Absolute Beginner's Guide to Project Management

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About the Author

Gregory M. Horine is a published author (*PMP Exam Cram 2*) and certified project management and business technology professional (PMP, CCP) with more than 16 years of consulting experience across multiple industries. His primary areas of professional expertise include

- Project management and leadership
- Complex application development
- Enterprise solution development
- Business process analysis and improvement
- Data analysis and transformation
- Package implementation and integration
- Vendor and procurement management
- Regulatory and process compliance
- Project management tools
- Computer systems validation
- Testing processes
- Quality and risk management

In addition, Mr. Horine holds a master's degree in computer science from Ball State University and a bachelor's degree in both marketing and computer science from Anderson College (Anderson, IN).

Through his "servant leadership" approach, Mr. Horine has established a track record of empowering his teammates, improving project communications, overcoming technical and political obstacles, and successfully completing projects that meet the targeted objectives.

Mr. Horine is grateful for the guidance and the opportunities that he has received from many mentors throughout his career. Their patience and influence has resulted in a rewarding career that has been marked by continuous learning and improvement.

You can access a recent interview of Mr. Horine by the Canadian Information Processing Society (CIPS) and the Networking Professionals Association (NPA) at these respective websites:

http://www.npanet.org/public/interviews/careers_interview_121.cfm

http://www.stephenibaraki.com/cips/feb04/ghor.asp

When not engaged in professional endeavors, Mr. Horine hones his project management skills at home with his lovely wife, Mayme, and his five incredible children: Michael, Victoria, Alex, Luke, and Elayna.

Dedication

This book is dedicated to the "students" that I constantly visualized in my mind as I developed this book—the bright and caring family that surround my life, including my wife, parents, siblings, in-laws, aunts, uncles, cousins, and grandparents.

This book is also dedicated to the parents, families, practitioners, and researchers who are diligently fighting to rescue children from autism spectrum disorders.

This book is dedicated to my key inspirational sources: my incredible wife, Mayme (I wake-up everyday with a smile in my heart knowing I am married to her), and my "fabulous five" children: Michael, Victoria, Alex, Luke, and Elayna (each one is a hero to me).

Acknowledgments

I am grateful for the patience, support, and teamwork demonstrated by the following individuals: my editors, Loretta Yates and Songlin Qiu; the entire Que Publishing team; the management team at INRANGE Consulting Corporation; my project team; and my parents (Carla and Bud).

I extend a special thanks to my technical editor, Mr. Andrew Cline, for his perspective and insights. It was a pleasure working with you on this venture.

I wish to acknowledge the talents and professionalism of Mr. Craig Thurmond for his graphical design contributions to this book.

We Want to Hear from You!

As the reader of this book, *you* are our most important critic and commentator. We value your opinion and want to know what we're doing right, what we could do better, what areas you'd like to see us publish in, and any other words of wisdom you're willing to pass our way.

As an associate publisher for Que Publishing, I welcome your comments. You can email or write me directly to let me know what you did or didn't like about this book—as well as what we can do to make our books better.

Please note that I cannot help you with technical problems related to the topic of this book. We do have a User Services group, however, where I will forward specific technical questions related to the book.

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INTRODUCTION

As organizations continue to move toward "project-based" management to get more done with less resources, and as the demand for effective project managers continues to grow, more and more individuals find themselves with the "opportunity" to manage projects for the first time.

In an ideal world, every new project manager candidate would complete certified project management training programs and serve as an apprentice before starting their first project manager opportunity, but...this is the real world. In many cases, a quicker, more accessible, and more economical alternative is needed to guide this audience in managing projects successfully the first time.

The *Absolute Beginner's Guide to Project Management* is intended to provide this alternative with a helpful, fun, and informative style.

About This Book

Let's take a quick review of the objectives and approach of this book.

Objectives

The objectives of this book include the following:

- To be an easy-to-use tutorial and reference resource for any person managing their first project(s)
- To teach the key concepts and fundamentals behind the project management techniques

  If these are understood, they can be applied effectively independent of toolset, environment, or industry
- To reduce the "on-the-job" learning curve by sharing the traits of successful projects and "lessons learned" from less-than-successful projects
- To balance the breadth of topics covered with adequate depth in specific areas to best prepare a new project manager
- To review the skills and qualities of effective project managers

  Emphasize the importance of project "leadership" versus just project "management"

Approach

Consistent with the *Absolute Beginner's Guide* series, this book will use a teaching style to review the essential techniques and skills needed to successfully manage a project. By "teaching" style, we intend the following:

- A mentoring, coaching style.
- Assumes that the reader does not have previous hands-on experience with project management.
- Teaches the material as if an instructor were physically present.
- Task-oriented, logically ordered, self-contained lessons (chapters) that can be read and comprehended in a short period of time (15–30 min).
- Emphasis on understanding the principle behind the technique or practice.
- Teaches the material independent of specific tools and methodologies.
- Teaches the material with the assumption that the reader does not have access to organizational templates or methodologies.
- Provides a summary map of the main ideas covered at the end of each chapter. Research has shown that this type of "mind-map" approach can drive better memory recollection when compared to traditional linear summary approaches.

OUT-OF-SCOPE

The scope of this book is clearly outlined in the table of contents, but as we will cover later, it is always good to review what is out of scope to ensure understanding of the scope boundaries. Since the field of project management is extremely broad, and we needed to draw the line somewhere, this book focuses on the proper management of a single project. As a result, the following advanced project management subjects are not covered in this book:

- Program management
- Enterprise portfolio management
- Enterprise resource management
- Advanced project risk management topics
- Advanced project quality management topics
- Advanced project procurement management topics

Who Should Read This Book?

The *Absolute Beginner's Guide to Project Management* is recommended for any person who fits into one or more of the following categories:

- Individuals unsatisfied with other introductory project management books
- Individuals new to project management, such as
  - Technologists
  - Knowledge workers
  - Students
  - Functional managers
- Professionals taking first project management assignment, such as
  - Team leaders
  - Project coordinators
  - Project administrators
  - Project support
  - Functional managers
- Experienced project managers needing a refresher course
- Experienced project managers with limited formal project management education

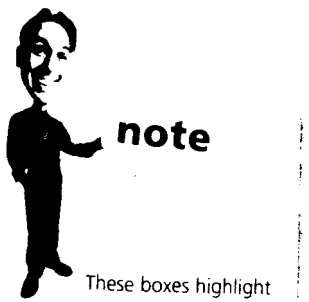
How This Book Is Organized

This book has been divided into four parts:

- Part I, "Project Management Jumpstart," sets up the general framework for our project management discussion and accelerates your project management learning curve, including an insightful review of successful projects and project managers.
- Part II, "Project Planning," reviews the processes that establish the foundation for your project.
- Part III, "Project Control," reviews the processes that allow you to effectively monitor, track, correct, and protect your project's performance.
- Part IV, "Project Execution," reviews the key leadership and people-focused skills that you need to meet today's business demands.

Conventions Used in This Book

- At the beginning of each chapter, you'll find a quick view of the major topics that will be expounded upon as you read through the material that follows.
- The end of each chapter provides a list of key points along with a visual summary map.
- You will also find several special sidebars used throughout this book:

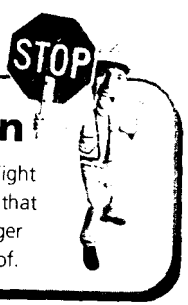


note

These boxes highlight specific learning points or provide supporting information to the current topic.

tip

These boxes highlight specific techniques or recommendations that could be helpful to most project managers.



caution

These boxes highlight specific warnings that the project manager should be aware of.

PART I

PROJECT MANAGEMENT JUMPSTART

In This Chapter

- **Clarify what project management is and "is not" (it's likely more than you think)**
- **Learn why projects are challenging to manage**
- **Understand why project management is the key to the future growth of any organization**
- **Learn why the future of project management is bright and why becoming a certified project manager may be a wise career move**
- **Review the latest trends in project management that may impact your first opportunity**

1

Project Management Overview

Since your perceptions surrounding project management will vary depending upon work experiences, education, industry, and roles, it's important to establish some "common ground" before we venture down the road of learning what a project manager must do to be successful in his/her first opportunity.

This chapter provides the "common ground" by clarifying what constitutes project management and why project management is important to both your future and the future of your organization.

What Is Project Management...Exactly?

If you are like most people, you are "pretty sure" you know what projects are, and you "think" you know what project management is (and what a project manager does), but there's always a varying amount of uncertainty in those perceptions. So, let's start off by clarifying some key concepts. *Project management* is simply the process of managing projects (and you thought this was going to be difficult). While this definition is not particularly helpful, it does illustrate three key points:

- Project management is not "brain surgery." Yes, it covers a vast array of subjects, processes, skills, and tools, but the key fundamentals of project management are straightforward and are consistent across industries.
- To better understand project management, we need to understand what a *project* is. The nature of a project provides insights into the scope and challenges of project management.
- To better understand project management, we need to understand what is implied by the term *managing* and how this compares against traditional business management.

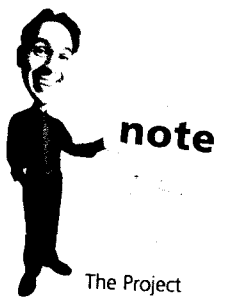
What Is a Project Exactly?

A *project* is the work performed by an organization one time to produce a unique outcome. By "one time," we mean the work has a definite beginning and a definite end, and by "unique," we mean the work result is different in one or more ways from anything the organization has produced before. Examples of projects would include the following:

- Building a new house
- Developing a new software application
- Performing an assessment of current manufacturing processes
- Creating a new radio commercial

This is in contrast to the *operations* of an organization. The operational work is the ongoing, repetitive set of activities that sustain the organization. Examples of ongoing operations include the following:

- Processing customer orders
- Performing accounts receivable and accounts payable activities
- Executing the daily manufacturing orders



note

The Project Management Institute (PMI), the globally recognized standards organization for project management, defines a project as "a temporary endeavor to produce a unique product or service."

To further explain the nature of projects (and project management) and how they compare to the ongoing operations of an organization, please review the summary in Table 1.1.

Table 1.1 Comparing Projects and Operations

Feature	Projects	Operations
Key Similarities	Planned, executed, and controlled Performed by people Resource constrained	Planned, executed, and controlled Performed by people Resource constrained
Purpose	Attain objectives and terminate	Sustain the organization
Time	Temporary Definite beginning and end points	Ongoing
Outcome	Unique product, service, or result	Non-unique product, service, or result
People	Dynamic, temporary teams formed to meet project needs Generally not aligned with organizational structure	Functional teams generally aligned with organizational structure
Authority of Manager	Varies by organizational structure Generally minimal, if any, direct line authority	Generally formal, direct line authority

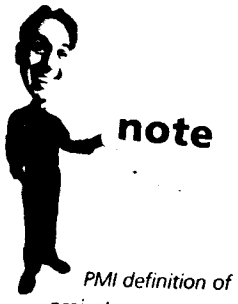
After learning more about the nature of projects, you are beginning to see the inherent challenges involved with project management (and we will detail these out later in this chapter). For now, let's better define "project management."

"Managing" Projects

What do we mean when we say "managing" projects?

- We mean applying both the science and art to planning, organizing, implementing, leading, and controlling the work of a project to meet the goals and objectives of the organization.
- We mean the process of defining a project, developing a plan, executing the plan, monitoring progress against the plan, overcoming obstacles, managing risks, and taking corrective actions.
- We mean the process of managing the competing demands and trade-offs between the desired results of the project (scope, performance, quality) and the natural constraints of the project (time and cost).
- We mean the process of leading a team that has never worked together before to accomplish something that has never been done before in a given amount of time with a limited amount of money.

Sounds like fun, doesn't it? We will explain each of these key aspects of project management in subsequent chapters, and we will discuss many of the specific tasks and responsibilities performed by the project manager in Chapter 2, "The Project Manager," but for now we just want to align our general understanding of project management.



PMI definition of project management—The application of knowledge, skills, tools, and techniques to project activities to meet project requirements.

An Academic Look

To further assist this alignment process, let's look at project management from a more academic level. The Project Management Institute (PMI) defines project management as a set of five process groups (refer to Table 1.2) and nine knowledge areas (refer to Table 1.3).

Table 1.2 Description of Project Management Process Groups

#	Process Group	Description per PMBOK 2000 Edition	Common Terms
1	Initiating	Authorizing the project or phase	"preliminary planning" "kicking off"
2	Planning	Defining and refining objectives of the project and selecting the best course of action to attain those objectives	"defining" "developing the plan" "setting the stage"
3	Executing	Coordinating the people and resources to implement the plan	"making it happen" "getting it done" "coordinating"
4	Controlling	Ensuring project objectives are met by monitoring and measuring progress regularly to identify variances from the plan so that corrective actions can be taken	"tracking progress" "keeping on course"
5	Closing	Formalizing acceptance of project or phase and bringing to an orderly end	"client acceptance" "transition" "closeout"

Figure 1.1 summarizes the relationships among the project management process groups, which is based on PMBOK 2004 Edition (Figure 3-2 page 40).

FIGURE 1.1
Project management process relationships.

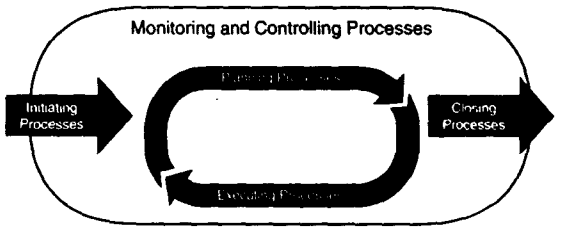


Table 1.3 Description of PMBOK Knowledge Areas

#	Knowledge Area	Description per PMBOK 2000 Edition	Common Deliverables
1	Project Integration Management	Processes required to ensure the elements of the project are properly coordinated	Project Charter Project Plan Change Requests Work Results
2	Project Scope Management	Processes required to ensure that project includes all the work that is required and only the work that is required to complete the project successfully	Scope Statement Work Breakdown Structure Formal Acceptance
3	Project Time Management	Processes required to ensure timely completion of the project	Network Diagram Task Estimates Project Schedule
4	Project Cost Management	Processes required to ensure the project is completed within the approved budget	Resource Requirements Cost Estimates Project Budget
5	Project Quality Management	Processes required to ensure the project will satisfy the needs for which it was undertaken	Quality Management Plan Checklists Quality Reviews
6	Project Human Resources Management	Processes required to make the most effective use of the people involved with the project	Role and Responsibility Matrix Organization Chart Performance Evaluations
7	Project Communications Management	Processes required to ensure the timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information	Communication Plan Status Reports Presentations Lessons Learned
8	Project Risk Management	Processes concerned with identifying, analyzing, and responding to project risk.	Risk Management Plan Risk Response Plan Risk Log
9	Project Procurement Management	Processes required to acquire goods and services outside the performing organization	Procurement Plan Statement of Work Proposals Contracts

Again, depending on your experiences, you may not have realized that project management consisted of all this, and you may not actually perform all of these activities as a project manager in your organization. However, it is important and helpful to understand how big your playing field is when learning something new. This book will not completely educate you on each of these process groups nor each of the nine knowledge areas, but it will provide you with the knowledge, essential tools and "real-world" insights to make you effective in your first project management opportunity.

Project management is a broad field with great potential for specialized and in-depth study. There are entire books and training classes focused solely on advanced analysis of individual process groups and knowledge areas.

What Is the Value of Project Management?

As operating environment for most organizations continues to become more global, more competitive, and more demanding, organizations must adapt. They must become more efficient, more productive—they must "do more with less." They must continually innovate. They must respond rapidly to a fast-changing environment. *How can they do this? How can they do this in a strategic manner? How can they do this and still have the proper management controls?* They can do this with effective project management. The strategic value points that effective project management can offer an organization include the following:

- Provides a controlled way to rapidly respond to changing market conditions and new strategic opportunities
- Maximizes the innovative and creative capabilities of the organization by creating environments of focus and open communication
- Allows organization to accomplish more with less costs
- Enables better leverage of both internal and external expertise
- Provides key information and visibility on project metrics to enable better management decision-making
- Increases the pace and level of stakeholder acceptance for any strategic change
- Reduces financial losses by "killing off" poor project investments early in their life cycles

In addition to providing apparent value to any organization, project management also offers tremendous value to each of us as individuals. At a personal level, the value of effective project management

- Ensures that our work is put to the best use for the organization and properly recognized
- Provides a career path that offers unique, challenging opportunities on each new project
- Provides a career path that requires all of our abilities and knowledge, including our management, business, people, and technical skills
- Provides a career path that is high in demand, and generally, an increase in income
- Provides a career path that prepares you for organizational leadership positions
- Provides a career path that is recognized more each year as excellent preparation for CxO positions (as more CxO positions are filled by individuals with project management experience)
- Provides a career path that allows you to be on the front lines of strategic organizational initiatives and have major impact on the organization's future

Why Are Projects Challenging?

From what we've covered so far, from your own experiences, or from your reading of trade publications, you likely have some appreciation for the difficulty of completing a successful project. While we address many common challenges in more detail throughout this book, let's review the key reasons why projects are challenging to manage:

- **Uncharted territory**—Each project is unique. The work to be done has never been done before by this group of people in this particular environment.
- **Multiple expectations**—Each project has multiple stakeholders that each have their own needs and expectations for the project.

Stakeholder is the term used to describe individuals and organizations who are actively involved in the project, or whose interests may be impacted by the execution or completion of the project.

- **Communication obstacles**—Due to natural organizational boundaries, communication channels, and team development stages, communication of project information must be proactively managed to ensure proper flow.
- **Balancing the competing demands**—Every project is defined to produce one or more deliverables (scope) within a defined time period (time), under an approved budget (cost) with a specified set of resources. In addition, the deliverables must achieve a certain performance level (quality) and meet the approval of the key stakeholders (expectations). Each of these factors can affect the others, as Figure 1.2 and Figure 1.3 illustrate. For example, if additional functionality (scope, quality) is desired, the time and/or cost (resources needed) of the project will increase. This is a key focus of an effective project manager.

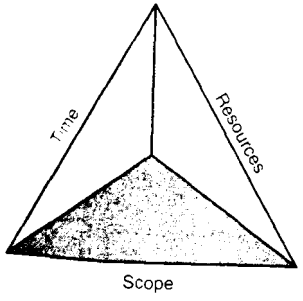


FIGURE 1.2 Competing project demands (traditional model). This figure summarizes the relationships between the natural competing demands of projects.

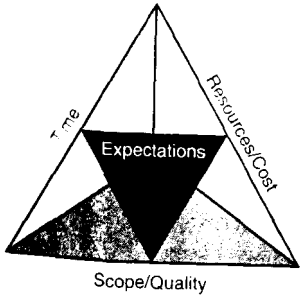


FIGURE 1.3 Competing project demands (modern model). This figure summarizes the relationships between the natural competing demands of projects.

- **Cutting Edge**—Often, projects have a strategic, innovative focus. As a result, they will often deal with new, leading edge technologies. In these cases, the project has more risks, more unknowns, and is much more difficult to estimate accurately.
- **Organizational Impacts**—In addition to overcoming natural communication obstacles created by the project structure, the project manager must also manage overlaps in organizational approval and authority domains, contend with competing priorities for shared resources, deal with annual budget cycles that may not be aligned with the project's funding needs, and ensure that the project is aligned with the focus of the organization.
- **Collaboration**—Depending on the strategic level and scope of your project, your project team will consist of stakeholders across the organization from different functional areas that are likely not accustomed to working together. For project success, these different stakeholders must learn to work together and to understand the others' perspectives in order to make the best decisions for the project. Often, the project manager plays a key facilitating role in this collaboration process.
- **Estimating the Work**—Estimating project work is difficult, yet the time and cost dimensions of the project are built upon these work effort estimates. Given the facts that the work of the project is often unique (never been done before at all, never been done with these tools, and/or never been done by these people), and most organizations do not maintain accurate historical records on previous projects (that may have similar work components), it is difficult to accurately estimate the effort for individual work items, not to mention the entire project. For the entire project, you need to anticipate the quantity and severity of the issues and obstacles that are likely to surface. We'll cover this in more detail in Chapters 7, "Estimating the Work," and 14, "Managing Project Risk."

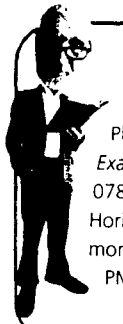
note

The competing project demands are often referred to as the *triple constraint of project management*. Time and Cost (or Resources) are always two sides of the triangle. Depending on where you look, the third side is either Scope, Performance, or Quality. In either case, it's the "output" of the project. Additionally, many recent variations of this model have included the additional demand of Client Expectations.

Growing Demand for Effective Project Managers?

With the value that project management offers any organization, it is easy to understand why more and more industries are adopting project management as the way to do business. As a result, if you check nearly any recent hiring survey or "hot" careers forecast, you will find project management near the top of this list.

With the business trends of global competition and increased worker productivity continuing for the foreseeable future, the demand for successful project managers will only increase. Even in industries and organizations that are experiencing staff reductions, the individuals who have the knowledge, the people skills, and the management competence to solve problems and get projects done will be the individuals most valued and retained by the parent organization.



tip

Please refer to the *PMP Exam Cram 2* book (ISBN: 0789730375; Authors: Greg Horine and David Francis) for more information on the PMP certification process.

In addition, many organizations have either compliance or competitive drivers requiring them to make process improvements to meet process standards set forth by acts of Congress (Sarbanes-Oxley act), government agencies (such as the federal Food and Drug Administration or Environmental Protection Agency), industry standards bodies (such as International Organization for Standards), or industry process models (such as Six Sigma Quality Model, or the Capability Maturity Model Integration for software engineering or project management). In all these cases, effective project management is a requirement to ensure these process improvements are made, sustained, and can be repeated.

As the demand for effective project managers continues to grow and organizations continue to experience varying degrees of success with project management, more organizations are requiring their project managers to be certified. Specifically, they are requesting PMI's Project Management Professional (PMP) certification. Much like a master's of business administration (M.B.A.) degree does not guarantee a person can run a profitable, growing business, the PMP certification does not guarantee a person can successfully manage a project. However, it does provide assurance that the individual does have a baseline level of knowledge and experience.

Trends in Project Management

In addition to the focus on organizational process improvements, there are other trends in business and project management that a first-time project manager is likely to encounter (that they may not have just a decade or less ago).

- **Managing Vendors**—With the increased outsourcing of non-core activities, more projects leverage one or more vendors (suppliers) to get work done. More on this in Chapter 21, "Managing Vendors."

- **Risk Management**—Coinciding with the focus on enterprisewide process improvements and in response to past project experiences, more organizations are placing additional emphasis and formality on their project risk management processes. More on this in Chapter 14, "Managing Project Risks."
- **Quality Management**—Much like the factors driving the emphasis on risk management, the link between rigorous quality management procedures and improved project management practices continues to strengthen. More on this in Chapter 15, "Managing Project Quality."
- **Managing Virtual, Cross-Functional and Multi-Cultural Teams**—With the continuous advancements in workgroup and communications tools, the increased integration of processes within an organization, and the continuous drive for increased organizational efficiencies, it is very likely that your project team will consist of members from different physical locations (virtual), different functional departments (cross-functional), or different cultures (multi-cultural, global). More on this in Chapter 20, "Managing Differences."
- **Change Agent**—Since most projects represent a "change" to business as usual, the project manager is expected to play a key role in leading the stakeholders through the change and acceptance process. More on this in Chapter 16, "Leading a Project," and Chapter 18, "Managing Expectations."
- **Servant Leadership**—Due to a lack of formal authority; the need to understand the requirements of all stakeholders; and the importance of facilitation, collaboration, and managing expectations; there is a growing awareness that a servant leadership style is paramount for effective project management. More on this in Chapter 16.

THE ABSOLUTE MINIMUM

At this point, you should have a high-level understanding of the following:

- The elements of project management.
- The common challenges of managing projects.
- The value of effective project management to an organization.
- The merits of project management as a career choice.
- The latest business and project management trends that may impact your first opportunity.

continues

In addition, I recommend the following online resources for insightful articles on project management:

- www.pmi.org
- www.gannthead.com
- http://www.niwotridge.com/
- http://www.maxwideman.com/pmglossary/
- http://projectmanagement.ittoolbox.com/
- www.pmforum.org
- www.pmousa.com
- www.cio.com

The map in Figure 1.4 summarizes the main points we reviewed in this chapter.

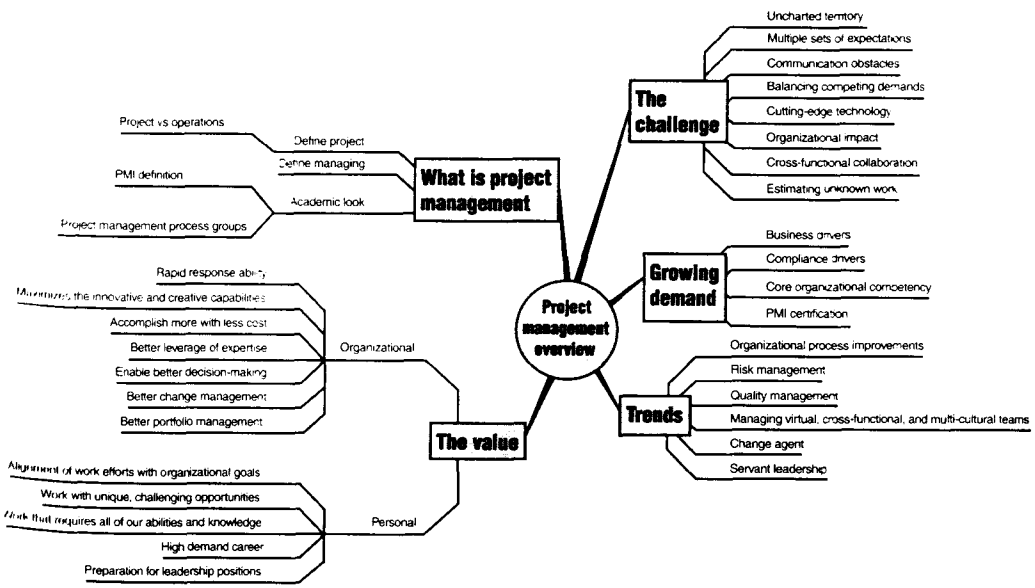


FIGURE 1.4
Project management overview.

IN THIS CHAPTER

2

Review the different roles played by the project manager

Review the key skills every project manager should possess

Learn why some project managers are much more successful than others

Understand the common mistakes made by many project managers

THE PROJECT MANAGER

As we reviewed in Chapter 1, the project manager has many activities to perform, challenges to overcome, and responsibilities to uphold over the life of a project. Depending on your individual experiences, your industry background, and the manner in which project management has been implemented, this review may have been quite enlightening to you.

To ensure that we have a common understanding on what a project manager does, we'll review the different roles a project manager plays over the life of a project, and we'll discuss the prerequisite skills that are needed to perform those roles. Most importantly, we'll accelerate your learning curve by sharing the characteristics of successful project managers and the common mistakes made by many others.

One Title, Many Roles

You've likely heard many of the analogies before to describe the role of project manager—the "captain" of the ship, the "conductor" of the orchestra, the "coach" of the team, the "catalyst" of the engine, and so on. There's truth and insight in each of the analogies, but each can be incomplete as well. To gain better understanding of what a project manager does, let's briefly discuss each of the key roles played by the project manager:

- **Planner**—Ensures that the project is defined properly and completely for success, all stakeholders are engaged, work effort approach is determined, required resources are available when needed, and processes are in place to properly execute and control the project.
- **Organizer**—Using work breakdown, estimating, and scheduling techniques, determines the complete work effort for the project, the proper sequence of the work activities, when the work will be accomplished, who will do the work, and how much the work will cost.
- **"Point Man"**—Serves as the central point-of-contact for all oral and written project communications.
- **Quartermaster**—Ensures the project has the resources, materials, and facilities it needs when it needs it.
- **Facilitator**—Ensures that stakeholders and team members who come from different perspectives understand each other and work together to accomplish the project goals.
- **Persuader**—Gains agreement from the stakeholders on project definition, success criteria, and approach; manages stakeholder expectations throughout the project while managing the competing demands of time, cost, and quality; gains agreement on resource decisions and issue resolution action steps.
- **Problem-Solver**—Utilizes root-cause analysis process experience, prior project experiences, and technical knowledge to resolve unforeseen technical issues and to take any necessary corrective actions.
- **"The Umbrella"**—Works to shield the project team from the politics and "noise" surrounding the project, so they can stay focused and productive.
- **Coach**—Determines and communicates the role each team member plays and the importance of that role to the project success; finds ways to motivate each team member; looks for ways to improve the skills of each team member; and provides constructive and timely feedback on individual performances.
- **"The Bulldog"**—Performs the follow-up to ensure that commitments are maintained, issues are resolved, and action items are completed.

- **Librarian**—Manages all information, communications, and documentation involved in the project.
- **"Insurance Agent"**—Continuously works to identify risks and to develop responses to those risk events in advance.
- **"The Police Officer"**—Consistently measures progress against the plan; develops corrective actions; reviews quality of both project processes and project deliverables.
- **Salesman**—An extension of the Persuader and Coach roles, but this role is focused on "selling" the benefits of the project to the organization, serving as a "change agent," and inspiring team members to meet project goals and overcome project challenges.

Key Skills of Project Managers

While there is a broad range of skills needed to effectively manage the people, process, and technical aspects of any project, it becomes clear there is a set of key skills that each project manager should have. While these skill categories are not necessarily exclusive of each other, let's group them into five (5) categories to streamline our review and discussion:

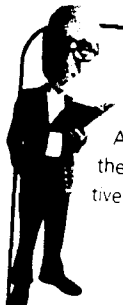
1. **Project Management Fundamentals**—The "science" part of project management, covered in this book, including office productivity suite (such as Microsoft Office, email, and so on) and project management software skills.
2. **Business Management Skills**—Those skills that would be equally valuable to an "operations" or "line-of-business" manager, such as budgeting, finance, procurement, organizational dynamics, team development, performance management, coaching, and motivation.
3. **Technical Knowledge**—The knowledge gained from experience and competence in the focal area of the project. With it, you greatly increase your "effectiveness" as a

note

While there is consensus that the disciplines and techniques used in project management can be applied in any industry, there is no consensus on whether individual project managers can be effective in a different industry.

There is no doubt that the more knowledge and experience that a project manager has in the subject matter area of the project, the more value that he/she can offer. However, depending on the size of the initiative and the team composition, a project manager with different industry experience can bring tremendous value if they are strong in the other four skill categories.

project manager. You have more credibility, and you can ask better questions, validate the estimates and detail plans of team members, help solve technical issues, develop better solutions, and serve more of a leadership role.



tip

Active listening is one of the secret weapons of effective project managers.

4. **Communication Skills**—Since communication is regarded as the most important project management skill by PMI, I felt it was important to separate these out. Skills included in this category would include all written communication skills (correspondence, emails, documents), oral communication skills, facilitation skills, presentation skills and the most valuable—active listening. *Active listening* can be defined as "really listening" and the ability to listen with focus, empathy, and the desire to connect with the speaker.
5. **Leadership Skills**—This category overlaps with some of the others and focuses on the "attitude" and "mindset" required for project management. However, it also includes key skills such as interpersonal and general "people" skills, adaptability, flexibility, people management, degree of customer-orientation, analytical skills, problem-solving skills, and the ability to keep the "big picture" in mind.

I know, I know...after reading this, you are probably thinking either one or more of the following:

- "You must be kidding! I need to be good in all those areas to manage a project?"
- "Wait! I've been on projects before, and I've yet to see a project manager who could do all that."
- "Wait, you must be kidding! If anyone was excellent in all those areas, they'd be a CxO of our company."

To help answer all of these questions, please understand two important observations:

1. Many projects are not successful.
2. You do not need to get an "A" in all of these categories to be successful as a project manager.

note

The specific combination of skills that are required for a project manager to be successful on a given project will vary depending on the size and nature of the project. For example, as a general rule, on larger projects, technical knowledge will be less important that competence in the other four skill categories.

The key is that the project manager has the right mix of skills to meet the needs of the given project. In addition, a self-assessment against these skill categories will allow you to leverage your strengths, compensate for your deficiencies, and focus your self-improvement program.

Qualities of Successful Project Managers

Given the many roles played by a project manager, the broad range of skills needed, and the inherit challenges in successfully delivering a project, we need to find ways to accelerate the learning process. Two key ways to accelerate our learning: understanding the qualities of successful project managers and understanding the common mistakes made by project managers.

Successful project managers do not share personality types, appearances, or sizes, but they do share three important features.

1. They excel in at least two of the five key skill categories (Project Management Fundamentals, Business Management Skills, Technical Knowledge, Communication Skills, Leadership Skills) and are either "good enough" in the other categories or staff their teams to compensate for their deficiencies.
2. They avoid the "common" mistakes described in the next section.
3. They bring a mindset and approach to project management that is best characterized by one or more of the following qualities:
   - **Takes Ownership**—Takes responsibility and accountability for the project; leads by example; brings energy and drive to the project; without this attitude, all the skills and techniques in the world will only get you so far.
   - **Savvy**—Understands people and the dynamics of the organization; navigates tricky politics; ability to quickly read and diffuse emotionally charged situations; thinks fast on the feet; builds relationships; leverages personal power for benefit of the project.
   - **"Intensity with a Smile"**—Balances an assertive, resilient, tenacious, results-oriented focus with a style that makes people want to help; consistently follows up on everything and their resolutions without "annoying" everyone.
   - **"Eye of the Storm"**—Demonstrates ability to be the calm "eye" of the project "hurricane"; high tolerance for ambiguity; takes the heat from key stakeholders (CxOs, business managers, and project team); exhibits a calm, confident aura when others are showing signs of issue or project stress.

- **Strong customer-service orientation**—Demonstrates ability to see each stakeholder's perspective; ability to provide "voice" of all key stakeholders (especially the sponsor) to the project team; strong facilitation and collaboration skills; excellent "active" listening skills.
- **"People-focused"**—Takes a team-oriented approach; understands that methodology, process, and tools are important, but without quality "people" it's very difficult to complete a project successfully.
- **Always keeps "eye on the ball"**—Stays focused on the project goals and objectives. There are many ways to accomplish a given objective. Especially important to remember when "things" don't go as planned.
- **"Controlled passion"**—Balances "passion" for completing the project objectives with a healthy "detached" perspective. This allows him/her to make better decisions, to continue to see all points of view, to better anticipate risks, and to better respond to project issues.
- **"Healthy paranoia"**—Possesses a "healthy paranoia" toward the project. Balances a confident, positive outlook with a realism that assumes nothing, constantly questions, and verifies everything.
- **"Context" understanding**—Understands the "context" of the project—the priority that your project has among the organization's portfolio of projects and how it aligns with the overall goals of the organization.
- **"Looking for trouble"**—Constantly looking and listening for potential risks, issues, or obstacles; confronts doubt head-on; deals with disgruntled users right away; understands that most of these situations are "opportunities" and can be resolved up-front before they become full-scale crisis points.

15 Common Mistakes of Project Managers

While we will review many of the common errors made in each of the fundamental areas of project management throughout this book (so you can avoid them), understanding the most common project management mistakes will help focus our efforts and help us to avoid the same mistakes on our projects. The following are some of the most common mistakes made by project managers:

1. Not clearly understanding how or ensuring the project is aligned with organizational objectives.
2. Not properly managing stakeholder expectations throughout the project.
3. Not gaining agreement and "buy-in" on project goals and success criteria from key stakeholders.
4. Not developing a realistic schedule that includes all work efforts, task dependencies, bottom-up estimates, and leveled assigned resources.
5. Not getting "buy-in" and acceptance on the project schedule.
6. Not clearly deciding and communicating who is responsible for what.
7. Not utilizing change control procedures to manage the scope of the project.
8. Not communicating consistently and effectively with all key stakeholders.
9. Not executing the project plan.
10. Not tackling key risks early in the project.
11. Not proactively identifying risks and developing contingency plans (responses) for those risks.
12. Not obtaining the right resources with the right skills at the right time.
13. Not aggressively pursuing issue resolution.
14. Inadequate requirements definition and management.
15. Insufficient management and leadership of project team.

THE ABSOLUTE MINIMUM

At this point, you should have a high-level understanding of the following:

- The different roles played by the project manager
- The five key skill areas every project manager should master
- The common qualities of successful project managers
- The common mistakes made by project managers

The map in Figure 2.1 summarizes the main points we reviewed in this chapter.

FIGURE 2.1
The Project manager overview.

IN THIS CHAPTER

3

- **Learn what comprises a "successful" project**
- **Understand the common characteristics of "troubled" projects**
- **Review the common characteristics of successful projects**
- **Learn which tools are indispensable to most project managers**

ESSENTIAL ELEMENTS FOR ANY SUCCESSFUL PROJECT

In this chapter, we want to continue the accelerated learning approach we started in the previous chapter. Anytime that you are learning a new field, especially one that is as broad as project management, one of the most effective ways to reduce your learning curve and focus your mental energies is to understand what "successful" people do in the field, and, equally important, understand what "not to do."

With this philosophy in mind, we will take a step up in this chapter and look at "projects" as a whole and not just the project manager position. We will review the leading causes of "troubled" projects, and we'll discuss the common principles, techniques, and tools underlying most successful projects. With this foundation in place, you will better understand the purpose and the value of the fundamentals covered in the rest of this book, and as a result, be much better positioned for success on your initial project management assignment.

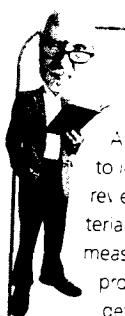
What Exactly Is a "Successful" Project?

You would think it would be relatively straightforward to describe the attributes of a successful project. Well, let's just say this endeavor has kept more than a few "spin doctors," "politicians," and "history revisionists" employed throughout organizations across our great land. Why is this the case? There are several reasons for this.

- There is a lack of universal harmony of what comprises project success metrics. It seems that every project management educational source and organizational process maturity standard has a slightly different definition of project success.
- For many projects, the acceptance and success criteria are never established or agreed to by all key stakeholders.
- In many cases, an organization may define a project as successful even when some of the textbook criteria for project success (such as schedule, cost, client expectations) are not completely met.
- In other cases, a "cancelled" project may be a "successful" project if there was a plan for one or more "go/no-go" decision points.

From a utopian, academic standpoint, the "ultimate" successful project would be defined as a project that:

- **Delivered as promised**—Project produced all the stated deliverables.
- **Completed on-time**—Project completed within the approved schedule.
- **Completed within budget**—Project completed under the approved budget.
- **Delivered quality**—Project deliverables met all functional, performance, and quality specifications.
- **Achieved original purpose**—The project achieved its original goals, objectives, and purpose.
- **Met all stakeholder expectations**—The complete expectations of each key stakeholder were met, including all client acceptance criteria, and each key stakeholder accepts the project results without reservation.
- **Maintains "win-win" relationships**—The needs of the project are met with a "people focus" and do not require sacrificing the needs of individual team members or vendors. Participants on successful projects should be enthusiastic when the project is complete and eager to repeat a similar experience.



tip

An excellent technique is to identify, document, review, and approve any criteria that will be used to measure the success of the project during the project definition and planning processes.

Learning from Troubled Projects

Before we review the common traits of many successful projects, there's a lot to be learned from "less than successful" projects. From my experience, the reasons for project troubles can be generally classified in two groups: organizational-level issues and project-level issues.

One of the key differences in the two groups is the level of control that the project manager has over these factors. For project-level issues, the project manager has tremendous influence on these matters. In most cases, the project manager can either avoid the issue or take action to resolve it if it does occur. For organizational-level issues, the project manager cannot generally "fix" the problem, but the project manager can certainly have influence on them by asking the right questions, anticipating the associated risks and issues, focusing extra efforts to compensate for the issue, and developing contingency plans to minimize the impact on the project.

Also, please note that these issues are not exclusive. In most cases, there is overlap, and if you have one of these factors present in a project, you will generally have others. Table 3.1 summarizes these issues, gives specific examples of each and notes what type of issue it is (organizational, project, or both).

Table 3.1 Common Reasons for Troubled Projects

Reason	Example(s)	Type	Key Learning Point
Project not aligned	Project not aligned with business unit or organizational goals; Project not aligned with other projects	Org.	Verify alignment before project kicks off
Lack of management support	Insufficient funding; Insufficient resources; Issues not resolved; Senior mgmt performance criteria not aligned with project success criteria	Org.	Understand project impact of organizational structure; Ensure proper senior mgmt involvement in project organization: Advocate PMO and Steering Committee structures
Lack of stakeholder "buy-in"	Purpose and goals not clear; "Trust" relationship not established; Inadequate communications; Mismatched expectations; All stakeholders not involved	Both	Gain acceptance of project purpose, goals, and success criteria up front; Ensure all stakeholders are identified and consulted; Constantly communicate and validate understanding
Inadequate project sponsor	Inactive, unengaged sponsor; Lack of leadership; Ethical issues; Not handling organizational issues; Not supportive of project management process	Org.	Educate the sponsor on their roles and responsibilities; Gain formal authorization of project and the project manager position; Understand sponsor's motives and incentives

Table 3.1 (continued)

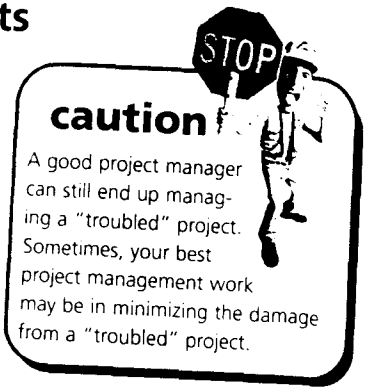
Reason	Example(s)	Type	Key Learning Point
Too many project sponsors	Conflicting project goals; Lack of ownership; Political battles	Org.	Relates to the need for proper project alignment and clear roles and responsibilities
Lack of clarity on roles and responsibilities	Inefficient work efforts; Missed deadlines; Lower team morale; Delayed issue resolution	Both	Use *Responsibility Matrix* to clarify all roles and responsibilities; Review roles and responsibilities with each individual; Validate expectations in advance
Poor communications	Inconsistent, incomplete, or non-existent status information on key project metrics; Inadequate tracking and monitoring of project progress; Not listening to stakeholder concerns or feedback; Not using proper mediums for certain project communications; Messages are not clear or occur too frequently	Project	Develop a project *Communications Plan* that is acceptable to all stakeholders; Establish tracking and monitoring mechanisms during planning; Constantly seek questions and feedback; Understand each stakeholder's perspective; Clearly set context of each message
Price wars	Due to budget reduction measures or market pressures, management agrees to perform project at or below estimated costs	Org.	Develop complete, detailed project budgets; Communicate associated risks; Improve negotiating skills
Resource conflicts	Lack of dedicated team members; Key resources not available when scheduled	Org.	Develop project Resource Plan; Gain commitments from Resource Managers; Encourage centralized organizational structure for resource planning/deployment
Inadequate project manager	Lack of leadership; Inexperienced or untrained project manager; Ineffective project manager	Both	Organizational commitment to PM education; Use of PM mentorship programs
Underestimate change impact	Not understanding the complete effects on both existing processes and people that the "change" introduced by the project will have; Not properly preparing or planning for the "change"	Org.	Use project sponsor and business process owners to champion the new process; Involve additional stakeholders to understand their needs and to solicit their support; Plan for the necessary communications and training (change management plan)

Table 3.1 (continued)

Reason	Example(s)	Type	Key Learning Point
			Plan for the "disruptive" deployment period; Utilize pilot approaches to minimize impact
Inadequate planning	Management does not require or allow time for proper planning; Incomplete scope or deliverables list; Incomplete "work" identification; Lack of detailed schedule; Inadequate risk identification; Assumptions not documented; Lack of schedule and budget contingency	Both	Educate senior mgmt on the value of proper planning; Use standard methodology for project planning; Gain formal acceptance of Project Plan before proceeding; Develop realistic project schedule and budget, as well as tools and processes to keep updated; Identify and document project risks and mitigation strategies
Lack of change control management	Scope of work increases without proper schedule, budget, or resource adjustments; Changes occur to deliverables, schedule, or budget without proper notification and approval	Project	Utilize formal change control procedures to properly assess and communicate any change to the scope, schedule, budget, and targeted project deliverable
Lack of completion criteria	Missed stakeholder expectations; Increased costs or missed deadlines due to re-work; Lack of smooth transition from one phase to another	Both	Ensure success criteria is established during planning phase; Define user acceptance criteria for project deliverables; Define exit criteria for project phases
Inadequate progress tracking	Inability to measure project status and probability for success; Inability to review project at key points to make go/no-go decisions	Both	Establish and execute periodic status meetings and reporting (weekly in most cases); Review project at scheduled intervals against established criteria to determine if project should progress into next phase
Unforeseen technical difficulties	Effort spent resolving technical issues drive missed schedules and increased costs; Unproven technology does not meet user expectations	Project	Structure project to deal with high risk technical challenges early in the project; Prove the technology before making additional investment; Leverage technical expertise to support team capabilities

Learning from Successful Projects

After reviewing what makes a project successful and the common ills that befall many "troubled" projects, you likely have a good sense of the qualities and traits shared by most successful projects. While no two projects are ever the same, and every project has its own unique set of challenges, there is a common core of principles that successful project share. By understanding these, a new project manager can better prioritize and better focus his/her project management efforts. These qualities are generally true about successful projects:



- Project is aligned with organizational goals.
- Project has effective management support.
- Project has effective leadership.
- All key stakeholders are in agreement on the purpose, goals, and objectives of the project.
- All key stakeholders share a common vision on the project results.
- All key stakeholders share *realistic* expectations for the project results.
- The project results meet the expectations of the key stakeholders.
- Stakeholder expectations are constantly managed and validated throughout the project.
- There is an investment made in proper planning.
- The project scope, approach, and deliverables are clearly defined and agreed upon during planning.
- Each stakeholder and team member's role(s) and responsibilities are clearly communicated and understood.
- A high priority is placed on accurate and complete work effort estimates.
- A realistic schedule is developed and agreed upon.
- The project team has a strong results-focus and customer-orientation.
- Project communications are consistent, effective, and focused on "understanding."
- Project progress is measured consistently from the current baseline.
- Project issues and subsequent action items are aggressively pursued.
- There is a strong sense of collaboration and teamwork.

- Expectations and changes surrounding scope, quality, schedule, and cost are closely managed.
- Project resources are skilled and available when needed.
- Project team proactively identifies risk and determines mitigation strategies to reduce project exposure.
- Project team anticipates and overcomes obstacles to ensure project meets objectives.

Essential Project Manager Toolkit

While there are many facets of project management and many lessons to be learned from both troubled projects and successful projects, there is an essential set of tangible tools that any project manager needs to have to best manage any project. Table 3.2 lists these essential tools and why they are important.

The important principles to remember regarding project management tools are as follows:

- Any planning document needs to be reviewed and agreed to by appropriate project stakeholders and team members.
- Separate documents are not always needed. Smaller projects might combine relevant information (especially "plan" documents) into a single "grouped" document.
- The essential tools represent the key information and thought processes that is needed to effectively manage the project.

Table 3.2 Essential Project Manager Tools

Tool	Description	Value	Notes
Project Charter	Authorizes project and the project manager	Provides official notice to the organization	May not always be a formal document; At a minimum, get an email notification
Project Definition Document	Defines project purpose, objectives, success criteria, and scope statement	Key for managing expectations, controlling scope, and completing other planning efforts	Core tool
Requirements Document	Defines the specifications for product/output of the project	Key for managing expectations and controlling scope	Core tool

Table 3.2 (continued)

Tool	Description	Value	Notes
Project Schedule	Shows all work efforts, properly estimated, with logical dependencies, assigned to responsible resources scheduled against a calendar	Key for directing all project team work efforts; Key for managing expectations; Allows for impact and what-if simulations when things change	Core tool
Status Reports	Periodic reviews of actual performance versus expected performance	Provides essential information to stakeholders; Allows for timely identification of performance variances	See Chapter 10, "Controlling a Project," and Chapter 17, "Managing Project Communications," for more details
Milestone Chart	A summary of the detailed project schedule showing progress against key milestone	Allows stakeholders to see high level project progress on one page	Detailed schedule roll-ups can be difficult to read and interpret; Incorporate into Status Report
Project Organization Chart	Shows all project stakeholders and the working relationships among them	Allows team members to get a better understanding of project project roles and organizational dynamics	On smaller projects, may be combined with project plan or project definition document
Responsibility Matrix	Defines all project roles and indicates what responsibilities each role has	Key for managing expectations; Establishes accountability	On smaller projects, may be combined with project plan or project definition document
Communi-cation Plan	Defines the how, what, when, and who regarding the flow of project information to stakeholders	Key for managing expectations; Establishes buy-in	On smaller projects, may be combined with project plan or project definition document
Quality Management Plan	Defines the approaches and methods that will be utilized to manage the quality levels of project processes and results	Key for managing expectations regarding quality, performance, and regulatory compliance matters; Impacts work efforts and project schedule Establishes accountability	On smaller projects, may be combined with project plan or project definition document
Staffing Management Plan	Lists how project resources will be acquired, when they are needed, how much they are needed, and how long they will be needed	Key for building schedule; Key for properly managing resources	May also include role profiles, rates, training needs; On smaller projects, may be combined with project plan or project schedule

Table 3.2 (continued)

Tool	Description	Value	Notes
Risk Response Plan	Lists each identified risk and the planned response strategy for each	Communicates potential issues in advance Proactive measures help reduce impact to project	On smaller projects, may be combined with project plan or project definition document
Project Plan	Formal, approved document that is used to manage project execution	Includes all other supplemental planning documents; Key output of project planning	On smaller projects, may be combined with project definition document
Deliverable Summary	Defines and lists all deliverables to be produced by the project	Key to managing expectations; Ensures proper visibility, tracking, and reporting of targeted deliverables	May be combined with status reports
Project Log	Captures essential information for each project risk, issue, action item, and change request	Ensures proper visibility, tracking, and reporting of items impacting the project	Core tool
Change Request Form	Captures essential information for any requested change that impacts scope, schedule, or budget	Allows change item to be properly assessed and communicated before action is taken	Core tool
Project Notebook	Used by project manager to maintain official record of important project documents and deliverables	Part of managing project information	Electronic and/or hardcopy versions

THE ABSOLUTE MINIMUM

At this point, you should have a solid understanding of the following:

- What defines a successful project and why it is not always easy to measure
- The common reasons why projects get in trouble and what you can do to avoid them
- The key principles that serve as the foundation for most successful projects
- The essential project management tools and why they are important

The map in Figure 3.1 summarizes the main points we reviewed in this chapter.

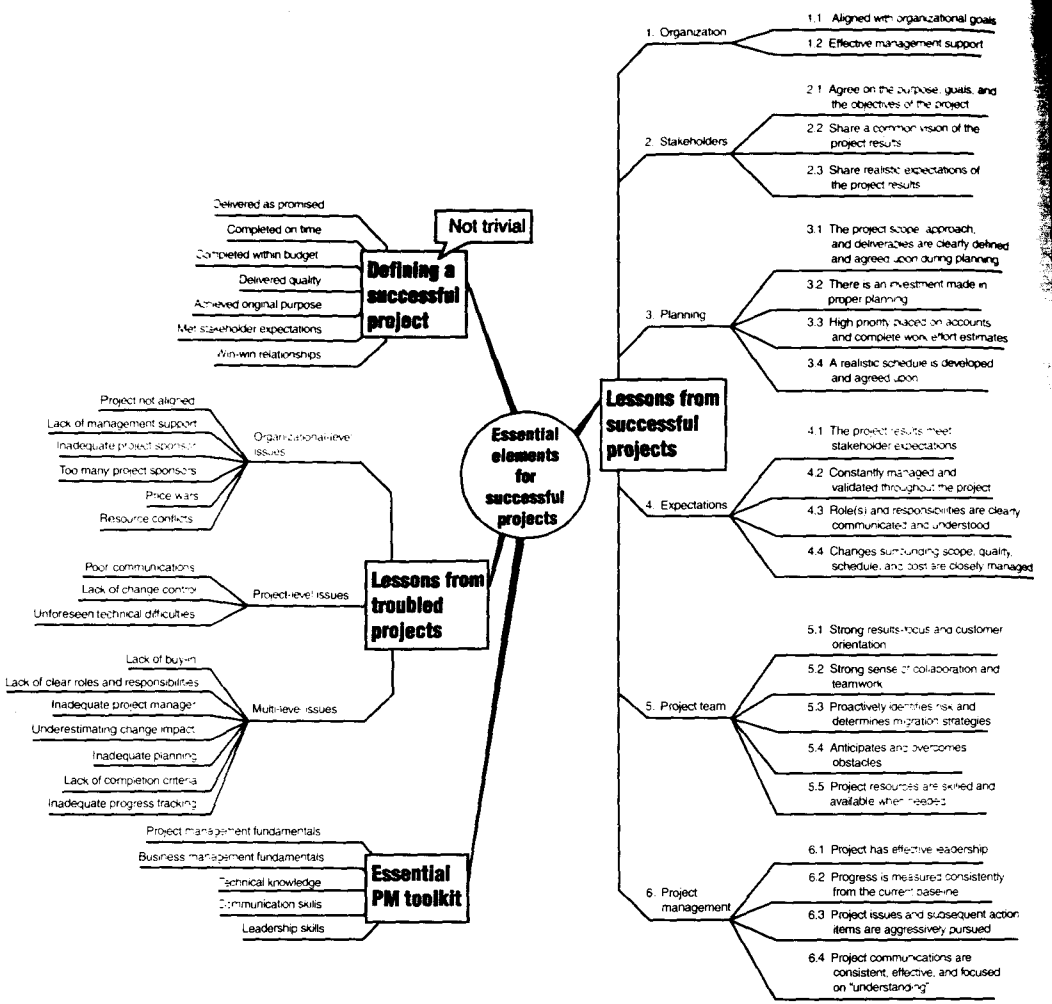


FIGURE 3.1
Essential elements for any successful project overview.

PART II

PROJECT PLANNING

In this chapter

Understand the importance of defining a project correctly

Learn what questions must be answered to properly define a project

Understand how defining a project relates to planning a project

Review the essential elements for a Project Definition document

Learn how to determine if a project has been properly defined

4

Defining a Project

The journey begins...

The first stop on our journey down Project Management Boulevard is also the most important, because it builds the foundation for all other project management activities and sets the stage for our eventual project success (or failure).

The irony of this is that depending upon your organization and industry, you (the project manager) may be the primary agent in getting this done, or you may not be involved at all until after project definition is complete.

In either case, you need to know how to properly define a project and how to evaluate if a project definition performed by others is complete before starting any detailed project planning efforts.

With all this in mind, we will review the critical importance this step plays, the key questions that must be answered and agreed upon, the "must-have" elements of your Project Definition document, and the success criteria for the project definition process.

Setting the Stage for Success

Pick your cliché of choice here: "getting everyone on the same page," "singing from the same songbook," "dancing to the same beat," "pointed in the same direction," and "painting the picture." They all apply, and they all communicate the importance of getting the key project participants to agree on the answers to these seven basic project definition questions:

1. Why are we doing this? (Purpose)
2. What organizational level goal(s) does this project support? (Goals and Objectives)
3. How does this project fit with the other projects that are going on? (Scope, Project Context, Project Dependencies)
4. What is the expected benefit from this project? (Expected Benefits, Business Case, Value, Success Criteria)
5. What are we going to do? (Scope)
6. Who is impacted by this and who must be involved? (Stakeholders)
7. How will we know when we are done or if the project was successful? (Success Criteria)

Gaining consensus on these questions is paramount to managing the organizational level factors that get projects in trouble (such as alignment with organization and management support) and to controlling key project level factors that impact project success: stakeholder expectations and scope management.

How Does Defining a Project Relate to Project Planning?

Many people think of "defining a project" as part of the project planning process, and they are correct. It is the first step. However, it is important to make the distinction for several reasons:

- Logistically, before you develop a detailed and complete project plan, you need to know the parameters and boundaries for the project.
- Politically, you need to know the key stakeholders are all in agreement with the project mission (project purpose, goals, objectives, and success criteria) before proceeding forward.

- Practically, the work to properly define a project is often not trivial. In fact, many process-focused and disciplined organizations handle "project definitions" as separate projects. Common examples include business case development projects, cost-benefit analysis projects, selection projects, and assessment projects.
- Historically, people have learned that detailed project planning and general project management are inefficient, and difficult at best, if project definition is not performed.
- Financially, effective execution of the project definition process enables the organization to leverage portfolio project management processes. This should allow the organization to better invest their limited resources into initiatives that offer the greatest return.

note

As with all project management processes, the time and rigor invested should be consistent with the size and risk level of the project.

As a general guideline, 20% of the total project duration should be invested in definition and planning activities.

PORTFOLIO PROJECT MANAGEMENT

Portfolio project management is a management practice that brings rigor and diligence to the project definition process. It is a management practice that allows executives to make better decisions regarding which projects to fund, gives them visibility to all targeted enterprise projects throughout the project lifecycle, and applies a consistent set of performance metrics and criteria to better compare project performance. It as a management practice that attempts to bring an end to projects that are not organizationally aligned, not prioritized, not resourced properly, and not monitored closely. Some of the key benefits of this approach to an organization include

- Requires each potential project to be fully defined up front.
- Engages the executives in the project selection and prioritization process, using a consistent, objective approach.
- Ensures that individual work efforts are prioritized and focused on most important projects.
- Maintains executive visibility on targeted projects. This helps maintain organizational alignment.
- Allows executives to identify "troubled" projects earlier. This provides them more options, and it allows them to re-allocate valuable resources much quicker.

Project Definition Document

We've referred to "gaining consensus" and "getting agreement" on the answers to the important project defining questions several times. How do you do this? You write them down and get everyone to formally sign off on this document. We will refer to this document as the *Project Definition* document. In this section, we will review both the "must-have" elements and "good to have" elements of the Project Definition document.

caution

There are many different names for the Project Definition document. Some of the most common alternative names are Project Brief, Project Charter, Project Initiation, Scope Statement, and Statement of Work.

We are using Project Definition, because this term best describes the purpose of the document.

Required Elements

First, let's review the must-have informational elements that should be included in your project definition document.

- **Purpose**—This section should answer the "Why?" question and clearly communicate the expected business value. It should reference the organizational objective being supported, the business problem being solved, and its relative priority level.

- **Goals and Objectives**—This section is derived from the Purpose and communicates the targeted outcomes for the project. It should answer the "What are you going to accomplish?" question.

- **Success Criteria**—Closely related to Goals and Objectives, this section should list the measurable, verifiable results that will determine the success level of this project. This section is often referred to as Critical Success Factors too.

- **Project Context**—Documents how this project relates to other projects within the product program and/or within the organization as a whole. This section should also describe how the project fits within the organization and business process flow.

tip

Whenever you are defining what is "in scope", it's a good idea to note what related work is "out of scope."

This will help clarify understanding and expectations regarding project scope.

As a rule, any work item that is related to your defined scope that someone could assume is included, but is not, should be listed as "out-of-scope."

- **Project Dependencies**—Closely related to Project Context, this section clearly documents any dependencies that could impact the results or success factors of this project.

- **Scope Specifications**—Clearly designates the organizational, process, systems, and functional specification boundaries for the project. Should be high-level breakdown of the Goals and Objectives.

- **Out-of-Scope Specifications**—To better communicate what is considered to be "in scope," it is recommended that you clearly indicate the high level work items that are related (or associated) to this initiative, but that are not of this project

- **Assumptions**—This section clearly communicates the underlying basis or things to be considered true in regards to any other aspect of this document. In most cases, the Scope, Out-of-Scope, Assumptions, and Constraints section combine to clearly define *what* work will be performed by this project.

- **Constraints**—This section lists any business event, schedule, budgetary, resource, or technical factor that will limit the options available to the project.

- **Risks**—This section will list any uncertain event or condition (risk) that, if it occurs, could have a negative impact on one or more project success criterion (schedule, budget, quality, and so on). For each risk, it is good to list the related causes, the perceived negative impacts, the likelihood it will occur, and the planned response strategy and action items. See Chapter 14, "Managing Project Risks," for more details.

- **Stakeholders**—This section lists all of the individuals, business units and organizations involved in the project, the role(s) each is expected to play, and an indication of how they relate to one another. A Project Organization chart and a Stakeholder-Role Description Table is highly recommended here.

note

To expedite the process of getting agreement on the project definition document, walk through an initial draft that you develop with the stakeholder group rather than starting with a blank slate.

The process of project definition and project planning is a process of iterative refinement (or what PMI refers to as *progressive elaboration*), so your draft will help facilitate the discussions, negotiations, and modifications that need to occur amongst the stakeholders.

- **Recommended Project Approach**—To better describe the intent of the initiative, this section highlights the recommended approach to getting the work of the project done and why it was selected over any other options. This section should note any key strategies, methodologies, and technologies to be used.

Additional Elements to Consider

These are informational elements that may not always apply, but if appropriate, are recommended additions to Project Definition document.

- **Alternative Project Approaches**—This section lists the approach details for any alternatives that were considered.
- **Organizational Change Issues**—Since most projects result in a change to the status quo, and the most common oversight in projects is not adequately realizing, planning, and preparing for the "change" impact to current customers, business processes, and personnel, it is highly recommended that this area be a focus from the start of the project.
- **Policies and Standards**—Given the priority that standardization, compliance, process improvement, security and quality have in most organizations, it is highly recommended that any policy, regulation, or standard that will be applied to the project or the results of the project be identified from the start of the project.
- **Preliminary Cost, Schedule and Resource Estimates**—Generally, there is some preliminary "ballpark" expectation for the cost, timing, and resource needs of this project. In many cases, these will be noted as either project objectives or as project constraints. The most valuable information here is not necessarily the date or the dollar amount, but an explanation for what is driving the figures presented.
- **References to Supporting Documents**—For any situation, where the results of a preliminary or related project served to define the need or details for this project, always include a reference to those supporting documents. Common examples would be a Business Case, Cost-Benefit Analysis, Assessment Results, Requirements Document, and Business Process Engineering Studies.

caution

The Project Definition document is a "living" document and should be updated to reflect the evolving circumstances, issues, and needs surrounding the project.

Changes are okay. The changes just need to be announced, reviewed, and approved by the relevant stakeholders.

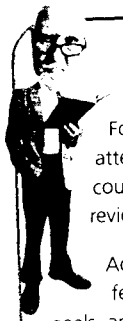
Project Definition Checklist

Here's a checklist that can help you to determine if your project is defined properly and if you are ready to proceed to the next iteration of detailed planning. If you find that your project is not properly defined, you have the following options available to you:

- Resolve any gaps with appropriate stakeholders before moving onto next phase
- If the project has already been defined, work to resolve these gaps during the detail planning phase.
- If gaps cannot be resolved, then handle as project risks or issues (whichever is appropriate for the specific gap).

General

- Is it clear why this is project is being undertaken?
- Is there a clear picture of the desired results of this project?
- Is there a clear picture of how this project fits within the organizational landscape?
- Do you understand who is funding the project initiative?
- Is there a gap between available and needed funds?
- Is the gap between the current state and the desired future state clearly documented and understood?
- Has the expected "change impact" on existing business processes, customers, systems and staff been clearly documented?
- Have the success factors been identified? Are they complete? Are they SMART?
- Have any future state performance targets been defined as success factors? Are they SMART?



tip

For anyone who has not attended a Goal Setting 101 course, let's do a quick review of SMART goals.

Actually, I've seen two different definitions of SMART goals, and they both apply:

Definition #1—SMART goals are **S**pecific, **M**easurable, **A**chievable, **R**ewarding, and **T**ime-based.

Definition #2—SMART goals are **S**pecific, **M**easurable, **A**greed-To, **R**ealistic, and **T**ime-based.

Perhaps, the acronym should be SMAARRT. For projects, the second definition is more important due to the "Agreed-To" element.

Scope

- Does project scope indicate boundaries between impacted processes, systems, and organizations?
- Is project scope defined clearly enough to show when scope creep is occurring?
- Have any external process or system interfaces that will be impacted by this project been identified?
- Has the process workflow between business units or business functions been properly considered?
- Have the organizational and geographic boundaries been clearly defined?
- Does project scope include related items that are out-of-scope?
- Does project scope include any other organizational or technology-based initiative that is needed to fully support the project objective?
- If project scope includes any requirements, have the requirements been properly validated?
- Have any and all project constraints been identified?
- Have any and all project assumptions been identified?
- Are there any known policies, regulations, or standards that will apply to this project (such as procurement, quality, security, regulatory compliance, and so on)?

Stakeholders

- Has the project sponsor been identified and engaged?
- Is each impacted business unit and business process step represented on the project team?
- Is each customer group represented on the project team?
- Are all stakeholders identified in a project organization chart?
- Are the reporting relationships indicated in the project organization chart?
- Are project roles described and assigned to each stakeholder?
- Have we identified which stakeholders will form the core management steering committee?
- Have we identified which stakeholders will need to review and approve any requested change to the project definition?

Project Approach

- Does the recommended approach explain why it was selected over the alternatives?
- Are the proposed technologies, strategies, and methodologies documented?

Other

- Are the project definition elements documented?
- Is the Project Definition document under configuration management (version control)?
- Have high level risks and planned responses been identified?
- Has preliminary timeline and budget been stated? Are the supporting reasons and assumptions documented?

caution

As with all project documents, make sure you have a way to control changes to the Project Definition document and that you have proper backups of it.

Your Configuration Management Plan (discussed in Chapter 12, "Managing Project Deliverables") will document this.

Acceptance

- Have all stakeholders reviewed, agreed upon, and approved the Project Definition document?
- Has the project and the project manager been officially authorized?

THE ABSOLUTE MINIMUM

At this point, you should have a solid understanding of the following:

- A properly defined project will greatly increase the odds for project success.
- The project and the project manager position should be officially announced and formally authorized to proceed.
- The key project manager tools for defining a project are the Project Definition document and a Project Organization Chart.
- The key skills used by the project manager when defining a project are facilitation, interviewing, negotiation, and general interpersonal skills.

continues

- The Project Definition document should clearly communicate why the project is being undertaken, how it fits within the organization, what it will accomplish, the boundaries for the project work, who will be involved, and how project success will be measured.
- The Project Definition document is a living document throughout the project. However, any change to the document must be approved by the same set of original stakeholders.
- All stakeholders in the project must be identified.
- All major stakeholders must approve the Project Definition document.

The map in Figure 4.1 summarizes the main points we reviewed in this chapter.

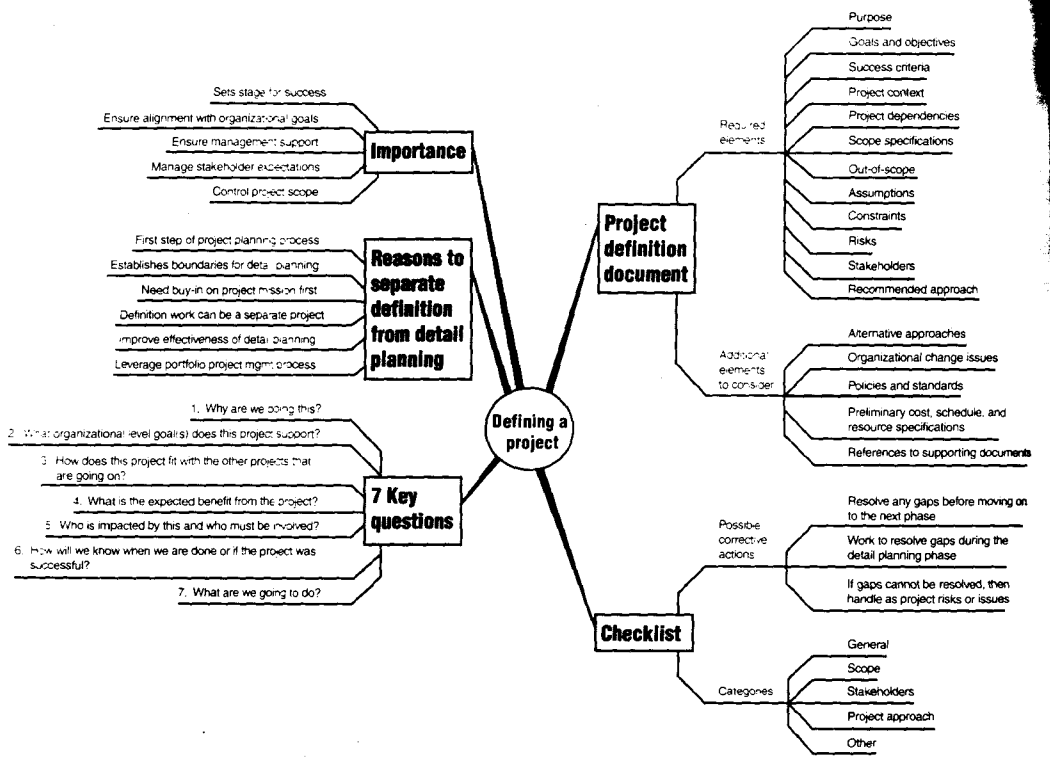


FIGURE 4.1
Defining a project overview.

IN THIS CHAPTER

5

- Understand the key principles of effective project planning
- Learn the important questions that project planning should answer
- Understand that a project plan is not a Microsoft Project file
- Review the essential elements for a project plan
- Learn how to develop a project plan
- Learn how to avoid the common project planning mistakes

PLANNING A PROJECT

The journey continues...

As is true with defining a project, project planning is essential for project success. In defining a project, we ensure that we agree on *what* we will do and *who* will be involved. In planning a project, we focus on *how* the work will be done. This involves both how the deliverables will be developed and how the project will be managed. Thus, project planning involves the traditional areas of work tasks, resources, schedule, and costs, and it also sets the stage for managing project changes, project communications, project quality, project risks, project procurement activities, and the project team. Each of these factors directly impact stakeholder expectations and our ability to successfully control and execute the project.

Unfortunately, there are many misconceptions about project planning, and often it is performed incompletely or incorrectly.

With this in mind, we will review the key principles of project planning, how to properly plan a project, the key planning questions that must be answered and agreed upon, the "must-have" elements of your Project Plan document, and the success criteria for the project planning process.

Key Project Planning Principles

While most reasonable people will, at least, acknowledge there is value to "planning" at a logical level, many of those same people are less than "emotionally committed" to the practice. Why is this? Generally, it is because the "project planning" they have witnessed has violated one or more of the following key project planning principles.

- **Purpose**—The purpose of project planning is to develop a plan that enables the project to be executed and controlled, as shown in Figure 5.1.

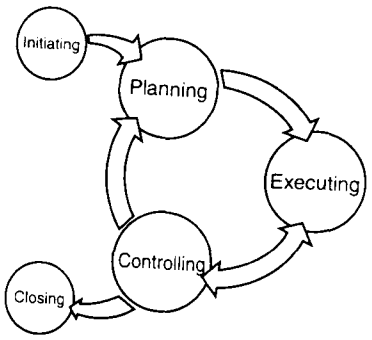
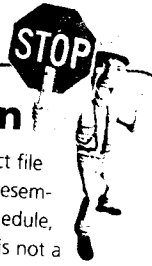


FIGURE 5.1
Highlights the interactions between the planning, executing, and controlling project management processes.

- **Multiple passes required**—Project planning is not a one-time activity performed at the beginning of a project. For starters, it generally takes several iterations to get to a comprehensive plan given the multitude of inputs that must be integrated and the number of stakeholders that need to agree on the plan. In addition, as things happen and we learn more, plans will need to be adjusted and details ironed out as the project moves along.

note

A planning technique that is often used to deal with the "realities" of planning project work is called *rolling wave planning*. Rolling wave planning is a technique that plans work *details only* for the *next* project phase. The planning for the subsequent phases is kept at a high level. As part of the closing process and review of the current phase, the work details for the next phase are then planned out.



caution

A Microsoft Project file (or anything else resembling a project schedule, timeline, or WBS) is not a project plan.

A project plan will generally reference other documents and supplemental plans, including a WBS and project schedule.

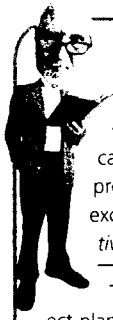
tip

A project plan is all-encompassing document that is used as the basis for controlling and executing a project.

- **A project plan is NOT a Microsoft Project file**—Before we go any further, let's make sure we are clear on a few key terms. A project plan is not a project schedule or a Work Breakdown Structure (WBS). A project plan is all-encompassing document that is used as the basis for controlling and executing a project.
- **Give me one**—The planning exercise and the planning team must have control over one of the traditional project success factors (scope, time, cost, or performance). Senior management can set all but one of these factors—just not all of them.
- **"Proactive" project management**—Effective planning enables a "proactive" project management approach. Before the execution of the project gets underway, we ask the questions and determine the approaches we will take to manage the project and stakeholder expectations regarding project communications, stakeholder responsibilities, quality management, risks, responses to specific performance variances, procurement management, and project team management.
- **"Stay down from the mountain"**—Project planning is not the time for the top-down, Mount Olympus approach to management. Project planning is the time for questions, facilitation, interaction, and feedback.

  Specifically, you need to conduct a *stakeholder analysis* on all of your management and customer stakeholders to validate the project definition elements, understand their expectations and communication needs, and to review procedures for dealing with critical issues, risks, change requests, and performance variances.

  In addition, the team members who will be *doing* the work should be heavily involved in *defining* and *estimating* the details of the work to be performed. We address this further in Chapters 6 and 7. This approach leads to a better definition of the work required and a higher commitment level toward scheduled work assignments.



tip

Change control, communications, risk, and quality project management are excellent examples of *proactive* project management.

The team approach to project planning greatly increases their acceptance and commitment level to the project plan.

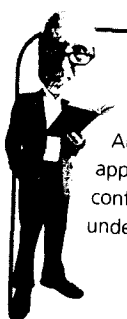
Important Questions Project Planning Should Answer

Think of project planning as a process of "asking questions" and working with your team to "get the answers." While the process of defining a project answers some key fundamental questions to get us started such as

- Why are we doing this project?
- What is the project supposed to accomplish?
- Who are the key stakeholders? The sponsor? The customers?

It is the process of "detail planning" a project that allows us to answer the questions we need addressed to implement and manage the project. These important questions focus on both the work to produce the targeted deliverables and on the work to manage the project. Some of these key questions include the following:

- How exactly will the deliverables be produced?
- What work tasks must be performed to produce the deliverable?
- Who will do the work?
- What other resources (facilities, tools) will we need to do the work?
- Where will the work occur?
- How long will it take to do the work?
- When will the work be done?
- How much will this project cost?
- What skills, skill levels, and experience are needed for each role? When do I need them?
- When do I need each resource? How do I get resources?
- Who is responsible and accountable for what?
- How will changes be controlled?
- How do I ensure acceptable quality in deliverables and in the process?
- How will I keep stakeholders informed, get their feedback, what mediums are best?
- How will I track issues? How will critical issues be escalated?
- How do we handle variances? What is the threshold for senior management? What communications need to occur?



tip

Always get sign-off from appropriate stakeholders to confirm agreement and understanding.

- What risks exist? What are our response strategies?
- How will version control be conducted?
- How will project information be maintained, secured?
- How will I manage the project team? What training needs exist? How will their performance be evaluated? How will I orient any new team member?
- If we are leveraging external resources (vendors, suppliers), how do we manage their performance?
- How will project performance be measured and reported?
- And ultimately, do I have a plan that will allow me to execute and control this project?

As we determine these answers, we capture them in the project plan. We can then review the project plan with our key stakeholders to ensure we have agreement and understanding. Let's next step through a typical project plan and review what each section is for and how we go about getting this information.

Building a Project Plan

The first step in building a project plan is to validate the elements of the project definition document. Depending upon the length of time between acceptance of the project definition and the start of detail planning, you may need to confirm that there have been no changes in the purpose, objectives, success criteria, and scope of the project with your key stakeholders.

- **Validate project definition**—This section should reference the project definition document and includes all required elements of a project definition document. The key task here is to re-validate the business case for the project. This is especially important if there has been a time lag between project definition and detail project planning, or if the planning exercise results in time and cost estimates significantly greater than originally estimated during project definition.
- **Determine what needs to be done**—This section should provide any additional details regarding the project approach (how this will be done), the targeted deliverables that will be produced, and all of the work that is required to complete the project. This process is explained in greater detail in Chapter 6, "Developing a Work Breakdown Structure."

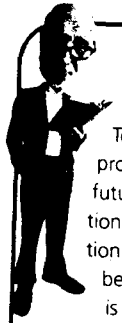
tip

As you visit with stakeholders during detail planning, make sure to validate their project definition understanding and expectation.

Re-confirm that the business case for the project is still valid after the detailed project planning exercise is complete.

This section normally refers to a list of deliverables and to the WBS.

- **Determine acceptance criteria**—This information can be part of other components, such as deliverables list, WBS, project approach, or quality management plan, and may not be its own section. However, to validate that all required work has been identified and to improve the quality of work estimates, it is best to clearly document (somewhere in the project plan) what the acceptance criteria is for each deliverable and for each project phase.



tip

To simplify the review process and to minimize future document modifications, capture any information that is shared, needs to be reviewed separately, or is likely to be updated frequently in its own document.

Common examples are assumptions, WBS, communications plan, project schedule, requirements, project organization chart, and responsibility matrix.

- **Determine resource needs**—Based upon the tasks and activities that need to be performed, determine the type and quantity of resources needed. Resources include people (roles), facilities, and tools. These resource needs should be determined when developing the WBS with the team members who will be doing the work.

  To assist the acquisition and management of these resources, all resource needs should be documented (resource management plan). For people resources, document the role description and the prerequisite skills, skill levels, and experience.

  As part of the scheduling process, the timing of resource needs should be noted and finalized in the resource management plan. A sample resource management plan is illustrated in Figure 5.2.

- **Acquire resources**—After the resource needs are documented, you can now begin the process of acquiring those resources. The key questions to be answered here are
  - Will I be able to get the "quality" of resource requested?
  - Will I be able to get this resource in-house or will I need to obtain it from an external supplier/vendor?

  - Will the resource be available when needed?
  - How will this impact my cost estimates and budget?

FIGURE 5.2
Basic example of a resource management plan.

Role	Team Member	Training Needs	Projected Start Date	Projected Roll-off Date	Percent Allocation
Technical Leader	B Gates	• Advanced Enterprise Web Development	6/1/2004	10/30/2004	80%
Business Process Leader	S Jones	• Process Modeling • Power PowerPoint User	6/1/2004	10/30/2004	100%
Lead Developer	L Gregory	• Advanced Enterprise Web Development	6/15/2004	10/30/2004	100%
Lead Analyst	E Michael	• Rational Test Studio	6/1/2004	10/30/2004	100%
Test Manager	Q Victoria	• Advanced Load Testing	6/15/2004	10/30/2004	100%
Developer	R Alexander	• Accelerated OO Development	7/15/2004	9/30/2004	100%

- **Estimate the work**—After we know what all of the work activities are, and we know what level of resource will be doing the work, we can now estimate the effort and duration for each activity. Due to the critical importance and difficulty of this step, we review this in greater detail in Chapter 7, "Estimating the Work."
- **Develop the schedule**—Now that we understand the required resources and estimated effort for each work task, we are now in position to identify the relationships between these tasks and build a schedule to complete the work. Due to the critical importance and common errors in this step, we review this in greater detail in Chapter 8, "Developing the Project Schedule."

  At a minimum, schedule information should be available in at least one summary form (such as a milestone summary listed in Figure 5.3) and always available in complete detail.

FIGURE 5.3
Example of a milestone schedule summary that tracks any approved schedule variances

Project Milestone	Original Est. Completion Date	Revised Est. Completion Date 06/15/04	Variance
Plan Phase Toll-Gate	Apr 30, 2004	-	-
Design Phase Toll-Gate	Jun 15, 2004	Jun 22, 2004	1 week
Iteration 1 Development Complete	July 15, 2004	July 22, 2004	1 week
Iteration 2 Development Complete	Aug 15, 2004	Aug 29, 2004	2 weeks
Iteration 3 Development Complete	Sep 15, 2004	Sep 30, 2004	2 weeks
Stress Testing Complete	Sep 30, 2004	Oct 15, 2004	2 weeks
User Acceptance Testing Complete	Oct 30, 2004	Nov 15, 2004	2 weeks
Deploy Phase Toll-Gate	Nov 7, 2004	Nov 22, 2004	2 weeks
Pilot Site Implementation	Nov 17, 2004	Nov 29, 2004	2 weeks
Pilot Implementation Review	Dec 15, 2004	Jan 15, 2005	4 weeks
Close Phase Toll-Gate	Dec 22, 2004	Jan 22, 2005	4 weeks

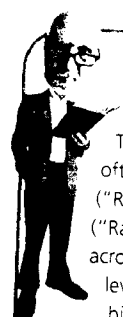
■ **Update roles and responsibilities**—This step has two parts.

First, if any new role has been identified, then update the *stakeholder-role description* table (first mentioned in the project definition document) with the name of the required role and the specific responsibilities that role has.

Once specific individuals are assigned to roles, the project role responsibility chart can be updated to reflect role assignments. An example of a partial project role responsibility chart is presented in Figure 5.4.

Second, for each significant work package listed in the WBS, map the responsibility level that each role has regarding that item. This mapping is routinely captured in a responsibility assignment matrix. An example of a partial project responsibility assignment matrix is presented in Figure 5.5.

This summary map is a powerful tool to help stakeholders clearly understand their roles and what is expected of them.



tip

The responsibility matrix is often referred to as a RACI ("Ray-Cee") matrix or RASIC ("Ray-Sic<") matrix. The acronyms represent each level of potential responsibility.

R—Responsible
A—Accountable
C—Consulted
I—Informed

R—Responsible
A—Approve
S—Support
I—Informed
C—Consulted

FIGURE 5.4
A partial role responsibility chart for a software development project.

Project Role	Project Responsibilities	Assigned Team Member
Project Sponsor	• Responsible for championing the project and communicating all aspects of the project to other senior management stakeholders. • Has ultimate authority over and is responsible for the project and/or the program. • Approves changes to the scope and provides the applicable funds for those changes.	T. Terrific
Project Manager	• Provides direction and oversight to the initiative • Works with stakeholders to ensure that expectations are met • Develop and manage project plan • Design and execution of a project communications plan • Measure, evaluate, and report progress against the project plan • Provide project status reports • Coordinate and manage activities of project personnel • Resolve project issues • Conduct scheduled project status meetings • Establish documentation and procedural standards for the project • Perform quality review of deliverable documents • Maintain project communication with the Client Project Manager • Review and administer Project Change Control Procedures.	M. Yost
Technical Leader	• Provide technical leadership on the design of application architecture • Lead resolution of any application development issues • Facilitates technical design sessions • Provides quality assurance to technical deliverables	B. Gates
Quality Assurance Manager	• Provides quality assurance to the overall project processes, procedures, and deliverables. • Works with the Project Leadership to ensure project expectations are met	N. Reed
Business Process Leaders	• Provide business competence to the project team • Participate in information gathering sessions • Provide pertinent strategic business documentation and information • Assist in the identification of business critical processes • Validate viability of recommendations • Serve as primary user acceptance testers	S. Jones G. Griffey

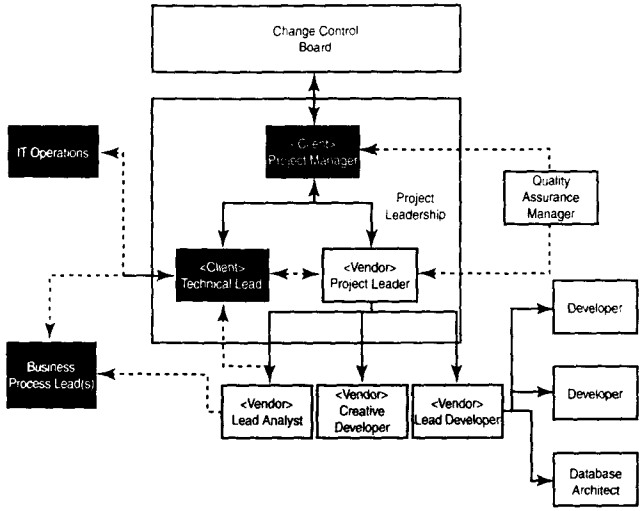
FIGURE 5.5
A partial RASIC responsibility matrix.

Role	Team Member	Approved Budget	Current State Process Flow	Requirements Document	Change Impact Analysis	Configuration Mgmt Plan	Disaster Recovery Strategy	Deployment Plan	Project Plan	QA Plan	Risk Response Plan	Future State Process Flow	Test Cases	Test Plan	Training Plan	System Design Document
Project Sponsor	T Terrific	A	I		A			A	A	A	A	A	I	I	A	
Project Manager	M Yost	R	C		R	R		S	R	A	R	C	C	A	C	A
Technical Leader	B Gates	S	C	A	C	I	R	S	A	A	A	C	C	C	C	A
Business Process Leader	S Jones	C	A		A	C		A	A	A	A	A	A	A	R	A
Lead Developer	L Gregory		C	C		S			C	C	C	I	C			R
Lead Analyst	E Michael		R	R	C	I		R	A	C	C	R	S	S	S	S
QA Manager	N Reed	I	I	I	C	I		C	A	R	C	I	A	A	A	
Test Manager	Q Victoria		I	I		I		R	A	C	C	R	R	R	S	S
Developer	R Alexander		I	I		S		I	C	I	C	I	C		C	S

Legend: R=Responsible; A=Approve; S=Support; C=Consulted; I=Informed

- **Update project organization**—Also previously mentioned in the project definition document, this section lists all of the individuals, business units, and organizations involved in the project, the role(s) each is expected to play, and an indication of how they relate to one another. A project organization chart as shown in Figure 5.6 is highly recommended here.

FIGURE 5.6
A project organization chart for an outsourced software development initiative.



- **Determine project costs and budget**—Now that we have our resource needs and a preliminary schedule, we can tabulate estimated project costs and a phased project budget. We will discuss this in greater detail in Chapter 9, "Determining the Project Budget."

- **Determine project control system**—Specifically, we need to get agreement on how the performance of the project will be measured, how often, and how it will be reported. In addition, we need to determine how performance variances should be managed. Frequently, this information is documented in either the project plan itself, the project communications plan, and/or in the quality management plan. We will discuss this in greater detail in Chapter 10, "Controlling a Project."

tip

To help identify relevant stakeholders, make sure to understand the complete business workflow process(es) and how each person involved is impacted by your project objectives.

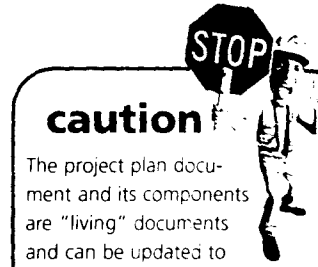
- **Plan for change**—All plans are subject to change. The difference with successful projects is that they anticipate the changes and establish procedures in advance to review, assess, and manage any request or any factor that impacts the key performance factors (scope, quality, time, and cost). These procedures help to ensure that the right people are involved in the process and that the right people are informed of any "change" decision. We will discuss this in greater detail in Chapter 11, "Managing Project Changes."
- **Plan for project information**—There are two primary objectives of this step:
  - Where will the project repository be located? Who can access it? Who controls it?
  - How will changes to project deliverables be managed and controlled?

  This information is frequently maintained in a configuration management plan. We will discuss this in greater detail in Chapter 12, "Managing Project Deliverables."
- **Plan for issues**—All projects have issues and action that must be taken to resolve them. The difference on successful projects is that they establish a process in advance to closely track these issues and establish a procedure in advance to escalate any critical issue to the appropriate management stakeholders. We will discuss this in greater detail in Chapter 13, "Managing Project Issues."

note

The risk management process can impact the project plan throughout the project because it is a continuous, proactive project management activity.

- **Plan for quality**—Another proactive management approach to determine the quality standards and policies that project deliverables and processes must meet. For planning, the significance is that additional roles, work activities, and costs will likely impact the project schedule and the project budget. We will discuss this in greater detail in Chapter 15, "Managing Project Quality."
- **Plan for communications**—A proactive management approach to determine the information and communication needs of each project stakeholder. These needs should be determined as part of the stakeholder analysis. The work efforts associated with delivering project communications should be accounted for in both the WBS and the project schedule. We will discuss this in greater detail in Chapter 17, "Managing Project Communications," and in Chapter 18, "Managing Expectations."
- **Plan for team management**—While we have already taken key steps to laying the groundwork for an effective project team by involving them in the "planning" process, establishing clear role descriptions, and scheduling clear assignments, there are additional steps to consider too, including training needs and performance evaluation. We will discuss this in greater detail in Chapter 19, "Keys to Better Project Team Performance."
- **Plan for procurements**—This step is closely linked to resource planning. If resources will need to be obtained externally, then the work to manage the procurement process must be planned and added to the WBS, project schedule, and project budget. We will discuss this in greater detail in Chapter 21, "Managing Vendors."



The project plan document and its components are "living" documents and can be updated to reflect the evolving circumstances, issues, and needs surrounding the project.

Changes are okay. The changes just need to be announced, reviewed and approved by the relevant stakeholders.

The formality and detail of each Project Plan section or supplemental plan will vary depending on project need, project size, industry, and organizational culture.

Summary of Supplemental Project Plan Components

We introduced several new planning components, in addition to the core work plan, budget and control elements you expect in the previous section and made reference to the impact that several of them have on the overall project planning effort. To help summarize and organize this information, please refer to Table 5.1.

Table 5.1 Summary of Supplemental Project Plan Components

Project Plan Component	Purpose	Key Elements/ Notes	Impact on Project Planning
Change Control Plan	Describes how the project success factors (scope, cost, schedule, quality) will be managed and how changes will be integrated.	Can include assessment of expected stability of project scope.	Proactive approach; manage expectations.
Communications Plan	Describes how the information and communication needs of project stakeholders will be met.	Often documented and presented in tabular form.	Communications management plan details must be added to WBS and project schedule.
Configuration Management Plan	Describes how changes to project deliverables and work products will be controlled and managed.	Should include both technical work products and project documentation.	Proactive approach; manage expectations.
Procurement Management Plan	Describes how the procurement process will be managed.	Contract types Roles of project team and procurement dept.	Remaining procurement management tasks must be added to project schedule. Constraints of scheduling procurement activities with third-party vendors may impact the project schedule.
Quality Management Plan	Describes the project quality system.	Should address both project work products and the project processes.	Cost and schedule adjustments may be needed to meet quality standards. Quality assurance and quality control activities must be staffed and added to the project schedule.
Responsibility Matrix	Lists the project roles and responsibilities. Cross-references roles with assigned resources.	RACI matrix.	Ensure all required resources are accounted for.

Table 5.1 (continued)

Project Plan Component	Purpose	Key Elements/ Notes	Impact on Project Planning
Resource Management Plan	Indicates when project resources are needed on the project (start and end dates).	Impact if resource cannot meet all skill requirements. Impact if resource must be acquired at rates higher than estimated.	Cost baseline, work estimates, and project schedule are in flux until the final resources are acquired.
Risk Management Plan	Describes how the risk management process will be structured and performed.	Describes the process to be used.	Ensure risk management tasks are added to WBS and project schedule.
Risk Response Plan	Describes the response strategies for identified risks.	Risk Log. Details action steps to be taken if risk event occurs.	Risk response strategies may entail the allocation of additional resources, tasks, time, and costs. Budget reserves, contingency plans.
Variance Management	Describes how performance (cost, schedule) variances will be managed.	Documents planned responses to different variance levels.	Proactive approach; manage expectations.

Project Plan Checklist

Here's a quick checklist that can help you to determine if your project is planned properly and if you are ready to proceed to execute your project.

- Have you answered all the questions in the section "Important Questions Project Planning Should Answer"?
- Have you reviewed your WBS, work effort estimates, project schedule, and project budget against their respective checklists?
- Has the project plan been reviewed and approved?
- Was the project plan signed off in a review meeting? In-person?

tip

To assist the review and acceptance process of the project plan, consider the following:

1. Distribute project plan and components to reviewers in advance of the official review meeting.
2. Prepare a summary presentation of the project plan.
3. Encourage open, honest feedback.
4. Seek understanding and "buy-in" first; then and only then, ask for the acceptance sign-off.

THE ABSOLUTE MINIMUM

At this point, you should have a solid understanding of the following:

- Project definition is focused on *what* the project will do. Project planning is focused on *how* the project will get it done.
- A project plan is all-encompassing document that provides the basis for project execution and control, and it is not a Microsoft Project file.
- The project plan document should clearly communicate what work will be performed, who will do it, when they will do it, who is responsible for what, and how the project will be managed, monitored, and controlled.
- The project plan document and its components are living documents throughout the project. However, any change to the document must be approved by the same set of original stakeholders.
- The key skills used by the project manager when planning a project are facilitation, analytical, organizational, negotiation, and general interpersonal and leadership skills.
- All major stakeholders must approve the project plan document, preferably in person.
- A sign-off does not have to be a physical document signature. It can also be an email or a verbal acceptance (if it is documented in meeting minutes). However, the risk of misunderstandings is usually increased.

The map in Figure 5.7 summarizes the main points we reviewed in this chapter.

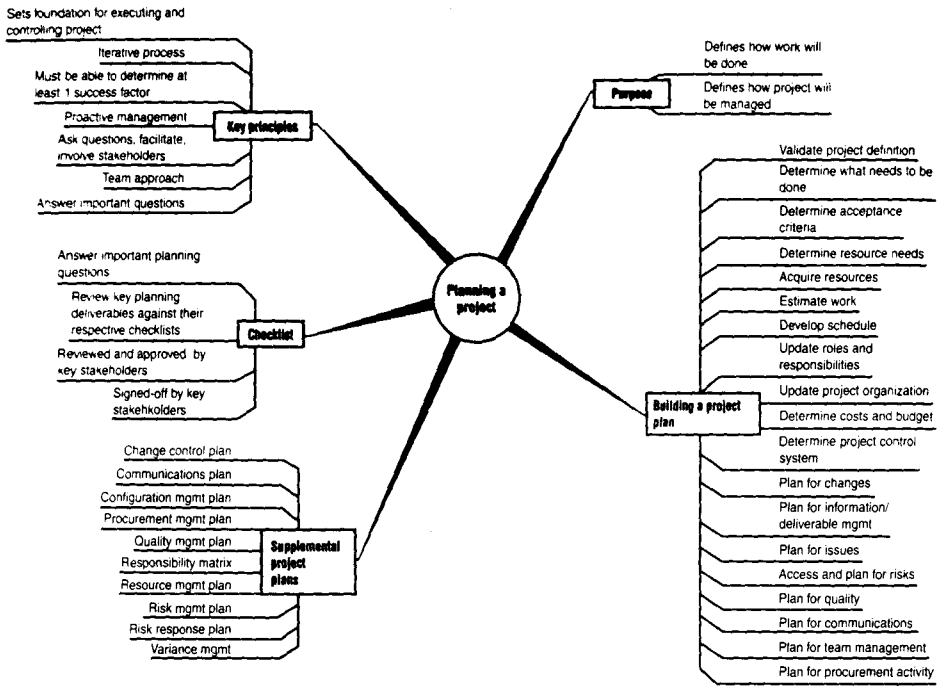


FIGURE 5.7
Planning a project overview.

IN THIS CHAPTER

- Clarify what a work breakdown structure (WBS) is, and is not
- Understand why the WBS is considered the most important tool of the project manager
- Learn what makes an effective WBS
- Learn how to avoid the common mistakes when developing a WBS

6

DEVELOPING THE WORK BREAKDOWN STRUCTURE

If you were to ask anyone off the street what they think of when they hear "project management," you are likely to hear "planning." And if you further ask them what they mean by "planning," you are likely to hear "schedule" or "work plan." Yes, even to the uninitiated, people know that project managers "plan" and develop "work schedules," if they do nothing else.

Yet, the process of understanding all the work that needs to be done and building a realistic project schedule continues to be the Achilles' heel of project management.

In this chapter, we begin our close review of the schedule development process by understanding the power and the purpose of the work breakdown structure (WBS). By performing this step correctly, we will do a much better job at the other detail project planning activities such as identifying resources, identifying risks, getting better estimates, building a realistic schedule, and developing an accurate project budget. In addition, a solid WBS allows us to better manage stakeholder expectations and the critical success factors throughout the project life cycle.

As part of this review, we will clarify exactly what a WBS is (and is not), we will understand why the WBS is crucial to our other project management activities, and we will learn how to develop an effective WBS and avoid the common miscues in this arena.

What Is a WBS Exactly?

As I mentioned in Chapter 1, "Project Management Overview," project management is not "brain surgery" and does not require advanced logic and reasoning skills to achieve winning results (see author for great example of this). In most cases, the disciplines and terms used in project management are very "common sense" and obvious in nature. A WBS is a classic case. As the terms defining the acronym indicate, a WBS is logical "breakdown" (decomposition) and representation (hierarchical "structure") of the "work" required by the project.

A WBS can take one of two forms: graphical or outline. See Figures 6.1 and 6.2 for examples of each.

Both types have their place in your toolbox. The graphical form is best for communicating the top 3–5 levels of work activity to senior management or customer stakeholders. The outline form is best for capturing the details needed for cost and schedule development.

A WBS shows the work and any interim deliverables that will be required to produce the major project deliverables identified in the project definition process. In most cases, the WBS reflects the components that make up the final deliverables and the approach (methodology) used to develop, integrate, and validate them. In short, the WBS is an organized task list.

By simply doing this, we create an organized picture that allows us to see, and more importantly, allows our stakeholders to see, all of the work required to accomplish the project objectives. You can begin to see the power of the WBS in managing expectations.

note

WBS is a logical, hierarchical, organized task list developed with the team.

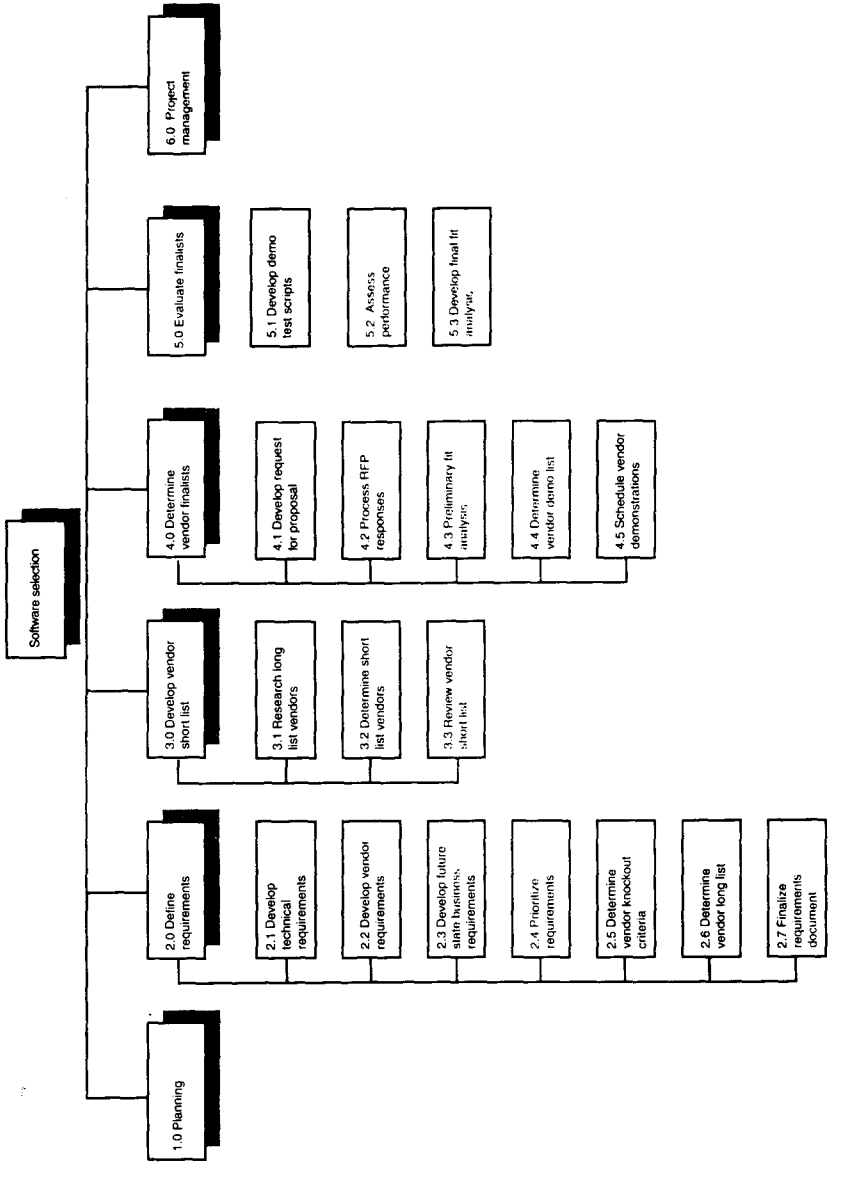
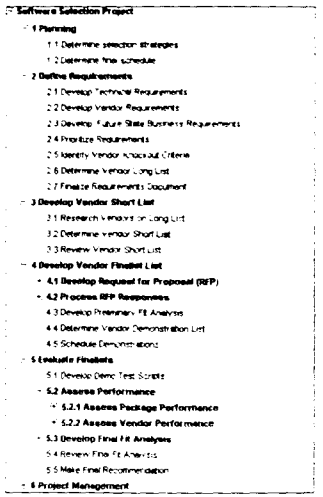


FIGURE 6.1
Partial graphical WBS for a software selection project.

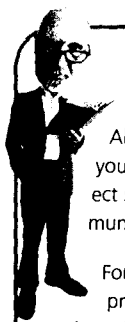
FIGURE 6.2
Partial outline WBS for a software selection project.



Also, by doing this, we employ the primary secret weapon of managing large, complex projects, which is "You don't!" You break the work down into chunks and manage many smaller components.

I'm not going to spend a great deal of time on explaining how to create a WBS and how to break down the higher level work of a project, because I think most analytical people do this naturally, and the details of the work decomposition will depend upon the specifics associated with your organization and industry. In fact, many organizations leverage standard WBS templates to ensure any new project includes the recommended work items.

However, what I will spend time on is making sure you are clear on terminology, making sure you understand how this step fits into the overall schedule development process, and reviewing the best practices of WBS development.



tip

Always clarify terms with your project team and project stakeholders in any communication.

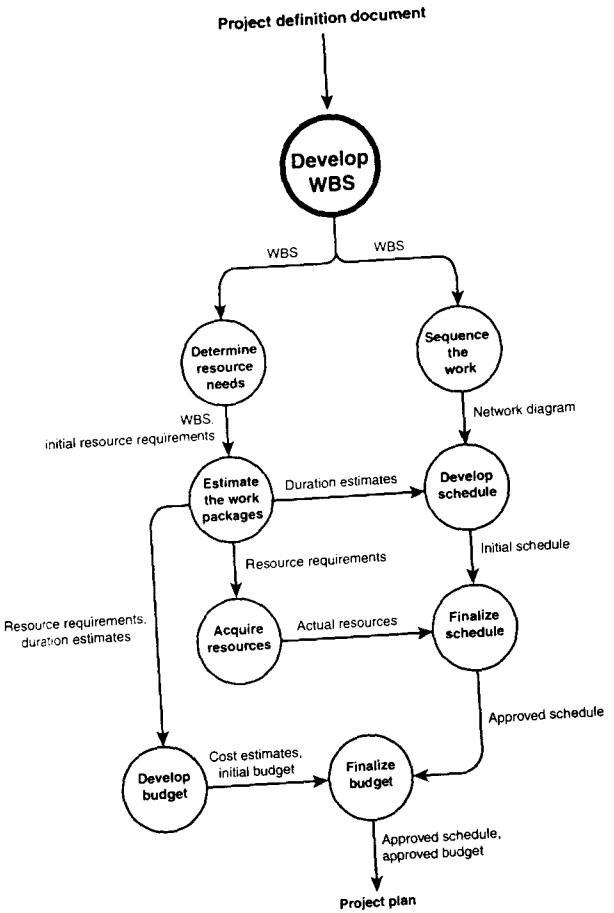
For an official repository of project terms, the use of a project glossary document can be helpful.

Isn't WBS Just Another Name for the Project Schedule?

Many industries and organizations routinely use the following terms in an interchangeable fashion: WBS, project plan, project schedule, and work plan. As you know by now, these terms do represent different project management elements and should not be used interchangeably. However, as with all "less than ideal" practices, there are reasons. Understanding the reasons is always helpful, and in this case, can provide additional insights as to why projects can get into a "troubled" state.

When you think about the process for developing a schedule (see Figure 6.3), determining the work (detail tasks) that is required is the first step.

FIGURE 6.3
The role of the WBS in the development of the project schedule.



Once you have identified the work tasks, you can then determine what resources are required for each task, how much effort each task will take (process details discussed in Chapter 7, "Estimating the Work"), and what logical dependencies exist between the tasks (these details are covered in Chapter 8, "Developing the Project Schedule").

At this point, you can begin to construct the first of several iterations of a project schedule.

Sounds logical enough—so, where's the problem?

In general, the problems lie with the use and application of project scheduling software such as Microsoft Project. Here's a common scenario:

- Joe Manager is told to go build a work plan for the project.
- Joe Manager goes to his desk and opens up MS Project and starts entering and organizing the tasks that need to be performed.
- Joe Manager enters estimated durations and start and end dates for some of the key or most visible tasks.
- Joe presents results to his supervisor for review.

So, what did Joe present to his boss? A WBS? It does have work tasks listed. A project schedule? It was created in MS Project. A work plan? That's what his boss asked for. Well, what you probably have here is a high level WBS and an initial milestone schedule summary, at best. This example illustrates how an inadequate project planning and schedule development process combined with inadequate training on the project scheduling software can lead to "terminology" confusion. Table 6.1 summarizes these terms and the factors that lead to their interchangeable use.

Table 6.1 Terms Used for Planning Project Work

Term	Description	Key Factors	Notes
Project Plan	All-encompassing planning document used as basis for execution and control	Often incorrectly used to describe project schedule or work plan	Common tendency to think of project "scheduling" software as project "management" software
Project Schedule	Shows when the work will be done and by whom Drives project execution	Many "schedules" are more like task lists (WBS), because the task dependencies and resource assignments are not properly captured	Inadequate training on project scheduling software Inadequate schedule development and review process
Work Plan	A generic term used to refer either of the other three	Usually refers to project schedule	Need to clarify terms up-front
WBS	Work Breakdown Structure Hierarchical representation of work to be performed	WBS often created with project scheduling software (MS Project) WBS templates often created and saved with project scheduling software (MS Project)	Use of project scheduling software is acceptable as long as the proper process is followed

Key Differences Between the WBS and the Project Schedule

The key differences between the WBS and the project schedule include the following:

- Task dependencies—WBS does not show them; a project schedule does.
- Scheduled tasks—WBS does not show when tasks occur; a project schedule shows start and end dates for each task.
- Task assignments—WBS does not show who is assigned to individual task; a project schedule does.

tip

Avoid judging a current work practice or process or the people involved before you understand "why" it is done this way or "how" it evolved to the current point.

This approach will keep you results-focused, improve your ability to develop solution alternatives, increase your effectiveness in leading change, and enhance your relationships with all stakeholders.

Different Types of Breakdown Structures

Another factor that can impact understanding of the WBS term and concept is that many industries utilize other breakdown structures and related acronyms that can confuse this subject. Therefore, to better understand what is meant be a WBS, you should be familiar with these other types of breakdown structures, as listed in Table 6.2, and how they are different from a WBS.

Table 6.2 Different Types of Breakdown Structures

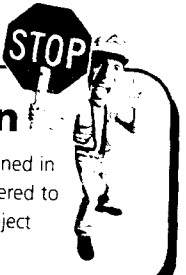
Acronym	Description	Notes
CWBS	Contractual WBS	Defines the level of reporting between the seller and buyer. The CWBS is not as detailed as the WBS used to manage the actual work.
OBS	Organizational Breakdown Structure	Maps work components to organizational units.
RBS	Resource Breakdown Structure	Maps work components to individuals.
BOM	Bill of Materials	Describes the physical components needed for the project.
PBS	Project Breakdown Structure	The PBS is actually the same as the WBS. This term is only used in areas where the term *WBS* is incorrectly used to refer to a BOM.

Why Is the WBS Important?

The Project Management Institute (PMI) considers the WBS the most important tool of the project manager. Why?

More than any other project management tool, the WBS provides the foundation for defining and organizing the work needed to fulfill the project objectives. Through the WBS, the work to produce the targeted deliverables is structured, assigned, scheduled, tracked, and reported. Through the WBS, the work of the project is effectively represented and communicated to all stakeholders. A well-done WBS accomplishes the following objectives for the project manager:

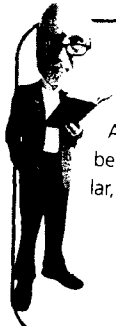
- **Manage the Pieces**—It provides a mechanism to manage any project size or complexity. Through decomposition, you can manage the pieces (work packages) rather than the whole project.
- **Better Work Definition, Less Changes**—It enables identification of all necessary work for the project and only the necessary work. It also reduces the number of items that "slip through the cracks" as well as the "Oh, I didn't think of that!" moments.



caution

Any work not defined in the WBS is considered to be outside the project scope.

- **Better Estimates, Better Planning**—It improves the accuracy of cost, duration, and resource estimates.
- **Better Control**—It defines a baseline for performance measurement and control.
- **Clear responsibilities**—It facilitates clear responsibility assignments at both an individual and organizational level.
- **Stakeholder buy-in on scope work effort**—It facilitates understanding and buy-in of the project scope, the project approach, the work effort involved, and alignment between scope and work from each stakeholder.
- **Tighter management integration**—It provides a mechanism to relate the work directly to schedule, budget, and resource allocation plans.
- **Better team performance**—It allows each team member to easily understand how his or her work fits into the overall project, how it impacts the work of other team members, and to stay focused on deliverables.
- **Risk factors are identified early**—Through decomposition of the work, a more complete and effective risk analysis can be performed during project planning.
- **Confidence increases**—When people see that the work of the project is structured, definable, and doable, their confidence level in the project increases.



tip

A well-done WBS can become a template for similar, future projects.

The Process of Building a WBS

Now that we understand what a WBS is and the importance it plays to our project, let's review the key techniques, guidelines, and principles in building an effective WBS.

In general, the process of breaking down work is something we do frequently and is a straightforward logical endeavor. However, there are frequently two common challenges in the WBS development process.

- Where do I start?
- Where do I stop?

Getting Started

To start the work decomposition process, think about the following:

- Does a template WBS exist as part of our methodology or from a past project that I can use?
- What are the major deliverables?
- What is the project approach? The project lifecycle? The major project phases?
- Think through the entire project. What does the "end" look like?

To continue the work decomposition process, think about these questions:

- Can I break down this WBS element (deliverable) into sub-components?
- How exactly will the deliverables be produced? What processes and methods will be used?

note

Major deliverables should come from the project definition document and are likely second-level WBS elements.

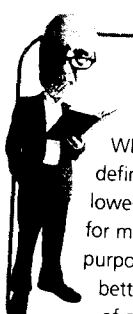
There is no one way to organize a WBS. It should be organized in a manner that emphasizes the most important aspects and that best communicates the entire scope of the project to your stakeholders.

- How do I ensure acceptable quality in deliverables and in the process?
- Can I make adequate costs and duration estimates from this level of detail?

Guidelines for Effective WBS

Here are a few "guidelines" regarding the development of the project WBS that you will want to keep in mind:

- *All* the work of the project is included in the WBS.
- The WBS should be "deliverable focused."
- All deliverables are explicit in the WBS.
- The WBS should be developed "with the team."
- The WBS is refined as the project progresses.
- The WBS is a top-down decomposition and is logical—the summary tasks go with lower level tasks.
- The WBS should be organized in a manner that emphasizes the most important aspects of the project and that best communicates the entire scope of the project to your stakeholders.
- The lowest level of the WBS is the work package or activity level and is used for schedule and cost development. This is the level where effort and cost can be reliably estimated.
- Unique identifiers are assigned to each item in the WBS to allow for better management reporting of costs and resources.
- WBS elements should be consistent with organizational and accounting structures.
- The coding scheme should clearly represent a hierarchical structure.
- Review and refine the WBS until all key project stakeholders are satisfied.
- Each WBS element represents a single deliverable and should be an aggregation of lower level WBS elements.
- Each WBS element has only one parent.
- Upper levels of the WBS represent major deliverables or project phases.
- The WBS should include project management tasks and activities.



tip

WBS should always be defined at least one level lower than what is required for management reporting purposes. This allows you to better identify the source of any issues or variances.

- The WBS should include and isolate any work needed to integrate components/deliverables.
- The WBS should account for any subcontracted or externally committed deliverable.
- The WBS should represent all work needed to ensure completeness, correctness, and acceptance of deliverables.
- Depth of WBS depends on three key factors:
  - The amount of project risk.
  - The reporting requirements.
  - The balance of control versus costs.

note

In general, the more detail in the WBS, the more accurate the work estimates and the better level of control. However, there is a balance. Too much detail and you will incur excessive costs performing data collection, tracking, and reporting. Too little detail and you incur higher risks and be unable to effectively manage.

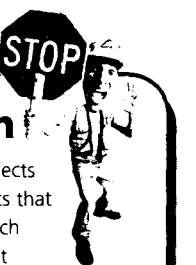
The level of depth (granularity) for the work package level in a WBS (lowest levels) will vary. It depends on what level of detail the project manager needs for effective management and control of the project.

In a program, or on large projects, the work package level may represent efforts in the hundreds of hours. In these cases, it is expected that the teams assigned to these work packages (or subprojects) will define the detail activities and tasks needed to complete the work package. From a practical standpoint, these teams should develop their own WBS that can then be rolled-up into the master WBS.

Knowing When to Stop

The other aspect of WBS development that creates frequent uncertainty is knowing when to stop. To determine if you have enough detail in your WBS, review these questions for each lower level item:

- Can each lower level item be estimated, scheduled, budgeted, and assigned to a responsible party?
- Do I need more detail to make it easier to estimate effort, assign work, track costs, or measure progress?



caution

Most troubled projects have WBS elements that are too large. If each lower level element should be completed within the standard reporting period (every week or every two weeks), it is much easier to track actual progress and to take any corrective actions.

- In addition, consider further decomposition of the lower level item, if any of the following are true:
  - The work cannot be completed within the standard reporting period for the project.
  - There are specific risks associated with a smaller portion of the work element.
  - More than one individual or group is responsible.
  - More than one deliverable is included.
  - More than one work process is included.
  - There is time gap involved.
  - The resource requirements for the work element are not consistent.

The importance of the WBS cannot be over-emphasized. Since the correctness and completeness of the WBS has a direct impact on how well we determine our resource needs, estimate the work efforts, and properly sequence the work, it is the foundation that drives our schedule and most of our planning efforts.

note

You will read about common rules of thumb for the proper size of work packages. The most common rules are 8/80 and 4/40, which means no task should be less than 8 hours or more than 80 hours, or in the case of 4/40, it would less than 4 hours or more than 40 hours.

These are solid guidelines, but not rules.

The most important thing to remember is to size the work package to the level you need for effective management and control. Again, setting the maximum size to correspond to your reporting period is an excellent idea.

THE ABSOLUTE MINIMUM

At this point, you should have a solid understanding of the following:

- A WBS is a logical breakdown of all the work to be performed by the project.
- A WBS is neither the project schedule nor the project plan.
- The WBS should be developed with the project team.
- The WBS is a vital tool to the project manager.
- Avoid judging a current work process or the people involved before you understand *why* it is done this way or *how* it evolved to the current point.
- How to evaluate a WBS.

continues

- How to avoid the common challenges and issues with WBS development.
- The WBS is the foundation for developing a realistic schedule, determining project resource needs, and figuring an accurate project budget.
- The work packages included in the WBS should be detailed enough to support effective management and control.
- The maximum size of a WBS work package should correspond to the standard reporting period for the project.

The map in Figure 6.4 summarizes the main points we reviewed in this chapter.

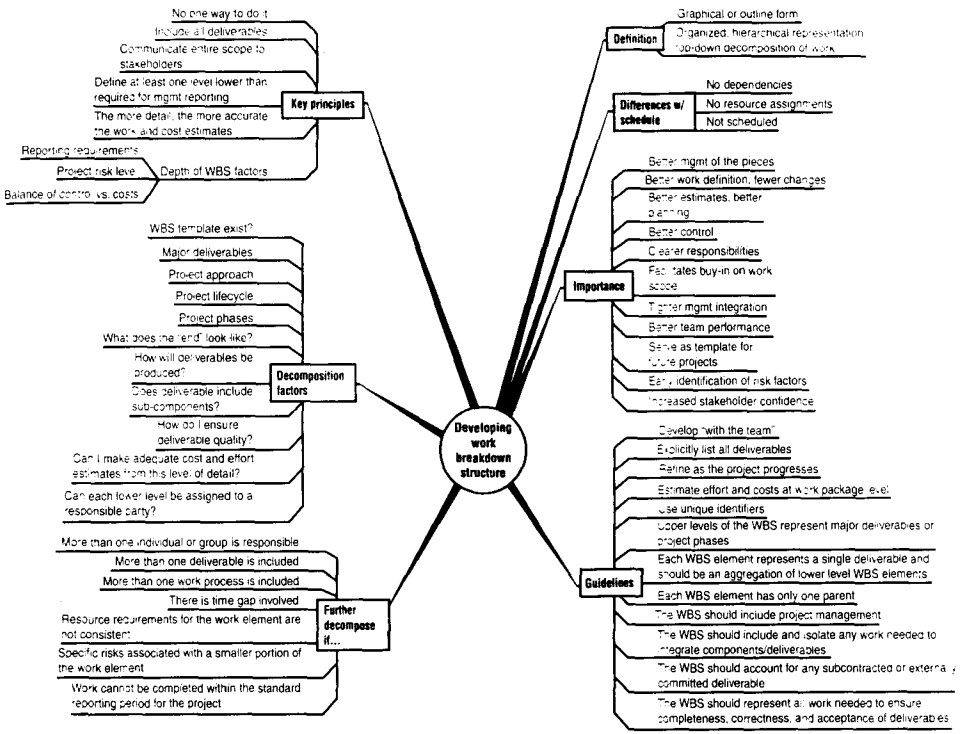


FIGURE 6.4
Developing a work breakdown structure overview.

IN THIS CHAPTER

7

- Understand the importance that estimating plays in the success of a project
- Understand how estimating is used to manage project risk
- Review the common reasons for poor estimates and how to avoid them
- Review the key estimating techniques and methods
- Understand the power of bottom-up estimating
- Learn how to properly ask for an estimate
- Understand how to deal with uncertainty
- Learn the best estimating practices of successful projects

ESTIMATING THE WORK

Estimating. Nothing else symbolizes the challenges of project management better. Negotiate with senior management and customers to prevent "ball park" estimates from becoming your targets; team with subject matter experts (SMEs) and knowledge workers to develop accurate estimates for work that has never been done before in these conditions, with these tools, by these people; assess your risks; educate stakeholders on the estimating process; and continuously manage the time-cost-quality equilibrium. Plus, you likely must do all of this in an organization that has not made the investment to improve estimating accuracy. Is it any wonder we love this job? For most people and most organizations, you would need a U-Haul truck to carry all of the "baggage" that comes along for the ride when estimating is discussed. The "baggage" accumulates from political battles, misunderstandings, a sense of "no control," and past troubled projects. As a result, there are complete educational courses and books in the marketplace that cover nothing but "estimating"—not to mention the many reputable therapists that can improve your emotional and spiritual well-being (just kidding; it's not that bad).

In this chapter, we will show you how to leave that U-Haul behind and take control of the estimating process. It can be done. First, we will review how estimating the work fits in with the overall schedule development process and how it is an integral part of how we manage risk on the project. Then, we will learn the key estimating techniques and methods and understand how to use them. And finally, we will discuss the common reasons for poor estimates and review the golden guidelines of estimating. This will allow you to improve your estimating accuracy and to get it right the first time.

Next Step in the Schedule Development Process

Before we get into the details of estimating, let's make sure we are clear on where estimating falls in the schedule development and planning process. If someone stopped you on the street and asked you for an "estimate," what is the minimum information that you would need? You would need to know what the estimate is for—what work is to be done. And you would need to know who is going to do it—what type of resources will be involved in performing the work. This is what we show in Figure 7.1. Estimating the work should occur after we have identified the work and after we have thought about what resources are needed for the project.

It sounds so simple, doesn't it? Then why is this so tough? Well, we will cover this in more detail later in this chapter, but these two basic prerequisites are where most estimating woes originate. There is often not a clear or complete understanding of the work to be performed by the person doing the estimate, and the relationship between the work estimate and the resource doing the work is not defined or communicated. In addition, there is the challenge of estimating work that has not been done before in exactly these conditions.

Yet, estimating the work effort is a cornerstone activity for planning the project. From these work estimates, we determine the project costs (see Chapter 9, "Determining the Project Budget"), develop the project schedule (Chapter 8, "Developing the Project Schedule"), and identify key project risks. This relationship is illustrated in Figure 7.2.

Accurate estimates build the foundation for a realistic schedule and an accurate project budget.

FIGURE 7.1
The step of estimating the work in the development of the project schedule.

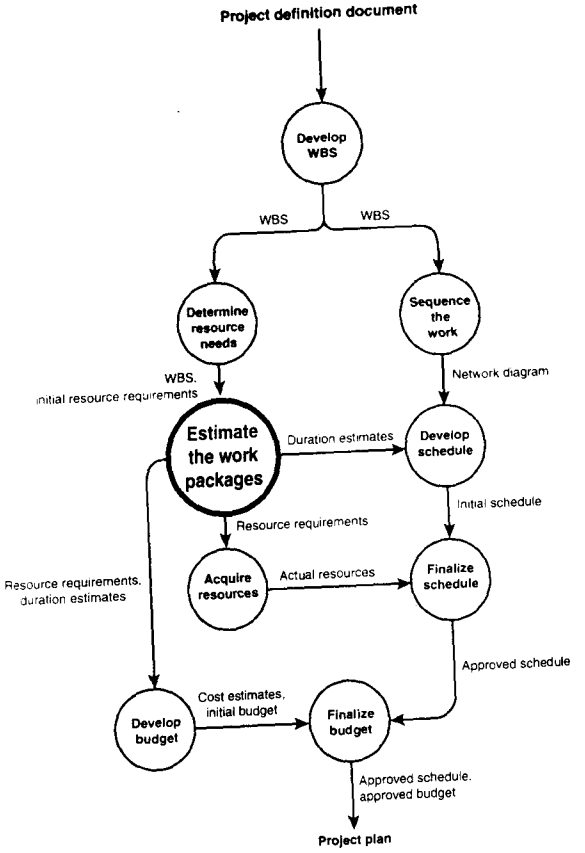
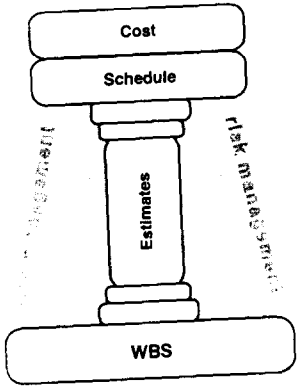


FIGURE 7.2
Shows the foundational role that the WBS and the work estimates play in the overall planning process.



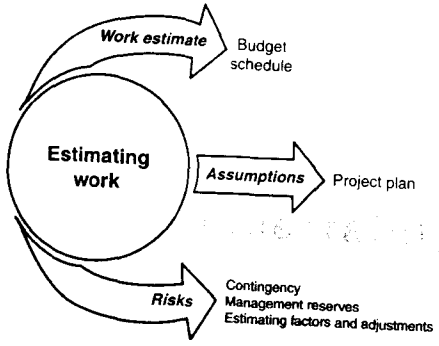
Managing the Risk, Managing the Estimates

There lies the key challenge. How do you manage the uncertainty that is naturally involved with the estimating process? Since these estimates form the foundation for the project schedule and the project budget, we must implement techniques and approaches that allow us to properly manage this risk and the expectations of our stakeholders.

While this subject of estimating and risk could easily slip into a review of statistics, probability, standard deviations, skewed distributions, and Monte Carlo analysis, we will not go there. In many real-world environments, these advanced concepts and techniques are not utilized to estimate work and to manage the associated risk, and these topics would be outside the scope of this book. Our focus will be understanding the impact that estimating the work has on our overall risk management approach and what we can do to minimize the those risks.

Estimating the work is a fundamental risk analysis step. Not only do you estimate work efforts, but you also identify the assumptions that support the estimate and the key risk factors that may impact the accuracy of those estimates. These key outputs are depicted in Figure 7.3.

FIGURE 7.3
Estimates are key inputs for scheduling, budgeting, and risk management.



Reasons for Estimating Woes

Before we review the key estimating techniques and methods that we need to know to best plan our projects and manage our risk, let's first take a deeper look at the common reasons for estimating woes on many troubled projects:

- **Improper work definition**—The number one reason for inaccurate work estimates is inadequate definition of the work to be performed. This includes the following:
  - Estimates based on incomplete work. Work elements (packages) not accounted for in the WBS.
  - Estimates based on lack of detail work breakdown.
  - Estimates made without understanding the standards, quality levels, and completion criteria for the work package.
- **Wrong people estimating**—Another key reason for inaccurate work estimates is that the wrong people make the estimates. While it may be appropriate for management to make ballpark estimates during the early defining and planning stages, when firm commitments must be made, it is best to have the people who have experience doing the work make the estimates (or at least review and approve any proposed estimate made by someone else).
- **Poor communications**—This reason hits on the process of facilitating estimate development. This category includes such events as
  - Not sharing all necessary information with the estimator.
  - Not verifying with the estimator what resource assumptions and other factors the estimates are based on.
  - Not capturing and communicating the estimate assumptions to all stakeholders.
- **Wrong technique used**—We will cover this in greater detail in the next section, but this category includes events such as
  - Making firm budget commitments based on top-down or "ballpark" estimates rather than bottom-up estimates.
  - Not asking for an estimate range or multiple estimates.
  - Not leveraging the project team.
  - Not basing estimates on similar experiences.
- **Resource issues**—Related to the poor communications category, but this is a specific case where it's not really an estimate issue. This is when the person assigned to do the work is not producing at the targeted level or when there are performance quality issues with any of the materials, facilities, or tools. Without documented assumptions, these issues can appear as inaccurate estimates to stakeholders.
- **Lack of contingency**—In many cases, especially on projects involving new technologies and new processes, the identified risk factors are not properly accounted for in the work estimates. The uncertainty level in specific work estimates needs to be identified and carried forward into the project schedule and budget as part of the contingency buffer or management reserve.

- **Management decisions**—In many situations, senior management influence and decisions impact the estimating accuracy level. This category includes events such as
  - Senior management making firm budget commitments based on initial, high level estimates and not accounting for accuracy ranges.
  - Senior management not willing to invest time or resources to get detailed, bottom-up estimates.
  - Estimators factoring their estimates for senior management expectations rather than the actual work effort.
  - Management requesting that estimates be reduced in order to make the work meet the budget or schedule goals.
  - Management decisions to bid or accept work for less than estimated cost.
  - No use of management reserve to account for risk/uncertainty.

Powerful Estimating Techniques and Methods

There are several key estimating techniques you should know about. Table 7.1 lists these techniques and summarizes the key characteristics of each.

Table 7.1 Estimating Techniques

Estimating Technique	Key Characteristics	Notes
Analogous (top-down) estimating	Used in early planning phases and project selection. Utilizes historical information (actual duration periods from previous projects) to form estimates.	Reliable if WBS from previous projects mirror the WBS needed for this project.
Bottom-up estimating	Used to develop detailed estimates. Provides estimate for lowest level of the WBS (work package). Provides the most accuracy.	Best technique for identifying risk factors. Takes most time and money to develop.
Effort Distribution Estimating	Uses project phase percentages to estimate. Example would be Initiation Phase—10% Plan Phase—10% Elaboration Phase—20% Construction Phase—40% Deploy Phase—20%	Used in organizations that use common methodology and/or that do similar projects. Can be used if enough information is known for one of the major project phases.

Table 7.1 (continued)

Estimating Technique	Key Characteristics	Notes
Heuristic estimating	Based on experiences. "Rule-of-thumb" estimating. Frequently used when no historical records are available.	Also known as Delphi technique and expert judgment.
Parametric estimating	Uses historical data and statistical relationships. Developed by identifying the number of work units and the duration/effort per work unit. Examples include Lines of code for software development. Square footage for construction. Number of sites for network migration.	Also known as Quantitative-based estimating. Can be used with other techniques and methods.
Phased estimating	Estimates the project phase by phase. Provides for a detailed, bottom-up estimate for the next phase and a higher level, top-down estimate for the other phases. Best technique to use on high-risk projects.	Incorporates "re-estimating" as part of the management approach. Best use of estimating resources. Excellent risk management tool.

For each estimating technique (approach), there are one or more methods that can be leveraged. Table 7.2 lists these methods and summarizes the key characteristics of each.

Table 7.2 Estimating Methods

Estimating Method	Key Characteristics	Notes
Expert judgment	Relies on subject matter expert (SME) in targeted work area	Used most effectively with bottom-up estimating.
Historical information	Relies on actual durations from past projects. The three types are project files, commercial databases, and project team members.	Many organizations do not accurately capture this information. Recollection of project team members is the least reliable source. Critical to improving estimate accuracy in an organization.
Weighted average (PERT)	Uses three estimates for each activity (weighted average): optimistic, most likely, pessimistic E = (O + 4M + P) / 6 Each estimate is captured for each activity.	Used mainly on large scale or high-risk projects. Excellent risk management technique. This technique is time-consuming. PERT = Program Evaluation and Review Technique.

Table 7.2 (continued)

Estimating Method	Key Characteristics	Notes
Risk Factors	Adjusting an original estimate based on one or more risk factors. Used in conjunction with other methods.	Common risk factors impacting effort estimates include Complexity—technical, process Organizational change impact Requirements—volatility, quality Resources—skills, costs, etc.
Team (Consensus) Estimating	Uses multiple SMEs to develop independent estimates. Facilitation meeting used to reconcile differences and develop consensus estimates.	Best for identifying assumptions and other risk factors. Avoids one person being accountable for estimate. Allows for multiple historical perspectives to be taken into account. Allows SMEs from different backgrounds to complement one another.

As with all other planning activities, work estimates are refined and improved as more is learned about the project. At a minimum, each project (or project phase) should be estimated three times. Each estimate provides a greater degree of accuracy. To better understand this concept and to better educate others in your organization, refer to the three levels of estimate accuracy recognized by PMI in Table 7.3.

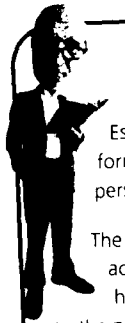
Table 7.3 Estimate Accuracy Levels

Level	Accuracy Range	Generally Used During
Order of magnitude	-25% to +75%	Initiating (defining) phase
Budget	-10% to +25%	Planning phase
Definitive	-5% to +10%	Planning phase

Best Practices

Now that we have an overview of the estimating techniques and methods that are available to us, and we have a feel for the estimating mistakes that are commonly made, let's review the estimating best practices of successful organizations and projects.

- Estimating should be based on the work breakdown detailed in the WBS.
- Estimating should be performed (or approved) by the person doing the work.



tip

Estimating should be performed (or approved) by the person doing the work.

The two main reasons: more accurate estimates and higher commitment levels to the project.

- The work estimates for lower level WBS items should be less than the standard reporting period for the project (typically one or two weeks).

  As discussed in Chapter 6, if the work estimate is not less than this, it is a good sign the task needs further decomposition.
- Estimating should be based on historical information and expert judgment.
- Estimates are influenced by the capabilities of the resources (human and materials) allocated to the activity.
- Estimates are influenced by the known project risks and should be adjusted accordingly to account for those risks.
- All bases and assumptions used in estimating should be documented in the project plan.
- When asking an SME for an activity estimate, make sure to provide the following whenever possible:
  - Project definition document (context, approach, assumptions, constraints)
  - WBS
  - The applicable standards, quality levels, and completion criteria for the work package
- When asking an SME for an activity estimate, make sure to ask for the following at a minimum:
  - An estimate range (not just a single value).
  - Factors driving that range
  - Assumed resource level, skills and productivity
  - Assumed quality level and acceptable completion criteria
- Estimates should be given in specific time ranges.
- For managing high-risk projects, the following estimating techniques are recommended:
  - Use of phased and bottom-up estimating techniques
  - Use of the average weight and/or team consensus estimating methods

- For high-risk projects where the organization lacks significant previous experience or process knowledge, consider outsourcing the planning phase as an assessment engagement to an outside firm.
- A project's time and cost estimates should be based on project needs and not dictated by senior management. The project manager should work with senior management to reconcile any differences.
- Reserve time (contingency, buffer) should be added to either the project schedule or to individual activity duration estimates to account for the level of risk and any uncertainty that exists.
- Historical information is vital to improving estimates. If you don't measure actual performance, you will not have the feedback to improve estimating accuracy.

note

I have no doubt that these last two guidelines are common, everyday practice in your "real-world" experience.

A clear example of why leadership, negotiation, and communication skills are so important for project managers.

THE ABSOLUTE MINIMUM

At this point, you should have a solid understanding of the following:

- It takes time and money to develop accurate estimates.
- Any estimating technique will improve results if it is used consistently by leveraging lessons from the past.
- To get science in the process, estimates must be compared to actual performance.
- Multiple estimating techniques can be used together. The art is knowing when to use which technique and knowing how much accuracy is required for the business decision at hand.
- Many variables beyond the control of the project team, such as changing specs, team turnover, and failed technology, can invalidate original estimates.
- Project managers should never work independently when making estimates.
- Organizations must make a conscious effort to establish rigor and procedures to estimating to improve accuracy over time.
- All stakeholders are responsible for estimates.

The map in Figure 7.4 summarizes the main points we reviewed in this chapter.

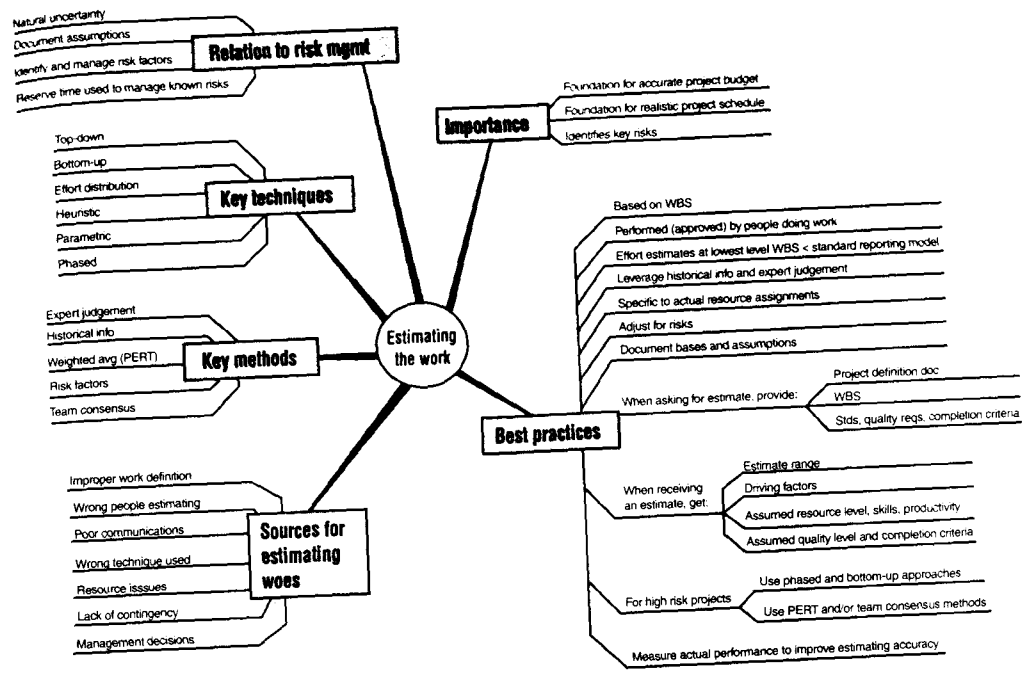


FIGURE 7.4
Estimating the work overview.

IN THIS CHAPTER

- **Understand why the project schedule is vital to a successful project**
- **Review the process for creating a realistic schedule**
- **Learn the characteristics of a good schedule**
- **Learn how to avoid the common mistakes that even experienced project managers can make when building a schedule**
- **Review the options for effectively presenting your schedule to others**

8

DEVELOPING THE PROJECT SCHEDULE

It's funny really. The one activity that the common person associates with project management is planning, and the main output from this planning effort is a schedule. Yet, it is a challenge to find a project manager who can develop one accurately. Although the central technical component of project management, it is also the most common technical weakness of most project managers.

Why is this? Well, from my own experience, I can state at least four reasons: lack of time for proper planning, lack of education on the schedule development process, lack of training with the scheduling software, and a belief that a detailed schedule is not necessary. I believe this issue is one of the fundamental reasons why many organizations started project management offices (PMOs)—internal support and governance organizations to improve project performance. Unrealistic project schedules have an adverse impact on resource management and project investment decisions.

Of course, as a reader of this book, you will know the proper process for developing a schedule, you will understand the necessity of a detailed schedule, and you will have plenty of ammunition to use when negotiating for project planning time. Combined with proper knowledge of the scheduling software you are using, you will possess a key strength for successful project managers and be a key asset to your stakeholders. Given that, let's continue our review of the overall schedule development process.

In this chapter, we will emphasize the vital importance of the project schedule, step through the process for developing a realistic schedule, and highlight the areas where people often go astray. This will lead to a schedule that your stakeholders will believe and accept, and it will provide you with the foundation to properly execute and monitor the project.

The Impact of the Project Schedule

The project schedule is the tool that merges all of the work tasks to be performed, their relationships, their estimated durations, and their assigned resources to a calendar. Examples of partial schedules are illustrated in Figures 8.1 and 8.2. For most, specialized scheduling software (such as Microsoft Project) is used to produce a project schedule.

FIGURE 8.1
An example of a partial schedule displayed in table form.

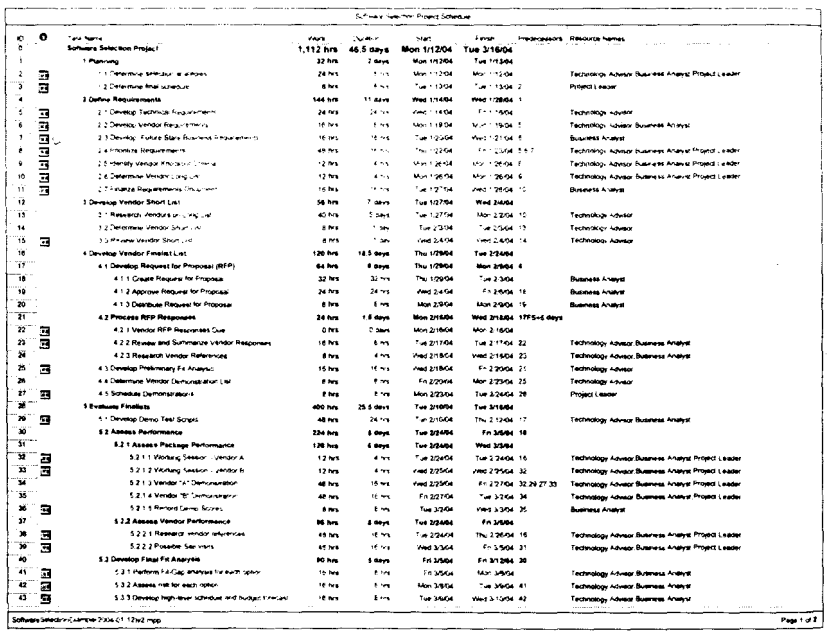
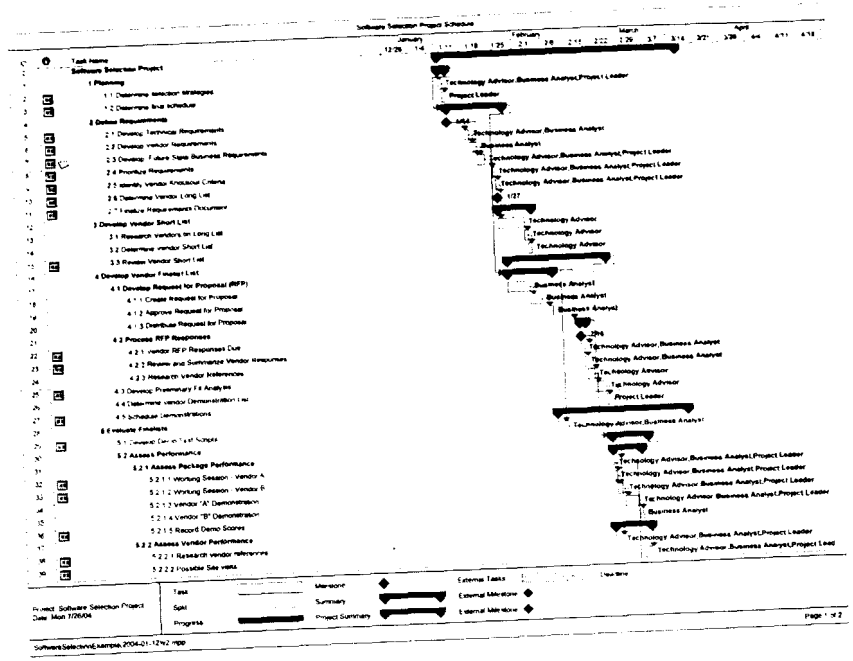


FIGURE 8.2
An example of a partial schedule displayed in Gantt chart form.



As mentioned earlier in the book, the project schedule is often referred to as the "project plan" in error. While not technically correct, it is easy to understand why this term is often used. The project schedule serves as the chief integration point for most, if not all, of your project planning efforts. The project schedule reflects (or should reflect when the schedule development process is complete) all of the following:

- WBS
- Resource plan
- Work estimates
- Key milestones
- Responsibility assignments (RASIC)
- Quality management plan
- Risk management plan
- Communications management plan
- Procurement management plan
- Staff management (training) plan

In addition to providing this vital integration role, the project schedule is important to the project manager for these reasons as well:

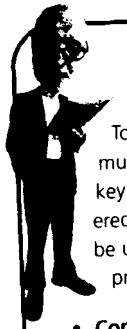
- **Drives project budget**—Since most of your project costs are a factor of time (we'll cover this in more detail in Chapter 9), the project schedule is a main driver for your project budget. If the schedule is inaccurate, your budget is likely incorrect too.
- **Drives resource schedule**—Your schedule drives the timing of your resource needs. Especially in organizations where resources are shared across projects or centrally managed, the accuracy of the schedule is key to efficient resource management.
- **Essential for managing expectations**—With a well-developed schedule, you have the best tool for managing stakeholder expectations regarding the schedule-cost-quality equilibrium. A well-developed schedule will illustrate the "earliest" date a project can be completed given the project's current requirements and constraints. This is an invaluable tool when negotiating the final schedule with senior management or customers and when assessing the impact of any change to equilibrium factors during the execution of the project.
- **Allows project performance to be measured**—With a well-developed and approved project schedule, you now have the ability to establish a baseline for how the project is actually performing. We will discuss this in more detail in Chapter 10, "Controlling a Project."
- **Provides for "what-if" analysis capabilities**—Another important ability that a well-developed schedule provides is the ability to perform "what-if" analysis during the execution of the project. Over the course of a project, things happen that can negatively impact project performance. At these times, you will often be asked what corrective actions can be taken to possibly get the project back on schedule. Without a well-developed schedule, you will not be able to quickly determine the impact of implementing a given schedule compression technique, such as fast-tracking, crashing, or limited overtime.

The Goal of the Schedule Development Process

I've used terms like "realistic" and "well-developed" to describe the type of project schedule we want to develop. Before we continue, let's clarify what the goal of the schedule development process should be. The schedule development process should generate a project schedule that meets the following criteria:

- **Complete**—The schedule must represent all the work to be done. This is why the quality and completeness of the WBS is so important.
- **Realistic**—The schedule must be realistic with regard to time expectations.
- **Accepted**—The schedule must have "buy-in" from team members and stakeholders.
- **Formal**—The schedule must be documented and formalized.

After reviewing this list, you probably see why so many projects are troubled from the start. While there are many factors that can adversely impact project performance and cause us to re-plan, re-schedule, or take corrective actions, an improper schedule should not be one of them. Of course, by understanding the lessons discussed in this chapter and in this book, you will be well on your way to developing solid project schedules every time.



tip

To be final, a schedule must possess the following key attributes to be considered complete and ready to be used as a baseline for project performance:

- **Complete**—The schedule must represent all the work to be done.
- **Realistic**—The schedule must be realistic with regard to time expectations.
- **Accepted**—The schedule must have "buy-in" from team members and stakeholders.
- **Formal**—The schedule must be documented and formalized.

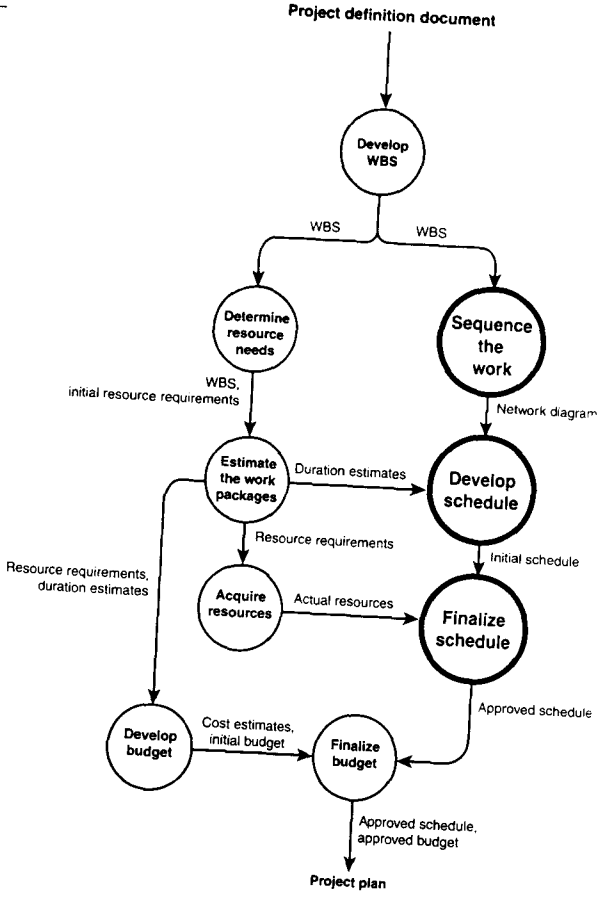
Key Inputs for Building a Schedule

The first step in building a schedule is to review the key inputs. Let's make sure we are clear on these and where we are in the overall schedule development and planning process. To build a project schedule, you need five key inputs:

- **WBS**—List of organized tasks, the work to be done (covered in Chapter 6, "Developing the Work Breakdown Structure").
- **Effort estimates**—Amount of effort and time each task will take (covered in Chapter 7, "Estimating the Work").
- **Task relationships**—The logical dependencies that exist between work tasks (depicted as the Sequence the Work step in Figure 8.1). We will review this step in this chapter.
- **Resources**—The actual personnel and equipment needed to perform the work between work tasks (referenced throughout these Planning chapters, and covered in more detail in this chapter).
- **Risk responses**—Measures taken to deal with the uncertainty surrounding effort and resource estimates. Usually, in the form of additional time (contingency buffer) added to the schedule.

Due to the amount of important information and the critical nature of two of these inputs (developing the WBS and estimating the work packages), we reviewed them in their own chapters. In this chapter, we will take these two key inputs together with the other three (sequencing the work, develop schedule, and finalize schedule) to develop a realistic schedule, as depicted in Figure 8.3.

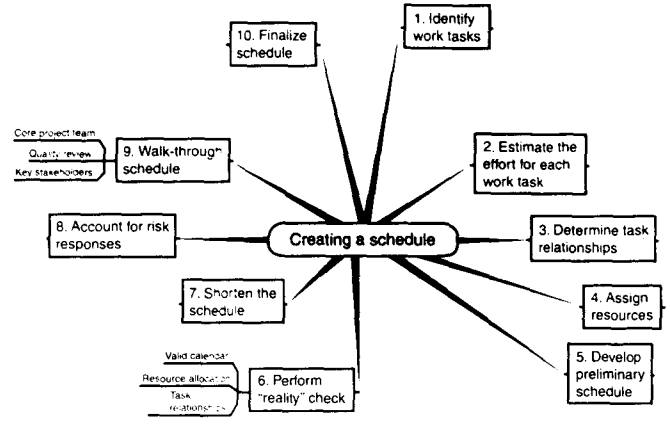
FIGURE 8.3
The schedule development points to be reviewed in this chapter.



Creating a Schedule

Since we are on this wavelength, let's go ahead and review the key steps involved in building a project schedule. The steps are also summarized in Figure 8.4. We will follow-up this section with a more in-depth look at a few of these:

FIGURE 8.4
The ten steps involved in creating a schedule.



1. **Identify the work tasks to be done (WBS)**—Reviewed in Chapter 6, but may need to be revisited as you iterate through the process.
2. **Estimate the effort for each work task**—Based on specific resource types, the amount of effort each task will task. Covered in Chapter 7, but may need to be revisited as well until resource assignments are finalized.
3. **Determine task relationships (network diagram)**—Identify which tasks have to be done before others can begin and which tasks can be done at the same time (in parallel).
4. **Assign resources**—Assign the roles, personnel, and equipment that will perform each task.
5. **Develop preliminary schedule**—If you have not already, capture all of these inputs using your preferred scheduling software.
6. **Perform "reality" check**—A key, often overlooked, step in the process to make your schedule realistic. This step includes a review of resource allocation and calendar setup.
7. **Shorten the schedule**—In this step, you will determine the critical path and look for ways to reduce the time required to complete the critical path tasks.
8. **Account for risk responses**—If any of the risk responses includes adding a contingency buffer to any specific task or to the entire schedule, make sure to include this in the schedule too.

9. **Walk through the schedule**—In this important step, the proposed schedule is presented for review and feedback. At a minimum, the schedule should be closely reviewed by the core project team first, and then by the key stakeholders (management, customers).
10. **Finalize schedule**—Incorporate feedback from stakeholders; make any adjustments for actual resource assignments, final risk responses, and success factor tradeoffs; get formal acceptance of schedule.

tip

Due to the number of inputs, tradeoffs, and feedback points, the schedule development process is a natural, iterative process.

Expect to continuously loop back through this process and refine your inputs until a final, approved schedule is achieved.

Let's take a closer look at a few of the key steps.

Determining Task Relationships (Sequencing the Work)

In this step, we think about what needs to be done first and what can be done at the same time. We want to capture the logical relationships that exist between the tasks in our WBS. The traditional technique used to capture these relationships is the network diagram. An example of a network diagram is pictured in Figure 8.5.

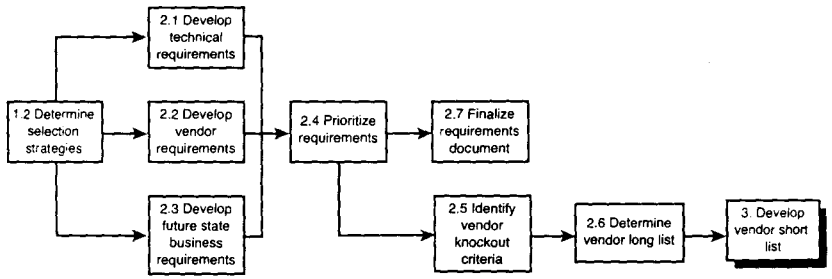
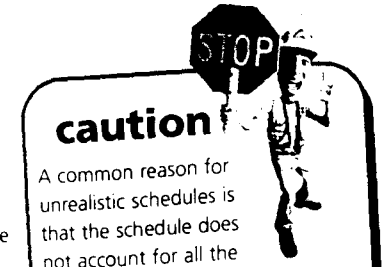


FIGURE 8.5
Example of a partial network diagram showing logical sequence of tasks.

Unlike most introductory project management books, I'm not going to spend 5–10 pages (or more) on traditional network diagram topics such as types of network diagrams (Activity-on-Node, Activity-on-Arrow, GERT), dependency types (Finish-to-Start, Start-to-Finish, Start-to-Start, Finish-to-Finish), or mathematical analysis scheduling techniques (Critical Path Method, PERT, and Monte Carlo simulation). Why? Because unless you are in a specialized industry, these techniques are not used very often, and most project scheduling software will take care of most of this for you (if you know how to use it). Of course, if you plan to take the PMP, you will need to hone up on these concepts.

The whole idea here is look at your work visually and think about in what order (sequence) the work needs to occur. This is an exercise in logic. In many cases, this step is an excellent team activity. At this time, you don't want to concern yourself with resource constraints: just focus on logical sequence of the work. When you complete this task, you want to be clear on three things:

- For each task, what others tasks must be completed first?
- For the project, what tasks could be done at the same time (concurrently, in parallel)?
- For the project, where are your external dependencies? What tasks need an external event or task to complete, before it can start?



caution

A common reason for unrealistic schedules is that the schedule does not account for all the logical dependencies that exist. The schedule will generally reflect an earlier completion date than what is actually possible.

Building the Preliminary Schedule

Now that we have our key inputs (WBS, task relationships, effort estimates, and resource assignments), we are ready to build our initial schedule. There are a few keys to remember here:

- Use scheduling software and get properly trained in how to use it.

tip

Become knowledgeable and proficient at the scheduling software you use. Many unrealistic schedules originate with a project manager who does not understand how to best use the tool

VALUE OF SCHEDULING SOFTWARE

In case you are not an advocate of scheduling software, or you need to help convince someone else in your organization, please note the following benefits provided by scheduling software:

- Critical path analysis
- Project and resource calendars
- Schedule calculation
- Resource leveling
- Baseline management

- If you've done the other steps well up to this point, this step is much, much easier.
- For each task you want to schedule, you need want to enter the following information:
  - Task name
  - Estimated effort
  - Predecessor task
  - Assigned resource
- Understand the relationship between work, duration, resources, and productivity.

  The duration of a task is dependent upon the number of resources (and their productivity rate) that are assigned to the total work effort.
- Using the scheduling software, locate the critical path. Often, the software will differentiate the tasks that comprise the critical path in some way, such as showing these tasks in red font.

  The critical path is the longest path through your network and represents the minimum amount of time it will take to complete the project.
- While the overall schedule development process should be a team-based activity, a single person generally performs the construction of the actual schedule, due to the nature of the software.

caution

Avoid entering start and end dates for tasks unless you have a hard, fixed milestone date that must be honored.

These dates establish constraints in the scheduling software and can give you unexpected results.

A team-based schedule development approach should be pursued whenever possible for two primary reasons:

- Higher quality schedule
- Team ownership of the schedule

note

A schedule is considered "preliminary" until resource assignments are confirmed.

Perform "Reality" Check

In this step, we need to make sure the schedule is reasonable and is aligned with the organizational culture. The primary checkpoints are listed here:

- **Check for proper allocation of resources**—In this activity, we want to do two things: remove unrealistic work allocations and optimize the use of our resources.

This activity is commonly referred to as *resource leveling*. Most scheduling software systems will provide a function to do this for you, but proceed with caution—the software does not always get this right. As a result, you can have a less than optimal schedule.

I recommend, especially if you are just beginning, that you manually level the allocation of your resources. You will learn more about your scheduling software and you will become more intimate with your schedule.

Review the resource schedule and look for any allocation that is over the maximum hours per day or per week. In other words, if Joe Analyst is allocated for 16 hours on Monday, we have an unrealistic expectation. An adjustment needs to be made. The three common responses to resource over-allocation situations are

1. Utilize other resources. Assign one or more of the affected tasks to an available resource.
2. Establish a predecessor relationship. If Joe is the one who must perform each task, make the start of one task dependent upon the finish of the other(s).
3. Modify the priority level of one or more of the tasks and let the software perform its resource leveling function.

- **Check for proper use of calendars**—In this activity, we want to check the following:

  Are the non-working days accounted for (holidays, weekends)?

  Are the number of work hours per day consistent with the organization's expectation? Are 8 hours of productivity per day assumed or something different?

  For part-time resources or resources with special work schedules, are individual calendars assigned to them that reflect this reality?

caution

Over-allocated resources and misaligned schedule calendars are two of most common causes of unrealistic project schedules.

Shorten the Schedule

On most projects, your preliminary schedule will not be the schedule presented to the stakeholders for approval. Due to either stakeholder expectations or an external deadline that must be met, an effort must be made to compress or "shorten" the schedule without reducing the scope of the project. The key to this effort is the critical path.

The critical path determines the earliest (the soonest) your project can be completed given the current task relationships and estimated durations. As a project manager, you want to be very clear about which tasks comprise the critical path for two reasons:

- If you can reduce this critical path (or change it), you may be able to complete the project sooner.
- Any slippage in the completion of a critical path task will push out the completion date for the entire project.

note

The only way to shorten a schedule is to compress the critical path time.

The common techniques to consider are detailed in Table 8.1.

Table 8.1 Techniques for Compressing the Project Schedule

Technique	Definition	Key Issue(s)
Crashing	Adding resources to critical path activities only	Certain activities cannot be completed faster by adding resources. Additional resources often add overhead that can negate any time savings. Crashing can increase project costs.
Fast tracking	Performing critical path activities in parallel	Fast tracking is a high-risk technique that increases the probability of rework.
Process improvements	Gaining productivity increases based on different work processes, technologies, and/or machinery	New approaches can increase project risks. Process improvements are not always available.
Limited overtime	Increasing the number of hours per day or week available to work on project tasks	Overtime is most effective when used for limited periods of time. Overuse can lead to team morale and quality of work issues.

Walk Through the Schedule

In our pursuit of both a more realistic schedule and a schedule that our stakeholders feel ownership, we need to walk through the schedule with at least two groups—and if at all possible get a third quality-based review.

- **Review with project team**—First, present the proposed schedule to your project team. Seek their feedback on all aspects: complete task listing, correct resource assignments, logical task sequence, reality factors, and so on. Make any necessary adjustments.
- **Quality review**—This review is not always possible, but whenever possible, have an experienced and knowledgeable project scheduler review your proposed schedule before you submit it to your stakeholders. Especially if you are just gaining experience at this, this input and training can be invaluable.

tip

Techniques to shorten the project schedule can also be deployed during project execution as a corrective action to a schedule variance.

Clearly document and communicate all assumptions used in building the schedule.

- **Review with project stakeholders**—Present the proposed schedule to key stakeholders. Seek feedback and questions on all aspects: verify resource assignments, risk responses, key milestones, and so forth. There are two keys to this step. One, the form and manner in which the schedule information is presented (making it as reviewer friendly as possible), and two, investing the time to have a real-time, interactive review session.

Presenting the Schedule

One element of project planning and project management that is often overlooked is effectively communicating the project schedule to the various project stakeholders. Although presenting a detailed, tabular view of the schedule to the core team is acceptable, the use of visual summary representations of the schedule is highly recommended when presenting the schedule to other stakeholders. The common methods of presenting a project schedule summary are detailed in Table 8.2.

Table 8.2 Methods for Presenting a Project Schedule Summary

Method	Key Attributes	Benefits	Notes
Milestone chart	This is a bar chart that shows start and end dates, major deliverables, and key external dependencies.	Highlights key decision and completion points as well as any external dependencies.	Milestone tables are also used (same information, no bar chart).
Gantt chart	This is a bar chart that shows the various levels of the WBS.	Easy to read, incorporates the WBS, and can easily show actual progress against estimates.	Usually does not generally show interdependencies.

Table 8.2 (continued)

Method	Key Attributes	Benefits	Notes
Network diagram	A network diagram uses nodes and arrows. Date information is added to each activity node.	Highlights the critical path and shows project logic (flow).	For presentations, the summary task level of the WBS is generally used. Otherwise, a network diagram is best suited for wall display.
Modified WBS	Uses the project WBS organization with status information added to each node.	Shows progress against original work breakdown organization. Easy to read.	Similar to network diagram type representations.

THE ABSOLUTE MINIMUM

At this point, you should have a solid understanding of the following:

- Schedule development is an iterative, team-based activity.
- The project schedule is a critical component of the project plan and integrates together all of the key planning activities.
- The project schedule drives the project budget and the resource schedule.
- The project schedule is the project manager's most effective tool in managing expectations regarding the key success factors (time, cost, and quality).
- There are five key inputs for the schedule are the WBS, the effort estimates, the task relationships, assigned resources, and the planned risk responses.
- Many reasons for an unrealistic schedule originate with an inadequate schedule development process and inadequate training with the scheduling software.
- Document and clearly communicate all scheduling assumptions.

The map in Figure 8.6 summarizes the main points we reviewed in this chapter.

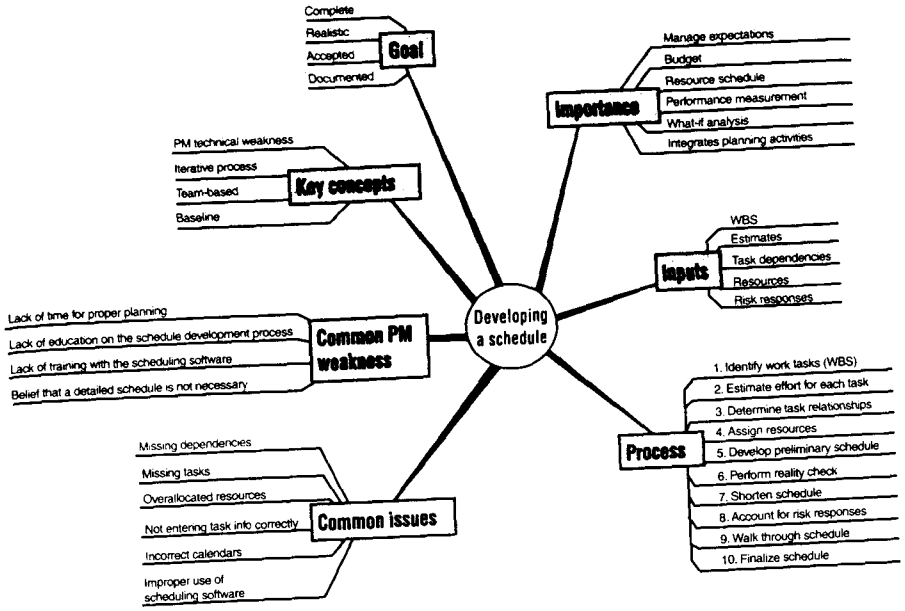


FIGURE 8.6
Overview of developing a schedule.

IN THIS CHAPTER

- **Understand why the project budget is important to project success**
- **Review the process for figuring a realistic budget**
- **Learn the key project budgeting principles**
- **Understand the common mistakes people make when building a project budget**

9

DETERMINING THE PROJECT BUDGET

It's one of the key success factors for projects—completing the project within budget. Yet, for many project managers, especially those managing internal projects, it's the success factor they have the least awareness about. There are several reasons why this occurs, and it does vary by industry, but most of the reasons have to do with organizational management structures and organizational budgeting and cost controlling policies.

For our purposes, in this age of increased accountability of project investment decisions, we will assume you need to establish a project budget and will need to track costs to it as the project is executed.

Since this an introductory project management book, we will avoid any discussion of advanced financial topics and instead will put our focus on the "need to know" fundamentals for figuring your project budget. In this chapter, we will emphasize the importance of the project budget, review the process and key principles for developing a realistic budget, and highlight the areas where people often go astray. This will lead to a budget that has credibility with your stakeholders and that provides you with the foundation to effectively track project costs and manage project execution.

The Impact of the Project Budget

Even if you find yourself in an environment where it is not expected that you develop a project budget (instead you are asked to primarily manage schedule and scope), I strongly encourage you to do two things:

- **Do it anyway**—Develop a project budget anyway. This exercise will build your project management skills, enable you to recognize project performance issues sooner, and better prepare you for senior management discussions about your project.
- **Follow the money**—You should have determined this as part of project definition, but just in case you have not yet, make sure you are totally clear on who is financially sponsoring the project and who controls any financial-based decision to be made about your project. This awareness is key in your efforts to manage expectations and to understand the political aspects of your project.

The project budget estimates all of the costs the project will incur, when they will be incurred, and is a key component of the overall project plan. The project budget is important for the following reasons:

- **Planning validator**—Since the project schedule is a main driver for the project budget, the budget can serve as an excellent cross-reference for the validity of the schedule and vice versa. By looking at the schedule from a cost perspective, you may see resource or budget issues that were not obvious before. Inversely, the schedule input is key for validating the project budget, because the budget needs to account for all the time a resource is required on the project.
- **Performance measurement**—By measuring project progress against a cost baseline, you can better measure the true performance of your project along the way, and in most cases, identify issues and risks much sooner. This is the basis for an advanced project controlling technique called *earned value management*, which we will discuss in Chapter 10, "Controlling a Project."

- **Managing expectations**—The budget impacts stakeholder expectations in several ways. The initial budget sets the expectation on what the total project costs should be. If the budget is not developed properly then you are bound to have an expectation issue. If the project budget is pre-defined and serves as a cost ceiling for the project then it helps you to set stakeholder expectations regarding project schedule and project scope.
- **Cash flow management tool**—Your schedule drives the timing of your resource needs. Especially in organizations where resources are shared across projects or centrally managed, the accuracy of the schedule is key to efficient resource management.
- **Justifying project investment**—With more projects accountable to a project selection process and to financial return on investment expectations, it is increasingly important to establish the cost baseline for the project and monitor closely.

Principles of an Effective Budget

Before we get into the details of building a project budget, let's review the fundamental principles that will guide this process:

- **Iterative process**—Budget development is an iterative process just like all of project planning. The various facets of project planning all interrelate and have natural feedback loops. With the project budget, there are strong dependencies on organizational policies and on the schedule development process. As a result, it usually takes several cycles to fully develop the budget and to get agreement.
- **Total lifecycle**—The budget should address the total project lifecycle. This is a common oversight, especially for the operational phases of the project.
- **Time-phased**—Not only do we need to budget cost totals, but we need to know when these costs will be incurred for both cash flow management and project control reasons. The goal of the project budgeting process is to establish a cost baseline.
- **Comprehensive**—The budget should account for all project costs. There is a tendency to only account for obvious resources needed for the project (labor, new equipment). As part of our focus on making the budget (like the schedule) complete and realistic, we'll cover all of the costs that need to be considered later in this chapter.

- **Include a buffer**—A buffer, normally referred to as management reserve, should be allocated to the project budget. The management reserve is primarily there to deal with known risks (a risk response), the estimating uncertainty factor, and the overall planning uncertainty factor (hidden work, re-work, hidden costs, change requests). In addition, if you have a long-term project or an international project, you may need a buffer for monetary factors such as inflation and exchange rates. Of course, these should be noted as risks in these situations.
- **Document assumptions**—Budget assumptions are documented like all other project assumptions. Any assumption made as part of the budgeting process should be documented and clearly communicated. As with all assumptions, you can document them within the targeted deliverable (in this case the budget document spreadsheet), or add them to the designated repository for project assumptions (commonly either a separate assumptions document, the project definition document, or project plan).

Creating a Project Budget

The actual process of developing a project budget is straightforward. The general challenges lie more with omissions and the foundation the budget is based upon. In this section, we will review the details of the develop budget and finalize budget steps that we have depicted in our general project planning process flow (see Figure 9.1).

Sources of Project Costs

The first step in building a project budget is to identify your costs. This sounds easy enough, right? Let's review the cost sources that need to be considered. These cost sources are summarized in Figure 9.2.

- **Labor costs**—One of the key budget cost items. Budget should reflect a line item for each person or role—whichever makes the most sense for your project. Costs are based upon resource rates and estimated work durations. When dealing with external labor, these costs are a key component of the business relationship and normally easy to obtain. However, it can be difficult getting rates for internal resources. In most organizations, either the human resources or finance department should have standard labor rates for internal resources based on role.
- **Equipment**—This category generally includes the tools that the project team requires to complete the work of the project. For budget purposes, the keys with the equipment category are twofold:

- **Completeness**—Using a bottom-up estimating approach should identify all equipment needs from a task perspective. For knowledge-based projects, you need to account for software-based tools too.
- **Expense versus capital**—You should work with accounting to determine if your equipment costs need to be expensed at full cost against your project or if your project just needs to reflect depreciation cost. Different factors can influence this decision, but the most common one is whether or not the equipment will be used by more than one project.

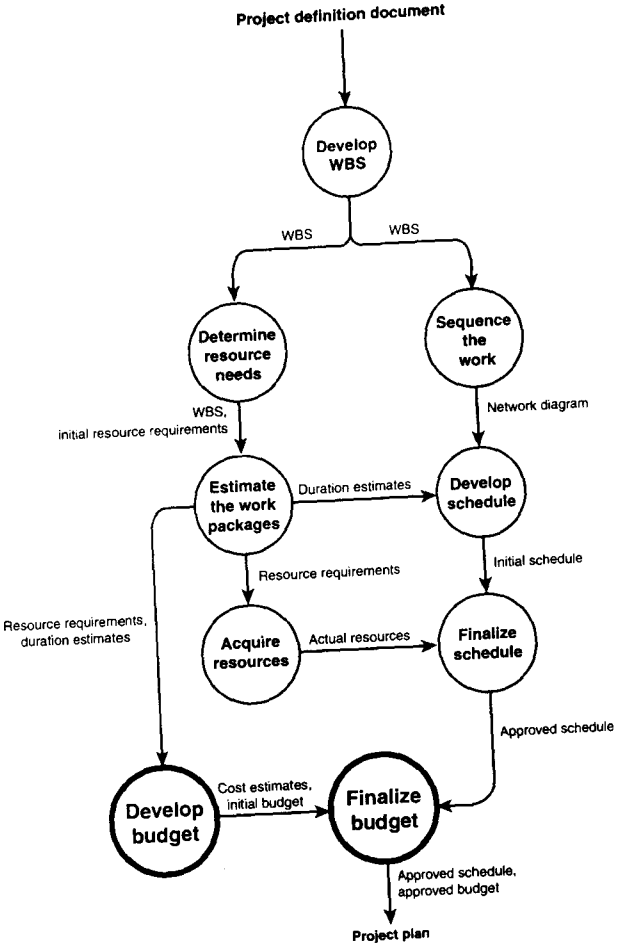
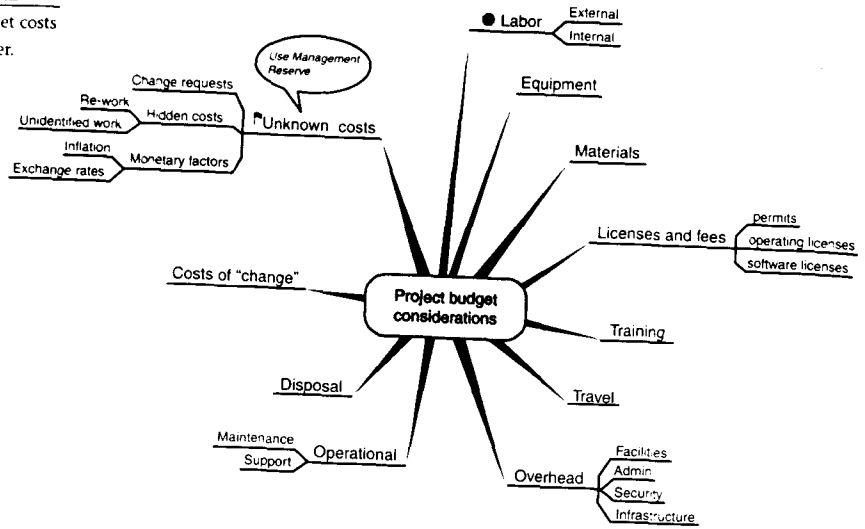


FIGURE 9.1
The budget-focused planning steps.

FIGURE 9.2
The budget costs to consider.



- **Materials**—This category includes those items that are needed to build the product. The information is generally found in the product specifications document. In dealing with vendor relationships, you would either acquire or confirm material costs by reviewing vendor responses to the formal procurement documents.
- **Licenses and Fees**—This category includes costs such as software licenses, building permits, and so on.
- **Training**—This category includes the cost of any training your project team will need to do their work and any training your users may need to use the final product.
- **Travel**—This category includes the travel and lodging costs to be charged to the project that will be incurred by any project team member while doing the work of the project.
- **Operational costs**—This category includes the costs associated with the maintenance and support of the final product. In addition, there may be costs to dispose of whatever the project is replacing.
- **Disposal costs**—This category includes the costs associated with the disposal or removal of whatever the project is replacing.
- **Overhead costs**—This category includes the common overhead costs incurred by any project. Items typically included are facilities, administrative assistance, security, and technology infrastructure. Depending on the organization, these costs may not be allocated to individual projects or there may be a pre-determined percentage or amount that is used by all projects.

- **Costs of "change"**—A focal point of project planning is to consider the "change" impact that the project will have. This category would include any costs (change management programs, initial productivity loss) that can directly attributed to the change factor. These costs should have been considered during the project selection phase as part of a cost-benefit analysis or return on investment analysis. In addition, these costs may be accounted for in the other budget categories. The important thing here is to think about these costs up-front during planning.

Develop Initial Budget

Once we have our resource requirements and work duration estimates, we can start to develop the budget. Like the estimates for work, it is best to estimate your costs at the work package level. By taking a bottom-up approach, you are in the best position to identify all of your resource needs and develop a more realistic budget. In addition, many industries and organizations have cost estimate models that can be leveraged, too. These models are best used during initial planning activities and as a cross-reference and validation tool for your detailing planning efforts.

Unless your organization has invested in an enterprise project management application with an emphasis on project costing or you have advanced skills in project scheduling software, I recommend the use of spreadsheet software (such as Microsoft Excel) for your project budget. I favor the spreadsheet approach for three principal reasons:

- **Capture all costs**—The spreadsheet approach allows you to easily capture all of your project costs (and not just labor costs which is the primary cost element captured by your schedule).
- **Flexible**—The spreadsheet approach offers flexible options in how you set up and organize your budget. It can also be used to track your project costs during project execution.
- **Easy analysis**—The spreadsheet approach comes with built-in analysis and reporting capabilities that can be easily leveraged.

The two keys for setting up your project budget are to set a line item for each cost source and to use columns for each time phase (period) that will be tracked.

note

Most project scheduling software programs offer a resource schedule that will show the total hours (and total costs) that each resource incurs each over the desired time period. This feature can be very helpful to your budgeting process.

Finalize Budget

Once the schedule nears completion and the actual resources have been identified, we can finalize the project budget. Besides firming up rates on resources and estimates on other cost factors, there are several objectives to accomplish in this step.

- ***Validate procurement tasks scheduled***—Make sure that all the tasks dealing with procuring resources (labor, equipment, materials) are accounted for in the project schedule (and WBS). Common tasks include ordering, delivery, setup, and payment.
- **Reconcile task costs versus resource costs**—In most cases, there will be gaps between resource assignments on the schedule, or resources will not always be scheduled at maximum capacity. Much of this depends on how efficiently resources are leveled. Nevertheless, if your resource costs are based solely on assigned tasks, your budget may not reflect the actual resource costs you will incur. For example, Joe Analyst may only have 26 estimated work hours assigned one week, but is fully booked at 40 hours the following week. You can't afford to release Joe for the small gap that exists, so the project is generally accountable for all of his time both weeks. This situation also depends on the level of responsibility the project has for maximizing resource usage, the level of resource planning done in the organization, and how time is reported.

  A good rule of thumb is to calculate personnel costs by taking their rates multiplied by a given calendar time period. For example, if I know Joe Analyst is on my project for 12 weeks, and I know he is generally a full-time resource, I will calculate a resource cost for Joe by taking Joe's hourly rate × 40 hours × 12 weeks. This is likely to give me a truer cost estimate—at least a more conservative one.
- **Finalize management reserve**—Based upon all known risk factors, finalize the buffer amount to be added to the project budget. The specific amount will vary depending on risk level, industry practices, and management philosophy.

Common Budget Challenges

Let's take a quick review of the common challenges that a project manager faces when figuring a project budget. By increasing awareness of these factors, you can work proactively to avoid these in your own situation.

- **Based on weak foundation**—The budget is built upon the planning foundation created by the WBS, resource estimates, effort estimates, and the project schedule. An inadequacy in any of these elements is directly reflected in the budget.
- **Missing cost categories**—The budget needs to reflect all the costs that will be incurred or at least all the costs that the project is accountable for by the sponsoring organization. See earlier section for the list of cost sources that should be considered.
- **No profit margin**—For projects that are sold to clients, do not forget to include the profit margin in your project budget and in your pricing decisions.
- **Budget is pre-allocated**—In many organizations, due to the nature of their budgeting cycles and level of project management maturity, the budgets for projects are established (from high level estimates) before the complete work of the project is defined. In these cases, the budget is often the dominant constraint on the project; as a result, it will limit the amount of work that can be completed and the resourcing options available.
- **Labor costs not tracked**—More of an issue for internal projects, but in many organizations it can be difficult for the project manager to define and track labor costs, especially for internal staff. The most common reasons for this include
  - Organizational policy that project managers do not track internal labor costs
  - Organizational policy to treat internal labor as "sunk costs"
  - A mismatch between time reporting system/procedures and needs of the project

  This last reason is important to understand and may limit your cost tracking options, or at least the level of detail information you can obtain.

THE ABSOLUTE MINIMUM

At this point, you should have a solid understanding of the following:

- If the other planning activities have been done well, establishing a project budget is a very straightforward process.
- The project budget is vital for managing expectations, accurately measuring project performance, and managing cash flow.

continues