Chapter 1

Building the Foundation

THE PMP® EXAM CONTENT FROM THE PEOPLE DOMAIN COVERED IN THIS CHAPTER INCLUDES THE FOLLOWING:

✓ **Task 1.2: Lead a team**

- Task 1.2.1 Set a clear vision and mission

✓ **Task 1.9 Collaborate with stakeholders**

- 1.9.2 Optimize alignment between stakeholder needs, expectations, and project objectives

THE PMP® EXAM CONTENT FROM THE PROCESS DOMAIN COVERED IN THIS CHAPTER INCLUDES THE FOLLOWING:

✓ **Task 2.2: Manage communications**

- 2.2.3 Communicate project information and updates effectively

✓ **Task 2.13: Determine appropriate project methodology/ methods and practices**

- 2.13.4 Recommend a project methodology/approach

Congratulations on your decision to study for and take the Project Management Institute (PMI®) Project Management Professional (PMP)® certification exam (PMP® exam). This book was written with you in mind. The focus and content of this book revolve around the principles of sound project management as outlined in the three domains contained in the *Project Management Professional (PMP)® Examination Content Outline* published in June 2019. The three domains include People, Process, and Business Environment. I will cover each of these domains in depth in this book.

PMI® has also published a body of work called *A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition*. This guide covers the process aspects of project management and I will refer to this information during the course of this book. Keep in mind that the PMP® exam is primarily principle focused, rather than process focused, but all topics are potential exam questions, so don't skip anything in your study time. When possible, I'll pass on hints and study tips that I collected while studying for the exam. I will also be referencing another publication from PMI® called the *Agile Practice Guide* (PMI®, 2017). This guide outlines practices related to agile and hybrid development methodologies. A large portion of the exam will cover agile and hybrid techniques, and I'll cover those in detail throughout the book.

PMI® is the de facto standard for project management principles, techniques, and processes. To become familiar with the material and principles they've developed, I recommend first familiarizing yourself with the terminology used in the *PMBOK® Guide*. Volunteers from differing industries from around the globe worked together to come up with the standards and terms used in the guide. These folks worked hard to develop and define project management terms, and the terms are used interchangeably among industries. For example, *resource planning* means the same thing to someone working in construction, information technology, or healthcare. You'll find many of the *PMBOK® Guide* terms explained throughout this book. Even if you are an experienced project manager, you might find that you use specific terms for processes or actions you regularly perform but that the *PMBOK® Guide* calls them by another name. So, the first step is to get familiar with the terminology.

The next step is to become familiar with the processes as defined in the *PMBOK® Guide*. The process names are unique to PMI®, but the general principles and guidelines underlying the processes are used for most projects across industry areas.

This chapter starts with the Process domain and lays the foundation for building and managing your project. We'll focus on this domain through Chapter 5. I'll start this chapter with an overview of projects versus operations and a discussion on how projects come about. We'll take a look at the PMI® process groups and their purposes and end the

chapter with an overview of project management life-cycle methodologies. We'll examine the various project methodologies such as predictive (also known as waterfall), agile methodologies (of which there are several), and the hybrid approach. These project management methodologies will be discussed and used in examples in the remainder of this book. I'll continue to build on these topics, and others, throughout the book. Good luck!

The process names, inputs, tools and techniques, outputs, and descriptions of the project management process groups and related materials and figures in this chapter are based on content from *A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition* (PMI®, 2017). The references to adaptive and hybrid methodologies, related materials, and figures in this chapter are based on content from the *Agile Practice Guide* (PMI®, 2017).

Establishing the Foundation

Consider the following scenario: The VP of marketing approaches you with a fabulous idea—"fabulous" because he's the big boss and because he thought it up. He wants to live-stream the organization's board meetings and live-stream town hall meetings with the CEO and allow employees to ask questions in real time. He tells you that the board of directors has already cleared the project, and he'll dedicate as many resources to this as he can. He wants the live-streaming solution in place by the end of this year. The best news is he has assigned you to head up this project.

Your first question should be "Is it a project?" This might seem elementary, but projects are often confused with ongoing operations. Projects are temporary in nature; have definite start and end dates; produce a unique product, service, or result; and are completed when their goals and objectives have been met and signed off by the stakeholders or when the project is terminated.

Exam Spotlight

Projects may be terminated for any number of reasons. Examples include: the objectives have been met, the objectives cannot be met, funding is no longer available or was spent, the project is no longer needed, or it was terminated for legal cause or convenience.

A common characteristic of projects is that they often initiate change in an organization by moving the business from one state to another. For example, when an organization undergoes a new back office software implementation or upgrade, changes will occur

within the organization to accommodate the new business process and software. The business moves from current state—where they are now—to the future state—where they will be once the software is implemented.

Projects also bring about business value creation. Business value can be tangible (revenue, goods, market share) or intangible (goodwill, recognition, public benefit).

When considering whether you have a project on your hands, you need to keep some issues in mind. First, is it a project or an ongoing operation? If so, what characteristics distinguish this endeavor as a project? We'll look at each of these next.

Projects vs. Operations

Projects are temporary in nature and have definitive start dates and definitive end dates. The project is completed when its goals and objectives are accomplished (by producing deliverables) to the satisfaction of the stakeholders. Sometimes projects end when it's determined that the goals and objectives cannot be accomplished or when the product, service, or result of the project is no longer needed and the project is canceled. Projects exist to bring about a product, service, or result that didn't exist before. This might include tangible products, components of other products, services such as consulting or project management, and business functions that support the organization. Projects might also produce a result or an outcome, such as a document that details the findings of a research study. In this sense, a project is unique. However, don't be confused by the term *unique*. For example, Ford Motor Company is in the business of designing and assembling cars. Each model that Ford designs and produces can be considered a project when it is first introduced to the marketplace. The models differ from one another in their features and are marketed to people with various needs. An SUV serves a different purpose and clientele than a luxury sedan or a hybrid. The initial design and marketing of these three models are unique projects. However, the actual assembly of the cars is considered an operation—a repetitive process that is followed for most makes and models.

Determining the characteristics and features of the different car models is carried out through what the *PMBOK® Guide* terms *progressive elaboration*. This means the characteristics of the product, service, or result of the project are determined incrementally and are continually refined and worked out in detail as the project progresses. More information and better estimates become available the further you progress in the project. Progressive elaboration improves the project team's ability to manage greater levels of detail and allows for the inevitable change that occurs throughout a project's life cycle. This concept goes along with the temporary and unique aspects of a project because when you first start the project, you don't know all the minute details of the end product. Product characteristics typically start out broad-based at the beginning of the project and are progressively elaborated into more and more detail over time until they are complete and finalized.

Exam Spotlight

Progressive elaboration is most often used when creating the project or product scope, developing requirements, determining human resources, scheduling, and defining risks and their mitigation plans.

Operations are ongoing and repetitive. They involve work that is continuous without an ending date, and you often repeat the same processes and produce the same results. One way to think of operations is the transforming of resources (steel and fiberglass, for example) into outputs (cars). The purpose of operations is to keep the organization functioning, whereas the purpose of a project is to meet its goals and to conclude. At the completion of a project, or at various points throughout the project, the deliverables may get turned over to the organization's operational areas for ongoing care and maintenance. For example, let's say your company implements a new human resources software package that tracks employees' time, expense reports, benefits, and so on. Defining the requirements and implementing the software is a project. The ongoing maintenance of the site, updating content, and so on are ongoing operations.

It's a good idea to include some members of the operational area on the project team when certain deliverables or the end product of the project will be incorporated into their future work processes. They can assist the project team in defining requirements, developing scope, creating estimates, and so on, helping to ensure that the project will meet their needs. The process of knowledge transfer to the team is much simpler when they are involved throughout the project; they gain knowledge as they go and the formal handoff is more efficient. This isn't a bad strategy in helping to gain buy-ins from the end users of the product or service either. Often, business units are resistant to new systems or services, but getting them involved early in the project rather than simply throwing the end product over the fence when it's completed may help gain their acceptance.

Managing projects and managing operations require different skill sets. Operations management involves managing the business operations that support the goods and services the organization is producing. Operations managers may include line supervisors in manufacturing, retail sales managers, and customer service call center managers. The skills needed to manage a project include general management skills, interpersonal skills, planning and organization skills, and more. The remainder of this book will discuss project management skills in detail.

According to the *PMBOK® Guide*, several examples exist where projects can extend into operations up until and including the end of the product life cycle:

- Concluding the end of each phase of the project
- Developing new products or services

- Upgrading and/or expanding products or services
- Improving the product development processes
- Improving operations

The preceding list isn't all inclusive. Whenever you find yourself working on a project that ultimately impacts your organization's business processes, I recommend you get people from the business units to participate on the project.

Project Characteristics

You've just learned that a project has several characteristics:

- Projects are unique.
- Projects are temporary in nature and have a definite beginning and ending date.
- Projects are completed when the project goals are achieved or it's determined the project is no longer viable.
- A successful project is one that meets the expectations of your stakeholders.
- Projects initiate change in the organization.
- Projects bring about business value creation.

Using these criteria, let's examine the assignment from the VP of marketing to determine whether it is a project:

Is it unique? Yes, because the board conference room does not currently have live-streaming equipment or software.

Does the project have a limited time frame? Yes, the start date of this project is today, and the end date is the end of this year. It is a temporary endeavor.

Is there a way to determine when the project is completed? Yes, the live-streaming equipment and software will be installed. Once the system is intact and operating, the project will come to a close.

Is there a way to determine stakeholder satisfaction? Yes, the expectations of the stakeholders will be documented in the form of deliverables and requirements during the Planning processes. These deliverables and requirements will be compared to the finished product to determine whether it meets the expectations of the stakeholders.

Is it driving change? Yes, this is a new way of communicating with their shareholders and employees.

Will business value creation be realized? Yes, this project will improve communication among shareholders and employees.

Houston, we have a project.

What Is Project Management?

You've determined that you indeed have a project. What now? The notes you scratched on the back of a napkin during your coffee break might get you started, but that's not exactly good project management practice.

We have all witnessed this scenario: an assignment is made, and the project team members jump directly into the project, busying themselves with building the product, service, or result requested. Often, careful thought is not given to the project-planning process. I'm sure you've heard co-workers toss around statements like, "That would be a waste of valuable time" or "Why plan when you can just start building?" Project progress in this circumstance is rarely measured against the customer requirements. In the end, the delivered product, service, or result doesn't meet the expectations of the customer. This is a frustrating experience for all those involved. Unfortunately, many projects follow this poorly constructed path.

Project management brings together a set of tools and techniques—performed by people—to describe, organize, and monitor the work of project activities. *Project managers* are the people responsible for managing the project processes and applying the tools and techniques used to carry out the project activities. All projects are composed of processes, even if they employ a haphazard approach. There are many advantages to organizing projects and teams around the project management processes endorsed by PMI®. However, process is only one side of the equation. A project manager is a business-savvy leader who is able to link project benefits with business objectives and ensure that the project produces business value. They will do this in part with project management processes and by utilizing their business acumen and leadership skills. We'll be examining both of these concepts in depth throughout the remainder of this book.

According to the *PMBOK® Guide*, project management involves applying knowledge, skills, tools, and techniques during the course of the project to meet requirements. It is the responsibility of the project manager to ensure that project management techniques are applied and followed.

Exam Spotlight

Remember that according to the *PMBOK® Guide*, the definition of project management is applying tools, techniques, skills, and knowledge to project activities to bring about successful results and meet the project requirements.

Project management is a collection of processes that includes initiating a new project, planning, putting the project management plan into action, and measuring progress and performance. It involves identifying the project requirements, establishing project objectives, balancing constraints, and taking the needs and expectations of the key stakeholders

into consideration. Planning is one of the most important functions you'll perform during the course of a project. It sets the standard for the remainder of the project's life and is used to track future project performance. Let's look at some of the ways the work of project management is organized.

Programs

According to the *PMBOK® Guide*, programs are groups of related projects, subsidiary programs, and other activities that are managed using similar techniques in order to capitalize on benefits that wouldn't be feasible if you managed the projects individually. When projects are managed collectively as programs, it's possible to capitalize on benefits that wouldn't be achievable if the projects were managed separately. This would be the case where a very large program exists with many subsidiary projects under it—for example, building an urban live-work-shopping development. Many subsidiary projects exist underneath this program, such as design and placement of living and shopping areas, architectural drawings, theme and design, construction, marketing, facilities management, and so on. Each subsidiary project is a project unto itself. Each subsidiary project has its own project manager, who reports to a project manager with responsibility over several of the areas, who in turn reports to the head project manager (often called a program manager) who is responsible for the entire program. All the projects are related and are managed together so that collective benefits are realized and controls are implemented and managed in a coordinated fashion. Sometimes programs involve aspects of ongoing operations as well. After the shopping areas in our example are built, the management of the buildings and common areas becomes an ongoing operation. The management of this collection of projects—determining their interdependencies, managing among their constraints, and resolving issues among them—is called *program management*. Program management also involves centrally managing and coordinating groups of related projects to meet the objectives of the program.

A new type of project referenced in the *PMBOK® Guide* is called a *megaproject*. These projects, as implied by the term, are very large and take multiple years to complete. The total investment of these multiyear projects must be $1 billion or more (in US dollars) and the project must affect 1 million people or more. A few examples might include the construction of a new interstate highway or the implementation of a national healthcare system.

Portfolios

Portfolios are collections of programs, subsidiary portfolios, operations, and projects that support strategic business goals or objectives. Let's say our company is in the construction business. Our organization has several business units: retail, single-family residential, and multifamily residential. Collectively, the projects within all of these business units make up

the portfolio. The program I talked about in the preceding section (the collection of projects associated with building the new live-work-shopping urban area) is a program within our portfolio. Other programs and projects could be contained within this portfolio as well. Programs and projects within a portfolio are not necessarily related to one another in a direct way. However, the overall objective of any program or project in this portfolio is to meet the strategic objectives of the portfolio, which in turn should meet the strategic objectives of the department and ultimately the business unit or corporation.

Portfolio management encompasses centrally managing the collections of programs, projects, other work, and sometimes other portfolios. It involves guiding the investment decisions of the organization and ensures that the investments are appropriately applied to the projects and programs so that they advance the organization's strategic goals. The project management office (discussed in the next section) is typically responsible for managing portfolios. This gives a central, enterprise view to the projects for the organization as a whole and leads to more effective management of the programs and projects within the portfolio. Maximizing the portfolio is critical to increasing success. This includes weighing the value of each project, or potential project, against the business's strategic objectives, selecting the right programs and projects, eliminating projects that don't add value, and prioritizing resources among programs and projects. It also concerns monitoring active projects for adherence to objectives, balancing the portfolio among the other investments of the organization, and ensuring the efficient use of resources. Portfolio managers also monitor the organizational planning activities of the organization to help prioritize projects according to fund availability, risk, the strategic mission, and more. As you can see, portfolio management (and program management) has a different objective, life cycle, and benefits than project management. Portfolio management is generally performed by a senior manager who has significant experience in both project and program management.

Exam Spotlight

Projects or programs within a portfolio are not necessarily related to or dependent on each other.

Table 1.1 compares the differences between projects, programs, and portfolios according to the *PMBOK® Guide*.

TABLE 1.1 Projects, programs, and portfolios

	Purpose	Area of focus	Manager	Objectives	Success
Project	Applies and uses project management processes, knowledge, and skills	Delivery of products, services, or results	Project manager	Detailed objectives for the project	Objectives are met and stakeholders are satisfied.
Program	Collections of related projects, subsidiary programs, or work managed in a coordinated fashion	Project interdependencies	Program manager	Coordinated objectives and interdependencies across the program to realize benefits	Collective objectives and benefits are realized.
Portfolio	Aligns projects/ programs/ portfolios/ subsidiary portfolios/ operations to the organization's strategic business objectives	Optimizing efficiencies, objectives, costs, resources, risks, and schedules	Portfolio managers. Project and program managers may report to the portfolio manager.	Align with the organization's strategic business objectives. Prioritizes the right programs and projects, prioritizes work, and ensures resources are available.	Performance and benefit realization of the portfolio

Exam Spotlight

Project and program management both focus on performing the projects and programs in the right way. Portfolio management is concerned with working on the right projects and the right programs for the organization.

Organizational Project Management

Organizational project management (OPM) ensures that projects, programs, and portfolios are aligned and managed according to the organization's strategic business objectives. It optimizes the organization's capabilities by correlating projects, programs, and portfolios to perform efficiently and align with the strategic goals. The focus of OPM is to ensure that the organization performs the right projects, that critical resources are available and assigned appropriately, and that the strategic objectives and business value are first and foremost.

Project Management Offices

The *project management office (PMO)* is usually a centralized organizational unit that oversees the management of projects and programs throughout the organization. The most common reason a company starts a project management office is to establish and maintain procedures and standards for project management methodologies and to manage resources assigned to the projects in the PMO. PMOs are often tasked with establishing an organizational project management (OPM) framework. OPM helps ensure that projects, programs, and portfolios are managed consistently and that they support the overall goals of the organization. OPM is used in conjunction with other organizational practices, such as human resources, technology, and culture, to improve performance and maintain a competitive edge.

According to the *PMBOK® Guide*, the key purpose of a PMO is to provide support for project managers. This may include the following types of support:

- Providing an established project management methodology, including templates, forms, and standards
- Mentoring, coaching, and training project managers
- Facilitating communication within and across projects
- Managing resources

Not all PMOs are the same. Some PMOs may have a great deal of authority and control, whereas others may only serve a supporting role. According to the *PMBOK® Guide*, there are three types of PMOs: supportive, controlling, and directive. Table 1.2 describes each type of PMO, its roles, and its levels of control.

A PMO might have full authority to manage projects, including the authority to cancel projects, or it might serve only in an advisory role. PMOs might also be called *project offices*, *program management offices*, or *Centers of Excellence*.

TABLE 1.2 PMO organizational types

PMO type	Role	Level of control
Supportive	Consulting: Templates, project repository, training	Low
Controlling	Compliance: Project management framework/ Conformance to methodologies/Conformance to governance frameworks/Use of specific templates and tools	Moderate
Directive	Controlling: PMO manages projects	High

The PMO usually has responsibility for maintaining and archiving project artifacts for future reference. This office compares project goals with project progress and gives feedback to the project teams and management. It ensures that projects are aligned with the strategic objectives of the organization, and it measures the performance of active projects and suggests corrective actions. The PMO evaluates completed projects for their adherence to the project management plan and asks questions like "Did the project meet the time frames established?" and "Did it stay within budget?" and "Was the quality acceptable?" and "Did we bring about business value?"

Project managers are typically responsible for meeting the objectives of the project they are managing, delivering business value, controlling the resources within the project, and managing the individual project constraints. The PMO is responsible for managing the objectives of a collective set of projects, managing resources across the projects, and managing the interdependencies of all the projects within the PMO's authority.

Project management offices are common in organizations today, if for no other reason than to serve as a collection point for project artifacts. Some PMOs are fairly sophisticated and prescribe the standards and methodologies to be used in all project phases across the enterprise. Still others provide all these functions and also offer project management consulting services. However, the establishment of a PMO is not required in order for you to apply good project management practices to your next project.

There Ought to Be a Law

The importance of practicing sound project management techniques has grown significantly over the past several years. In 2015, President Obama signed the *Program Management Improvement and Accountability Act of 2015 (PMIAA)*. This act intended to enhance accountability in project management and ensure that best practices are used

for projects performed by the federal government. It developed an official career path for project managers and recognized the importance of the role of the project sponsor and executive management on the project. This act enforced the development of a standards-based program management policy across the federal government and set up an interagency council on project management so that knowledge sharing could occur among agencies.

Understanding How Projects Come About

Your company's quarterly meeting is scheduled for today. You take your seat, and each of the department heads gets up and gives their usual "We can do it" rah-rah speech, one after the other. You sit up a little straighter when the CEO takes the stage. She starts this part of the program pretty much the same way the other department heads did, and before long, you find yourself drifting off. You are mentally reviewing the status of your current project when suddenly your daydreaming trance is shattered. You perk up as you hear the CEO say, "And the new phone system will be installed by Thanksgiving."

Wait a minute. You work in the telecom department and haven't heard a word about this project until today. You also have a funny feeling that you've been elected to manage this project. It's amazing how good communication skills are so important for project managers but not for. . .well, we won't go there.

Project *initiation* is the formal recognition that a project, or the next phase in an existing project, should begin and resources should be committed to the project. Unfortunately, many projects are initiated the way the CEO did in this example. Each of us, at one time or another, has experienced being handed a project with little to no information and told to "make it happen." The new phone system scenario is an excellent example of how *not* to initiate a project.

Taking one step back leads you to ask, "How do projects come about in the first place? Do CEOs just make them up like in this example?" Even though your CEO announced this new project at the company meeting with no forewarning, no doubt it came about as a result of a legitimate need. Believe it or not, CEOs don't just dream up projects just to give you something to do. They're concerned about the future of the company and the needs of the business and its customers.

According to the *PMBOK® Guide,* projects are initiated by business leaders due to four categories or factors that influence the organization:

- Regulatory compliance, legal requirements, or social requirements
- Stakeholder needs and requests
- Changing technology needs of the organization
- Creation or improvement of processes, services, or products

There are several needs or demands that bring about the creation of a project within these categories. I'll cover this topic next.

Needs and Demands and Other Factors That Lead to Project Creation

Organizations exist to generate profits, serve the public, and create business value. To stay competitive, organizations are always examining new ways of creating business, gaining efficiencies, or serving their customers. Sometimes laws are passed to force organizations to make their products safer or to make them less harmful to the environment, for example. Projects might result from any of these needs as well as from business opportunities or problems. According to the *PMBOK® Guide*, most projects will fit one of the seven needs and demands described next. Let's take a closer look at each of these areas:

Market Demand The demands of the marketplace can drive the need for a project. For example, a bank initiates a project to offer customers the ability to apply for mortgage loans using a simple phone app.

Organizational Need The new phone system talked about earlier that was announced at the quarterly meeting came about as a result of a business need. The CEO, on advice from her staff, was advised that call volumes were maxed on the existing system. Without a new system, customer service response times would suffer, and that would eventually affect the bottom line.

Customer Request Customer requests run the gamut. Generally speaking, most companies have customers, and their requests can drive new projects. Keep in mind that customers can be internal or external to the organization. For example, government agencies don't have external customers per se (we're captive customers at any rate), but there are internal customers within departments and across agencies.

Technological Advance Many of us own a smartphone that keeps names and numbers handy along with a calendar, a to-do list, and a plethora of other apps to help organize our day or add a little fun in between meetings. I couldn't live without mine. However, a newer, better version is always coming to market. Satellite communications, bigger screens, thinner bodies, touch screens, video streaming, and more are all examples of technological advances (I can't wait for a working foldable screen, but I digress). Electronics manufacturers are continually revamping and reinventing their products to take advantage of new technology (thank you!).

Legal Requirement Private industry and government agencies both generate new projects as a result of laws passed during every legislative season. For example, new sales tax or healthcare laws might require changes to the computer programs that support these systems. The requirement that food labels on packaging describe the ingredients in the product, the calories, and the recommended daily allowances is another example of legal requirements that drive a project.

Ecological Impacts Many organizations today are undergoing a "greening" effort to reduce energy consumption, save fuel, reduce their carbon footprint, and so on. Another example might include manufacturing or processing plants that voluntarily remove their waste products from water prior to putting the water back into a local river or stream to prevent contamination. These are examples of environmental considerations that result in projects.

Social Need The last need is a result of social demands. For example, perhaps a developing country is experiencing a fast-spreading disease that's infecting large portions of the population. Medical supplies and facilities are needed to vaccinate and treat those infected with the disease.

Exam Spotlight

Understand the needs and demands that bring about a project.

In addition to the needs and demands that may bring about a project, other factors are outlined in the *PMBOK® Guide* that may also lead to project creation. Let's take a look at those next.

Strategic Opportunity or Business Need An example here might include the acquisition or merger of two business entities in order to expand market penetration. The business may need to purchase or build a new warehouse, they may have a strategic opportunity to expand into a new market, and so on. There are an unlimited number of business needs that could bring about a project.

Competitive Forces We've all likely seen the better burger commercials and two-for-one promotions, or maybe stood in line all night in the cold waiting to be one of the first to buy the next new technology gadget. When one business develops new pricing structures or new products, or offers more for the same, competing businesses must do something similar in order to stay competitive. This can bring about the creation of projects.

Political Changes I have witnessed this example countless times in my career. A new government official is elected, or perhaps a change in power occurs in a legislative body, and once they take office, they kill the projects that the previous office held dear and initiate their own projects.

New Technology This category is like the technological advance category described earlier. It can also include technology that will improve efficiencies within the organization, provide a better customer experience, save money, increase revenues, and so on.

Stakeholder Demands Stakeholder demands can create an infinite number of projects. There is no limit to what they might need in order to support the organization or their customers.

Business Process Improvements This category of project creation can also bring about numerous requests. For example, perhaps the organization currently uses a manual process for travel authorization requests. To improve the business process, they request an automated workflow and electronic signature so that travel requests can be routed electronically rather than using paper.

Material Issues This need refers to issues that may occur with existing assets that require a project to replace or fix. For example, a warehouse holding products ready to ship is hit by a tornado. The building will need to be demolished and replaced.

All of these needs and demands represent opportunities, business requirements, or problems that need to be solved. Each may also introduce risk to the project. Management must decide how to respond to these needs and demands, which will more often than not initiate new projects.

Real World Scenario

Project Initiation

Corey is an information technology manager who works for the National Park Service. One warm spring Sunday morning, he is perusing the local online news and comes across an article about new services being offered at some of the national parks. He perks up when he sees his boss's name describing the changing nature of technology and how it impacts the types of services the public would like to see at the parks. Corey knows that the public has been asking when wireless Internet services will be available in some of the larger parks and has also been involved in the discussions about the resources needed to make this happen, but the project never has enough steam to get off the ground. It seems that a higher-priority project always takes precedence. However, all that changes when Corey sees the next sentence in the article: his boss promising wireless access in two of the largest parks in their region by July 4. It looks like the customer requests have finally won out, and Corey has just learned he has a new project on his hands.

Skills Every Good Project Manager Needs

Many times, organizations will knight their technical experts as project managers. The skill and expertise that made them stars in their technical fields are mistakenly thought to translate into project management skills. This is not necessarily so.

Project managers are generalists with many skills in their repertoires. They are also problem solvers who wear many hats. They are also leaders who deliver business value to the organization. Project managers might indeed possess technical skills, but technical skills are not a prerequisite for sound project management skills. Your project team should include a few technical experts, and these are the people on whom the project manager should rely for technical details. Understanding and applying good project management techniques, along with a solid understanding of strategic and business management skills, leadership skills, as well as interpersonal skills, are career builders for all aspiring project managers.

Project managers have been likened to small-business owners. They need to know a bit about every aspect of management. General management skills, also known as business acumen, include every area of management, from accounting to strategic planning, supervision, personnel administration, and more. Interpersonal skills are often called soft skills and include, among others, communications, leadership, and decision making. General management and interpersonal skills are called into play on every project. But some projects require specific skills in certain application areas. Application areas consist of categories of projects that have common elements. These elements, or application areas, can be defined several ways: by industry group (automotive, pharmaceutical), by department (accounting, marketing), and by technical (software development, engineering) or management (procurement, research and development) specialties. These application areas are usually concerned with disciplines, regulations, and the specific needs of the project, the customer, or the industry. For example, most governments have specific procurement rules that apply to their projects but that wouldn't be applicable in the construction industry. The pharmaceutical industry is acutely interested in regulations set forth by the Food and Drug Administration. The automotive industry has little or no concern for either of these types of regulations. Having experience in the application area you're working in will give you a leg up when it comes to project management. Although you can call in the experts who have application area knowledge, it doesn't hurt for you to understand the specific aspects of the application areas of your project.

Project managers are not the sole performers on a project and are not expected to know everything or to perform every task. But they should have sound project management skills,

adequate technical skills, and sufficient experience to manage the size, complexity, and risk of the project they'll undertake. They also serve as champions for the value of project management, help to socialize and gain acceptance of project management concepts, and advance the effectiveness and advantages of the PMO.

The *PMBOK® Guide* outlines the skills every project manager needs in what they call the *PMI® Talent Triangle™*, which is made up of technical project management skills, leadership skills, and strategic and business management skills. I will discuss each of those next, along with other skills that I consider the foundation of good project management practices. Your mastery of them (or lack thereof) will likely affect project outcomes. We'll look at an overview of these skills now, and I'll discuss each in more detail in subsequent chapters.

Once you obtain the PMP® credential, you will need to complete a certain number of professional development units (PDUs) every three years. PMI® requires you to record the PDUs according to the Talent Triangle™. That is, PDUs are earned and recorded in the leadership, strategic, and technical categories.

Technical Project Management Skills

Technical skills, as the term relates to project management, refer to the technical aspects of performing the role. This incorporates skills like applying project management knowledge in order to deliver the objectives of the projects, defining the critical success factors of the project, developing a project schedule, and knowing when you don't know and need to ask for help. As I noted earlier, the project manager isn't expected to be the technical expert (from the perspective of the product of the project) and should have sufficient subject matter experts on the project team to address technical concerns. The project manager is concerned with using the right tools and techniques for the project, planning appropriately, and managing the schedule, budget, resources, and risks. Technical project management skills are included in the PMI® Talent Triangle™ skills.

Business Management and Strategic Skills

Project managers should be able to describe the business needs of the project and how they align to the organization's goals, including elements such as operations, market conditions, competition, and strategy. This also means that the project manager should have a basic understanding of how the goals of the project relate to various business functions in the organization, such as finance, marketing, customer service, and operations. Having an understanding of the business needs and the strategic vision of the organization helps you to recognize what aspects of the project may need to be closely monitored or which deliverables have higher priority than others.

Business skills also involve understanding the risks and issues involved in bringing about the results of the project, the financial impacts and their effects, how business value is maximized through a successful project, and how to manage the scope and schedule.

Another skill you might not equate to a business skill is understanding the politics of the organization and, most importantly, understanding who has the power, responsibility, and authority to make things happen for your project. Business management and strategic skills are included in the PMI® Talent Triangle™ skills.

Communication Skills

One of the single most important characteristics of a first-rate project manager is excellent communication skills. Written and oral communications are the backbone of all successful projects. Many forms of communication will exist during the life of your project. It's your job, as the creator or manager of most of the project communication (project documents, meeting updates, status reports, and so on), to ensure that the information is explicit, clear, and complete so that your audience will have no trouble understanding what has been communicated. Once the information has been distributed, it is the responsibility of the people receiving the information to make sure they understand it.

Many forms of communication and communication styles exist. I'll discuss them more in depth in Chapter 10, "Sharing Information."

Organizational and Planning Skills

Organizational and planning skills are closely related and probably the most important skills, after communication skills, a project manager can possess. Organization takes on many forms. As project manager, you'll have project documentation, requirements information, memos, project reports, personnel records, vendor quotes, contracts, and much more to track and be able to locate at a moment's notice. You will also have to organize meetings, put together teams, and perhaps manage and organize media-release schedules, depending on your project.

Time management skills are closely related to organizational skills. It's difficult to stay organized without an understanding of how you're managing your time. I recommend that you attend a time management class if you've never been to one. They have great tips and techniques to help you prioritize problems and interruptions, prioritize your day, and manage your time.

I discuss planning extensively throughout the course of this book. There isn't any aspect of project management that doesn't first involve planning. Planning skills go hand in hand with organizational skills. Combining these two with excellent communication skills is almost a sure guarantee of your success in the project management field.

Conflict Management Skills

Show me a project, and I'll show you problems. All projects have some problems, as does, in fact, much of everyday life. Isn't that what they say builds character? But I digress.

Conflict management involves solving problems. Problem solving is really a twofold process. First, you must define the problem by separating the causes from the symptoms. Often when defining problems, you end up just describing the symptoms instead of getting to the heart of what's causing the problem. To avoid that, ask yourself questions like, "Is it an internal or external problem? Is it a technical problem? Are there interpersonal problems between team members? Is it managerial? What are the potential impacts or consequences?" These kinds of questions will help you get to the cause of the problem.

Next, after you have defined the problem, you have some decisions to make. It will take a little time to examine and analyze the problem, the situation causing it, and the alternatives available. After this analysis, the project manager will determine the best course of action to take and implement the decision. The timing of the decision is often as important as the decision itself. If you make a good decision but implement it too late, it might turn into a bad decision.

Negotiation and Influencing Skills

Effective problem solving requires negotiation and influencing skills. We all utilize negotiation skills in one form or another every day. For example, on a nightly basis I am asked, "Honey, what do you want for dinner?" Then the negotiations begin, and the fried chicken versus swordfish discussion commences. Simply put, negotiating is working with others to come to an agreement.

Negotiation on projects is necessary in almost every area of the project, from scope definition to budgets, contracts, resource assignments, and more. This might involve negotiation one on one or with teams of people, and it can occur many times throughout the project.

Influencing is convincing the other party that swordfish is a better choice than fried chicken, even if fried chicken is what they want. It's also the ability to get things done through others. Influencing requires an understanding of the formal and informal structure of all the organizations involved in the project.

Power and politics are techniques used to influence people to perform. *Power* is the ability to get people to do things they wouldn't do otherwise. It's also the ability to change minds and the course of events and to influence outcomes.

Politics involve getting groups of people with different interests to cooperate creatively even in the midst of conflict and disorder.

These skills will be utilized in all areas of project management. Start practicing now because, guaranteed, you'll need these skills on your next project.

Leadership Skills

Leaders and managers are not the same. *Leaders* impart vision, gain consensus for strategic goals, establish direction, and inspire and motivate others. They guide and direct the team in accomplishing the project's objectives. *Managers* focus on results and are concerned with getting the job done according to the requirements. Even though leaders and managers are not the same, project managers must exhibit the characteristics of both during different times on the project. Understanding when to switch from leadership to management and then back again is a finely tuned and necessary talent. Leadership is one of the Talent Triangle™ skills.

Team-Building and Motivating Skills

Project managers will rely heavily on team-building and motivational skills. Teams are often formed with people from different parts of the organization. These people might or might not have worked together before, so some component of team-building groundwork might involve the project manager. The project manager will set the tone for the project team and will help the members work through the various stages of team development to become fully functional. Motivating the team, especially during long projects or when experiencing a lot of bumps along the way, is another important role the project manager fulfills during the course of the project.

An interesting caveat to the team-building role is that project managers many times are responsible for motivating team members who are not their direct reports. This scenario has its own set of challenges and dilemmas. One way to help this situation is to ask the functional manager to allow you to participate in your project team members' performance reviews. Use the negotiation and influencing skills I talked about earlier to make sure you're part of this process.

Multiple Dimensions

Project managers are an interesting bunch. They know a little bit about a lot of topics and are excellent communicators. They have the ability to motivate people, even those who have no reason to be loyal to the project, and they can make the hard-line calls when necessary. Project managers can get caught in sticky situations that occasionally require making decisions that are good for the company (or the customer) but that aren't good for certain stakeholders. The offended stakeholders will then drag their feet, and the project manager has to play the heavy in order to motivate them and gain their cooperation again. Some organizations hire contract project managers to run their large, company-altering projects just because they don't want to burn out a key employee in this role. Fortunately, that doesn't happen often.

Role of a Project Manager

Project managers are responsible for ensuring that the objectives of the project are met. Projects create value, which in turn increases the business value of the organization. Business value is the total value of all the assets of the organization, including both tangible and intangible elements. The project manager must be familiar with the organization's strategic plan in order to marry those strategic objectives with the projects in the portfolio. This requires all the skills we covered in the preceding sections.

Now that you've been properly introduced to some of the skills you need in your tool kit, you'll know to be prepared to communicate, solve problems, lead, and negotiate your way through your next project.

Understanding Project Management Process Groups

Project management processes organize and describe the work of the project. The *PMBOK® Guide* describes five process groups used to accomplish this end. These processes are performed by people and are interrelated and dependent on one another.

These are the five project management process groups that the *PMBOK® Guide* documents:

- Initiating
- Planning
- Executing
- Monitoring and Controlling
- Closing

All these process groups have individual processes that collectively make up the group. For example, the Initiating process group has two processes called Develop Project Charter and Identify Stakeholders. Collectively, these process groups—including all their individual processes—make up the project management process. Projects, or each phase of a project, start with the Initiating process and progress through all the processes in the Planning process group, the Executing process group, and so on, until the project is successfully completed, or it's canceled. All projects must complete the Closing processes, even if a project is killed.

Let's start with a high-level overview of each process group. If you want to peek ahead and see the complete list, Appendix B, "Process Inputs and Outputs," lists each of the process groups, the individual processes that make up each process group, and the Knowledge Areas in which they belong. (I'll introduce Knowledge Areas in the next chapter.)

Initiating The *Initiating* process group, as its name implies, occurs at the beginning of the project and at the beginning of each project phase for large projects. Initiating acknowledges that a project, or the next project phase, should begin. This process group grants the approval to commit the organization's resources to working on the project or phase and authorizes the project manager to begin working on the project. The outputs of the Initiating process group, including the project charter and identification of the stakeholders, become inputs into the Planning process group.

Planning The *Planning* process group includes the processes for formulating and revising project goals and objectives and creating the project management plan that will be used to achieve the goals the project was undertaken to address. The Planning process group also involves determining alternative courses of action and selecting from among the best of those to produce the project's goals. This process group is where the project requirements are fleshed out. Planning has more processes than any of the other project management process groups. To carry out their functions, the Executing, Monitoring and Controlling, and Closing process groups all rely on the Planning processes and the documentation produced during the Planning processes. Project managers will perform frequent iterations of the Planning processes prior to project completion. Projects are unique and, as such, have never been done before. Therefore, planning must encompass all areas of project management and consider budgets, activity definition, scope planning, schedule development, risk identification, staff acquisition, procurement planning, and more. The greatest conflicts a project manager will encounter in this process group are project prioritization issues.

Executing The *Executing* process group involves putting the project management plan into action. It's here that the project manager will coordinate and direct project resources to meet the objectives of the project management plan. The Executing processes keep the project on track and ensure that future execution of project plans stays in line with project objectives. This process group is typically where approved changes are implemented. The Executing process group will consume the most project time and resources, and as a result, costs are usually highest during the Executing processes. Project managers will experience the greatest conflicts over schedules in this cycle.

Monitoring and Controlling The *Monitoring and Controlling* process group is where project performance measurements are taken and analyzed to determine whether the project is staying true to the project management plan. The idea is to identify problems as soon as possible and apply corrective action to control the work of the project and ensure successful outcomes. For example, if you discover that variances exist, you'll apply corrective action to get the project activities realigned with the project management plan. This might require additional passes through the Planning processes to adjust project activities, resources, schedules, budgets, and so on.

Monitoring and Controlling is used to track the progress of work being performed and to identify problems and variances within a process group as well as the project as a whole.

Closing The *Closing* process group is probably the most often skipped process group in project management. Closing brings a formal, orderly end to the activities of a project phase or to the project itself. Once the project objectives have been met, most of us are ready to move on to the next project. However, Closing is important because all the project information is gathered and stored for future reference. The documentation collected during the Closing process group can be reviewed and used to avert potential problems on future projects. Formal acceptance and approval are obtained from project stakeholders.

Exam Spotlight

The project manager and project team are responsible for determining which processes within each process group are appropriate for the project on which you're working. This is called *tailoring*. You should consider the size and complexity of the project and the various inputs and outputs of each of the processes when determining which processes to implement and perform. Small projects might not require all of the processes within a process group or the same level of rigor as a large project. Every process should be addressed, and it should be determined whether the process is appropriate for the project at hand and, if so, what level of implementation is required. Use your judgment when deciding which processes to follow, particularly for small projects.

Characteristics of the Process Groups

The process groups have several characteristics. The first is that costs are lowest during the Initiating processes, and few team members are involved. Costs and staffing increase in the Executing process group and then decrease as you approach the Closing process group. The chances for success are lowest during Initiating and highest during Closing. The chances for risks occurring are higher during Initiating, Planning, and Executing, but the impacts of risks are greater during the later processes. Stakeholders have the greatest influence during the Initiating and Planning processes and less and less influence as you progress through Executing, Monitoring and Controlling, and Closing. For a better idea of when certain characteristics influence a project, refer to Table 1.3.

TABLE 1.3 Characteristics of the project process groups

	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Costs	Low	Low	Highest	Lower	Lowest
Staffing levels	Lowest	Medium	High	High	Low
Chance for successful completion	Lowest	Low	Medium	High	Highest
Stakeholder influence	Highest	High	Medium	Low	Lowest
Risk probability of occurrence	Highest	High	Medium	Low	Lowest

The Process Flow

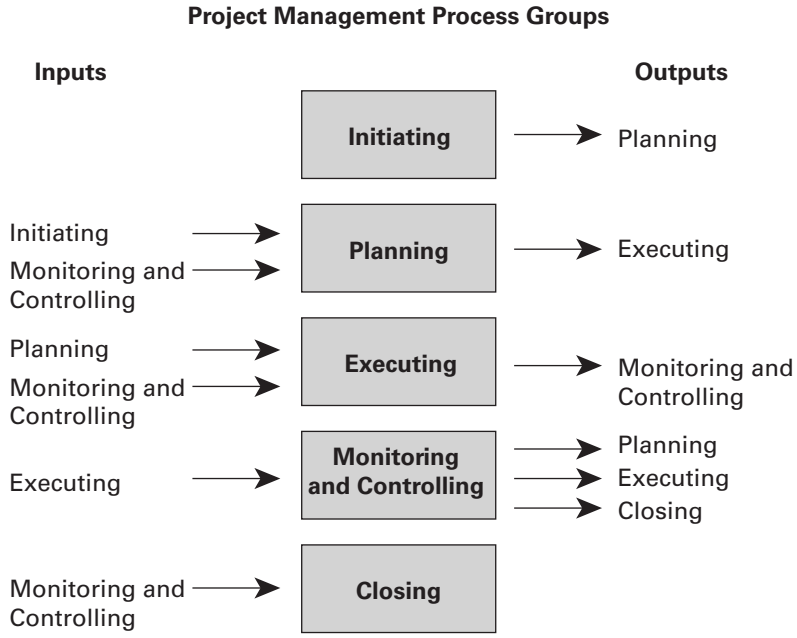
You should not think of the five process groups as onetime processes that are performed as discrete elements. Rather, these processes interact and overlap with one another. They are *iterative* and might be revisited and revised several times as the project is refined throughout its life. The *PMBOK® Guide* calls this process of going back through the process groups an iterative process. The conclusion of each process group allows the project manager and stakeholders to reexamine the business needs of the project and determine whether the project is satisfying those needs—and it is another opportunity to make a go or no-go decision.

Figure 1.1 shows the five process groups in a typical project. Keep in mind that during phases of a project, the Closing process group outputs can provide inputs to the Initiating process group. For example, if you performed a feasibility study as the first phase of a project, once it's accepted or closed, it becomes an input to the Initiating process group.

It's important to understand the flow of these processes for the exam. If you remember the processes and their inputs and outputs, it will help you when you're trying to decipher an exam question. The outputs of one process group may in some cases become the inputs into the next process group (or the outputs might be a deliverable of the project). Sometimes just understanding which process the question is asking about will help you determine the answer.

As I stated earlier, each process group contains several individual processes. For example, the Closing process group consists of two processes: Close Project or Phase and Close Procurements. Each process takes inputs and uses them in conjunction with various tools and techniques to produce outputs.

FIGURE 1.1 Project management process groups



Exam Spotlight

Understand each project management process group and all the processes that make up these groups. Appendix B contains a table of all the processes, their inputs, their tools and techniques, their outputs, and the Knowledge Area in which they each belong. I'll cover Knowledge Areas in Chapter 2, "Assessing Project Needs."

You may see test questions regarding inputs, tools and techniques, and outputs of many of the processes within each process group. One way to keep them all straight is to remember that tools and techniques usually require action of some sort, be it measuring, applying some skill or technique, planning, or using expert judgment. Outputs are usually in the form of a deliverable. Remember that a deliverable is characterized by results or outcomes that can be verified. Last but not least, outputs from one process often serve as inputs to another process.

It's outside the scope of this book to explain all the inputs, tools and techniques, and outputs for each process in each process group (although they are in Appendix B). You'll find all the inputs, tools and techniques, and outputs detailed in the *PMBOK® Guide*, and I highly recommend you become familiar with them.

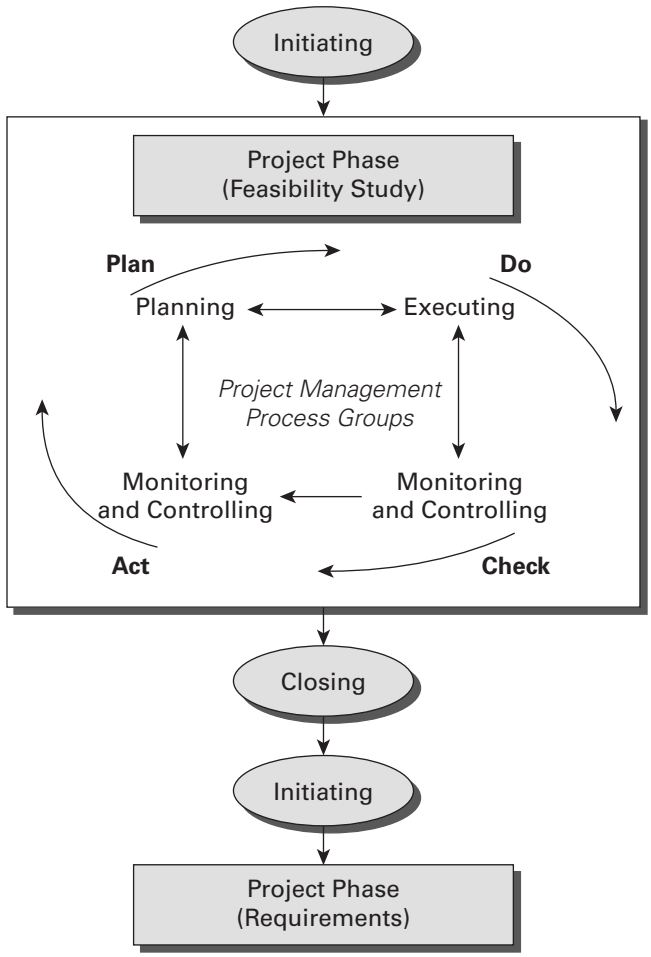
Process Interactions

We've covered a lot of material, but I'll explain one more concept before moving on to project management methodologies. As stated earlier, project managers must determine the processes that are appropriate for effectively managing a project based on the complexity and scope of the project, available resources, budget, and so on. As the project progresses, the project management processes might be revisited and revised to update the project management plan as more information becomes known. Underlying the concept that process groups are iterative is a cycle the *PMBOK® Guide* describes as the Plan-Do-Check-Act cycle, which was originally defined by Walter Shewhart and later modified by Edward Deming. The idea behind this concept is that each element in the cycle is results oriented. The results from the Plan cycle become inputs into the Do cycle, and so on, much like the way the project management process groups interact. The cycle interactions can be mapped to work with the five project management process groups. For example, the Plan cycle maps to the Planning process group. Before we go any further, here's a brief refresher:

- Project phases describe how the work required to produce the product of the project will be completed.
- Project management process groups organize and describe how the project activities will be completed in order to meet the goals of the project.
- The Plan-Do-Check-Act cycle is an underlying concept that shows the integrative nature of the process groups.

Figure 1.2 shows the relationships and interactions of the concepts you've learned so far. Please bear in mind that a simple figure can't convey all the interactions and iterative nature of these interactions; however, I think you'll see that the figure ties the basic elements of these concepts together.

FIGURE 1.2 Project management process groups interactions



Determining a Project Methodology or Approach

Project life cycles are similar to the life cycle that parents experience raising their children to adulthood. Children start out as infants and generate lots of excitement wherever they go. However, not much is known about them at first. So, you study them as they grow, and you assess their needs. Over time, they mature and grow until one day the parents' job is done.

Projects start out just like this and progress along a similar path. Someone comes up with a great idea for a project and actively solicits support for it. The project, after being approved, progresses through the intermediate phases to the ending phase, where it is completed and closed out.

All the collective phases the project progresses through from the start of the project until the end are called the *project life cycle*. Project life cycles are similar for all projects regardless of their size or complexity.

The phases that occur within the project life cycle are sequential or may sometimes overlap each other. Most projects consist of the following life-cycle structure:

- Beginning the project
- Planning and organizing the work of the project
- Performing the work of the project
- Closing out the project

A *development life cycle* consists of the phases of the project associated with producing the product, service, or result of the project. A development life cycle is performed within the project life cycle. We'll look at categories of development life cycles next.

Don't confuse a *product life cycle* with a project life cycle. A product life cycle consists of the phases that represent the development of a *product* idea from its inception, through market delivery, and eventually to retirement of the product. A project life cycle is the series of phases from the start of a *project* until the end. Product and project life cycles are independent of each other.

Life Cycle Categories

According to the *PMBOK® Guide*, there are four categories of development life cycles and two categories of project life cycles. Each contains the phases we just discussed (beginning, planning, performing, closing). Let's look at the development life cycles first.

Predictive Development Life Cycle (Also Known as Plan-Driven Life Cycle or Waterfall) The predictive development life cycle approach defines the scope or deliverable at the beginning of the life cycle. Changes are monitored closely and typically permitted only if they are essential for completing the product of the project. The entire life cycle is completed before moving on to the remaining project phases.

Iterative Development Life Cycle Project deliverables are defined early in the development life cycle and progressively elaborated as the project, or life cycle, progresses. Schedule and cost estimates are continually modified as the final product, service, or result of the project becomes clear. The product of the project continues to evolve by adding functionality during repeating, iterative cycles. Iterative life cycles

may take more time than an incremental approach because this approach is optimized for learning rather than speed. This is a great development life cycle to use when the team is new to agile approaches because of the optimization for learning.

Incremental Development Life Cycle The incremental development life cycle is similar to iterative, but the incremental approach uses predetermined periods of time called *iterations* (not to be confused with the iterative life cycle) to complete the deliverable. During each iteration, new functionality is introduced. The deliverable is considered complete after the final iteration is finished. Incremental development life cycles are best when speed of delivery is necessary.

Iterative and incremental development life cycles are perfect choices for large projects, for complex projects (these life-cycle processes will reduce the complexity), for projects where changing objectives and scope are known ahead of time, or for projects where deliverables need to be delivered incrementally.

Hybrid Development Life Cycle This development life cycle is a combination of a predictive and adaptive life cycle (*adaptive* in the development life cycle refers to an iterative or incremental life cycle). Typically, the elements of the deliverable that are well known at the beginning of the life cycle will follow a predictive approach whereas the elements that are not clear at that stage will follow either an incremental or an iterative approach.

Project life cycles are either predictive or adaptive. Remember that a development life cycle can be performed within the project life cycle, so you may use more than one life cycle approach during the course of the project. For example, the development life cycle might be incremental whereas the project life cycle might be predictive. We discussed predictive in the context of the development life cycle, so next we'll look at it from a project life cycle approach.

We will look at the differences in development life cycle approaches in more depth in Chapter 6, "Developing the Project Budget and Engaging Stakeholders." If you want to peek ahead, take a look at Table 6.2.

Predictive Life Cycle Methodology

A predictive or *waterfall* approach is a step-by-step methodology whereby each stage of the project is completed in order. Typically, you don't move from one stage to another until the previous stage is completed, although there are exceptions that we'll get to later in this section. For example, once the project is kicked off, requirements are defined in detail and approved before any work begins. In this approach, it is very difficult to change requirements or incorporate new ideas as the project progresses. Sometimes months, if not years,

of planning go into getting every detail of the planning before actual work begins. The customer may not see any deliverables, functionality, or understand if business value is being created until the project is close to the end of its life cycle.

If changes are made, you must revisit and modify project plans and formally accept the changes to the scope and subsequent project management plan. Schedules and budgets are defined early in the life cycle as well. Predictive life cycles are an excellent choice for projects where the requirements are well understood, for low-risk projects, and for projects where the team is well established and stable.

Waterfall projects are sometimes divided into phases. A project *phase* generally consists of segments of work that allow for easier management, planning, and control of the work and generally produce at least one deliverable by the end of the phase. The work and the deliverables produced during a phase are typically unique to that phase. The work of each phase is usually distinct and not repeated in other phases. Each phase has an emphasis on a different portion of the project activities, and different project management process groups are performed during each phase. You can use a phased approach with adaptive methodologies, but they are more commonly used in a waterfall approach.

Project phases are determined in any number of ways. The type of project itself and the industry you're in may drive the phases of the project, as could decision points such as milestone completion or go/no-go decisions. The number of phases in the project life cycle depends on the project complexity and the industry you're in. According to the *PMBOK® Guide*, phases are described by such attributes as name, number, duration, resource requirements, and entrance and exit criteria. For example, information technology projects might progress through phases named this way: requirements, design, development, test, and implement.

Many industries use a *feasibility study* as one of the first phases of the project (this is also another potential phase name). A feasibility study is used to determine whether the project is worth undertaking and whether the project will be profitable to the organization. It's a preliminary assessment of the viability of the project; the viability or perhaps marketability of the product, service, or result of the project; and the project's value to the organization. It might also determine whether the product, service, or result of the project is safe and meets industry or governmental standards and regulations. The completion and approval of the feasibility study triggers the beginning of the requirements phase, where requirements are documented and then handed off to the design phase, where blueprints are produced, and so on through the phases. The feasibility study might also show that the project is not worth pursuing and the project is then terminated; therefore, the next phase never begins.

The group of people conducting the feasibility study should not be the same people who will work on the project. Project team members might have built-in biases toward the project and will tend to influence the feasibility outcome toward those biases.

Phase Reviews

Project phases evolve through the life cycle in a series of phase sequences called *handoffs*, or technical transfers. For projects that consist of sequential phases, the end of one phase typically marks the beginning of the next.

A *phase review* should be held at the end of each phase. This review allows the project manager, stakeholders, and project sponsor the opportunity to determine whether the project should continue to the next phase and whether business value has been achieved. They will examine the progress performance to date against the project charter, the business case, the project management plan, and the benefits management plan. As each phase is completed, it's handed off to the next phase.

For example, as we've discussed, a deliverable produced in the beginning phase of a project might be the feasibility study. Producing, verifying, and accepting the feasibility study will signify the ending of this phase of the project. The successful conclusion of one phase does not guarantee authorization to begin the next phase. Let's say our feasibility study was performed for a construction project. The study showed that environmental impacts of a serious nature would result if the construction project were undertaken at the proposed location. Based on this information, a go or no-go decision can be made at the end of the phase. Phase reviews give the project manager the ability to discover, address, and take corrective action against errors discovered during the phase.

The *PMBOK® Guide* states that phase reviews are also known by a few other names: *phase gate, phase entrance, phase exit, stage gate,* and *kill points*.

Phase Completion

You will recognize phase completion because each phase has a specific deliverable, or multiple deliverables, that marks the end of the phase. A *deliverable* is an output that must be produced, verified, and approved to bring the phase, life-cycle process, or project to completion. Deliverables are unique and verifiable and may be tangible or intangible, such as the ability to carry out a service. Deliverables might also include things such as design documents, project budgets, blueprints, project schedules, prototypes, and so on.

Multiphased Projects

Projects may consist of one or more phases. The phases of a project are often performed sequentially, but there are situations where performing phases concurrently, or overlapping the start date of a sequential phase, can benefit the project. Multiple phases allow the team to analyze project performance and take action in concurrent and later phases to correct or prevent the problems that occurred previously. According to the *PMBOK® Guide*, there are three ways project life-cycle phases could be performed:

Sequential One phase must finish before the next phase can begin.

Iterative More than one phase is being performed at the same time.

Overlapping One phase starts before the prior phase completes.

Sometimes phases are overlapped to shorten or compress the project schedule. This is called *fast tracking*. Fast tracking means that a later phase is started prior to completing and approving the phase, or phases, that comes before it. This technique is used to shorten the overall duration of the project.

Project Phases vs. Project Management Process Groups

Don't confuse project phases and project life cycles with the project management process groups. Project phases and life cycles describe how the work associated with the product of the project will be completed. For example, a construction project might have phases such as feasibility study, design, build, inspection, and turnover. The five project management process groups (Initiating, Planning, Executing, Monitoring and Controlling, and Closing) organize and describe how the project activities will be conducted in order to meet the project requirements. These processes are generally performed for each phase of a large project. The five process groups are the heart of the *PMBOK® Guide*. Be certain you understand each of these processes as they're described in the *PMBOK® Guide*.

Agile Methodologies

Agile project management is a method of managing projects in small, incremental portions of work that can be easily assigned, easily managed, and completed within a short period of time.

An agile project management approach allows the team to quickly adapt to new requirements and allows for the continual assessment of the goals, deliverables, and functionality of the product.

You'll want to choose an agile, or adaptive, methodology when active participation of your stakeholders is required throughout the project, when you are not certain of all the requirements at the beginning of the project, or when you work in a changing environment.

Agile is a highly iterative approach where requirements can be continually defined and refined based on continuous feedback from the product owner. This allows the development team to quickly adapt to changes and accommodate new or modified functionality requests.

Agile has been around for many years in one form or another. In 2001, several software developers converged to formalize the agile approach. They published the *Manifesto for Agile Software Development* (`agilemanifesto.org`) and identified 12 principles that are the focus of any agile approach. These principles include factors such as daily interactions

between the business and agile teams, frequent deliverables, and self-motivated teams, with a focus on continuous improvement.

One of the key principles in the *Agile Manifesto* is the focus on the value to the customer. Instead of measuring how efficiently a certain process runs or the quality of a deliverable, attention is given to the value the customer perceives. For example, this value may include a tangible deliverable that contains functionality that's critical to the success of the project; business value is thereby created during each period of work. Rather than measuring project success based on the "on time and on budget" approach, success is measured by the progress made in incremental steps and the value that the functionality or deliverables bring to the stakeholders as the project is progressively elaborated.

There are several agile methodologies to choose from. Some are more suited for software development projects and some more suited for manufacturing processes. All of them have elements that can be applied to your next project. We'll look at each next.

Scrum

Scrum is a form of agile project management. Scrum project teams consist of cross-functional team members and are self-organized and self-directed. Scrum emphasizes daily communication and the flexible reassessment of plans, which are carried out in short, iterative phases of work called *sprints*. Sprints are always time-bound and generally consist of two-week time periods, but they can consist of any short period of time defined and agreed on by the team. The goal of the sprint is to produce a deliverable, or a tangible portion of a deliverable, by the end of the sprint. Sprint is a term that is specific to the Scrum methodology. Other agile methodologies use this same time-bound approach and call these short work periods *iterations*.

Scrum is most commonly used in software development projects for similar reasons to those just stated. Using an agile approach, a development team can assess results and adjust processes in order to meet new or modified requirements during or after each sprint. Prototypes can be delivered early and tangible progress is made in each sprint.

Scrum is customer focused, meaning that the project team gathers the wish list from the customers (sometimes called end users), listing all the elements that will make the product great. These are called *user stories* or, simply, *stories*. User stories contain features that are written from the perspective of the end user.

The user stories are kept in the *product backlog*. Keep in mind that the product backlog contains all the user stories that define the features and elements that make up the requirements of the project. Once they are all documented, they are prioritized by the customer in order of importance. Then, a few user stories are chosen from the backlog and worked on during each sprint. The Scrum team estimates the amount of work involved to complete each user story at the beginning of the sprint. The completed results are released at the end of the sprint for the customer to validate. User stories that were not completed in the previous sprint, or those that require changes, along with new user stories, are worked on in the next sprint, and the cycle repeats until the project is completed.

Kanban

Kanban is a lean scheduling agile methodology that was developed by the Toyota Motor Corporation. Kanban is an agile project management methodology that is typically seen in manufacturing projects, but it also has a presence in the information technology field. With Kanban, the work is balanced against available resources or available capacity for work. It's a pull-based concept where work progresses to the next step only when resources are available. It's also considered an on-demand scheduling methodology because the work is pulled through the system according to demand.

Kanban means "billboard" or "sign." Using Kanban, you construct a board that represents your project. The Kanban board can be physical, like a whiteboard, or you can use software to manage the board. The Kanban board is simple to construct and looks somewhat like Figure 1.3 in the beginning of the project.

FIGURE 1.3 Kanban board at the start of the project

Product Backlog	Build	Test	Done
Item 1 Item 2 Item 3 Item 4			

Any number of columns can exist in between the Product Backlog and Done columns. It's up to the team to define the stages of work represented by the columns on the board.

Kanban consists of one or more product owners, who are responsible for creating the work list. Each of the tasks are called user stories, tasks, or cards. In Figure 1.3, each of the sticky notes represents a task. Initially the product backlog contains all the notes, but as the project begins and team members start to work on tasks, the notes are moved from the product backlog to the next column to the right. As a sticky note task is completed in a given column, it is moved to the next column to the right, and so on. Once a note has vacated a column, a new note can move into its place. You can use the terms *story*, *task*, or *card* interchangeably. They all mean the same thing: time-bound modularized tasks with discrete deliverables.

In this regard, Kanban is like Scrum. Both are called *pull systems*, meaning that as a task moves from one column to the next, a new task is pulled from the previous column. However, unlike Scrum, which uses sprints that typically consist of two to four weeks' worth of work, Kanban is a continuous system. The work does not start and stop but continues through to completion. There are no sprints in Kanban. The Kanban methodology may involve more than one team working on different functional aspects of the work, although they all work from the same Kanban board in a continuous manner.

Lean

Lean is another agile methodology that is concerned with making work processes as efficient as possible while also assuring that the quality of the output is excellent. Lean thinking aims to reduce or eliminate waste. Much of lean thinking is derived from Toyota executives such as Taiichi Ohno. Although thinking lean is primarily focused on manufacturing, it does not mean that the principles cannot be used in other project management efforts.

Kaizen is a lean methodology. Kaizen means continuous improvement in Japanese. The idea behind Kaizen is to continually improve service and quality and reduce waste. Waste is anything the project team is doing that doesn't add value to the process. The foundational belief of Kaizen is that everything can be improved. Kaizen involves every person in the organization—from the CEO to project managers to line workers. They are charged with looking at their jobs and activities in a new light and finding ways to improve productivity and decrease waste in small steps over time. This isn't about looking for a large, onerous problem (although if you find one, you should deal with it) but about looking for small things that produce inefficiencies or waste in the process. For example, perhaps your PMO requires approvals and sign-offs on every document and nearly every task performed on the project. This is likely overkill, and eliminating many of the unnecessary approvals can free up the project managers to work on actual project tasks, thereby delivering project value more quickly. Other examples that come to mind are holding too many meetings that don't add value, implementing tools or processes that aren't effective and that the team avoids using, and requiring too much movement because team members are in different physical locations across the city or the globe. This philosophy could be applied to any number of activities.

Using the Kaizen approach, workers look for places where the seven wastes may appear and then take steps to reduce or eliminate them. The seven wastes are listed here. Reducing or eliminating them by changing your work to make it more efficient is the essence of Kaizen.

Motion This concerns the movement, or amount of motion, employees go through while performing their work. Examine whether they move too much or too little.

Waiting Examine whether workers have times where they are simply waiting for the next task and find ways to decrease that wasted time.

Transportation Moving items or elements of work takes time; put the items needed to complete a task next to the employee.

Storage Storing materials for tasks or storing completed items for shipment can create waste. Keep materials and supplies organized and easily accessible to employees to reduce waste.

Defects Defects may be introduced by manufacturing defective parts or by making mistakes in the work. Examine the causes of defects and determine ways to eliminate them.

Processing This could involve creating too much or too little effort when processing goods or services. Reducing efforts in processing will reduce waste.

Overproduction This involves making too much of something. This could impact waiting times or storage as well.

Extreme Programming

Extreme Programming (XP) is another agile methodology used in software development. Technology changes rapidly and development teams today do not usually have the luxury of taking years to develop new products. XP involves delivering the software that's needed when the customer needs it. Consider using XP under these conditions:

- When there are dynamically changing user requirements. This typically happens when the customer, or end user, doesn't have a clear idea of what they need.
- When a high amount of risk is associated with the project.
- When you have small development teams of between two and twelve programmers.

XP requires that all project team members work together collaboratively to create the product of the project. They need to work side by side in order to bring about cohesiveness and be able to collaborate instantly. XP also requires automated unit and functional tests. Unit tests are tests on small, whole units of code to determine whether the code is functional. Integration testing involves testing several pieces of the code together to see if they perform as expected. Functional testing is an end-to-end test to ensure the code works throughout the entire process.

You will learn more about these agile techniques throughout the remainder of the book. I will also explain other agile methods when appropriate as we come to them.

Six Sigma

Six Sigma (also represented as the number six, and the Greek letter sigma—6σ) consists of a set of management techniques designed to do away with defects and increase productivity to its maximum. Six Sigma practitioners are highly regarded, well paid, and leaders in the lean manufacturing project management industry.

Six Sigma analysts typically look at one process at a time to evaluate the process for defects or errors. They correlate that information using statistical techniques and look for ways to improve the process. Six Sigma is discipline oriented and focuses on developing and practicing disciplines that improve and maintain quality.

Hybrid

A *hybrid* methodology is just like the name implies: it's a combination of one or more methodologies to create what works best for your team. This combination could include aspects of predictive and adaptive methodologies, or a combination of adaptive methodologies. Hybrid does not mean that there is an equal distribution of methodologies. You may work on a project where a waterfall approach is used to document requirements and it accounts for a third of the project time. The remainder of the project will utilize an agile approach, but the combination of approaches means this is technically a hybrid development life cycle. A good friend of mine calls the combination of waterfall and agile "Wagile."

Project Life Cycles

Life cycles, as you'll recall from an earlier section in this chapter, are all the phases a project progresses through from the beginning of the project to the end.

Table 1.4 highlights the differences in the life cycles between an agile approach (highly adaptive) and a waterfall approach (highly predictive). The hybrid of the two methodologies is listed in the middle of the chart. This hybrid column could read "It depends" for every entry, because the more the organization leans toward predictive (versus adaptive), the more the hybrid approach will behave as predictive does and will produce similar results. If the approach is more predictive, the planning will be more methodical in the beginning of the cycle with few changes. If it's more adaptive, the approach will be iterative and incremental. The bottom portion of the table highlights the differences between these life cycles and their interaction with each project process group.

TABLE 1.4 Life cycle differences

	Highly predictive (waterfall)	Hybrid	Highly adaptive (agile)
Requirements	Detailed specifications	High-level planning and iterative refinements	Progressively elaborated during each iteration
Risks	A good deal of time is spent at the beginning of the project identifying risks. They are continually identified throughout the project.	Risks are iteratively identified throughout the project.	Risks are identified at the beginning of each iteration.

	Highly predictive (waterfall)	Hybrid	Highly adaptive (agile)
Costs	A good deal of time is spent at the beginning of the project documenting costs. Once the budget is established, there is little room for change.	Costs may be identified at the beginning of the project with some consideration for changes as the project progresses.	Costs are identified with each of the iterations. A high-level budget may be established at the beginning of the project but cost and time estimates are performed at the beginning of the iteration.
Stakeholders	Heavily involved in gathering and documenting requirements. Their involvement tapers off as the project progresses.	More involvement than highly predictive approach and less involvement than highly adaptive approach	Continuous involvement and frequent feedback because the stakeholders work beside the project team
Schedule	Created once for the project or phase	May be created once with high-level milestones and further defined as the project progresses.	Each iteration is its own schedule. The work of the iteration is defined at the beginning of each sprint.
Planning	Once the plan is approved, changes that impact scope, time, or budget are controlled and minimized.	A high-level plan is developed at the beginning of the project and further elaborated as the project progresses.	There is progressive elaboration of scope based on continuous feedback.

Understanding How This Applies to Your Next Project

As you can tell from this first chapter, managing projects is not for the faint of heart. You must master multiple skills and techniques in order to complete projects successfully.

I talked about the definition of a project in this chapter. You'd be surprised how many people think ongoing operations are projects. Projects create business value and move the organization from one state to another. This can be subtle or significant, depending on the project.

Projects come about for many reasons. Most of the time, understanding the reason it came about will give you some insight into its purpose. For example, if a new law is passed

that requires anyone applying for a driver's license to show two forms of identification but the existing system has the space to record verification of only one document, you immediately have a firm grasp on the purpose of the project—you'll have to update the system to include additional space for recording the second document.

I've made the mistake of thinking the project management process groups are overkill for a small project. My team once embarked on a small project and thought that within a matter of weeks we'd have it wrapped up and delivered. We neglected to get signatures from the project requestor on the agreed-on scope, and, you guessed it, the scope grew and grew and changed several times before we were able to get the project back under control. If you're reading between the lines here, you can also tell we didn't have adequate change control in place. As you progress through the book, I'll highlight the important processes you'll want to include on all projects, large and small, so you don't get caught in this trap.

It's important to understand the differences in project management methodologies. Some projects need a waterfall approach whereas other projects would benefit from an agile approach where continuous feedback is provided. I work in the information technology industry and we often employ agile methodologies to our projects. It allows us to get continuous feedback from the customer and keeps us from developing something that isn't useful for our customers at the end of the project.

Summary

Phew! We covered a lot of ground in this chapter. You learned that projects exist to bring about a unique product, service, or result. Projects are temporary in nature and have definite beginning and ending dates.

I detailed how projects are initiated. Projects come about as a result of one of seven needs or demands: market demands, organizational needs, customer requests, technological advances, legal requirements, ecological impacts, or social needs. Other factors that bring about projects are strategic opportunity or business need, competitive forces, political changes, new technology, stakeholder demands, business process improvements, and material issues.

Project management is a discipline that brings together a set of tools and techniques to describe, organize, and monitor the work of project activities. Project managers are the ones responsible for carrying out these activities. Projects might be organized into programs or portfolios and might be managed centrally by a PMO.

All projects have one or more phases, and the progression of phases from the beginning to the end of the project is known as a project life cycle. There are also development life cycles that can occur within a project life cycle.

The project management process groups are performed throughout the project's life cycle. The process groups described in the *PMBOK® Guide* are Initiating, Planning, Executing, Monitoring and Controlling, and Closing.

The adaptive, or agile, methodology is a method of managing projects in small, incremental portions of work that can be easily assigned, easily managed, and completed

within a short period of time. Predictive methodologies, also known as waterfall, typically require one process or phase of the project to be completed before moving to the next. A hybrid methodology is a combination of both waterfall and agile practices.

Scrum, Kanban, and XP are agile methodologies that are used in the information technology industry. Lean, Kaizen, and Six Sigma are primarily used in the manufacturing industry, and Kanban has some applications in this industry as well. Keep in mind that there are aspects of any of these methodologies that may apply to your project.

Exam Essentials

Be able to describe the difference between projects and operations. A project is temporary in nature with a definite beginning and ending date. Projects produce unique products, services, or results. Operations are ongoing and use repetitive processes that typically produce the same result over and over.

Be able to distinguish between the seven needs or demands that bring about project creation. The seven needs or demands that bring about project creation are market demand, organizational need, customer requests, technological advances, legal requirements, ecological impacts, and social needs.

Other factors that bring about projects are strategic opportunity or business need, competitive forces, political changes, new technology, stakeholder demands, business process improvements, and material issues.

Be able to describe a feasibility study. A feasibility study is used to determine the viability of the project, the probability of success, and the viability of the product, service, or result of the project.

Be able to name the five project management process groups. The five project management process groups are Initiating, Planning, Executing, Monitoring and Controlling, and Closing.

Be able to denote the skills listed in the PMI® Talent Triangle™. The three skills are technical project management, leadership, and strategic and business management.

Be able to denote some of the skills every good project manager should possess. Communication, organizational, problem solving, negotiation and influencing, leading, team building, technical, and business knowledge are skills a project manager should possess.

Be able to name the three types of PMO organizations. The three types of PMO organizations are supportive, controlling, and directive.

Be able to name the three types of development life cycles. They are predictive (known as waterfall), adaptive (known as agile), and hybrid.

Be able to describe the agile project management methodology. A method of managing projects in small, incremental portions of work that can be easily assigned, easily managed, and completed within a short period of time. Agile involves continuous stakeholder involvement and feedback.

Be able to describe the difference between Scrum and Kanban. Scrum and Kanban are both agile methodologies. Scrum teams complete work in short, time-bound periods called sprints. Kanban is a continuous system. The work does not start and stop but continues through to completion. Kanban is also known as an on-demand scheduling system. Both Scrum and Kanban are known as pull systems.

Review Questions

You can find the answers to the review questions in Appendix A. Be sure to download the Bonus Exams and Bonus Questions so that you'll have a broader exposure and more experience answering questions related to the topics in this chapter.

1. Which organization has set the de facto standards for project management principles, processes, and techniques?
   - **A.** PMBOK®
   - **B.** PMO
   - **C.** PMI®
   - **D.** PBO

2. You work for a textile manufacturing firm. Your organization is introducing a new color line for their drapery materials. Changing colors for these materials during the manufacturing process is straightforward. This is considered which of the following?
   - **A.** Project initiation
   - **B.** Ongoing operations
   - **C.** A project
   - **D.** Project execution

3. Your company manufactures small kitchen appliances. It is introducing a new product line of appliances in designer colors with distinctive features for kitchens in small spaces. These new products will be offered indefinitely starting with the spring catalog release. Which of the following is true?
   - **A.** This is a project because this new product line has never been manufactured and sold by this company before.
   - **B.** This is an ongoing operation because the company is in the business of manufacturing kitchen appliances. Introducing designer colors and features is simply a new twist on an existing process.
   - **C.** This is an ongoing operation because the new product line will be sold indefinitely. It's not temporary.
   - **D.** This is not a project or an ongoing operation. This is a new product introduction not affecting ongoing operations.

4. Your company manufactures small kitchen appliances. It is introducing a new product line of appliances in designer colors with distinctive features for kitchens in small spaces. This project was approved by the stakeholders and you have been appointed the project manager. These new products will be offered starting with the spring online release. To determine the characteristics and features of the new product line, you will have to perform which of the following? (Choose two.)
   - **A.** Defining business value for the new product line
   - **B.** Consulting with the stakeholders about the characteristics and features of the new product line

C. Planning the project life cycle for the project

D. Progressively elaborating the characteristics and features of the new product line

5. You've been hired as a manager for the adjustments department of a nationwide bank based in your city. The adjustments department is responsible for making corrections to customer accounts. This is a large department, with several smaller sections that deal with specific accounts, such as personal checking or commercial checking. You've received your first set of management reports and can't make heads or tails of the information. Each section appears to use a different methodology to audit their work and record the data for the management report. You request that a project manager from the PMO come down and get started right away on a project to streamline this process and make the data and reports consistent. This project came about as a result of which of the following?

A. Technological advance

B. Organizational need

C. Customer request

D. Legal requirement

6. Which of the following applies a set of tools and techniques used to describe, organize, and monitor the work of project activities to meet the project requirements?

A. Project managers

B. The *PMBOK® Guide*

C. Project management

D. Stakeholders

7. Which of the following are true regarding multiphased relationships? (Choose three.)

A. Planning for an iterative phase begins while the work of other phases is progressing.

B. Overlapping phases occur when more than one phase is being performed at the same time.

C. During sequentially phased projects, the previous phase must finish before the next phase can begin.

D. Phase reviews should occur at the end of every phase.

8. Agile project life cycle methodologies are characterized by which of the following? (Choose three.)

A. Dividing tasks into small deliverables that can be completed in a short time frame.

B. Using a step-by-step process where one task is completed followed by another.

C. This methodology is used primarily in the software development industry but can be applied across other industry areas.

D. This methodology allows the project team to quickly adapt to new requirements and receive continuous feedback.

9. Your company sells Internet of Things appliances. They've just learned that another company is going to offer the same appliances you offer with new, updated features and functionality. Your project came about to incorporate similar features in your product line. What is the business reason or need that brought this project about?

- **A.** Technological advance
- **B.** Competitive forces
- **C.** Market demand
- **D.** Business process improvements

10. All of the following statements are true except for which one?

- **A.** Programs are groups of related projects.
- **B.** Project life cycles are collections of sequential, iterative, and overlapping project phases.
- **C.** A project may or may not be part of a program.
- **D.** Portfolios are collections of interdependent projects or programs.

11. What are the five project management process groups, in order?

- **A.** Initiating, Executing, Planning, Monitoring and Controlling, and Closing
- **B.** Initiating, Monitoring and Controlling, Planning, Executing, and Closing
- **C.** Initiating, Planning, Monitoring and Controlling, Executing, and Closing
- **D.** Initiating, Planning, Executing, Monitoring and Controlling, and Closing

12. During which project management process group are risk and stakeholders' ability to influence project outcomes the highest?

- **A.** Planning
- **B.** Executing
- **C.** Initiating
- **D.** Monitoring and Controlling

13. Which of the following are true about a PMO? (Choose three.)

- **A.** There are three types of PMOs: supportive, controlling, and collaborative.
- **B.** The PMO is often responsible for implementing the OPM.
- **C.** The key purpose of the PMO is to provide support to project managers.
- **D.** The PMO facilitates communication within and across projects.

14. Which of the following agile methodologies describes the seven wastes?

- **A.** Scrum
- **B.** Six Sigma
- **C.** Kaizen
- **D.** Kanban

15. Which of the following agile methodologies are a type of pull system? (Choose two.)

- **A.** Kaizen
- **B.** Six Sigma
- **C.** Lean
- **D.** XP
- **E.** Scrum
- **F.** Kanban

16. Which of the following agile methodologies relies heavily on statistical data?

- **A.** Kaizen
- **B.** Six Sigma
- **C.** Lean
- **D.** XP
- **E.** Scrum
- **F.** Kanban

17. Which of the following are characteristics of a predictive methodology? (Choose three.)

- **A.** The results of the work of the project are often not delivered until the end of the project.
- **B.** This methodology requires continuous feedback from your stakeholders throughout the project.
- **C.** Changes to the project require a review of project plans and documenting the changes in the project plan.
- **D.** Predictive methodologies might use a phased approach where deliverables are produced at the end of each phase.
- **E.** The project team reviews the work of the project with the stakeholders in an iterative fashion so that they can incorporate modifications to functionality in the next phase.

18. Which of the following are true regarding the *Agile Manifesto*? (Choose two.)

- **A.** It is concerned with the quality of the deliverable.
- **B.** Success is measured in incremental steps.
- **C.** The focus is on the value to the customer.
- **D.** It measures how efficiently the process was performed.
- **E.** It is concerned with business process improvements.

19. Match the following terms with the statements that describe them.

Term	Description
A. Project and program management	1. Concerned with working on the right projects at the right time
B. Portfolio management	2. Centralized unit that oversees the management of projects throughout the organization
C. Organization project management	3. Focus on performing the projects in the right way
D. Project management office	4. Ensures projects are aligned with the organization's strategic business objectives

20. Your project team has a solid idea of the requirements for the project up front. Some specific elements of the deliverables are known at this point. Not all deliverables have been completely defined yet. The team would like to start with the known requirements and specific deliverables and then change their approach later in the development phase to incrementally deliver results. What development life cycle does this describe?

A. Incremental

B. Predictive

C. Hybrid

D. Agile