someone asked from the audience.

"Let's just say that failure is not an option," Anne replied.

## INTRODUCTION

Many people and organizations today have a new—or renewed—interest in project management. Until the 1980s, project management primarily focused on providing schedule and resource data to top management in the military, computer, and construction industries. Today's project management involves much more, and people in every industry and every country manage projects. Project management is a distinct profession with degree programs, certifications, and excellent career opportunities. New technologies have become a significant factor in many businesses. Computer hardware, software, networks, and the use of interdisciplinary and global work teams have radically changed the work environment. The following statistics demonstrate the significance of project management in today's society, especially for projects involving information technology (IT). Note that IT projects involve using hardware, software, and networks to create a product, service, or result.

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

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

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

Today's companies, governments, and nonprofit organizations are recognizing that to be successful, they need to use modern project management techniques, especially for IT projects. Individuals are realizing that to remain competitive in the workplace, they must develop skills to become good project team members and project managers. They also realize that many of the concepts of project management will help them in their everyday lives as they work with people and technology on a day-to-day basis.

## WHAT WENT WRONG?

In 1995, the Standish Group published an often-quoted study titled "The CHAOS Report." This consulting firm surveyed 365 IT executive managers in the United States who managed more than 8,380 IT application projects. As the title of the study suggests, the projects were in a state of chaos. U.S. companies spent more than \$250 billion each year in the early 1990s on approximately 175,000 IT application development projects. Examples of these projects included creating a new database for a state department of motor vehicles, developing a new system for car rental and hotel reservations, and

*continued*

implementing a client-server architecture for the banking industry. The study reported that the overall success rate of IT projects was *only* 16.2 percent. The surveyors defined success as meeting project goals on time and on budget. The study also found that more than 31 percent of IT projects were canceled before completion, costing U.S. companies and government agencies more than \$81 billion. The study authors were adamant about the need for better project management in the IT industry. They explained, “Software development projects are in chaos, and we can no longer imitate the three monkeys—hear no failures, see no failures, speak no failures.”<sup>7</sup>

In a more recent study, PricewaterhouseCoopers surveyed 200 companies from 30 different countries about their project management maturity and found that *over half of all projects fail*. The study also found that only 2.5 percent of corporations consistently meet their targets for scope, time, and cost goals for all types of projects.<sup>8</sup>

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

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

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

## WHAT IS A PROJECT?

To discuss project management, it is important to understand the concept of a project. A **project** is “a temporary endeavor undertaken to create a unique product, service, or result.”<sup>9</sup> Operations, on the other hand, is work done in organizations to sustain the business. Projects are different from operations in that they end when their objectives have been reached or the project has been terminated.

### Examples of IT Projects

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

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

Gartner, Inc., a prestigious consulting firm, identified the top 10 strategic technologies for 2012. A few of these technologies include the following:

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

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



## MEDIA SNAPSHOT

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

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

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

For the iPad2, the top apps were as follows:

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

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

### Project Attributes

As you can see, projects come in all shapes and sizes. The following attributes help to define a project further:

- *A project has a unique purpose.* Every project should have a well-defined objective. For example, Anne Roberts, the director of the Project Management Office in the chapter's opening case, might sponsor an IT collaboration project to develop a list and initial analysis of potential IT projects that might improve operations for the company. The unique purpose of this project would be to create a collaborative report with ideas from people throughout the company. The results would provide the basis for further discussions and projects. As you can see from this example, projects result in a unique product, service, or result.
- *A project is temporary.* A project has a definite beginning and end. In the IT collaboration project, Anne might form a team of people to work immediately on the project, and then expect a report and an executive presentation of the results in one month.
- *A project is developed using progressive elaboration.* Projects are often defined broadly when they begin, and as time passes, the specific details of the project become clearer. Therefore, projects should be developed in increments. A project team should develop initial plans and then update them with more detail based on new information. For example, suppose that a

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

- *A project requires resources, often from various areas.* Resources include people, hardware, software, and other assets. Many projects cross departmental or other boundaries to achieve their unique purposes. For the IT collaboration project, people from IT, marketing, sales, distribution, and other areas of the company would need to work together to develop ideas. The company might also hire outside consultants to provide input. Once the project team has selected key projects for implementation, they will probably require additional resources. To meet new project objectives, people from other companies—product suppliers and consulting companies—may be added. Resources, however, are limited and must be used effectively to meet project and other corporate goals.
- *A project should have a primary customer or sponsor.* Most projects have many interested parties or stakeholders, but someone must take the primary role of sponsorship. The **project sponsor** usually provides the direction and funding for the project. In this case, Anne Roberts would be the sponsor for the IT collaboration project. Once further IT projects are selected, however, the sponsors for those projects would be senior managers in charge of the main parts of the company affected by the projects. For example, a vice president of sales who initiates a project to improve direct product sales using the Internet might be the project sponsor. In this situation, Anne might become part of a project steering committee, helping other managers understand different project objectives, resolve priorities, research issues, or alter constraints within a given project or across multiple projects.
- *A project involves uncertainty.* Because every project is unique, it is sometimes difficult to define its objectives clearly, estimate how long it will take to complete, or determine how much it will cost. External factors also cause uncertainty, such as a supplier going out of business or a project team member needing unplanned time off. This uncertainty is one of the main reasons project management is so challenging, especially on projects involving new technologies.

An effective **project manager** is crucial to a project's success. Project managers work with the project sponsors, the project team, and the other people involved to meet project goals.

## Project Constraints

Every project is constrained in different ways, often by its scope, time, and cost goals.

These limitations are sometimes referred to in project management as the **triple constraint**. To create a successful project, a project manager must consider scope, time, and cost and balance these three often-competing goals:

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

- *Cost*: What should it cost to complete the project? What is the project's budget? How will costs be tracked? Who can authorize changes to the budget?

Figure 1-1 illustrates the three dimensions of the triple constraint. Each area—scope, time, and cost—has a target at the beginning of the project. For example, the IT collaboration project might have an initial scope of producing a 40- to 50-page report and a one-hour presentation on about 30 potential IT projects. The project manager might further define project scope to include providing a description of each potential project, an investigation of what other companies have implemented for similar projects, a rough time and cost estimate, and assessments of the risk and potential payoff as high, medium, or low. The initial time estimate for this project might be one month, and the cost estimate might be \$45,000–\$50,000. These expectations provide the targets for the scope, time, and cost dimensions of the project. Note that the scope and cost goals in this example include ranges—the report can be between 40 to 50 pages long and the project can cost between \$45,000 and \$50,000. Because projects involve uncertainty and limited resources, projects rarely finish according to their original scope, time, and cost goals. Instead of discrete target goals, it is often more realistic to set a range of goals, such as spending between \$45,000 and \$50,000 and having a 40- to 50-page report. These goals might mean hitting the target, but not the bull's eye.



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**FIGURE 1-1** Project constraints



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

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

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

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

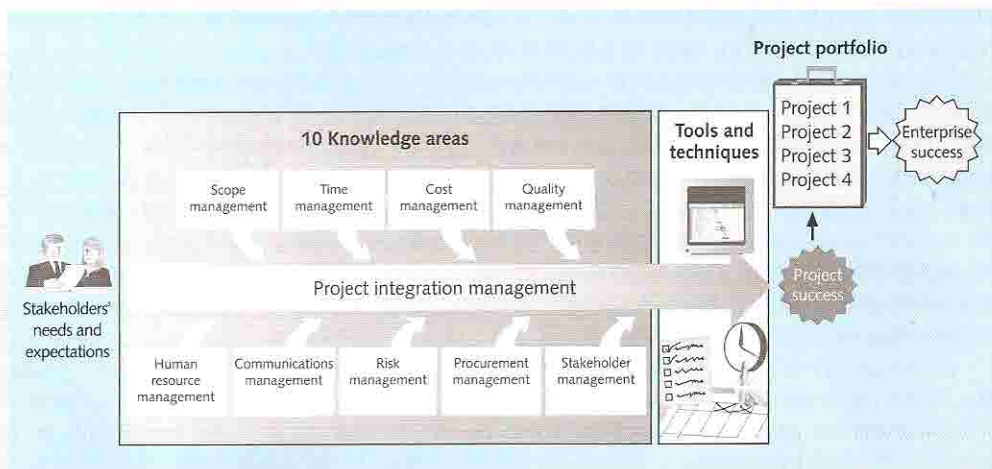
How can you avoid the problems that occur when you meet scope, time, and cost goals, but lose sight of customer satisfaction? The answer is *good project management, which includes more than managing project constraints*.

## WHAT IS PROJECT MANAGEMENT?

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**Project management** is “the application of knowledge, skills, tools, and techniques to project activities to meet project requirements.”<sup>13</sup> Project managers must strive not only to meet specific scope, time, cost, and quality goals of projects, they must also facilitate the entire process to meet the needs and expectations of people involved in project activities or affected by them.

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.



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**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. For example, building a new house is a well-known example of a project. There are several stakeholders in a home construction project.

- The project sponsors would be the potential new homeowners. They would be the people paying for the house and they could be on a very tight budget, so they would expect the contractor to provide accurate estimates for the costs of building the house. They would also need a realistic idea of when they could move in and what type of home they could afford given their budget constraints. 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 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 human resource management is concerned with making effective use of the people 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.

A 2006 survey of 753 project and program managers was conducted to rate several project management tools. Respondents were asked to rate 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 are bolded in Table 1-1.<sup>14</sup> Note that project stakeholder management was not a separate knowledge area at the time of this survey. Of course, different tools can be more effective in different situations. It is crucial for project managers and their team members to determine which tools will be most useful for their particular projects.

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

Knowledge Area/Category	Tools and Techniques
Integration management	Project selection methods, project management methodologies, stakeholder analyses, work requests, project charters, project management plans, <b>project management software</b> , <b>change requests</b> , change control boards, project review meetings, <b>lessons-learned reports</b>
Scope management	<b>Scope statements</b> , <b>work breakdown structures</b> , statements of work, <b>requirements analyses</b> , scope management plans, scope verification techniques, scope change controls
Time management	<b>Gantt charts</b> , project network diagrams, critical path analysis, crashing, fast tracking, schedule performance measurements
Cost management	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
Human resource management	Motivation techniques, empathic listening, responsibility assignment matrices, project organizational charts, resource histograms, team building exercises
Communications management	Communications management plans, <b>kick-off meetings</b> , conflict management, communications media selection, status and <b>progress reports</b> , virtual communications, templates, project Web sites
Risk management	Risk management plans, risk registers, probability/impact matrices, risk rankings
Procurement management	Make-or-buy analyses, contracts, requests for proposals or quotes, source selections, supplier evaluation matrices

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## ✓ WHAT WENT RIGHT?

Follow-up studies by the Standish Group (see the previously quoted CHAOS study in the What Went Wrong? feature) showed some improvement in the statistics for IT projects in the past decade:

- The number of successful IT projects more than doubled, from 16 percent in 1994 to 37 percent in 2010.
- The number of failed projects decreased from 31 percent in 1994 to 21 percent in 2010.
- “This year’s results represent the highest success rate in the history of the CHAOS Research,” said Jim Johnson, chairman of the Standish Group. “We clearly are entering a new understanding of why projects succeed or fail.”<sup>15</sup>

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