THE PROJECT MANAGEMENT TOOL KIT

THIRD EDITION

100 Tips and Techniques for Getting the Job Done Right

Tom Kendrick, PMP

Author of *Results Without Authority* and *Identifying and Managing Project Risk*

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100 Tips and Techniques for Getting the Job Done Right

TOM KENDRICK

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Library of Congress Cataloging-in-Publication Data

Kendrick, Tom.
The project management tool kit : 100 tips and techniques for getting the job done right. /
Tom Kendrick. — Third edition.
pages cm
Includes bibliographical references and index.
ISBN 978-0-8144-3345-4 (hardcover : alk. paper) —
ISBN 0-8144-3345-6 (hardcover : alk. paper)
1. Project management—Outlines, syllabi, etc. I. Title.

HD69.P75K462 2014
658.4'04—dc23

2013033618

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Printing number
10 9 8 7 6 5 4 3 2 1

To my family:

My father, Tom Kendrick,
His father, also Tom Kendrick,
and my uncle, George Kendrick.
They taught me the value of process, tools, logic, and patience.

My wife, Barbara Kendrick, for her support, tolerance,
and efforts to ensure that this edition remained coherent.

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Introduction to the Third Edition (Read this first!)

If you are typical of others leading projects today, you are very busy. Time pressures, complexity of project work, and lack of sufficient resources make your work challenging and difficult. Successful project management requires you to execute efficiently and well, even in situations where you may have little experience.

As in the previous two editions of *The Project Manager's Tool Kit*, this third edition assembles short, easy-to-apply summaries for proven project management practices. The process summaries are arranged alphabetically and numbered in *The Project Manager's Tool Kit*. To facilitate skimming, within each process keywords and phrases are in *italics*, and cross-references to related processes are **boldface**. These concise summaries will help you to achieve consistently better results in your projects, whether they are big or tiny, lengthy or brief, "agile" or "waterfall," or anything in between. Novice project leaders will be able to apply the process steps as a **roadmap** to understand what is necessary in unfamiliar situations. Experienced managers can use the process summaries as a **checklist** or reminder to ensure that they do not leave out anything essential, especially when a project requires something out of the ordinary.

The Project Manager's Tool Kit is based on established, practical ideas used by successful project managers in many fields and includes processes from all the areas outlined in the Project Management Institute (PMI) PMBOK® Guide, Fifth Edition (2013). This book includes "how-to" guidance cross-referenced with all the elements of the current PMBOK® Guide, plus additional topics useful to project leaders. As with a typical reference book, *The Project Manager's Tool Kit* is organized alphabetically for quick, *random* access to process guidance. The purpose of this book is to arrange the fundamental processes of project management in an easy-to use, compact format.

All projects are different, so each will undoubtedly require additional processes beyond those included here to deal with unique challenges and the specifics of the particular project's domain. While not every project will need all the practices in this book, most will prove useful, particularly after you

make the minor adjustments necessary to customize them to your specific environment.

The processes in this book can be grouped in the categories that follow. The 10 PMI© PMBOK® knowledge areas are numbered 4 through 13. The first four groupings here include processes from PMBOK® knowledge area four (Project Integration Management), as well as additional project management processes of a more general nature. Groups 5 through 13 directly map to the remaining numbered knowledge areas of the PMBOK® Guide. The lists that follow gather together related practices and concepts in a sequence in which they might normally be used. Additionally, Chapters 56, 61, and 62 provide flowcharts and descriptions showing how many of these processes relate to each other.

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1

Activity Definition (PMBOK® Guide 6.2)

What: Documenting the activities resulting from the lowest level of the project work breakdown structure (WBS) and assigning an owner to each.
When: Project planning.
Results: Clear descriptions of all identified project work and delegation of responsibilities.

An activity is generally the *smallest portion* of a project used in planning, tracking, and control. In some projects, activities may be referred to as tasks, stories, work packages, or use cases, or using other descriptors.

Verify Activities

Activity definition is a key step in **project plan development**. After developing the **work breakdown structure** (WBS), verify that all work listed is *necessary*. Begin assembling your project activity information based on your **schedule planning**. If the work at the lowest level might require more than a month to complete or seems likely to consume more than 80 hours of effort, strive to decompose it further.

People often overlook work related to organizational, business, or legal requirements. Examples include preparation for **project life cycle** checkpoints, methodology or regulatory requirements, project and other reviews, scheduled presentations, and specific documents the project must create. Add any *missing work* you discover to your WBS and scope baseline.

Describe Activities

Convert the lowest-level WBS entries into project activities that can be estimated, scheduled, and tracked. Check that each represents a *discrete*, separate piece of work that has a starting and a stopping point. For each piece of work, capture and document any assumptions.

Describe each lowest-level work package concisely in terms of the work to be done and the task deliverable (examples: install power, edit user docu-

mentation). These *verb-noun descriptions* ensure clarity and make planning and tracking easier.

Identify one or more specific *deliverables* for each lowest-level activity. For each deliverable, specify the acceptance or test criteria. Be able to describe any requirements relating to standards, performance, or specific quality level. If no one can clearly define the deliverable for an activity, the work may be unnecessary; consider dropping it.

Assign Owners

Seek capable, motivated owners for each lowest-level activity. Look for *willing volunteers* for all defined work and remember that you will be responsible for all tasks for which you fail to find an owner.

For each activity, assign one and only *one owner*, **delegating responsibility** for the work. Owners will be responsible for planning, estimating, monitoring, and reporting on the activity but will not necessarily do all the work alone. In some cases, owners will lead a team doing the work, or even serve as a liaison for outsourced tasks. For each activity, identify all needed skills, staff, and any other resources and use this information to complete your **responsibility analysis** and **required skills analysis**.

Identify Milestones

In addition to project activities, which consume time and effort, project schedules also have milestones—events of negligible duration used to synchronize project work and mark significant project transitions. Uses for milestones include:

- Project start
- Project end
- Completion of related parallel activities
- Phase gates or life cycle stage transitions
- Significant decisions, approvals, or events
- Interfaces between **multiple dependent projects**
- Other external activity dependencies and deliverables

List all project milestones.

Document Activities

Document all activities and milestones in your software scheduling tool or using some other appropriate method. Include activity names, owners,

assumptions, deliverable descriptions, any identification codes (based on your WBS hierarchy, phase or iteration prioritization, or other organizing technique), and other important information. The activity list (often part of a *WBS Dictionary*, "burn down" list, or plan of record) serves as the foundation for project planning, risk analysis, monitoring, and control. Provide all activity owners a thorough description of their work.

Use activity definitions as a foundation for other planning processes, including **activity duration estimating**, **activity resource estimating**, **activity sequencing**, **schedule development**, **cost estimating**, and **risk identification**.

As the project planning and execution proceed, keep activity information current. Periodically *review and update* the activity list to reflect additional work identified during the project, particularly work added because of **scope change control** or uncovered in a **project review**.

2

Activity Duration Estimating (PMBOK® Guide 6.5)

What: Forecasting durations for all identified project activities.
When: Project planning and execution.
Results: Duration estimates in workdays for all project tasks.

Determine Duration

Duration estimates are central to **project plan development**. For each listed task in your project **activity definition**, use **responsibility analysis** and other planning data to develop a *timing estimate*, in workdays, using the process defined in your **schedule planning**. Useful sources for activity duration data:

- *History* (lessons learned, databases of **project metrics**)
- *Activity owner analysis* and personal team member experiences
- Data from *previous similar work*
- *Experts* (consultants, peers, managers, vendor proposals)
- *Published data* (Internet, papers, articles, professional magazines)
- *Parametric or size-based formulas* ("rules of thumb," complexity analysis, component or module counts, function points and other system analysis, measurements of volume, area, length, or other parameters)
- *Team analysis* (**Delphi technique**, further work decomposition)

If initial activity duration estimates exceed your standards for length (20 workdays is a typical maximum), consider further decomposition. Update the project **work breakdown structure** to reflect any adjustments you make.

Refine Duration Estimates and Reconcile with Resource and Cost Estimates

Refine your initial duration estimates using *project specific factors* such as:

- Specific staffing data from **human resource planning** and **responsibility analysis**

- Project constraints and assumptions
- Any known delays or requirements for synchronization of work based on **activity sequencing**
- Any unclear project specifications from **scope definition**
- Probable scope changes
- Technical complexity
- Requirements for unusually high reliability or performance
- Requirements for innovation**,** investigation, or invention
- Consideration of shortcuts or alternative approaches that may require less time
- Overall project length
- Coordination with other projects and conflicts with other work
- Training and learning-curve issues

Duration estimating is closely related to **cost estimating** and **activity resource estimating**. Which of these you do first does not matter much, but you must reconcile them before finalizing a baseline plan. Adjust estimates as necessary to *ensure consistency* with your cost and effort analyses.

Consider Risks and Alternatives

Once you have made a "most likely" duration estimate, probe for failure modes and potential problems. Determine the timing consequences of *worst cases*.

You may adjust estimates for uncertainty using the *PERT* (Program Evaluation and Review Technique) formula: $t_e = (t_o + 4t_m + t_p)/6$, where t_e is a weighted average "expected" duration, based on t_o (an optimistic, "best-case" duration), t_m (the most likely duration), and t_p (a pessimistic, "worst-case" duration). Include significant pessimistic estimates as risks in your **risk identification** and use worst-case estimates to justify adequate schedule reserve for your overall project.

For activity estimates where you have low confidence, consider alternatives for the work, such as using older, more *established methods* that could yield more accurate estimates and lowered risk. Where uncertainty is high, develop and use duration estimate ranges.

Capture the Duration Data

Document duration estimates in workdays to use in **schedule development**. Duration estimates are required by **software and technical tools** for project

scheduling, and their databases are a standard place to store them. Accurate **project variance analysis** depends on detailed timing information.

Update Duration Estimates

Revise duration estimates as your project progresses, and use **schedule control** to resolve timing problems throughout project execution.

Especially on lengthy projects, *review and update duration estimates* periodically during **project reviews**.

3

Activity Resource Estimating (PMBOK® Guide 6.4)

What: Forecasting staffing, equipment, and other resources needed for project activities.
When: Project planning.
Results: Resource details for all project activities and a basis for cost estimating.

Determine Required Resources

Resource analysis begins with determining what your project will need to complete each task listed in your project **activity definition**, and it is done based on your **schedule planning**.

For most project activities, the main—sometimes only—resource required is *dedicated labor* within the organization. Estimating internal labor requires both identification of required specific skills and an overall assessment of how much effort from each resource type you will need.

Determine the types of contributors needed for each activity through **required skills analysis**. For each lowest-level activity in your **work breakdown structure** (WBS), develop effort estimates (in units combining staffing and time, such as person-days or engineer-hours) for each identified category of expertise. Useful sources for data on activity effort include:

- *History* (lessons learned, databases of **project metrics**, data from **earned-value management** analysis)
- *Activity owner analysis* and personal team member experiences
- Data from *previous similar work*
- Experts (consultants, peers, managers, vendor proposals)
- *Published data* (Internet, papers, articles, professional magazines)
- *Parametric or size-based formulas* ("rules of thumb," complexity analysis, component or module counts, function points and other system analysis, measurements of volume, area, length, or other parameters)
- *Team analysis* (**Delphi technique**, further work decomposition)

If initial activity resource estimates exceed your standards for length (80 hours is a typical maximum), consider further decomposition. Update the project WBS to reflect any adjustments you make.

Refine Effort Estimates and Reconcile with Duration Estimates

Adjust effort estimates for each specific project activity. Consider resource and *staffing factors* such as:

- Staffing data from **human resource planning** and **responsibility analysis**
- Staff capabilities and productivity
- Staff availability, based on discussions and resource calendar data
- Project constraints and assumptions
- Expected staffing or **procurement contracting** delays
- Potential turnover
- Team size
- The project work environment and frequency of interruptions
- Geographical separation of team members
- **Communications management** effort and project team **meetings**
- Possible alternative approaches that may require less effort
- Coordination with other projects and conflicts with other work
- Training and learning-curve issues

Individual contributor performance, and therefore estimated effort, can vary considerably. If team acquisition is incomplete or some activity roles lack named contributors, reflect this uncertainty by generating range estimates.

Activity resource effort estimating is closely related to **activity duration estimating**. Which you choose to do first does not matter much, but you must reconcile these estimates before finalizing your baseline plan. Determine the normal number of *work hours available* in a workday for project activities after accounting for meetings, email, telephone calls, breaks, meals, and other interruptions. Five to six hours may be available, but for some contributors the total is lower. Adjust activity durations as necessary to ensure consistency with realistic staffing availability.

Determine Other Resources

Project activities may require *other resources* in addition to internal labor. Quantify these additional resources for each project activity. Include all activity-related resources required for:

- Outsourcing (from **procurement contracting**)
- Hardware and other equipment purchases
- Charges for use of shared or rented equipment
- Supplies and required components
- Software acquisition, licenses, and support
- Communications such as audio, video, and computer networking
- Services, including shipping costs, maintenance, duplicating, and printing
- Travel expenses
- Other required resources having direct costs

Capture Resource Estimates

Document resources for project activities to support **cost estimating** and for **project plan development**. Accurate **project variance analysis** requires detailed resource information.

If your resource estimates are not consistent with committed project staffing, use the data to support **team acquisition** (and **procurement planning**) or, when necessary, in **negotiating project changes**.

Update Resource Estimates

Revise effort estimates as your project progresses and use **cost control** to resolve resource problems throughout project execution.

Especially on lengthy projects, *revalidate resource estimates* periodically during **project reviews**.

4

Activity Sequencing (PMBOK® Guide 6.3)

What: Determining project activity dependencies.
When: Project planning.
Results: A graphical or tabular summary of project workflow.

Review Project Data

Activity sequencing is generally done in parallel with **activity duration estimating** and **activity resource estimating** during **project plan development** and in line with your **schedule planning**. Sequencing is a *bottom-up workflow analysis* process. It should never be based on arbitrarily imposed, top-down fixed deadlines. If any significant project-timing issues arise, plan to resolve them using **constraint management and plan optimization** and by **negotiating project changes**, not by imposing unrealistic calendar constraints.

To begin, assemble project milestone and **activity definition** data, along with other *project information*, such as organizational standards, **project life cycle** and methodology requirements, constraints, and assumptions.

Identify Dependencies

There are many ways to *model project workflow*, but the easiest and most effective is to build an activity network using activity and milestone descriptions written on yellow sticky notes arrayed on a large piece of paper (or wall) where they can be easily rearranged. Manual project workflow analysis (also called precedence diagramming) has several advantages over other methods:

- It is easier to involve your team in collaborative analysis compared with entering dependency data directly into a computer scheduling tool.
- Workflow relationships are easy for all to see, and they can be quickly revised. Capturing linkages and work dependencies on tiny computer screens can be confusing and can result in overlooking critical linkages.

- Developing project workflow networks using tangible, movable components is a creative, "right brain" undertaking that provides greater perspective and more thorough analysis.

To begin the process, start with the initial milestone and begin linking following activities and milestones based on logical workflow and handoff of the activity deliverables. There are several *linkage types* that represent virtually all project dependencies:

- *Finish-to-Start*: Work is sequential. A predecessor activity must be completed before one or more following activities can begin. This linkage is most common; it is the default in project scheduling tools.
- *Start-to-Start*: The initiation of work is synchronized. This type of linkage occurs when activities must start simultaneously and proceed in parallel.
- *Finish-to-Finish*: Activity deliverables are synchronized. Finish-to-finish links are most common whenever the task deliverables may change or deteriorate unless they are used promptly.
- *Start-to-Finish*: The initiation of work on an activity forces the termination of an earlier activity. (Actual requirements for this are rare.)

Project managers can also model timing offsets using *lags and leads*—specified timing differences between activities. They may be Finish-to-Start, Finish-to-Finish, or Start-to-Start.

Because a project network is a model of workflow through time, linkages (the arrows used to link the activities and milestones) *must not loop* back on themselves. Where rework can be expected, define it using additional new activities. Project scheduling software applications will check for and will not permit loops.

Some activity dependencies are mandatory—essentially the project workflow. Other dependencies may be discretionary, subject to rearrangement without project impact, and useful for "what if?" analysis. Project activities may also link to external events or to project time constraints with unmovable fixed dates. As you proceed with workflow analysis, determine and note the flexibility of each defined dependency.

Document Project Work Sequences

Check that each activity and milestone is linked backward to at least one predecessor (except for the initial milestone) and forward to at least one successor (except for the final milestone). Develop a graphical representation similar to the example in Figure 4.1. Ensure *continuity of workflow* on each path in the

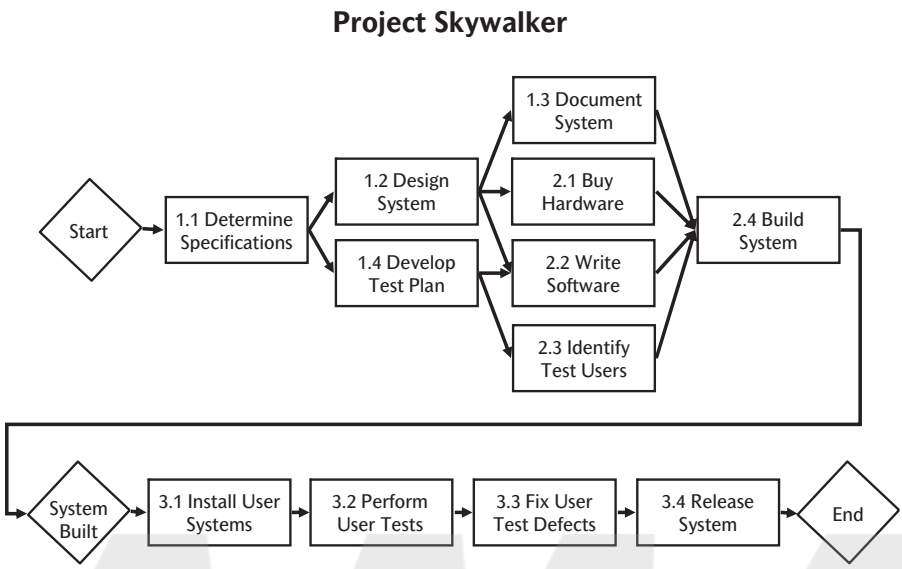

Figure 4.1. The work breakdown structure for Project Skywalker.

network. If you find logical gaps where connecting the defined activities requires work you have not yet identified, add it to the workflow diagram and update your **work breakdown structure**.

Use the *graphical representation* of the project to support **schedule development** and critical-path analysis. Some other names for this network diagram are:

- Precedence diagram
- Logical project network
- PERT chart (although true "Program Evaluation and Review Technique" charts are actually different, this usage has become common)

If you intend to use **software and technical tools** in scheduling your project, *enter the dependency data* from your network chart into the tool's database.

Periodically *revalidate the dependencies* that link future activities during **project reviews**, especially on lengthy projects.

5

Brainstorming

What: Using a team to generate many ideas.
When: Throughout a project.
Results: A large number of options for consideration.

Prepare

Although brainstorming may not always be the most efficient method for developing a range of ideas, it is useful for *generating alternatives* and enhancing **team development** in many project situations, including:

- **Project plan development**
- **Issue management**
- **Risk identification**
- **Risk response planning**
- **Scope definition**
- **Cause-and-effect analysis**
- **Decision-making**
- **Creative problem-solving**

Brainstorming is a *group technique*, depending on teamwork and interaction for good results. Gather people who can be expected to have insight into the current situation or problem to develop ideas.

Clearly present the *problem statement*, and encourage discussion if it is unclear. Post the statement where it will be visible to everyone.

Generate Ideas

Begin the process by providing paper or yellow sticky notes to the team members and encouraging them to write down as many ideas as they are able *on their own*, in silence. Capture each idea on a separate piece of paper. Minimize distractions and request that people who finish quickly remain quiet while others continue to work.

When everyone is done, ask each person to read one of his or her ideas aloud and post each idea where it is visible to the group. When you have

heard from everyone, continue until you have accumulated all the ideas in a *single list*. Include any new ideas that people generate while listening to other's submissions.

When gathering the ideas, *discourage criticism*. Focus on collecting ideas as quickly as possible.

When the team can see all the ideas, ask if anyone has any *questions* about the items on the list. Allow the person who contributed the idea to answer questions initially, but encourage other participants to help refine the wording. Before making significant changes, get agreement from the person who generated the idea.

Organize the List

When there are no more questions, *condense the list*. If some ideas are similar, work to consolidate them. If ideas seem similar, but the people who contributed them think they are different, leave them listed separately.

Truncate the list if necessary. If the list is longer than 20 items, give everyone three or four votes to indicate favored ideas and then reduce the list by selecting the ideas with the most support.

Prioritize the remaining ideas using a systematic process. You could discuss ideas further to generate information on costs and benefits, or apply systematic **decision-making** using weighted criteria and relative evaluations. Another method is to have each person rank the ideas on the list and then consolidate the rankings to define an overall team prioritization.

When brainstorming to make a team decision, focus on the *top option* and discuss any issues or potential problems associated with it. If no one has any objections, bring the brainstorming session to a close. If members disagree, consider the next two or three items on the list, or revise your evaluation method. Strive for a consensus decision that all can support.

At the end of the session, document the result and *put it to use*.

6

Canceling Projects

What: Terminating a troubled project before its scheduled completion.
When: Project execution.
Results: Minimized time, effort, and money expended on doomed projects and improved long-term team motivation.

Not every project, no matter how worthy or promising, will end well. When it becomes apparent that a project *will not ultimately succeed*, canceling it early, in a positive way, has many benefits.

Recognize the Problem

One reason for early termination is *insufficient progress* toward meeting your **project objective and priorities**. **Project variance analysis** may reveal:

- Schedule delays or execution problems
- Excessive resource consumption
- Insufficient staff, funding, or other resources
- Scope not achievable using available technologies and capabilities

Other reasons for ending projects relate to higher-level *business considerations*, such as:

- Changes in user needs, the market, or competing offerings
- Shifts in relative priority to more urgent project or other work
- Changes in overall business strategy
- Recognition that too many simultaneous projects are under way
- Loss of funding or sponsorship

Assess Your Situation

Whenever feasible, take action to restore your project to "green" status. Perform a **project review** and validate your project status data. Use **cause-and-effect analysis** to understand the sources of project problems. *Explore options* for continuing, such as **issue management**, **performance problem**

resolution, **negotiating project changes**, renewing **sponsorship** for the project, **problem escalation**, or other alternatives.

Terminate

For projects that cannot be rescued, document the situation and *communicate* cancellation to all stakeholders. Include a summary of the status, along with any alternatives you considered, and your recommendations for the timing and staffing of project closure. If appropriate, document the requirements for possible later resumption of the project.

Get approval for cancellation, and bring the work to a *logical conclusion*. **Closing projects**, even when canceled, requires:

- Documenting the results that were achieved
- Capturing lessons learned and clearly describing the situation that resulted in early termination
- Archiving the project data in your project management information system
- Acknowledging contributions
- Completing **procurement close-out** and all other financial requirements

Bring the project to as positive a conclusion as possible. Work to let everyone involved *move on* from the project to other work with enthusiasm. Discourage "bridge burning" and "blame-storming."

7

Cause-and-Effect Analysis

What: Determining the sources of a problem situation.
When: Throughout a project.
Results: Identified root causes for current or potential project trouble.

Identify Sources of Trouble

Cause-and-effect analysis is applied in a wide range of situations, such as:

- **Issue management**
- **Project variance analysis**
- **Schedule control**
- **Cost control**
- **Scope change control**
- **Performance problem resolution**
- **Risk response planning**
- **Process improvement**
- **Creative problem-solving**
- Failure diagnosis, **quality assurance**, and **quality control**

There are many names for essentially *similar processes*, including root cause analysis, failure mode and effect analysis (FMEA), "fishbone diagrams," and Ishikawa charts (named for Dr. Kaoru Ishikawa, the Japanese quality movement expert who popularized these and related concepts).

Describe the Effect

Whatever the process is called, it begins with a clear, *unambiguous statement* of the problem, issue, risk, variance, or other difficulty. Quantify the effect, defining the consequences in terms that are as specific and measurable as possible.

Involve project *team members* and stakeholders who may have relevant knowledge. Ensure that each person understands the situation and can describe it in his or her own words.

Identify Root Causes

As a group, **brainstorm** possible sources for the undesirable outcome. Collect as *many inputs* from the team as quickly as you can. Tap sources of data such as documented problems, lessons learned and other data from prior projects, checklists, and templates. Use the idea from **quality planning** of "asking *why* five times" to probe for causes, not just symptoms. Focus on the quantity of ideas, not the quality; you can filter later.

Organize the results into major *cause categories* such as:

- Scope
- Schedule
- Staff and resources
- Cost
- Organization

Diagram and Document

Display root causes visually, using a *fishbone diagram* (like Figure 7.1) to provide deeper understanding of the situation. Use subcategories as needed to organize the information logically, and review the results to see whether they stimulate additional causes.

Document the root causes and then use them to understand and address the problem situation.

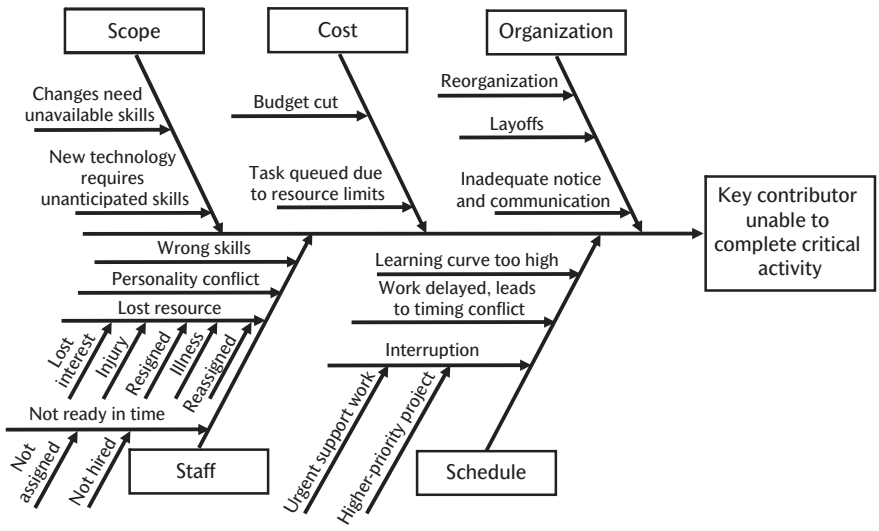

Figure 7.1. An example fishbone diagram.

8

Closing Projects (PMBOK® Guide 4.6)

What: Completion of project management tasks at the end of a project or phase.
When: Project (or phase) closure.
Results: Final project documents, approvals, and documented lessons learned.

This process is used to close a project. It is also applicable to **project reviews** on longer projects at life cycle phase, iteration, or stage gate transitions.

Obtain Formal Acceptance

Review **requirements collection** and **scope definition** and your records of **scope change control** to verify the project *deliverable requirements*. Validate that all final testing is aligned with the agreed-upon specifications.

Work with the people who must evaluate your project results to complete **scope verification**, formally acknowledging that required project deliverables have met the project goals. If there are no issues, *get formal sign-off* from your project sponsor and, as appropriate, from customers or other stakeholders. For projects undertaken for a fee, ensure that the customer is properly and promptly billed according to the terms of the contract.

If the project fails to deliver on some objectives, obtain written acknowledgment of the *partial results* that were delivered. Even when **canceling projects**, formally document all accomplishments.

Complete Project Documentation

Whatever the ultimate fate of your project, *write a report* to summarize results and to acknowledge contributors. This report is generally similar in format to routine **communications management** for project reporting. Use the report to inform everyone that the project is over (or, when completing a phase or iteration, that you are moving into the next stage of work).

Begin your closure report with a *high-level summary*, including the most significant results. In the remainder of the report, stress the accomplish-

ments of the project team and formally recognize significant contributions individuals and groups made to the project. Include retrospective **project metrics** and other performance information.

Add your project (or phase) closure report to the *project information archive*, along with any other project documents and reports that you have updated or created.

Close Out Contracts and Accounting

Complete all paperwork required for contracted services used on the project and approve all payments that are due. If there are issues or problems relating to a contract, escalate and resolve them as soon as possible. For completed contracts, proceed with **procurement close-out** following payment of all invoices, taking action to *terminate the contract*.

Summarize required **cost control** and financial information for the project and ensure that any *project accounting* is done accurately and promptly.

Thank Team Members and Celebrate

As part of your project (or phase) closure, *thank people*, both in person and in writing. For contributors who report to others, acknowledge their work formally to their managers. Use **rewards and recognition** as positive reinforcement for the good work of deserving project contributors.

Celebrate success at the end of a project with an event. Even if the project had problems, identify accomplishments, recognize them, and do something to end the project on a positive note. Celebrations need not be lavish to be effective. On **global teams** or distributed **matrix teams**, arrange similar events for each location.

Capture Lessons Learned

Finalize your close-out by conducting a *post-project retrospective analysis*. Meet with the project team soon after the completion of your project or a major phase of work to identify practices that went well and also to identify project processes that should change.

Prepare for this by scheduling a process review **meeting** soon after closing your project (or as you begin the next **project life cycle** phase or iteration on a lengthy project). Allocate sufficient time to gather information while it is still fresh in people's memory. Even shorter projects may generate enough information to justify a half-day retrospective analysis meeting. Consider circulating a *survey* in advance of the meeting to stimulate thinking about practices to keep or modify and recommendations for change.

Verify that team members and others who should participate will be available and get their commitment to attend. *Face-to-face meetings* are best, but for virtual teams, use the best **software and technical tools** available.

Set a meeting *agenda*, including time for:

- Positive results: things that went well and practices to repeat
- Desirable changes: processes that need improvement or replacement
- Prioritization of recommendations
- Final thoughts from all contributors

Before meeting, collect accurate, *up-to-date project documents*, including all final project reports. Also provide access to:

- Actual and planned schedule information
- Actual and planned resource and cost information
- The project **integrated change-control** history
- **Issue-management** history and problem escalations
- **Project metrics** and performance reports

Begin your lessons learned meeting with a review of the agenda and set the ground rules for the meeting. Keep the focus on project processes—avoid attacking individuals and "blame-storming." Select a scribe to capture ideas generated where all can see them. If the initial scribe was involved in the project, rotate the responsibility for capturing data so everyone can focus on process issues, at least for most of the time.

Probe for positive aspects of the project first. Identify specific processes and other project aspects that were successful. Capture what went particularly well on your project; identify new practices that you should repeat or extensions to existing processes that were valuable.

When most of the positives have been listed, shift the focus to *needed changes*. Identify process areas that need improvement and practices that should be simplified or eliminated. If disputes arise, use project documentation and project metrics for **conflict resolution**. Examine issues and problems using **cause-and-effect analysis** to determine root causes and use **brainstorming**, **creative problem-solving**, and **process improvement** to generate responses.

Near the end of the meeting, *prioritize the opportunities for improvement* using group **decision-making** and summarize recommendations for dealing with the most significant ones. If further analysis is necessary, capture action items with owners and due dates.

Close the meeting with reflections on the process. Encourage people to share how they plan to work differently in the future.

Following the meeting, *document findings and key recommendations* in a clear, short summary followed by the lists of information collected. Distribute the report to the participants and put a copy in the project information archive.

Take action on the principal recommendations. Implement any changes where you have the authority. For more significant process improvement opportunities, develop a business case and propose them to your management. Following every lessons learned analysis, select some project aspect to change to deal with at least one identified problem.

Monitor all changes adopted to ensure that the expected results occur and that there are no unintended consequences.

9

Coaching and Mentoring

What: Sharing expertise with team members and building needed skills.
When: Throughout a project.
Results: Improved teamwork and better project performance.

Seek Opportunities to Help

Identify *capability gaps* in the project using **required skills analysis**. Document proficiencies the project needs or would benefit from that are missing or insufficient. Use coaching for **performance problem resolution**.

Assess weaknesses on the project team and consider *threats and risks* that could require responses using specialized skills your team lacks.

Align *personal goals* with project and organizational needs. Ask team members what they desire to learn and do, and use the information to guide **team development** and increase **motivation**. Keep the "big picture" and **project vision** in sight and identify opportunities to develop new skills on your project team when **delegating responsibility**.

Foster an Open Environment

Build *trust* and teamwork, so people will feel free to discuss any matter or topic without fear of criticism. Encourage "pull"; respond positively to requests for help and encourage project staff members to let you know when they lack experience or skills needed for their assigned activities. Display **leadership**; model the behaviors you wish to see on the project. Follow through on commitments, make time for **communicating informally**, and be willing to teach and share your expertise.

Protect Confidentiality

Effective mentoring requires *discretion*. People need to feel free to reveal their shortcomings and ask "dumb questions." Because this may not be the case when the mentor is also the individual's manager, mentoring is often most successful across organizational boundaries, where revealing embarrassing deficiencies will be of less consequence.

Establish Enduring Relationships

Build on coaching and mentoring relationships over time. Establish long-term two-way relationships, where in some cases the roles reverse and the mentor requests guidance. Encourage people who benefit from mentoring to share what they have learned with others by becoming mentors.

10

Communicating Informally

What: Periodic person-to-person communication without a specific purpose.
When: Throughout a project.
Results: Good team relationships, fewer misunderstandings, and early warning of potential problems.

Informal communication is often at least as important on projects as formal communication. Many risks and problems surface first through conversations and other team interactions, and **team management** and relationship building depend on casual interactions.

Take Advantage of Unstructured Communication

Unplanned conversations at coffee machines, in corridors, and in parking lots and other settings represent some of the most important project communications. Successful project leaders make an effort to encourage frequent, unstructured conversations, both with and between team members. "Soft data" and other valuable project information often surface during unplanned exchanges.

Even with **global teams**, where you are seldom able to talk with people in person, there may be opportunities to do it once in a while; always take full advantage of face-to-face opportunities to enhance relationships. Use the *telephone* when you are distant. Call team members regularly, even when there may be no pressing project business, to ask how they are doing.

Social media technologies also represent a significant opportunity for informal team communications. While overuse can reduce productivity and be annoying, judicious use of instant messaging and social media can enhance trust, overall relationships, and team cohesion.

Practice Structured Informal Communication

Many project leaders set aside time at least once a week to "*manage by wandering around.*" MBWA is a particularly effective way to reinforce trust and build relationships within a project team. While it is best done in person and with no particular objective, it can also be a part of regularly scheduled one-

on-one meetings or telephone calls for **status collection** or other project discussions. Asking a team member questions about interests, family members, or other nonproject matters adds a personal touch and helps build **motivation**, particularly if you keep it brief and restrict yourself to topics both of you are interested in.

Informal communications are also an important benefit of *team activities*, longer meetings (such as **start-up workshops** and **project reviews**), and project celebrations. Use milestones and other key project dates to organize events that are at least partly social, to reinforce the connections within your team. Particularly for longer projects, extracurricular activities are effective in maintaining teamwork, but always let the team have influence in choosing the event. Avoid "forced merriment" and diversions that may annoy or distract the team. Eating together, scheduling an outing to a film, or engaging in some other activity of mutual interest can build the team cohesion essential to healthy projects.

11

Communications Control (PMBOK® Guide 10.3)

What: Providing timely project information to the project team, stakeholders, and others and communicating performance against the baseline plan.
When: Throughout a project.
Results: Project information available when needed and visible tracking of project results compared with expectations.

Assess Progress

Controlling communications and reporting project performance are central to **project plan execution**. Information distribution and communication control complete the project-tracking cycle, following **status collection**, **plan-variance analysis**, and, when necessary, actions for project recovery. Before documenting project performance, *verify status* of significant variances of schedule, cost, and other **project metrics** and ensure that your problem responses are consistent with:

- **Integrated change control**
- **Scope change control**
- **Cost control**
- **Schedule control**
- **Quality control**
- **Issue management**
- **Your project objective and priorities**

Review Performance

Use diagnostic project metrics such as **earned-value management** for *measuring project performance* and **forecasting project completion**.

Periodically, such as during **project reviews**, *analyze trends* in project data to identify potential future problems, poorly performing processes, and new project risks.

Report Performance and Update Your Project Management Information System

As defined in **communications planning**, prepare a *written status report* for each project status cycle, typically once a week. Reporting is most effective when it is neither too cursory nor too rambling. Both too little and too much information can result in confusion and loss of project control. Confine your reporting to factual information and be consistently honest, even regarding bad news.

Adopt a standard reporting format and always begin with a *short executive summary*. Limit your summary to about one-half page and include a list of no more than seven brief descriptions of key project accomplishments, next steps, and issues. Make the summary clear; some of the people who get your report will read no further.

Follow your summary with *additional information*, in order of relative importance. Customize reporting for different audiences by truncating the less essential information rather than by rewriting. A typical project status report may include:

- The executive summary of accomplishments, plans, and issues
- Status of change requests
- A schedule summary, with planned, actual, and expected future dates
- A resource summary, with planned, actual, and expected future cost and resource requirements
- A detailed project analysis, including an explanation of any variances
- A review of current and recently closed issues
- Risk reporting, including status of ongoing risk-recovery efforts
- Additional details, charts, and other information as needed

Always *proofread your reports* for errors, omissions, and unclear language. Correct any problems and replace technical jargon, acronyms, and idioms with terminology that all the readers will understand.

Send the report to team members, appropriate stakeholders, and others as part of ongoing **communications management**. Use project status information to support effective **stakeholder engagement management**.

Archive all reports for later reference in your project management information system (PMIS) and use your stored information to analyze lessons learned when **closing projects**. Update any project documents that need to change due to developments in each reporting cycle and conduct a thorough reevaluation of your PMIS contents during every **project review**.

12

Communications Management (PMBOK® Guide 10.2)

What: Formally archiving project information and documenting performance against the baseline plan.
When: Throughout a project.
Results: Periodic, accurate reports and presentations, and a thorough, accessible archive for project data.

Establish Project Communications

Use your **communications planning** when managing routine communications to serve the needs of your team members. Use all the effective communication methods you have available and provide information to team members using the methods they find easiest and most effective. Team members will need access to detailed information, so ensure that diagrams, tables, planning documents, and other formatted information can be easily and accurately read and that all communication **software and technical tools** are *compatible*.

Use *standard formats* for routine communications throughout the project to make finding information easier for the recipients. Minimize the use of acronyms, technical jargon, idioms, and other potentially *unfamiliar language* that may be confusing to some of your project team members—especially for your virtual or **global team** members. If you must include potentially difficult terminology, define it when you first use it in each document.

Routine Project Reporting

Manage project **status collection** and reporting throughout your project consistently using the processes you have adopted for **communications control**. Be disciplined about conducting **project variance analysis** in each status cycle and generate and distribute *accurate project status reports* promptly and on schedule, even in times of stress or crisis. Use your project reporting to keep your project progress visible and to keep stakeholders informed about any issues and your plans for resolving them.

High-Level Management Reporting

When providing project information to influential people listed in **stakeholder identification** (including sponsors, managers, and others who can affect your project), analyze the information before sending it. Begin with a short *summary* including your main points. To clarify complicated or technical information, develop graphs, diagrams, and carefully written descriptions to make the information as clear as possible for people who may not be deeply involved with your project. Strive to exclude unnecessary detail in high-level communications and **presentations**.

Maintain Your Project Management Information System (PMIS)

Keep your *archive for project information* up-to-date. When you distribute reports and other communications, add them to your PMIS. Whenever there are project changes affecting your tracking logs, **project charter**, or other definition documents, ensure that the content of your PMIS is correct and current.

13

Communications Planning (PMBOK® Guide 10.1)

What: Documenting communications decisions for a project.
When: Project planning and execution.
Results: A communications infrastructure that ensures timely and effective communication with stakeholders and supports smooth project execution.

Determine Communication Requirements

Review the **project infrastructure** decisions and determine how you plan to handle all formal communications. Define the internal reporting required for your project team and determine its frequency (at least weekly). Identify any external communications needed by those listed in **stakeholder identification**, especially your sponsor. Identify owners for all project communications, **delegating responsibility** either to yourself or to others on your team. Schedule routine **meetings**, communications, and reporting in support of your **project plan execution**.

Consider the best methods for your project communications. Plan to take advantage of all effective **software and technical tools** for **communications management** that are available to you. Throughout the project, use all types of communications: *formal* and *informal*, *written* and *verbal*. Use your **project infrastructure** decisions to select *methods* appropriate for various situations, such as those in Table 13.1:

Establish Your Project Management Information System

Develop a plan for **communications control** and *archiving project data* in your project management information system (PMIS) and decide where and how to store it and for how long. If your project involves *confidential* or proprietary information, determine how you will protect your data. Identify

Table 13.1. Communication methods.

	Same Place	*Different Place*
Same Time	• Conversations • Meetings • Networking • Team-building activities • Celebrations	• Telephone calls • Teleconferences • Videoconferences • Web-based meetings • Social media
Different Time	• Reports • Newsletters • Audio recordings • Video recordings • Yellow sticky notes • Memos	• Voice mail • Email • Fax • Websites • Network collaboration tools • Interoffice mail • Other mail

the people who must be able to read and update the archives, and implement systems to ensure that those who should not have access are excluded.

Provide for storage of the **project charter** and other definition documents, project plans, status reports, presentations, and other communications generated during project execution or project **issue management**, as well as **integrated change control** logs and reports created when **closing projects**. If the documents are not stored online, develop a system for distributing the information to all project team locations and work to keep all data archives synchronized with current versions of each project document.

Document the Plan and Get Approval

Record your decisions and identify anything in the communications plan that requires hardware you do not already have or that will generate expenses beyond what is expected for the project. Present your plan to your sponsor for review and get approval for it.

Use Your Plan

Install any teleconferencing equipment or other hardware necessary to communicate with distant virtual or **global team** members and test your systems

before their first scheduled use. If there are problems, promptly initiate any needed upgrades or maintenance and coordinate any future planned changes to *ensure ongoing compatibility*.

Update your communications plan as needed to improve the visibility and *flow of information* throughout the project. For longer projects, reevaluate communications requirements during **project reviews**.

14

Conflict Resolution

What: Gaining team agreement following a difference of opinion.
When: Throughout a project.
Results: Ongoing cooperation and team cohesion.

Understand Sources of Conflict

Whenever people work together, there is potential for conflict. Avoiding disagreements begins with *minimizing causes*. Table 14.1 illustrates typical problems and remedies:

Table 14.1. Typical problems and remedies.

Causes of Conflict	*Remedies*
Overlapping responsibility	• Clear **activity definition** • Unambiguously **delegating responsibility**
Differing cultures, viewpoints, perspectives, and backgrounds	• Effective **team management** and **team development** • Conducting a project **start-up workshop** • Avoiding unnecessary interactions that depend on **global teams** and **matrix teams**
Misunderstandings	• Thorough **communications planning** • Effective **communications control**
Lack of trust and relationships	• Periodic face-to-face **meetings** • **Coaching and mentoring** • Building **influence without authority**

Deal with Conflicts

Detect conflicts early and confront problems while they are still small. *Probe for information* using open-ended questions, seeking to understand the source of disagreements. Listening is an essential conflict resolution skill.

People deal with conflicts in a variety of ways. When the outcome is rel-

atively unimportant, the best path may be to smooth things over by accommodating the other party. You may even choose to do nothing at all, withdraw, and just attempt to move on. At the other extreme, there may be cases where the outcome is so important that the project leader will need to "pull rank" and impose a resolution, forcing compliance from the other party.

On project teams, however, people need to work together and maintain trust and good relationships. To maintain team cohesion, none of the options above will prove to be satisfactory. Over the long term, only *confrontation* and *compromise* will be effective. Sometimes it is not possible to resolve conflicts while keeping everyone equally satisfied, so successful resolution may involve seeking a "third way" that is different from the team members' initial ideas but is one they can accept and live with. Collaboration may require that everyone involved will need to give in a little.

Face the Issues

Resolving internal team conflicts begins with *meeting in person* (or via suitable conferencing techniques) so that people can discuss matters openly.

Clearly state the problem situation and verify that everyone involved *wants to resolve* the conflict.

Consider All Perspectives

Allow each person to *present his or her perspective* on the issue, without allowing any comments or criticism from others.

Encourage clarifying questions, but keep a narrow *focus on facts and data*, not on personality and emotion. Use active listening, paraphrasing, constructive feedback, and open questions to gain understanding.

Quantify the alternatives and options discussed in terms of time, money, or other specific measures that will support objective comparisons.

Seek "Win-Win" Resolutions

Use **brainstorming** to generate additional alternatives and *combinations of ideas* presented. Use the information you have and **creative problem-solving** to develop new, better ideas with broader potential for acceptance.

Use systematic **decision-making** to reach *common agreement*, or at least a resolution that everyone will accept.

Confirm closure and document what was decided.

Get Assistance When You Cannot Resolve the Conflict

In the case of especially significant external barriers or internal conflicts, you may fail to resolve the situation within your team. **Problem escalation** should always be a last resort, but a *forcing solution* imposed by the project sponsor or others with more authority may occasionally be necessary. Use this tactic sparingly; frequent escalations can lead to team resentment, malicious compliance, and future project conflicts. (And annoying your management too frequently is always a bad idea.)

15

Consensus-Building for Your Ideas

What: Creating team support for your ideas.
When: Throughout a project.
Results: Group buy-in and agreement for your plan of action.

Note: This process is suitable for project situations where you need to gain approval from a group to implement an idea. For *general group problem-solving*, use the **decision-making** process.

Plan

Outline the situation requiring your response. After documenting it, write down any alternatives that you can think of for dealing with it. Do not limit yourself to considering only the option you think best.

Identify all the team members, *stakeholders*, and others from whom you must obtain buy-in. Schedule a time and place to meet with the people who need to agree on your proposal. Get their commitment to attend.

From the perspectives of these decision-makers, *analyze* each possible response, noting the benefits, costs, and any possible objections. If your preferred response remains your best overall alternative, develop effective responses for any objections to it that you can expect.

Thoroughly plan your **meeting**. Set an *agenda* that covers definition and discussion of the problem situation, analysis by the group, and closure with a decision. Document your analysis, outlining the situation, your proposed response, and clearly specified and quantified benefits and costs. If you expect to have to do a formal **presentation**, organize it carefully and rehearse what you plan to say.

Meet

Review your agenda and discuss the details of the situation, including the consequences of taking no action.

Present a summary of your proposed response, emphasizing its *main bene-*

fits. Continue discussing the details and show how your idea directly addresses the needs.

Invite questions, criticism, concerns, and objections. Acknowledge them and *respond* to them using the information you prepared. Encourage people to propose modifications to your proposal that might improve it, and adopt any beneficial suggestions.

Ask if anyone has an *alternative* course of action that he or she would like to present. If there are any, discuss them along with yours. Use the information on alternatives you developed before the meeting to raise any issues concerning costs or other deficiencies.

Summarize the *merits* of your proposal and of any alternative ideas discussed. Focus the summary on areas of agreement within the group.

Seek *consensus* from the group for a single idea. If your preparation was thorough and your proposal has merit, the group will choose your idea.

Acknowledge the agreement, *document* the decision, and close the meeting.

Take Action

Communicate the decision to all project contributors and *implement* your idea.

16

Constraint Management and Plan Optimization

What: Resolving differences between project constraints and your bottom-up plans.
When: Project planning and execution.
Results: A project schedule that can achieve top-down objectives, or a best option with one or more alternatives.

Document Constraints and Limitations

Toward the conclusion of **project plan development**, *review and document* the **project objective and priorities**, assumptions, and constraints identified in your **project charter** at **project initiation**. Note also:

- Intermediate milestones and key *target dates*
- Profiles of *available staffing* effort from **team acquisition** and **human resource planning**
- Technical and other **required skills analysis**, with any *skill gaps* uncovered in **responsibility analysis**
- *Interfaces* and dependencies linking to any **multiple dependent projects**
- Any *other limitations*, constraints, or issues identified in the planning process

Identify Discrepancies Between the Bottom-Up Plans and Goals

Compare stated project goals with your plans. Determine any issues between your **schedule development** (based **on activity duration estimating** and **activity sequencing**) and the project deadline. Identify differences between the bottom-up **cost budgeting** (based on **activity resource estimating** and **cost estimating**) and the budget expectations for your project. Outline any scope issues between your documented **scope definition** and what your project team can realistically produce.

Document any significant *additional issues* involving timing and specification of interim deliverables, the profiles from **resource leveling**, **required skills analysis**, or any other consequences of your planning effort that differ from project expectations and constraints.

Use Priorities to Explore Trade-Offs

Review your project's priorities and use **brainstorming** to develop *plan modifications* consistent with them. If schedule is the top priority, modify resources and scope as necessary to align project completion with the defined project deadline. **Software and technical tools** can make "what if?" exploration of project options easier.

Possible *resource* plan changes include:

- Rescheduling work or doing **resource leveling** to exploit any *resource under-commitments*
- *Delaying noncritical work*
- *Reassigning staff to more critical work* from noncritical activities
- *Outsourcing work to contract staff* as a result of **procurement contracting**
- *Adding staff* from other parts of the organization
- *Upgrading or replacing equipment* to improve efficiency
- *Increasing performance* through **process improvement**
- *Automating manual work*
- Using **rewards and recognition** to *improve productivity* and **motivation**
- *Enhancing or building new skills* through training, **coaching and mentoring**, or **team development**
- *Decreasing interruptions*, distractions, and other conflicting commitments

Frequently there are project specifications that are not essential or not time critical. Consider modifications to project *scope*, such as:

- Prioritizing specifications and *removing less important features*
- *Delaying some requirements* to a follow-on project (or iteration or phase)
- *Stretching the delivery of results* over a longer time frame
- *Reducing complexity* of the required work
- Finding opportunities for *reuse and leverage*
- *Buying needed components* instead of making them

Even if timing is your highest priority, consider changes to the *schedule*:

- *Revising activity dependencies*
- *"Crashing" work by adding resources*
- Delaying less critical work by *using float* to accelerate critical tasks
- *Fast-tracking*—breaking activities into pieces that may be executed in parallel
- *Starting work earlier* than currently scheduled
- *Scheduling work on non-workdays* (but this can backfire)

Document the Best Plan(s)

Consider changes you are empowered to make and strive to develop a plan that *meets all your project objectives* and constraints. If you are successful, gain support from the team, document the resulting plan, and use it for **project baseline setting**.

If your best efforts *fall short of the project objective*, document at least two plan alternatives that come as close as possible while meeting the most important project priorities. Plan to use your alternative plans in support of **negotiating project changes** with your sponsor and stakeholders before project baseline setting and **project plan execution.**

17

Cost Budgeting (PMBOK® Guide 7.3)

What: Determining the overall expected project cost, based on bottom-up planning.
When: Project planning and execution.
Results: A realistic budget for the project derived from detailed planning data.

Identify Direct Project Costs

Develop a project budget using your **cost planning**. Project budgets are based on project **activity resource estimating** and **cost estimating**. Accumulate all activity-related cost estimates for labor (based on effort estimates and appropriate labor rates), **procurement contracting**, equipment, materials, software, travel, support, training, **communication management**, services, and other direct project expenses.

Determine the Project Budget and Project Cost Profile

Cost budgeting begins by accumulating these costs for the entire project. The *overall project budget* is the sum of all of the bottom-up costs associated with project activities plus any project-level expenses for **team acquisition**, overhead, and other indirect costs allocated to the project. For longer projects, you may also need to consider factors such as salary changes, contract renegotiations, and the effects of inflation.

The project budget also includes any *budget reserve* that you have been able to establish during **risk response planning**. The total of all these project costs forecasts the project budget at completion (BAC).

By integrating project budget data into your **schedule development**, you can create a *cost profile* for the project. This is the foundation of *planned value* or budgeted cost of work scheduled (BCWS), used for **earned-value management**. This period-by-period cost information reflects when during the project you expect that money will be spent.

You can display cost (or effort) profiles manually using resource tables or spreadsheets, or employ automated functions of **software and technical**

tools to generate histograms using resource calendar data from **human resource planning**. If you use cost category codes, you can also develop profiles for individual cost types. Cost profile analysis is used in **resource leveling**, and it also provides essential data for **return on investment analysis**.

Review Project Costs

Contrast the overall project budget with your project's financial objectives to determine whether the bottom-up analysis is consistent with the cost expectations of your project sponsor and stakeholders. If there are significant variances, either with the overall costs or with cost timing, *minimize the differences* through **constraint management and plan optimization**.

If there are still problems after your best replanning efforts, *resolve budget issues* by **negotiating project changes** and work to establish a realistic budget as part of **project baseline setting**. When planning reveals a need for a budget that exceeds initial expectations, focus your discussions on comparisons between the budget you need and the value of your project (not an arbitrary cost goal).

Manage the Project Budget

Document the project cost baseline and use it to track project performance throughout **project plan execution**.

Manage your budget through **cost control**. Periodically review your budget during **project reviews** and revise it when necessary.

18

Cost Control (PMBOK® Guide 7.4)

What: Monitoring project costs and managing use of project resources.
When: Project execution.
Results: Accurate project expenditure tracking and plan adjustments as required to manage budget expectations.

Determine Status and Analyze Variances

Cost control is central to **project plan execution**. It follows **status collection** and **plan-variance analysis** in the project-tracking cycle. If you are outsourcing work, cost control also involves **procurement control**. It is necessary in any cycle where you discover a significant cost or effort variance, or your **earned-value management** measurements are out of limit. For each variance, use **cause-and-effect analysis** to review its *root cause and impact* on the project budget. If the root cause relates to individual or team ineffectiveness, work toward **performance problem resolution**. Determine whether the impact is a onetime or short-term issue, or whether the root cause is longer term—a chronic problem or part of an adverse trend.

Plan Responses

For each cost (or effort) variance you uncover, review your **project infrastructure** decisions and **integrated change control** process to *ensure consistency* with agreed-upon principles and **cost planning**.

Involve the project *team members* in **issue management** and developing responses. Engage as many perspectives and problem-solving points of view as practical.

Determine the overall project cost impact by **forecasting project completion**. Depending on the severity of the problem and the nature of its root cause, the *type of response* may be:

- A minor change consistent with the **project objective and priorities**
- Implementation of contingency actions developed during **risk response planning**
- A major change to the project

For significant cost problems, **brainstorm** approaches that could resolve your resource variance. Explore options using the processes of **project plan development**, especially **constraint management and plan optimization**. **Software and technical tools** may also be useful in exploring "what if?" planning scenarios. Develop plans that deal with the root cause of each variance, not just the symptoms. Avoid adopting the first alternative you develop; work to generate *several credible responses*. Typical responses include:

- **Resource leveling**
- Lengthening the schedule
- Finding lower-cost alternatives for project work
- Reallocating resources from other projects
- Reducing the scope of the project deliverable
- Implementing responses that have been effective in similar past situations

For problems that cannot be solved using conventional analysis, try **creative problem-solving**. Allocate a reasonable amount of time to plan a response, but avoid "analysis paralysis." Set a time limit for planning and use systematic **decision-making** to choose the *best idea* available within that limit.

Take Action and Document Results

Validate the response you select before you implement it. Verify that your proposal is consistent with your priorities and expectations. If the response involves changes to the deliverable, get approval for it through **scope change control**. Discuss any major changes with the project sponsor and appropriate stakeholders. If necessary, use **problem escalation** to obtain approval. Major changes may involve **integrated change control**, and result in new **project baseline setting**.

Inform your project team and employ **stakeholder engagement control** to keep everyone involved aware of your plans. *Implement your response*.

Following your implementation, monitor to ensure that your response obtained the *expected results* and did not lead to adverse unforeseen consequences. If problems persist, seek a better solution through additional planning.

Update any project and *planning documents* that are affected by your decisions and reflect any updated estimates in your **cost budgeting**. Keep people aware of project status in your reporting and **communications management**.

19

Cost Estimating (PMBOK® Guide 7.2)

What: Forecasting the costs of project activities.
When: Project planning and execution.
Results: Cost estimates for all resources needed for project activities.

Estimate the Cost of Project Labor

Cost estimates are central to **project plan development** and require an effort estimate consistent with your **cost planning** for each listed task in your project **activity definition**. Verify your effort and required resource analysis from **activity resource estimating**.

Calculate a cost for the effort using either actual expected labor expenses for staffing, or with whatever standard *labor rates* your organization has established for the relevant categories of contributors working on your project. (If you have neither of these, use approximate labor rates based on about double average payroll expense.)

Determine Other Costs

Some project activities will probably have expenses in addition to labor. Some possible additional costs are associated with **procurement contracting**, **procurement control**, equipment, materials, software, travel, support, training, **communications management**, services, and other direct expenses. Estimate these *other expenses* for your activities and verify that they are consistent with your resource analysis.

Calculate Costs and Adjust for Uncertainty

Sum the labor costs and other expenses to determine a "most likely" cost estimate for each project activity. Establish and use consistent standards for the precision of all cost estimates. Estimates having more than about three significant digits are rarely that accurate.

Once you have a base cost estimate, probe for failure modes and potential problems. Determine the cost and resource consequences of *worst cases*.

PERT (Program Evaluation and Review Technique) defines a formula you may use to adjust cost estimates for uncertainty: $c_e = (c_o + 4c_m + c_p)/6$, where c_e is a weighted average "expected" cost, based on c_o (an optimistic, "best-case" cost), c_m (the most likely cost), and c_p (a pessimistic, "worst-case" cost). Note significant pessimistic cost estimates in project **risk identification** and consider them when establishing budget reserve for the overall project.

Capture Cost Data

Document costs for project activities to support **cost budgeting**, **resource leveling** analysis, and **earned-value management**. Assign estimated costs to appropriate accounts or categories if this is standard practice for your projects. Cost estimates may also be stored in the databases of **software and technical tools** for project management, time tracking, or accounting. **Project variance analysis** and earned-value management rely on realistic activity cost estimates.

Update Cost Estimates

Revise cost and effort estimates during your project whenever you deal with resource problems through **cost control**.

Revalidate estimates for effort and cost periodically during **project reviews**, particularly for lengthy projects.

20

Cost Planning (PMBOK® Guide 7.1)

What: Documenting the cost management processes for a project.
When: Project initiation and planning.
Results: A clearly defined process specifying how project finances will be determined and managed that provides control of the budget throughout a project.

Prepare for Cost Planning

Cost planning is part of overall **project plan development**. It begins with a review of project information from **project initiation**, including:

- **Project infrastructure** decisions
- **Sponsorship** and **stakeholder identification**
- **Project objectives and priorities**
- **Project charter** components, especially those related to constraints, staffing, budget and funding assumptions, and expense expectations

Identify any *missing information* you need and determine what you will need to do to provide it.

Cost planning and tracking for many projects may involve **software and technical tools**. In preparing for cost management on your project, assess your requirements and *determine your needs*. Small or informally managed projects can be easily managed without specialized software, and the overhead of learning and starting to use an application for time and cost tracking may be overkill. For projects with large staffs, undertaken on contract, or where such tracking is mandatory, use of some sort of formal time and expense tracking system can be essential, however. Considerations in selecting a tracking system include:

- *Consistency* with organizational standards, legal or regulatory requirements, and related applications
- *Overall cost* (software, training, support, upgrades, or other expenses)
- *Adoption by peers* (with resulting access to local expertise)

- *Ease of use* (installation, learning curve, operation, updates)
- Need for specialized *risk analysis* and modeling
- Extensive *resource analysis* and time tracking requirements
- *Customized reporting* capability
- Requirements for *import and export* of project information
- Analysis of **multiple independent projects** sharing resources
- Internet or other remote data entry and reporting

Adopt a tool that *meets your needs*, without a lot of excess capability that could increase the cost, overhead, and complexity. For small projects, the cost and effort tracking capabilities of midrange project management scheduling tools (such as Microsoft Project) or even a simple spreadsheet application may be sufficient. For larger projects or projects requiring more formal, auditable tracking capabilities, high-end "enterprise" tools (such as the suite of applications from Primavera or similar offerings), specialized time tracking applications, or capabilities integrated into your organization's accounting systems may be necessary. If you find the cost planning and tracking systems you intend to use complex and difficult to master, determine how to get the most benefit from them with the least overhead for your project. Work with peers, experts, and your **project office** (if you have one) to maximize the value of any cost management software applications you plan to use.

Also, commit to *effective use* of any software tools you select. No tools can plan or manage your project for you, but if you use them wisely, they can make your job more straightforward. Consider how to use them in planning for "what if?" analysis, **constraint management and plan optimization**, and **risk response planning**. As you proceed into **project plan execution**, determine how best to compare actual effort, expense, and other cost information with your plans for performance reporting. Throughout your project, use the software in analyzing the consequences of cost issues and **forecasting project completion**, and to support ongoing **integrated change control**.

Develop Cost Management Plans

Determine how you will proceed with **required skills analysis**, **responsibility analysis**, and **team acquisition**. Determine who from your project team should be involved with your cost management efforts and secure their commitment to contribute to **activity resource estimating**, **cost estimating**, work required for project financial and **return on investment analysis**, **cost budgeting**, and **schedule development**. If you will be outsourcing work, coordinate cost planning with your **procurement planning**. Schedule a project **start-up workshop** and include cost analysis activities in its agenda.

Decide how you will do **status collection** of **project metrics** related to effort and cost, including **earned-value management**. Document how you will *manage cost information* in your project management information system and in any tracking systems you will be using. Define the **communications management** for project cost information, including the formats to be used in your project performance reports, **presentations**, and other documentation. Also determine the methods you will use for **cost control** throughout your project. Plan for use of software tools to ensure appropriate security, facilitate storage, and provide remote access.

Finalize and Use Your Cost Plans

Validate your cost management processes with your sponsor, document your plans, and communicate your intentions to your project team members.

Use your plans to develop your project resource estimates, cost estimates, and project budget. Coordinate your cost plan with your **scope planning**, **schedule planning**, and other project planning efforts. Use your cost plans to finalize your **project baseline setting**.

21

Creative Problem-Solving

What: Using novel or unconventional approaches to resolve project problems.
When: Throughout a project.
Results: Solutions to problems and situations that do not yield to "normal" techniques.

Frame the Problem

Novel approaches to problem-solving may be necessary in many project situations, including:

- **Decision-making**
- **Project plan development**
- **Scope definition**
- **Issue management**
- **Performance problem resolution**
- **Conflict resolution**
- **Process improvement**
- **Risk response planning**

Clearly *describe the problem* you face, in writing. Outline conventional approaches that you have applied to the problem and summarize why these methods failed to resolve the problem. Use **cause-and-effect analysis** to understand the foundations of your problem. Consider reframing to better focus on its underlying source, not just its symptoms.

Engage the Right People

Work with a *diverse group* to stimulate ideas. Seek the help of people who have a track record of original thinking. Find help outside your normal work group—experts, people from other functions and disciplines, contributors with different backgrounds, cultures, and perspectives. Involve generalists

with a wide range of knowledge, and mix beginners and experienced team members together. Strive for synergy in the team, where the sum of talent exceeds the capabilities of the individuals.

Establish a Productive Environment

Creativity is less likely in familiar surroundings. Find an *unusual place* to work—off-site, outside, or in someone else's workplace. Getting away from your normal work space also minimizes interruptions.

Provide an atmosphere where people can *take risks* without criticism. Foster a willingness to test new ideas and alternatives, and encourage the free cascading of thoughts. Encourage humor, fun, and positive interaction.

The best solutions may not emerge quickly; get commitment for the *time and effort* the problem deserves, but do set a reasonable time limit.

Approach the Problem

Begin by **brainstorming** possibilities for resolution. Encourage everyone to think like a novice, without preconceived notions of what will not work. Be organized and *have a plan* for proceeding—avoid "getting stuck." The following approaches may help:

- Consider new technologies and alternatives.
- Use analogies. Look for similarities in other fields.
- Combine ideas into new concepts.
- "Misuse" techniques, ideas, and tools.
- Focus on what you *can* make work and attempt to expand on it.
- Be persistent. Develop partial answers and work them into full solutions.
- If the problem seems overwhelming, focus only on a key part of it and plan to resume your resolution efforts after you have made some progress.
- Tolerate errors and failure; seek ways to remedy any defects that develop, or to succeed using other similar methods.

Keep track of unsuccessful approaches; if something does not work, move on. Within the allotted time, select the best available option for dealing with the problem.

Implement and Communicate

Use the developed solution to *deal with the problem* situation.

Document your solution and *communicate* it to others responsible for similar project work. Also, capture information on any approaches you found deficient to avoid future blind alleys.

22

Customer Interviews

What: Discussions with customers and users of project deliverables to determine requirements and needs.
When: Project initiation and planning, with periodic review during execution.
Results: Clear knowledge of the customer's environment, needs, and trends.

Plan the Interview

Interviews are a technique for one-on-one user **requirements collection**. Some interviews are part of the interaction with specific individuals who are project stakeholders. Other interviews are more generic, as part of qualitative **market research**. Whatever their purpose, *plan* your interviews, estimating the required time, skills, and any costs for travel or other expenses. Determine how many interviews you will need to do; 20 to 30 interviews are typical for market research. Set up appointments with the individuals you need to meet with well in advance. Obtain and test a device for recording your interviews.

Define what you need to learn, and develop a *discussion guide* to use during interviews to ensure that you consistently probe for the information you need. Do a practice interview with one of your team members before your first customer session.

If you will be able to interview a customer only once, ensure that the *people you meet with* will be able to discuss all the topics of interest adequately. Never conduct an interview alone; include at least one other colleague who can observe and take notes. If you are not fluent in the language of your customer, arrange for an interpreter.

Conduct the Interview

Arrive slightly early to ensure that you will be on time for your appointment. Following introductions, briefly *discuss your objectives* and reconfirm the customer's cooperation. Request permission to record the interview and set up your recorder with the microphone near the interviewee(s). If recording is not permitted, have your colleague take very thorough notes.

Ask your questions, but spend most of your time listening. You are there to collect *the voice of the customer*. Learn by watching what happens. Work to understand what the customer does.

When you are finished, *thank the customer*, and follow up afterward with written thanks and responses to any questions that you were unable to answer during the interview.

Capture Results

Discuss what you learned immediately after the interview. Summarize your interview findings promptly, using a consistent format for all sessions. *Document your overall analysis* soon after your last interview.

Use the *customer interview* information to complete your **scope definition** and conduct follow-up interviews as needed to support **project reviews**.

23

Decision-Making

What: Using a systematic process to select one option among competing alternatives.
When: Throughout a project.
Results: Team buy-in for a decision that can be expected to deliver good results.

Define the Issue or Question

Good decision-making begins with a clear, *unambiguous statement* of the question that must be answered. Avoid beginning to solve problems prematurely, before you understand the issues. Use **cause-and-effect analysis** to probe for the source of the problem, not just the symptoms. Decompose complex issues into a number of smaller, simpler ones.

Frame the question by defining the results expected from a decision. Define performance measures that signify successful resolution, and limit your considerations to things that you can realistically influence or control.

Determine Logistics and Procedure

Decisions requiring team support are best made collaboratively. Determine *who needs to participate* and get their commitment to contribute. If one or more distant team members are involved, select times for conference calls that are acceptable to them.

Get agreement from participants on the *decision process* you will use. Objective decisions require *defined criteria*, such as cost, time, usefulness, completeness, or feasibility. Seek criteria that relate to your defined goal and make them measurable. Prioritize the criteria by relative importance. Also identify any constraints such as time, resources, or required approvals.

Once the question and constraints are clear, quickly poll the members of your team for their thoughts. If a consensus emerges, examine it for potential issues or problems. If there are none, make the decision and implement it.

Develop and Analyze Options

If no initial consensus emerges or the situation is complicated, work with the team to **brainstorm** *options*. Generate as many as you can in the time you have allotted. **Creative problem-solving** techniques and root cause analysis can help in developing a wide range of possibilities. Research the possibilities; investigate what others have done through networking, browsing the Internet, consulting with colleagues, and benchmarking.

Filter the options generated through a quick assessment using your decision criteria, especially if you have generated a large number of alternatives. Restrict detailed analysis to no more than about six options.

Analyze the best options, determining estimates for each that relate to your decision criteria. When it is difficult to quantify an assessment, compare options in pairs to determine which alternatives the team prefers, and how strongly it prefers them. **Software and technical tools** for assessing analytical hierarchies (or even spreadsheets) can be helpful when confronting complex decisions.

Use the assessments to *sequence your options* and then discuss how people feel about the prioritized list. Test the top option with scenarios, models, or simulations and consider possible unintended consequences and risks. If there are valid problems with the first option, examine the next alternative or revise your decision criteria.

Use systematic analysis to *reach closure* and document the team's decision.

Communicate and Implement the Decision

Document and *clearly communicate* the decision to all the people it affects.

Implement the decision and measure the results.

Be prepared to *revisit and adjust* decisions if they fail to deliver expected results. It is usually better to make decisions quickly, following up with necessary modifications, than to wait indefinitely for complete information.

24

Delegating Responsibility

What: Setting individual goals and tracking them to completion.
When: Project planning and execution.
Results: Commitment by team members to goals that align with business and project objectives.

Set Goals

When setting goals, both the project leader and the individual team member involved should *create lists* of work to be accomplished. The lists should include, but not be limited to, all items from the **activity definition** where **responsibility analysis** shows the individual is involved. Strive to capture all significant current responsibilities. Schedule a meeting time to discuss goals.

Make one list by combining the items from the leader's and the individual's lists. For any goal that appears only on one list, discuss it and agree that it is valid before adding it. If there are similar goals on the two lists, develop a single consensus description.

Test that each goal described on the list is:

- *SMART*: specific, measurable, assignable, realistic, time-bounded
- *Stable* (if it may change, list one or more shorter-term goals)
- *Aligned* with business goals and the **project objectives and priorities**
- *Coherent* (all the goals listed make logical sense together)
- *Clear* (the intended result is unambiguous)

To enhance **motivation**, include at least one goal that relates to a *personal preference* or desire for development.

Outline the *benefits* of achieving the goals to the individual, the project, and the overall organization. Uncover potential problems with goals through **risk identification**. If needed, modify goals to reduce risk.

Review the *target date* for each goal. Validate the **activity duration estimates** and **cost estimates** for all project activities where the individual is the owner. Modify unrealistic assumptions and dates and reflect any changes made in project planning documents. Ensure that the highest-priority goals

are scheduled for completion as early as practical and discuss the consequences of late completion in specific, measurable terms.

Document all current goals on the list, including any details on costs, timing, staffing, and external dependencies.

Get *commitment* for the goals on the list and express your confidence in the individual's ability to complete them successfully. Schedule periodic follow-up meetings to review goals and discuss progress.

Review and Update Goals

Prior to the follow-up meeting, *prepare to review* progress on the list of goals. Assemble data from **status collection** and, when appropriate, prepare a list of potential new goals to replace those that have been completed.

Begin the meeting by discussing finished work and goals showing satisfactory progress. *Recognize good performance* and thank the contributor for any goals completed. Consider **rewards and recognition** for completion of significant accomplishments.

Use **plan-variance analysis** to identify any *unmet goals* or any project work that is falling behind schedule. Use the follow-up meeting to discuss **performance problem resolution** and determine if it would be best to adjust the goal, replace it, or drop it.

Discuss any proposed *new goals* and add them to the current list of goals. Reprioritize the resulting list and adjust the dates on the goals as necessary.

To end the meeting, *document the updated goals* and confirm the place and time of your next progress review meeting.

Integrate *new schedule information* in your **communications management** concerning any goals that slipped or changed to any people or **multiple dependent projects** that may be affected.

Keep a *history* of goals and accomplishments for **project reviews**, evaluations, and analysis of lessons learned.

25

Delphi Technique

What: Using group input to refine forecasts and estimates.
When: Project planning and execution.
Results: Credible responses to questions requiring quantitative answers, even when supporting data is sparse.

Define the Question

Delphi technique draws on "group intelligence" and relies on the fact that although no one person may be able to provide reliable estimates or answers confidently, the middle range of the inputs drawn from a population of stakeholders will often realistically forecast numeric results. Delphi taps into *undocumented history*, and, because it is a collaborative process, it can also enhance **motivation**, ownership, buy-in, and teamwork.

To begin the process, clearly *state the question* requiring a numeric answer. For projects, the Delphi process can assist with many estimating efforts, including:

- **Activity duration estimating**
- **Activity resource estimating**
- **Cost estimating**
- **Quantitative risk analysis** of impact or probability
- Assessing criteria used for **decision-making**
- Forecasting data used for **return on investment analysis**

Gather *five or more people* who possess relevant experience and knowledge, even though they may not have confidence that they can answer with precision. **Meetings** in person are best, but teleconference-based meetings can also be effective.

Provide data on the question: facts, issues, constraints, and assumptions. Share any other relevant information with your team, but *withhold your opinion* on the answer to avoid skewing the responses.

Familiarize the team with the Delphi technique if it is new to them.

Collect Responses

Collect an initial response to the question from each participant. The participants should generate responses quickly and *individually*. Responses can be either anonymous or attributed.

Sort inputs based on the numerical responses into three roughly equal groups: the highest, middle, and lowest thirds.

Discuss the Outcome

After collecting the individual responses, encourage *group discussion*. Consider these questions:

- Are the most pessimistic responses based on specific experiences?
- Are there credible shortcuts or innovative methods that support the optimistic responses?
- Is the average of the middle responses realistic and reasonable?

Repeat the Process

Collect *another set* of individual responses. After collection, group and discuss the results.

Convergence in two to three cycles is common for most project-related questions. Strive for *consensus*, or at least an answer that all on the team will accept.

Document and use the outcome of the Delphi process.

26

Earned-Value Management (EVM)

What: Using predictive and diagnostic project metrics to evaluate project performance.
When: Project planning and execution.
Results: Early detection of resource overconsumption, and reliable forecasts of adverse budget and schedule trends.

Earned-Value Basics

Earned-value management (EVM) appears complex, but it has a simple foundation. **Project plan development** generates a schedule and a budget documented during **project baseline setting**. **Project plan execution** accumulates data through **status collection**, resulting in actual schedule performance and expenses. EVM provides a useful way to assess the *differences* between these schedules and budgets. EVM evaluates project progress in terms of diagnostic **project metrics** (using resource units, either *money* or *effort*) related to these schedules and budgets in various combinations. Table 26.1 illustrates the three principal metrics for EVM.

Table 26.1. Principal EVM Metrics.

		Budgets	
		Planned Expenses	*Actual Expenses*
Schedules	Planned Schedule	Planned Value (PV)	(Not used)
	Actual Schedule	Earned Value (EV)	Actual Cost (AC)

EVM tracks planned and actual cumulative resource consumption at the project activity level. When all three of these metrics are the same for a project, it may be considered to be on time and on budget.

The first requirement for EVM is **cost estimating** for each activity defined at the lowest level of the **work breakdown structure**. The overall budget is allocated among the planned project activities, accounting for exactly 100 percent of the project budget. *Planned value* (PV), also called the

budgeted cost of work scheduled (BCWS), is a running accumulation of these costs for the entire project based on the project schedule. Because PV may be calculated from the baseline plan, it is actually a predictive project metric, but for EVM it is generally treated as a diagnostic metric, evaluated throughout the project along with the other measures.

Whereas PV is based on the planned schedule and planned budget, *actual cost* (AC) is calculated using the actual schedule and actual budget. AC, sometimes referred to as the actual cost of work performed (ACWP), is a running accumulation of the realized costs for every project activity that is completed or currently under way.

EVM does not directly compare PV and AC because their differences may result from budget issues, schedule variances, or both. To untangle the comparison problem, *earned value* (EV) is derived using a combination of the planned budget and the actual schedule. EV, which may be defined as the budgeted cost of work performed (BCWP), is the running accumulation of the costs that were planned for project activities that are completed, plus a portion of the planned cost for activities that are in progress.

Perform the Analysis

Actual costs are *assessed* throughout the project through **status collection**. For a given date, both EV and PV are most commonly calculated using the 50/50 rule—accumulating half the planned cost on the start date and the other half at the finish. For greater precision, some use interpolated costs when evaluating these EVM metrics.

Assess *budget performance* by comparing earned value and actual cost. These metrics are both based on schedule status data, so any difference must result from a variance in resource consumption. The cost variance (CV) is EV minus AC, a quantitative measure of how much the project is currently over (or under) budget. The ratio of EV and AC is the cost performance index (CPI), which shows consumption of the project budget as a percentage. Positive CV (or a CPI greater than one) indicates a project that is under budget.

You may also use EVM to assess *schedule performance* by contrasting earned value and planned value. Both EV and PV are based on planned budget data, so any difference between the two must result from timing differences. Schedule variance (SV) is EV minus PV, and the schedule performance index (SPI) is the ratio of EV and AC. Positive SV (or an SPI greater than one) indicates a project that is ahead of schedule. For assessing schedule performance, however, there are other techniques for **project variance analysis** that may be more accurate and easier to evaluate.

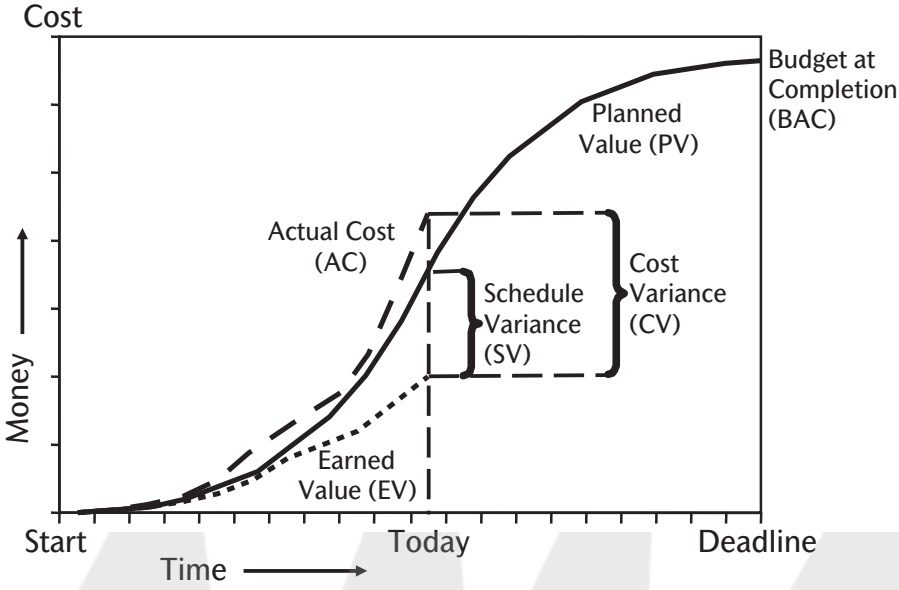

Figure 26.1. Earned-value metrics at mid-project.

The project in Figure 26.1 is about half completed. Based on an EVM assessment, it appears to be significantly over budget and somewhat behind schedule.

The *value* of EVM continues to be debated extensively. It can represent quite a bit of overhead, and for some projects, tracking the data may be overkill. On the other hand, EVM accurately predicts project budget overrun as early as 15 percent of the way through a problem project, and it also provides an effective basis for **forecasting project completion**.

27

Forecasting Project Completion

What: Using predictive and diagnostic project metrics to estimate project completion.
When: Project execution.
Results: Realistic project expectations based on credible forecasts of budget, schedule, and other project trends.

Some projects reassess project completion with each cycle of **project variance analysis** and communicate it as part of routine **communications management**, while other projects do it less frequently, as part of **project reviews** or with other periodic high-level project analysis.

Verify Project Status

The first step in assessing project completion is to establish a credible picture for the project. Assemble current accurate schedule, effort consumption, cost, and other **project metrics** and use them to determine how your project is doing compared to the commitments made during **project baseline setting**. **Earned-value management** (EVM) defines a number of specific measures related to project completion, but even if you are not using EVM to track project progress, there are other effective techniques you can use to determine if your schedule, budget, and other overall project goals remain realistic.

Forecast Project Financials

Project financial analysis involves comparing expected expenses with actual costs and then extrapolating the results to determine if the committed budget remains realistic. One simple high-level assessment technique begins by calculating two ratios, one for activities and another for financials. The activity ratio is based on the number of project activities completed to date divided by the total number of activities defined at the lowest level of the project **work breakdown structure**. This ratio may be compared with the aggregated actual expenses so far divided by the total committed project budget. If the ratios are comparable, the project may be doing well. However, if the completed activity ratio is 0.3 and the expense ratio is higher (for

example, 0.5), your resource "burn rate" is too high and your project is likely to significantly overrun its budget. A rough extrapolation using this technique would predict a final cost of about 167 percent of the budget. To improve on the precision of this overall final budget estimate, you could also compare the sum of actual expenses to date and updated **cost estimates** for all remaining project activities with your committed budget.

For projects employing EVM, there are several well-defined methods for determining project estimate at completion (EAC). The most optimistic method assumes that the initial analysis for all remaining work was accurate and adjusts original budget at completion (BAC) using the current cost variance (CV), or earned value minus actual cost. For this "best case," EAC = BAC – CV.

A more widely used formula assumes that the performance to date is a better predictor than the original estimates for future work and calculates the adjustment to the initial BAC by dividing it by the cost performance index (CPI), the ratio of earned value to actual cost. In this "realistic case," EAC = BAC/CPI.

An even more conservative method further adjusts this by also dividing BAC by the schedule performance index (SPI), the ratio of earned value to planned value, on the assumption that a slipping project will end up even more over budget. For this "worst case," EAC = BAC/CPI/SPI.

Two other metrics are used for resource and cost forecasting, estimate to completion (ETC—the cost of remaining work) and the to complete performance index (TCPI—a diagnostic metric that forecasts the performance required to achieve the goal BAC). ETC is calculated by subtracting the current actual cost from the project estimate at completion, where EAC is evaluated using one of the three methods. TCPI (or sometimes to complete index—TCI) is defined as the ratio of work remaining to funds remaining and is generally calculated as (BAC – EV)/(BAC – AC). A TCPI greater than one indicates that without improved performance, the project will overspend its BAC. For this metric, the numerator is based on plans and the denominator is based on actuals. A TCPI variant that indicates the performance need to meet the current EAC uses (EAC – AC) in the denominator.

Forecast Project Timing

Project timeline analysis is similar. It involves comparing estimated durations with actual durations and then extrapolating the results to determine if the committed deadline is realistic. As with financial forecasting, you can use an approximate assessment technique for this using two ratios, this time with

one for activities and another for timing. The activity ratio is the same as for cost analysis—the number of project activities completed to date divided by the total number of activities in the project. The second ratio is the time elapsed on the project so far divided by the total project timeline. If these ratios are comparable, the project is probably on track. However, if the project has used half its time and completed fewer than half the activities, there is likely cause for concern. Again, while extrapolating an adjusted timeline using these calculations is imprecise, any significant difference will indicate that more detailed analysis of project performance is warranted. For a more accurate schedule assessment, reforecast the project completion date by revising your **activity duration estimating** for future work based on actual schedule performance to date. Such analysis is straightforward using tracking Gantt charts from **software and technical tools** for project scheduling.

As a project nears completion, it is also useful to track the results of testing. Projects of a given type tend to exhibit predictable timing in the testing phase. You may be able to use retrospective project metrics to accurately predict the amount of time that remains after the number of uncovered defects and problems per testing period levels off and begins to drop.

You can also estimate schedule forecasts using EVM. Schedule variance (SV) is not measured in time, but you can adjust the expected completion date using the timing difference between the dates when the project PV was equal to current EV. (If EV is lagging, determine the elapsed lag compared to the expectations in the baseline plan.) You may also use the schedule performance index to forecast expected timing by adjusting the overall project duration and then converting this to a new calendar date. Although EVM is theoretically capable of forecasting project timing, the other methods discussed here tend to be both easier to implement and more accurate.

If your forecasting reveals significant project schedule, budget, or other issues, you may need to consider **negotiating project changes** and increase your **stakeholder engagement management**.

28

Global Teams

What: Communicating and working well with team members from other cultures.
When: Throughout any project having a global team.
Results: Satisfactory project performance when working with widely distributed teams.

Justify Global Projects

Work in modern companies is worldwide. Projects are global for a variety of *reasons*, including:

- Products and services are used in many countries.
- Companies have employees all over the world.
- Global staffing can lower project expenses.

There are many potential *benefits* of global teams, including access to new skills, 24-hour coverage using normal shift workers, cost savings, and local knowledge of diverse users. However, these prospective advantages come with *challenges*:

- Global team communication is hard, may involve multiple languages, and can be expensive.
- Time differences make routine communication inconvenient.
- Work styles and cultural variations can lead to problems and misunderstandings.
- Confusion and conflicts may be frequent.
- Effort for global teams is nearly always higher, compared with a co-located team with similar capabilities.
- When global teams do get together, it is time-consuming and expensive.

The *results* of global projects can be excellent or a disaster (few global projects are "average"), depending on whether the benefits or the challenges dominate. Success requires project leadership that sets a foundation for effective communication and minimizes the challenges.

Understand the Effects of Distance and Language

Different primary languages for global team members may make project communication very difficult. Even when team members share proficiency with a written language, spoken communications can cause misunderstandings and lead to problems. English in different parts of the world uses the same words to describe different things, so miscommunications occur even when languages are shared. Project **communication planning** requires minimizing of jargon, acronyms, and idioms, and demands unambiguous content in project documents.

The key to leading projects of all types is communication, and effective global communication often depends on *appropriate translations.* If you are unable to provide clear information personally to your project team and stakeholders, you will need to rely on translators. Effective language translation generally requires both time and money, so consider it in **schedule development** and include funding for it in your **cost budgeting**. Technical translation is difficult, so work to ensure that your translators are competent both with the languages needed *and* with your technologies.

Company culture and differences between job functions also affect communications. How people ask for things, come to agreement, and interact can vary a great deal on global teams.

Tailor Communication Styles

Global teams also differ in *communication preferences*. Some team members may be social and talkative and other team members may be more terse and business-oriented. Choose effective **leadership** and communication styles.

Use effective methods of inquiry; *avoid "yes/no" questions* with team members who might respond "yes" to be polite.

Whenever you pose questions *in writing*, carefully reread them. Even innocently written questions may seem insulting or rude to the people receiving them.

There are no fixed rules on communication styles; the best way to proceed is through good **team management** and building *one-on-one rapport* with distant team members. Whenever possible, begin global projects with a face-to-face project **start-up workshop**. Through building trust and strong relationships, you can ensure that minor issues will remain minor.

Choose the Best Communication Methods

Communications management with global teams is both *formal and informal*. If formal communication (reporting, documents, scheduled **meetings**, **presentations**, and project reviews) is ineffective, people will have too little

information and project performance will suffer. If **communicating informally** (conversations, emails, memos, social media, and other interactions) is inadequate, problems will surface too late, when they are difficult to solve. Preferences differ, so balance your project **communications control** to support the project and provide communication that serves everyone's needs.

There are *many techniques* for distributing information, but on global teams most communication is either "same time, different place" or "different time, any place." Neither is as effective as in-person communication, but if you conscientiously use all the methods available that are suitable for the team, you can be successful. Adopt **software and technical tools** for your team that enhance the effectiveness of your communications. Avoid using only one or two methods.

Invest the time necessary to ensure adequate technical support for remote meetings. *Effective teleconferencing* requires planning. Set an agenda before distance meetings with *topics*, *owners*, *timing*, and *expected outcomes* for each item included. If you will not be able to share live images during a teleconference, send visual information in advance, or provide network access to files that all can access. When dealing with significant time differences, schedule meetings at a time that is as mutually convenient as possible. Rotate meeting times so that all participants will be able to meet during their normal working hours, at least once in a while.

Manage Other Project Challenges

Confirm *continuing strong sponsorship*. Without adequate **sponsorship**, a global team is almost certain to fail.

On global teams, the *work styles* of team members from different cultures can vary a great deal. Some people are team-oriented and accustomed to working within a defined, structured hierarchy. Other people may be independent and more comfortable working autonomously in an environment where everyone has equal authority. Strive for a project **work breakdown structure** that decomposes project work in ways that minimize the need for people working at a distance or with different working styles to interact closely. In **project plan development**, structure the work to be consistent with project staff preferences whenever possible.

Culture also affects how *time and deadlines* are perceived. Some people are scrupulous about making and meeting time commitments, while others have a less-precise approach to deadlines. Even the way that people discuss time varies a great deal, making **status collection** on global teams difficult. Make time commitments as explicit as possible, always specifying months

using names (not numbers). Minimize dependence on team members who have a history of timing problems for key milestones.

Work to achieve a *consistent view* of the **project vision** and its expected results; use this to bridge any differences and bring the team together. A common goal that everyone understands and considers meaningful is essential to a smoothly working global team.

Increase **motivation** and buy-in to the project by obtaining *documented commitments* when **delegating responsibility**. Ensure that all managers involved also support and understand the commitments. Develop **rewards and recognition** that will be appropriate for each team member, and use them frequently.

Project plan execution also requires *extra attention* on global projects. Increase your effectiveness by building **influence without authority**. You may need to send inquiries several times, and you generally will distribute more information than you get back. Effective project leaders tend to lose some sleep; working with distant team members is most successful when you contact them while they are awake and in the office.

Combine High Tech with "High Touch"

Technology and other capabilities are essential throughout project plan execution, but must be *in addition to*, not instead of, other types of communication. High-technology communications work best when accompanied by "high-touch," more personal methods. Use all available tools but avoid misuse. Voice mail can be extremely valuable for communicating informally when team members share a language and culture, but for team members who speak different languages, voice mail can be easily misinterpreted and may seem rude or impolite.

Never miss an opportunity for *face-to-face meetings* for **team management** to build trust, even when it is not with the entire team. Get your whole team together as frequently as practical, at least semiannually, for events such as project **start-up workshops**, **project plan development**, and **project reviews**.

Exchanging photographs between distant locations, particularly informal pictures of team members outside the workplace, can be quite effective in building personal connections on a virtual team.

Whenever you must share complex information needs across your team, communicate it in *several ways*. If information distribution is initially verbal, follow up with a written summary. Tailor your communication to the recipients and offer to follow up and discuss any written communication that may be unclear.

Always *reread all emails* and other written communications before sending them to check for clarity, tone, and terminology. As you review what you have written, think how you would react to it if you received it. Encourage frequent, short communications and incorporate judicious use of social media and instant messaging in your project interactions.

29

Human Resource Planning (PMBOK® Guide 9.1)

What: Defining staffing, roles, responsibilities, and organizational structures for the project.
When: Project initiation and planning.
Results: A project roster defining expected contributions and reporting relationships, containing either names or plans for resolving staffing shortfalls.

Determine Necessary Staffing

Capture project *resource plans* based on committed resources, as part of overall **project plan development**. Formally document all ownership and responsibility commitments.

Use **activity resource estimating** to summarize the *staffing* needed to complete each task listed in your project **activity definition**. Use these data and **required skills analysis** to assess your project's talent and head count needs.

Also assess the overall project personnel needs for organizational support and **communications management**, organizing technical and other information, **stakeholder engagement management**, dealing with user and customer relationships, and managing other necessary interactions. Document these *interfaces*, liaisons, and connections.

Document your project *staffing needs*.

Analyze Existing Resources

Identify all committed staffing and document the initial project team roster during **project initiation**. Determine *available resources*, using information from your **project charter** and other planning documentation. Assess the realistic capacity available from your committed project staff. Ask contributors about other responsibilities, anticipated time off, and any other factors that could limit their available effort. For extended team members, be realistic about how much effort "part-time" on the project actually represents and

be skeptical of optimistic-sounding promises from staff members working on **multiple independent projects**.

Develop a project resource calendar to show available resources using a time-scaled histogram or spreadsheet using the same format as your required resource profile. Identify any differences between what you need and what you have available. If your preliminary project plans reveal significant *over-commitments*, attempt to resolve them through **resource leveling**. Determine which project activities are understaffed and document your analysis using planning data.

Compare the skills and experience of the project team with the project skills analysis. Also, use **responsibility analysis** to align staff members with each project activity derived from the **work breakdown structure**. Identify *unmet resource requirements* that project work depends on, such as:

- Unavailable skills or inadequate experience levels
- Key unstaffed project roles
- Insufficient staffing levels

Review Staffing Procedures and Standards

If you find that your project will *need to add staff* through hiring, employee transfer, contracting, or other means, ensure that you understand the processes required and that you have commitment from your project sponsor and others in your organization who must support and approve augmenting your team. Locate and use templates, previously used forms, and other staffing documents to minimize effort and potential problems in moving forward.

Identify any *support people* in your organization (such as legal, procurement, personnel, or human resources staff) who will need to be involved, and obtain their commitment to assist your project.

Develop a Project Roster

Outline the roles and responsibilities required by your project and determine the number of project contributors needed for each type of work. For each identified role for which there is a capable team member already committed to the project, *list the contributor by name* in a project roster or organization chart, along with contact information and other relevant data. If any project contributors are also committed to other projects or to nonproject work, determine and document the amount of effort that will be available to your project and reflect their availability in your overall staffing analysis. Some find it useful to distinguish between "core" project team members, assigned

to the project full-time throughout the work, and "extended" team members, who are essential but only intermittently involved. Include other relevant data on your roster, such as telephone numbers, locations, and email addresses. For **global teams** and **matrix teams**, also list organization and time zone information.

For roles that are not filled (or only partially filled), document any issues and your plans for resolution.

Resolve Staffing Issues

Determine how you will meet all *unresolved resource requirements*. Options include:

- **Negotiating project changes** to timing or scope to align with available resources
- Additional **team acquisition**
- Securing outside help through **procurement contracting**

Add all resource issues that are not resolved to the *project risk list* during **risk identification**.

30

Influence Without Authority

What: Securing commitments from project contributors from other organizations.
When: Project planning and execution.
Results: Cooperative relationships within diverse teams and reliable project commitments.

Prepare

On modern projects, there are many reasons project leaders may have no direct authority over team members. **Matrix teams**, with contributors who report to other managers, and geographically distributed project teams are prime examples. Projects that depend on staff and consultants external to the project as a result of **procurement planning** may also face control challenges. While cross-organizational teams may have many potential benefits, ultimate project success depends on your effort and **leadership** to *establish influence*, ensure effective **team management**, and obtain credible, reliable commitments.

One way to enhance your influence is to take advantage of **sponsorship** from upper managers or from powerful, respected individuals. Work to *build high-level support* for the project from key decision-makers and stakeholders who will back up requests, handle **issue-management** escalations, and assist you in sustaining the support of your project contributors. Work with them to establish a **project vision** that they will promote, and align your **project objective and priorities** with their goals.

As you assemble the *core project team* and complete your **team acquisition**, seek project contributors who are likely to get excited by the project and be compatible with other team members. Investigate the backgrounds and organizations of potential team members and discover what they, and their managers, care about.

Plan the **project infrastructure** to best support a diverse team. If the project team is *not co-located*, get committed funding for periodic travel to bring team members face-to-face. Integrate the use of effective **software and technical tools** into your **communications planning**. Cultural differences are often both the greatest asset and the biggest challenge for cross-

organizational teams. Set up the project to maximize the benefits of diversity and pay close attention to communication requirements for **global teams**.

Establish Relationships

Schedule and hold a face-to-face project **start-up workshop**, so you can get to know your team members better. *Discover the individual preferences* of each person on the project team. Ask people about recent accomplishments that they are proud of and probe for their individual goals and aspirations for the project. By discovering what they care about, you can structure project responsibilities to take advantage of their innate **motivation**.

As the planning for the project proceeds, work to align ownership of work from **activity definition** with individual preferences. When **delegating responsibility**, use the *principle of reciprocity*. In return for a commitment to the project, offer something meaningful in exchange. Assess what you and the project have to offer and use these currencies to gain reliable agreements to deliver what the project requires. As a project leader, you have more to offer than you may suspect. Currencies for exchange could include:

- *The work* (ownership and responsibility, learning and **team development**, new technology, challenges)
- *Recognition* (**rewards and recognition**—tangible and intangible, thanks, visibility, reputation building)
- *Interpersonal factors* (trust, networking, loyalty, teamwork, friendship)
- *The project itself* (project vision, importance, business results, job security)

Clearly *document all commitments* with team members and verify each agreement with the team member's direct manager.

Maintain Relationships

Deliver on your promises. Uphold your end of each agreement you make. Protect your reputation for doing what you said that you would do, fully and on time.

Frequent, effective *communication* is essential to sustaining relationships. Throughout **project plan execution**, tailor your formal **communications management** to meet the needs of the team members and solidify team trust by **communicating informally** with everyone frequently. Meet face-to-face with distant team members as often as practical. Stay in close contact with team members who belong to external organizations, going beyond the requirements of **procurement control**.

Identify problems before they become project threatening. Be disciplined in **status collection** and use **project variance analysis** to detect slipping commitments, so you can quickly recover through **performance problem resolution**. Confront team discord promptly and restore cooperation through **conflict resolution**.

Recognize contributions of team members throughout the project. Thank people individually following completion of project work and take full advantage of any opportunity to use existing reward and recognition programs. Highlight significant accomplishments by named contributors in your reporting and project **presentations** as part of your ongoing **communications control**.

On longer projects, *assemble the team in person* at least every six months to reinforce project goals, reacquaint the people, and do a **project review**. Validate all existing and new commitments and schedule some time for a nonproject team-building event to have some fun and celebrate project accomplishments to date.

31

Inheriting a Project

What: Taking over a project already in progress.
When: Generally during project execution.
Results: Project continuity that is as seamless as possible.

Staff turnover in projects is common, and sometimes it involves the project leader. In some cases, the project you will be asked to take over will be in great shape, having been managed by a competent leader who is no longer available for reasons having nothing to do with the project, such as an injury, illness, or promotion. More commonly, though, leaderless projects are troubled projects, so it is best to be very organized and proceed with caution.

Engage the Team

If you do not know your new team members, introduce yourself and find out what each contributor does. Verify roles and responsibilities and invest time in **team management** to build *relationships and trust* with each person. Use **communicating informally** to get to know each contributor, and interact face-to-face as much as possible.

Discuss the project with your team members, using an approach similar to the lessons learned analysis used when **closing projects**. Ask about what is working and what each person feels is the best way to keep things going well. Probe to uncover any *needed changes* and commit to using **issue management** and **process improvement** to correct any uncovered problems.

Even though you may not really have much of a grasp of what is going on, encourage people to *continue the work* and keep things moving, **delegating responsibility** for **leadership** when necessary while you work to better understand the project.

Verify (or Create) Plans

It is wise to treat an inherited project the same way you would a new one. Verify **sponsorship** and **stakeholder identification**. Engage the key people surrounding your project to ensure that you understand what they expect. Begin to develop relationships with those outside your project with

whom you will interact and review the **project charter** and **scoping definition** to validate that they remain accurate. (If they are missing, work to establish them.)

If there appears to be a good overall *project plan*, use it to track the current efforts, but be skeptical. Review any existing planning documents carefully and use them as the basis for your own **project plan development**. Work with the team to create your own up-to-date, realistic plan as soon as practical.

Establish a Realistic Project Baseline

If your best bottom-up credible plans are not consistent with the stated **project objective and priorities**, approach your sponsor and use your data to begin **negotiating project changes** for realistic **project baseline setting**. You will have some initial leverage; the organization does require someone to lead the project. Use your brief window of opportunity to propose changes. It may be crucial for success to *shift the project baseline*. The former project leader left for some reason, and it may or may not have been exactly what you were told.

A change of project leader is a useful time to schedule a project **start-up workshop**, or even a **project review**. Most of the planning you need to do can be integrated into these sessions, and as a bonus, such events are excellent for **team development** and building the relationships and trust you will need for project control.

32

Integrated Change Control (PMBOK® Guide 4.5)

What: Managing changes for the project overall.
When: Project execution.
Results: Coherent management of changes and minimization of unintended consequences.

Identify Potential Project Changes

After you have completed **project baseline setting**, use robust processes to manage integrated change control for your project. Once your plans are set and scope has been defined, your *documented processes* for dealing with change will become essential for project stability and ultimate success. Even for small projects, written processes will enhance your chances of meeting expectations. Projects using agile methods also depend on strong change management processes to prioritize and manage the backlog to maximize value delivery from one development iteration to the next.

Potential project changes originate from many sources, but they tend to fall into two broad categories:

- *Internal* (**project variance analysis**, performance reporting, **project reviews**, **risk identification**, team-generated ideas, opportunities, loss of staff)
- *External* (change requests, regulatory changes, modified standards, **market research**, new technology, meddling sponsors, natural disasters)

For all project changes, the main principle is to *resist all changes* until you have determined that the change represents a net positive business value—that the benefits expected from the change significantly and realistically exceed the consequences.

Document and Analyze Changes

Regardless of the source, provide *written documentation* for each proposed change (at a minimum as part of your overall project reporting and **commu-**

nications management). Scope change processes in particular will benefit from specialized forms and well-documented procedures for logging and tracking proposed changes that need to be considered.

Integrated change control includes many types of change. *Analyze each proposed change*, using the appropriate process for its type, as shown in Table 32.1:

Table 32.1. Project changes and control processes.

Types of Change	*Principal Control Processes*
Scope	**Scope change control, quality control**
Schedule	**Schedule control**
Cost	**Cost control**
Internal Staffing	**Human resource planning, team management**
External Staffing	**Procurement control**
Risk	**Risk response planning, risk monitoring and control**
Process	**Process improvement, organizational change**
Overall	**Project reviews**
Catastrophic	**Problem escalation, canceling projects**

Determine the *consequences* for every potential project change in specific terms, such as: cost, timing, effort, reduced deliverable value, staff morale and **motivation**, customer confidence, or other relevant factors. Also consider any risks or possible unintended consequences of each change. Especially for major changes, apply the techniques of **project plan development** to assess the implications by **forecasting project completion**.

Conservatively estimate the *expected benefits* of the change (savings from problems solved, schedules shortened, improvements to deliverables, higher efficiency, or whatever the primary intention of the change happens to be). For all discretionary changes that are proposed, be extremely skeptical of optimistic value estimates.

Decide and Communicate

Use a systematic process for **decision-making** and make a prompt *business decision* for each change. For each potential change, there are four alternatives: approval, approval with modification, deferral, and rejection. For changes that are mandatory (satisfying legal requirements, solving project-threatening problems, responding to significant external factors), the decision is usually easy: Accept the change (or abandon the project). For discretionary changes, a default decision of "reject," or at least "defer," is safest, but the net value of some changes may appear so significant that it will make sense to accept them. When this is the case, determine precisely what is necessary, verify that the

change is consistent with overall project priorities, and strip out anything superfluous before approving it.

Before final acceptance of any change that impacts the **project objective and priorities**, **negotiate project changes**. For major shifts, update your project plans and revisit **project baseline setting**. *Update all project documents* that are affected by accepted changes.

Document every change decision, including your analysis and rationale, and *communicate the results* to the requestor, your team members, and appropriate stakeholders. For all accepted changes, consider implications for **stakeholder engagement management**. Log all change decisions and store the data in your project information archive. Review your change history during **project reviews** and for post-project lessons learned analysis when **closing projects**.

Implement all approved changes promptly. An effective project change process closely resembles the "*Plan-Do-Check-Act*" cycle of quality management. Following any accepted change, monitor for expected results and any unintended consequences. For adopted changes that fail to achieve their stated objectives, either reverse them or consider additional changes.

33

Issue Management

What: Dealing with project problems and variances.
When: Throughout a project but primarily during execution.
Results: Prompt resolution of project issues.

Establish a Process for Issue Management

If you do not already have an issue—or action item—tracking process, establish one early, when making your **project infrastructure** decisions. Set up the process to deal with project problems relating to resources, timing, priority, and other matters. Get *buy-in* from your team for a disciplined process that identifies, tracks, and resolves issues promptly.

Set up your *issues log* in your **communications planning**. Make it part of your project management information system and ensure that it is easily accessible online by members of your project team and by appropriate stakeholders. Include information on each open issue in a table, spreadsheet, or web-based list, including an identifier or code associated with each issue to facilitate communications. Table 33.1 provides a sample log.

Table 33.1. A typical issue log.

ID	*Description*	*Opened*	*Due Date*	*Priority*	*Owner*	*Status*	*Comments*
41	Part shipped late	03 Jan 20xx	31 Jan 20xx	High	Frodo	Open	Expediting from alternate source

Track and Close Issues

Issues may arise anywhere in a project, in processes such as:

- **Project variance analysis**
- **Performance problem resolution**
- **Scope change control**
- **Schedule control**
- **Cost control**

- **Quality assurance or quality control**
- **Risk monitoring and control**
- **Procurement control**
- **Constraint management and plan optimization**
- **Project reviews**

Whenever a problem arises, add it *promptly* to the issue log. Work to uncover and resolve issues early, when you will be most easily able to recover through your own actions.

For each open issue, *identify an owner* by **delegating responsibility** and set a *realistic due date* for resolution.

Monitor issues as part of your **status collection** and include issue discussions in your **meetings**, **presentations**, and performance reporting. Reporting on overdue items using "Red-Yellow-Green" stoplight indicators is an effective and public way to keep the issues visible and receiving the attention they require.

Work to resolve and close issues using techniques such as **creative problem-solving**, **cause-and-effect analysis**, and **conflict resolution**.

Dealing with issues may require project shifts involving **integrated change control**. For problems that affect your project objective, the shifts may involve **stakeholder engagement management** and revisiting **project baseline setting**.

Resolving an issue within the project team is always preferable, but this may not always be possible. For issues that are overdue or that cannot be reasonably resolved within your project team, use your **problem escalation** process to engage your sponsor or someone else with sufficient authority to close the issue. Never hesitate to escalate major issues, but reserve this tactic for the most severe situations because it may interfere with your **team management**, can annoy influential stakeholders, and may result in unintended consequences that create new problems.

34

Leadership

What: Inspiring others toward a shared objective.
When: Throughout a project.
Results: Improved team motivation and enthusiasm, and higher likelihood of project success.

Establish the Foundation

Project success depends on effective leadership. Whether you are a program manager with hundreds of people reporting to you, in charge of a short project staffed by volunteers, or anything in between, you must be a leader. If this is a new role for you, plan for **transitioning to project leadership**. *Identify leadership gaps* and decide what you need to do to fill them.

While the role of "manager" can be delegated, you must earn the role of leader from the people you work with. Some of the *critical leadership skills* necessary for this can be developed through practice. Good leaders pay attention, so you must become proficient in *active listening*. In discussions with others, frequently paraphrase and verify what they have told you to ensure correct understanding and to let them know you are paying attention. Leaders have *credibility*, so strive to make your commitments clear and to deliver on what you promise. Effective leaders also display *integrity*. In your communications, ensure that you consistently say what you mean to say and that your messages are as reliable and factual as you are able to make them.

Lead the Team

Inspire people to get excited about the project. Use techniques for **influence without authority** to identify what matters to your team members. Emphasize aspects of the project that are fun and challenging, and build team **motivation** with your enthusiasm and confidence. Projects are complex and difficult. They do not get done because they are easy; they get done *because people care*.

Understand the values of your team and work to align your work methods, the **project vision** and **project objective and priorities**, and all

project communications with these *shared values*. Help people understand why the project is important through discussions, collaborative planning, and frequent reinforcement of goals and accomplishments.

Develop a *leadership style* that works for your team. Some teams work well under a decisive leader who directs the team autocratically using little input. Other teams prefer **decision-making** through unanimous group consensus. Most project teams work best when the style is primarily consensus-oriented, with shifts toward "command and control" as necessary when the team gets stuck or time is critical. In dealing with some team members, you may find it necessary to vary your style based on culture, individual preferences, or specific circumstances.

Build *trust and respect* within the team. Practice effective **team management** with all project contributors and develop personal relationships through **coaching and mentoring** your team members. Let people know when you agree with them, and in situations where you may have a difference of opinion, let them know why you disagree in an uncritical, nonthreatening way. Display team loyalty, and initially take the side of your team members in any disputes with others. When you fail to defend your team, respect for you as a leader erodes quickly.

Communicate effectively. Keep project documentation up-to-date and factual. Distribute project reports on schedule. Make time for **communicating informally** and frequently provide acknowledgment and feedback to team members on their work. Encourage each team member to provide you with constructive criticism and consider changes you could make in your **communications management** that might help your project.

Leaders succeed through others. Be generous in giving credit for accomplishments, take advantage of opportunities for **rewards and recognition**, and *foster a supportive environment* that people will enthusiastically return to for future projects.

Deal with Barriers

Guide **project plan development** and use realistic information for **project baseline setting**. Resist unnecessary change through scrupulous **scope change control** and visibly *monitor progress* throughout the project.

Practice aggressive **issue management** and act quickly to *resolve problems* while they are small. In a crisis, you may need to lead as if your authority is greater than your official position. Sometimes leadership requires acting decisively rather than waiting for permission (the "act now, apologize later" strategy). For situations you are unable to resolve, do not hesitate to use **problem escalation**.

Be persistent in dealing with project issues. If the first attempt to deal with a problem fails, try again. Successful leaders who embrace difficult assignments often face challenges where multiple failed attempts at solutions precede ultimate success. Remember that you can "lose some battles and win the war." Good leaders keep their teams focused on the overall objectives.

35

Market Research

What: Selecting and using techniques for assessing current requirements and future markets for products.
When: Project initiation and planning, with later updates as needed.
Results: Reliable information for defining project scope and for making sound decisions.

Define the Problem

Market research has many purposes, but the primary use in projects is to assess user needs in support of **requirements collection**. Review what you need to learn and document the *research questions* that you need to answer.

Prior to any new market research, review the *available information*. Check any research done for strategic planning at the organization level. Review internal information such as customer complaints, sales data, and customer requests. Also consider publicly available information from magazines, service bureaus, industry consultants, and the Internet.

Select the Method(s)

For general questions probing for motivations and alternatives, *qualitative techniques* such as **customer interviews**, focus groups, and general surveys are effective.

For testing alternatives, tracking trends, or estimating measurable criteria, *quantitative techniques* are useful; often professional services are employed to design and implement statistically valid models and controlled-experiment surveys. You can also use ergonomic testing, prototypes, mock-ups, simulations, and models to assess acceptance of new ideas.

Select techniques that will yield the information you require and develop a plan for the research. Determine who will lead the research effort and identify the skills and staffing that will be required.

Develop a *proposal* for the research and obtain approval for the time and funding required. Get agreement in advance on how the results will be used for **decision-making**.

Execute Research and Document Results

Do the research and interpret the information for use in **scope definition**. File all market research information centrally so other projects in your organization can benefit from the information.

Throughout the project, revisit the research as necessary as part of **integrated change control** and for **project reviews**.

36

Matrix Teams (Cross-Functional Teams)

What: Building and maintaining cooperation on project teams where contributors report to different managers.
When: Throughout a project.
Results: Effective teamwork among team members from diverse backgrounds.

Determine the Need for a Matrix Team

Most organizations are organized functionally, and managers are responsible for workers with similar job descriptions—marketing managers manage the marketing staff, and research and development managers are in charge of engineers. *Complex projects* generally rely on teams drawn from multiple functions.

Members of matrix project teams (also called cross-functional or multidisciplinary teams) have *more than one manager*—their functional manager and the person responsible for leading their projects. When the project manager has greater authority, the matrix is called *strong*; when functional managers have more power (the more typical case), it is a *weak* matrix.

Weak-matrix project teams generally have greater job security and ongoing programs for individual and **team development**, but their commitment to the project and **motivation** may be low. Matrix team projects are often staffed by a group of strangers, so project leaders must make the effort to establish **influence without authority** to be successful.

Build an Effective Matrix Team

Techniques for team building and effective **team management** are necessary for matrix teams, but they are not sufficient. Pay *extra attention* to:

- Strong project **sponsorship**, required whenever you need high-level intervention for **issue management**, **problem escalation**, or **conflict resolution**

- Explicit, formal commitments for time and effort from each team member's functional manager
- Clearly **delegating responsibility**, defining individual roles and showing precisely why each team member must be on the project
- A cross-functional, thorough process for **project plan development**
- A communal space (an actual "war room" or a at least a virtual website location)

Relationships on all project teams are important, but they are more difficult to establish and more quickly eroded on matrix teams. Identify and take advantage of anything that people on the team do have in common. Start with the **project objective**. Identify the reasons that a successful project is important to each team member and use this as a foundation for bringing the team together. The most effective way to quickly build a common **project vision** and trust within the team is to hold a project **start-up workshop**.

High-performing matrix teams also identify and build on *shared personal backgrounds*, such as interests, hobbies, and experiences. Find and take advantage of past working relationships, especially previous work on successful projects. Personal relationships with mutually respected colleagues may also provide useful connections.

Doing things together increases team cohesion. Small group project tasks and nonproject team-building activities (such as eating or events chosen by the team) also contribute to trust.

Create a team identity by *naming the team*. Encourage people to focus more on the project overall and less on their individual concerns.

Maintain an Effective Matrix Team

Keeping a diverse team together and motivated depends on intense *loyalty*. Natural loyalties are functional; counterbalance this through unflagging support of team members. Keep **conflict management** within the team whenever possible. Deal with situations requiring **performance problem resolution** one-on-one, involving the individual's manager only as a last resort. Although it may be challenging at times, remaining steadfastly loyal to your team can be essential to ultimate project success.

Focus on effective **communications management**. **Communicating informally** is especially important in keeping a cross-functional team motivated. **Communications planning** for cross-functional and **global teams** also requires ongoing vigilance in minimizing jargon, overly technical language, and other sources of potential confusion. Use the best **software and technical tools** to support *ongoing communication*.

On longer projects, periodically *bring the team members together*, face-to-face, for activities such as **project reviews**. Distant team members who have little or no personal contact will gradually come to mistrust each other, creating project problems.

Enhance connection to your project through frequent *personal thanks* to team members for their contributions (and to their managers, too). Use available programs for formal **rewards and recognition** to maintain team motivation.

37

Meetings

What: A structured process for planning and facilitating effective meetings.
When: Throughout a project.
Results: Accomplishment of stated objectives and willing attendance by meeting participants.

Plan the Meeting

Effective meetings require preparation. Begin by defining the *meeting objective*. Meetings can be costly, so always ensure that the expected results of your meetings are valuable enough to justify them.

Based on the meeting objective, determine:

- Agenda and topics required
- Participants needed and their roles
- Meeting logistics

Create a draft *agenda* by listing the topics that support the objective. Allow time for starting the meeting and for reviewing, if necessary, any open issues from previous meetings. Sequence the meeting topics, scheduling the highest-priority items first. Allow time at the end to close the meeting. For each *topic*, define the issue, the outcome you expect, the process, and specific roles for participants. Include the meeting day, date, starting and ending times, and location in your agenda.

Whenever possible, distribute the agenda before the meeting and ask for feedback, corrections, and additions. If the meeting requires advance preparation, allow adequate lead time.

Before each meeting, plan the *logistics*. For face-to-face meetings, reserve a room or other space that is large enough and properly equipped with any supplies you may need. Arrange for refreshments if appropriate. Prior to the meeting start, *set up the room* so that all participants can see each other, as well as any screens or other presentation aids to be used.

If the meeting will include remote participants (or everyone will be remote),

ensure that all participants have access to **software and technical tools** that are compatible and that you have scheduled in advance all equipment and facilities necessary for distant and **global team** telecommunications.

Confirm Participation

Identify the meeting *participants* who should attend: people who are critical to decisions and recommendations that must be made, people who will be affected by the outcomes of the meeting, and people with knowledge and expertise in the topics to be discussed. Effective meetings depend on involvement, so get a commitment to attend from all the people you need.

Several *roles* are essential for effective meetings. Leading an effective meeting involves two functions, *facilitation*, which focuses on the meeting processes, and *managing*, which focuses on the meeting content. Although one person can do both, it can be much more effective to use different people. This is particularly true of large, formal meetings, where a facilitator can keep things on track and serve as a "traffic director" without getting distracted by details of the discussions. Effective meetings also require a *recorder* (or scribe), responsible for capturing what happens in the meeting.

Start the Meeting

First and foremost: *Begin on time*. Waiting for late participants rewards inappropriate behavior and leads to progressively later and later starts.

When necessary, begin with *introductions*. Start the meeting with a review of the *meeting objectives* and the *agenda*. Make any necessary adjustments and post the agenda where it is visible.

Effective meetings rely on *ground rules*. Some useful meeting ground rules include:

- Attack issues, not people.
- Only one person speaks at a time.
- Unless part of the meeting, no use of mobile phones, laptops, or other distracting devices will be allowed during the meeting.
- Everyone has the obligation to be concise.
- All participants are responsible for the success of the meeting.

It is never sufficient just to state and post meeting ground rules. The meeting facilitator must also actively *enforce* them throughout the meeting.

Run the Meeting

Manage time using the agenda to track progress through the meeting. If a topic on the agenda requires more time than planned, bring it to a close and schedule follow-up in a later meeting, or get agreement to revise the agenda. Extend a meeting only rarely, and only for urgent topics.

Focus on *one issue at a time*. Whenever a relevant new issue arises, don't ignore it, but don't allow the meeting to lose focus on the primary topic. Always record each new issue on a posted "parking lot" or "bucket list" and ensure that all topics will be dealt with at a later time.

Record what occurs throughout the meeting. Keeping key points of discussion legible and visible where all participants can see them will facilitate understanding and allows even latecomers to participate without disrupting the meeting. Correct the notes whenever any speaker objects to the captured wording. Throughout the meeting, record decisions, recommendations, and conclusions.

Use **conflict management** to deal with problems that may arise during the meeting. Many conflicts can be defused by *enforcing your ground rules*. When people interrupt, criticize, or otherwise fail to observe posted rules, *confront the counterproductive behavior* immediately. If your meeting lacks a stated rule for problem behavior, consider taking a moment to adopt one. When you fail to deal promptly with inappropriate behavior, it will continue and may escalate.

For longer meetings, schedule periodic *breaks* to keep people engaged. Before each break, announce when the meeting will resume and ask for agreement to return. Always restart the meeting punctually. For meetings longer than an hour, structure the agenda so that the interactions and activities have *variety* to avoid boredom and disengagement.

Close the Meeting and Follow Up

At the end of the meeting, use **issue management** to deal with any action items, ensuring that each one is described unambiguously and has an assigned owner and a target date for completion. Determine how you are going to deal with any topics that were deferred to the "parking lot" or "bucket list." If there will be a subsequent meeting with the same group, confirm the date, time, and place, and note any topics that will be on that meeting's agenda. Take time to quickly review what has been accomplished and end each meeting positively.

Close the meeting on time or early. Chronically ending meetings late erodes **motivation**, discourages future attendance, and consumes time that could be spent doing other work. Before you leave a meeting room, take a few moments

to ensure that it is in good order. Remove used flip-charts, erase the boards, dispose of any trash, and restore the seating if you rearranged it.

Shortly after the meeting, prepare and distribute a *summary* based on the notes of the meeting to the people who attended and others who need to know what happened. Contact any team members who were unable to attend the meeting, especially if they are responsible for any action items.

After each meeting, track the *issues* and follow up on any other business left unresolved, including any items on the "parking lot" list. If there will be a subsequent meeting, begin to prepare for it.

38

Motivation

What: Enhancing project team performance.
When: Throughout a project.
Results: Enthusiastic project contributors and successful projects.

Motivate Contributors

Effective project **leadership** requires setting individual goals that people care about. Discover what people want to do and align with their wishes as much as possible when **delegating responsibility**. *Assign ownership* of the work in the project **activity definition** to team members who express interest in it and are competent to do it. Document an owner, by name, for each piece of project work. Involve the owners in **responsibility analysis**, **activity duration estimating**, **activity resource estimating**, and **cost estimating** for their tasks to reinforce their ownership and secure their buy-in.

People will be more motivated to deliver on commitments when they receive something in exchange that they desire, so use the *principle of reciprocity* to increase your **influence without authority**.

Measurement drives behavior, so establish and use diagnostic **project metrics** to support the project performance you seek. Motivating measurements are objective, nonthreatening, and used for process improvement, *not* for punishment.

Ensure that people care about each other and work effectively together through effective **team management**. *Identify roles* for individuals that draw on their strengths and align their contributions with your project's smooth operation. Understand individual values and establish team values that are compatible.

Establish a *productive environment*. Review the project plan for inefficiencies and find opportunities for **process improvement**. Replace or upgrade older equipment, and investigate and deploy the most effective methods in your **communications planning**.

Create an environment of *respect and fairness*. Praise people publicly, but handle all criticism, finding fault, or other negative feedback privately. Practice collaborative **decision-making**, and encourage participation in **project plan**

development and other analysis. Maintain open, bidirectional, and truthful **communications management**, providing people with the information needed to support project progress.

Make the overall project matter. Create a **project vision** that is compelling and that the team vigorously supports. Work together as a team to set high standards for achievement, quality, and excellence that everyone will strive for.

Enhance Motivating Factors

Use **rewards and recognition** to acknowledge individual and team performance. Tailor rewards to team preferences. Use a mix of public and private, tangible and intangible types of positive feedback in response to good performance. Never underestimate the power of intermittent *positive reinforcement*.

Frequently identify personal and group accomplishments and *thank people* individually. Give credit for significant accomplishments in project performance reporting and when it is culturally appropriate, publicly recognize people and teams for their work in organizational **presentations**.

Celebrate success. Take time after **project reviews** or at significant project milestones to get the team members together and congratulate each other. In some situations, *monetary rewards* can be motivating. Use them *infrequently*, to prevent them from becoming expected, and *privately*, so that they are not de-motivating to contributors who do not receive them.

Minimize De-Motivating Factors

Promptly deal with *team problems*. Work to detect and deal with missed individual commitments quickly through **performance problem resolution**. When you encounter disagreements, use collaborative **conflict resolution** within the team to restore cooperation. For situations beyond your control, promptly employ **problem escalation** to request help.

Work to *minimize unnecessary changes* through disciplined **integrated change control** and **scope change control**. Whenever changes do prove necessary, work with your team to reduce overhead and disruption.

Identify and *remove valueless project overhead*. Cancel unneeded **meetings** and shorten meetings that are too long. Stop preparing reports that no one reads and remove activities from the project that are not necessary. Locate and eliminate any other needless project effort.

39

Multiple Dependent Projects

What: Planning projects responsible for independently developed components that are part of a large, complex system.
When: Project planning and execution.
Results: Proactive identification and resolution of project interdependencies and successful management of complex programs.

Decompose and Define the Program

Very large, complex projects depend on project management principles, but beyond a certain scale success also requires *program management processes*. Successful program planning begins with overall **scope planning** and aligning business strategies with **requirements collection** from users. To manage complexity, very large programs begin by decomposing the work required into a hierarchy of independent but interrelated projects, arranged in levels similar to those in a project **work breakdown structure**. Methods used for program decomposition vary with program type, but they involve techniques including systems analysis, software architecture, concurrent engineering, and simultaneous development.

Much of this program-level planning may be completed by high-level stakeholders who initiate strategic analysis and engage program **sponsorship** well before any project leaders or contributors become involved. Once the *logical program structure* is defined, however, the next steps involve identifying the program staff, starting with a program manager who will assume responsibility for the program as a whole.

The program manager defines *program staffing*, starting with leaders for all defined projects and any intermediate levels that make up the program hierarchy, **delegating responsibility** for planning and managing the work that makes up the program. Additional program staff reporting directly to the program manager may be required for program-level planning, tracking, managing escalations, reporting, and other **project office** functions. The program manager needs a staff with skills in high-end **software and technical tools**, facility exerting **influence without authority**, a tolerance for ambiguity, and competence with complex **communications planning**, **communica-**

tions management, and **communications control**. Ensure that all program staff members are capable of managing their parts of a program of this size.

Get the program off to a *fast start* by conducting one or more program **start-up workshops**. Introduce the overall program objectives and clearly define contributions to the overall goals and the role to be played by each project team.

Plan the Component Projects

The next step in the planning process is **project plan development** for all of the lowest-level projects in the program hierarchy. Using the program objectives and constraints, each project team creates a thorough *bottom-up project plan*.

Because the projects are all interrelated, workflow for **activity sequencing** may link activities in different projects. When planning each project, identify all *required inputs* coming from outside the project that could interfere with progress.

Document all your *external input dependencies* as program *interfaces*. You are the "customer" who needs an input, so begin a dialog with the leader of the related "supplier" project that you expect to produce it. Figure 39.1 shows this relationship.

Work to *resolve interface* commitments by securing agreement with the leader of the project that you will depend on to provide what you need. Focus interface discussions on completion criteria and obtain an output description for your required input consistent with your requirements. Even if the other project is within your organization, treat interface agreements as though they were formal contracts. For all program interfaces, document an agreement between a supplier and at least one customer, including deliverable

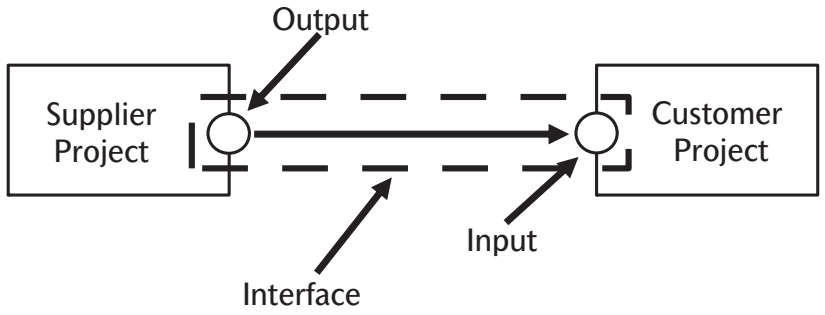

Figure 39.1. A program interface.

descriptions and early schedule dates based on each project's **schedule development** work.

Although the program management staff has ultimate responsibility for overall *interface management* (coordinating the discussions, escalating and resolving disagreements, locating outputs to match up with unresolved inputs, and formally documenting all program interfaces), project leaders need to ensure all their interfaces, especially inputs, are credible.

Integrate Plans

If there are any unpaired inputs (or outputs) remaining, work to resolve them. After verifying the need for each input, work to resolve it by:

- Identifying an appropriate supplier project and securing agreement
- Locating an acceptable substitute from an alternate source
- Planning to integrate necessary activities into the project(s) requiring the input

Similarly, locate customers for all unpaired outputs or, if not required, drop all the related activities. Overall, work at the project level to gain acceptance of interface descriptions acceptable to all involved parties.

If the identified interfaces seem *excessively numerous*, revisit the initial program decomposition to look for a program structure having greater project independence. Managing too many interfaces is risky, can be chaotic, and requires significant effort.

Create a *program timeline* using data from the interface agreements to show project interconnections. Use summary activities to represent project work (without details) and identify dependencies wherever inputs and outputs link the work connecting two or more projects. Inspect the program workflow and identify any execution gaps that may open up in project schedules.

An initial program timeline rarely meets program timing objectives, and it may also reveal resource overcommitments, staffing conflicts, budget problems, or other issues. The program staff and project leaders must work together to develop *alternative project-level plans* using **constraint management and plan optimization** techniques to resolve the program issues. More than one planning iteration may be necessary, especially when working with a hierarchy of projects. Work to improve the program schedule by adjusting project timing and **human resource planning** in the project plans. Not all program-level problems can be resolved through replanning; some may require changes to the initial overall program objectives.

Once the overall plans are acceptable to the program sponsor and stakeholders, *document the program baseline* plan.

Track and Manage the Program

Manage **project plan execution** for each lowest-level project in the program. At the program level, *track all interface variances*, **issue management** affecting several projects, and program-level **problem escalations**.

Periodically conduct program and **project reviews** to *revalidate plans* and interface management, especially for long duration programs.

40

Multiple Independent Projects

What: Managing unrelated projects that depend on shared resources.
When: Project planning.
Results: Predictable execution of a collection of projects and resource planning data consistent with organizational staffing constraints.

Prioritize the Set of Projects

Taking on too many projects is a common *portfolio management* problem. Ideas for good projects often exceed staffing limitations, and attempting to initiate all of them is a formula for chaos, poor **team management**, and low **motivation**. Successfully bringing projects to closure requires disciplined attention to detail and concentration on the critical few.

Use a systematic **decision-making** process to *rank order* all projects under consideration, based on factors such as the value of the deliverables, urgency, overall importance, strategic contribution, cost, length, or other considerations. (If the initial list of projects is lengthy, rank order them before developing any detailed plans or cost estimates. Focus on creating resource-loaded schedules only for the top projects—the ones that you believe can be adequately staffed.)

List all projects under consideration in sequence, from the highest priority to the lowest.

Plan *Each* Project

Focus on *each high-priority project individually*. Set a **project objective and priorities** and do **project plan development** for each project. Complete **activity duration estimating** and **schedule development** for each one using consistent units of measure to simplify resource analysis.

Develop resource-loaded schedules for each project based on **activity resource estimating** and **cost estimating**. Develop a week-by-week *resource profile*, similar to those used for **resource leveling**. Prepare staffing requirement summaries for the individual projects, both in total and by skill

set. Accumulate your data in resource histograms using **software and technical tools for project management** or capture the weekly summaries in a spreadsheet or table.

Develop a second set of week-by-week resource profiles identifying all available *committed project resources* (overall and by skill set) that is consistent with your project effort profiles. Incorporate all holidays, scheduled time off, and other personal time conflicts and commitments in your availability profiles.

Roll Up Resource Requirements into an Overall Resource Plan

Starting with the highest-priority project, assign available staff to project activities and summarize the effort profile in a *master resource plan* using a scheduling tool or spreadsheet.

Continue allocating staff to lower-priority projects in sequence, until you encounter a project that causes the master resource plan to exceed your available resource profile, either overall or for a specific type of contributor. Complete the process by considering smaller projects with slightly lower priorities (if there are any) that might be staffed using remaining resources. Although it is tempting to fully book all staff, it is prudent to leave some capacity uncommitted (10 percent is typical) as a reserve to deal with unforeseen work and for managing risk.

Adjust Project Objectives

Set the baselines of the highest-priority projects and prepare for **project plan execution**.

Begin **negotiating project changes** for the remaining projects, based on your resource analysis. Investigate:

- *Accelerating the high-priority listed projects* using any uncommitted resources in the master resource profile
- *Obtaining additional staff* through **human resource planning** to meet the timing and scope objectives of some additional projects on the list
- *Extending the deadlines* for the remaining projects, consistent with staff availability following completion of higher-priority work
- *Reducing the scope* for some of the remaining projects to allow them to proceed
- Using **procurement planning** and **procurement contracting** to increase staffing through *outsourcing*

- *Replanning the work* on lower-priority projects to reduce resource requirements
- *Delaying activities on higher priority projects within schedule float* to increase available resources
- *Increasing productivity* through **process improvement**, training, automation, equipment replacement, software upgrades, or other means
- *Scheduling small amounts of overtime*, but only as a last resort

Monitor Progress and Manage Resources

Initiate all top-priority projects that have sufficient committed staffing, and communicate the need to defer each lower-priority project based on a lack of available resources. Make your resource allocation decisions visible and use **stakeholder engagement management** to ensure that sponsors, team members, and others understand and accept the scheduling decisions.

Track project work for each project and work to protect staff and resources needed for the highest-priority projects.

Manage changes through **integrated change control** and ensure that the priorities of scheduled work are kept current.

Update your resource profiles and list of currently executing projects periodically and during **project reviews** to reflect staffing changes, new project requests, and completed projects.

41

Negotiating Contracts

What: Establishing a formal agreement that leaves all involved parties better off than they would be without the agreement.
When: Project initiation and planning.
Results: Documentation of unambiguous, explicit commitments and a signed agreement that represents value to all parties.

Note: While this process is described from the point of view of an acquirer of contract services, the same considerations are relevant when contracting to provide services.

Prepare

In the course of **procurement planning** and **procurement contracting**, learn what you can about the *other party*. Brainstorm their viewpoints and perspectives. Determine who can make commitments for the other party, and always negotiate directly with these decision-makers (or with people they empower).

Document your most important *negotiation objectives*. Identify significant interests, such as completing the statement of work (SOW), cost, or other priorities. Define the worst results (such as the highest price or longest schedule) that you can accept. Use your "Best Alternative to a Negotiated Agreement" (BATNA) to define this limit. Be prepared to walk away from a negotiation that fails to meet your minimum requirements.

Develop a negotiation *strategy*. Include the objectives, prioritized interests, the predefined limits, and criteria for decision-making. If you lack negotiation experience, seek help from legal, procurement, human resources, or purchasing specialists. Know your own authority, and stay within your negotiating limits.

Before negotiating, *rehearse* your approach. Have someone else role-play the other party and critique you to improve your negotiation techniques.

Conduct Negotiations

Establish a negotiation *deadline* consistent with the needs of your project and stick to it.

Establish a good *working relationship* with the other party. Communicate honestly and clearly during negotiations. Use facts, data, and metrics to make your points. Clarify your understanding by frequently asking questions and actively listening to what the other party says. Maintain objectivity in lengthy negotiations by scheduling periodic breaks.

You will need to work with the other party after reaching agreement, so begin to *build trust* during the negotiations. Seek common ground in areas such as interests, experiences, education, or background.

Learn what matters to the other party and relate your discussions directly to these priorities. Conduct *principled negotiations* concentrating on the matters that you and the other party most care about. Avoid taking positions that will lead to deadlock. Probe for underlying interests ("Can you help me understand why that is important to you?") when the other party proposes a one-sided solution. When discussions become emotional, acknowledge the situation and then resume using data, or take a break to allow everyone to cool off.

As the negotiation continues, acknowledge areas of agreement and focus your discussions on any remaining differences. If the negotiations stall, use **brainstorming** and **creative problem-solving** to generate possible *alternatives*. Discuss them with an open mind and work to resolve the most significant issues first. If it becomes obvious that there can be no mutual agreement meeting your criteria, terminate the negotiation.

Reserve final agreement until all the issues are resolved, but *document specifics* of deliverables, completion criteria, costs, timeliness, penalties, and other important criteria as you proceed. For each deliverable, ensure that specifications, ownership, and timing are clear and explicit. Discuss all acceptance and testing criteria and establish unambiguous procedures for **scope change control**. Negotiate terms that support your project; align any payments, incentives, or penalties with delivery of specific results.

Close Negotiations

Once you reach an acceptable *final agreement*, document it in writing using plain language. Whenever possible, use a standard format or preprinted form to capture the essential points of your agreement.

Acknowledge the accomplishment and thank the other party.

Finalize and Implement

Complete the agreement by obtaining *authorized signatures* from individuals representing each party. Process necessary paperwork and begin **procurement control**.

42

Negotiating Project Changes

What: Using bottom-up project planning data to gain support for necessary changes in project objectives.
When: Project planning and execution.
Results: Modified expectations for the project that are consistent with a credible plan.

Assemble Your Data

The results of your **project plan development** may fail to support the **project objective and priorities**, even after your best efforts at **managing constraints and plan optimization**. When this happens, *assemble factual data* from your bottom-up planning process and prepare to negotiate project changes with your project sponsor. Include:

- A high-level *plan summary* with a milestone project schedule
- The **work breakdown structure**
- A *Gantt chart* or other schedule showing project timing based on **activity duration estimating** and **schedule development**
- *Resource and budget summaries* from **activity resource estimating**, **cost estimating**, and **cost budgeting**
- One or more *proposals for alternative projects*

Build a case demonstrating that the initial project objective is *infeasible* using your planning data. Gaining agreement for necessary project changes requires fact-based, principled negotiation. Sponsors have more power and authority than project leaders and may easily dismiss arguments based only on your concerns or opinions. Plausible project data will increase your **influence without authority** and help your negotiations.

Prepare

Develop your *negotiation objective*. Determine and document what you wish to accomplish from the negotiation. If your project will require more time, or more resources, build a good business case to support your request. If changes to the project deliverable are necessary, show why, and be able to

demonstrate the value of the modified result. Develop project alternatives that provide for mutual gain, such as exploring opportunities that add value to the original project request, or segmenting the project into a sequence of smaller projects that might deliver earlier benefits. Prepare a compelling **presentation** to support your proposals, using unambiguous, nontechnical language. Successful negotiation also requires **consensus-building for your ideas**, so develop responses for possible objections to your proposals.

Before setting up a meeting with your sponsor, *rehearse* what you will say. Ask a team member to pretend to be your sponsor and go through your case for change. Seek criticism and use it to improve your negotiation approach.

Negotiate

Confirm your **sponsorship** and schedule a **meeting** with your project sponsor to *discuss your plans* and possible alternatives.

Begin your discussions by showing with your *planning results* why you will be unable to achieve the target project goals. Begin with your planning summary and support it with additional detail as necessary.

Present your *best alternative*, along with any other good options you developed. Encourage questions and discussion of alternatives, and support your proposals using historical, documented project data.

Strive for *"win-win" negotiations*, where both you and your sponsor get a good result. In project negotiations where only the sponsor "wins," everyone loses. When a project objective is not feasible, you and your project contributors lose because you will all be stuck on a doomed project, and sponsors and project stakeholders lose too, because they will not get what they want.

Use your planning alternatives to guide discussions toward *problem-solving* and sound **decision-making**; get everyone involved in seeking better options. Focus negotiations on resolving project issues. Work to shift the project objective into alignment with a realistic plan.

Close the Negotiation

Request agreement for a project objective that you can execute using a credible plan. Following agreement, use your plan for **project baseline setting**.

If a realistic analysis of your best project plan leads to recognition that the project is a bad idea, *take it no further*. **Canceling projects** that are sure to fail as early as possible is better for everyone.

If your presentation fails to convince your sponsor or falls on deaf ears, you might be forced into an *unrealistic project*. If so, document the situation for future reference and then do your best while you continue to seek alternatives.

43

Organizational Change

What: Modifying how people do their work.
When: Whenever necessary.
Results: Support for a needed process change with minimal resistance and prompt adoption.

Document the Need

When **project metrics** reveal an *ineffective process* (as part of **project variance analysis**, **issue management**, **quality control**, **project reviews**, or lessons learned from **closing projects**), use **process improvement** techniques to develop a better method and to document a new standard operating procedure.

Unless the new process is completely automated, developing a new process is never the whole job; you must also provide **leadership** to *gain acceptance* for the new way of working and persuade people to switch from their old processes.

Define Roles

Successful change in an organization depends on a number of roles:

- *Advocates*. Project leaders often advocate for project process changes. As an advocate, you recognize a need for change, develop a business case, and use **consensus-building for your ideas** to gain **sponsorship** and support.
- *Sponsors*. Project changes are generally sponsored by managers of project leaders, after advocates demonstrate the desirability and need for the change.
- *Agents*. Change agents manage projects that develop and introduce the new process.
- *Targets*. The individuals affected by the change need to be persuaded to modify how they work.

Plan for Change

You should develop a plan for implementing the change, including four key elements (see Figure 43.1):

- Outline *sponsor* responsibilities and get commitments for sending memos, leading meetings, and other contributions.
- Develop *metrics* that define the initial process baseline and can be used to demonstrate the benefits of the new process.
- Describe *success stories* from earlier, similar efforts (such as a pilot) to convince the people who are the target of the change to cooperate.
- Prepare the target users for the change through *training* and involve them in planning for the change.

Identify sources of potential *resistance to change* and use force field and **cause-and-effect analysis** to develop plans to minimize procrastination and malicious compliance.

Get funding for the communication, training, and other costs of the transition and set realistic expectations for the rate of change. Significant changes may take six months or longer to integrate fully into normal operations.

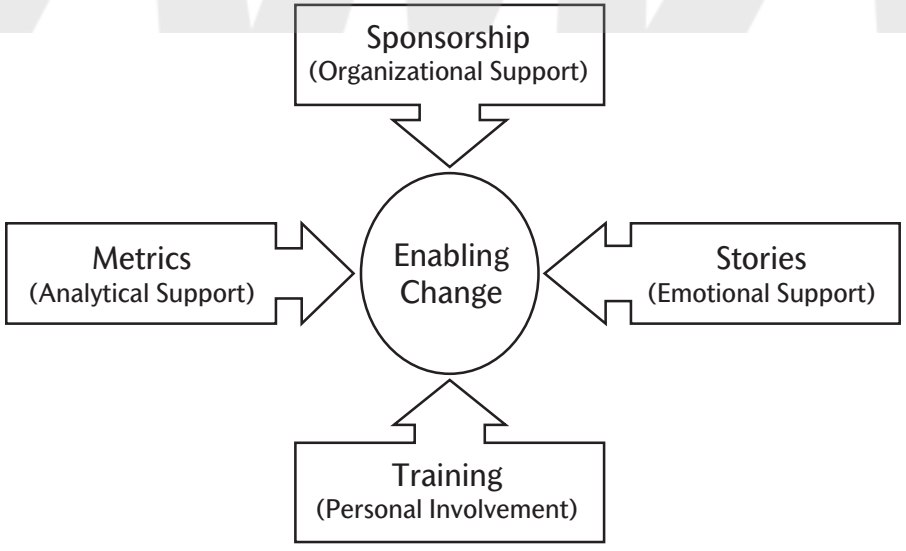

Figure 43.1. Elements enabling organizational change.

Implement the Change

Persuade the people affected of the benefits of change. Clearly demonstrate "What's in it for me" from their perspective. Build **motivation** for the change.

Use *metrics* to measure the initial results of the change. If the diagnostic **project metrics** fall short of expectations, or significant unintended consequences develop, initiate further improvements or restore the old process.

Reinforce cooperation and successful change. Use **rewards and recognition** to acknowledge target users who embrace change. Develop additional success stories using positive experiences to support later phases and to improve change acceptance by people who lag behind.

Continue efforts throughout the transition, until process measurements indicate that you have achieved your objective. At the conclusion of the change effort or when **closing projects**, analyze the project lessons learned and make recommendations that will *improve* future change efforts.

44

Organizing for Project Management

What: Defining and implementing the foundation for effective project management.
When: Prior to the project and during project initiation.
Results: An environment for successful projects.

Establish Support for Project Management

Maximizing the effectiveness of project management processes requires a combination of organizational will and well-defined, consistent methods. If your environment lacks elements outlined here, conspire to establish them. Some attributes of high-performing project management organizations are:

- An effective *project manager selection process*. There are few "accidental" project managers in these organizations, because they appoint project leaders based on knowledge of what successfully **transitioning to project leadership** requires.
- *Ongoing support and interest by higher-level managers* (but *not* day-to-day involvement). Strong **sponsorship** of projects is crucial in avoiding the problems of "too many projects," "decision delays," and "resource erosion." Sponsors who initiate projects and then lose interest in them set them up to fail.
- Readily available *project management training*, mentoring, and support. Competent project management develops more quickly in these organizations.
- *Project-oriented recognition programs*. **Rewards and recognition** are structured to encourage effective **team management** and cooperation, not individual acts of heroism.

Encourage Use of Project Management Methods

Well-defined *methods and processes* for project management are also essential. The method that you choose matters less than that you document, adopt, and

consistently use a process that supports thorough **project plan development** and competent **project plan execution**.

Project processes are necessary but may not be sufficient. The *other methods*, **project life cycles**, and development techniques used must align and support your project processes. If your latest fad for software application development is based on the concept that thinking and planning represent unnecessary overhead, projects will fail.

Work to adopt standard **software and technical tools for project management** across the organization, encouraging individuals to develop expertise and share their knowledge through mentoring. Enhance the *utility of tools* you adopt by developing shared, pre-populated planning templates, including activity information common to most projects.

Project metrics, stored in an organization-wide *project management information system*, also contribute to project excellence. Databases containing historical durations and costs, past problems and issues, and **risk identification** are all valuable intellectual assets.

A final ingredient for maximizing project success is a process to directly align **project objective and priorities** with *organizational strategies*. Formal coupling of projects to visible, high-level objectives will protect resources, ensure priority, and remove barriers—significantly improving the chances of project success.

45

Performance Problem Resolution

What: Promptly recognizing unmet individual goals and resolving them.
When: Project execution.
Results: Consistent delivery on commitments while maintaining individuals' motivation and self-esteem.

Identify Problem Situations and Probable Causes

When you learn that an individual goal has been *missed* or is in jeopardy through project **status collection**, **communicating informally**, or other interactions, clearly identify the problem and summarize expected consequences for the project (in schedule slippage, budget overrun, or other adverse results). Use **cause-and-effect analysis** to uncover the possible root causes. Some possibilities are:

- Ownership was not made clear when **delegating responsibility**.
- The individual lacks knowledge, skill, or aptitude for the work assigned.
- The individual has more work to do than can be accomplished.
- There are insufficient resources to complete the work.
- The work is dependent on an input or information that is late or inadequate.
- The individual is from another organization, where the priority of the work and commitment is low.
- There are no **rewards or recognition** tied to achieving the goal.
- There are no defined **project metrics** associated with the activity.

Confront the Problem

Meet, face-to-face if possible, with the individual to discuss the situation. Reconfirm the commitment to the goal, reviewing the expected results, timing, and other specifics. Outline the consequences of missing the commitment, emphasizing those that personally affect your individual contributor.

Discuss the *cause of the problem*. Start by allowing your team member to describe the reasons in his or her own words. Probe for the root cause, not just some surface rationalization.

Develop *possible solutions*, again beginning with suggestions from the individual. Seek solutions that align with the root cause, such as: **team development** though training or **coaching and mentoring** to address a skill gap, or outside help to correct a delayed input or resource shortage that is outside your control. After your contributor has had an opportunity to suggest a path forward, offer your own suggestions.

Agree on Next Steps

Select an option that will solve the problem (or at least mitigate it) and document the response.

Get the individual's agreement and *commitment* to follow through and express your confidence in his or her ability to deliver. Revise the specifics of any affected goals and update your project plans as necessary. Integrate actions affecting the project into **issue management**. For team members who are contractors, make resolution part of your **procurement control**.

Implement and Track

Track progress toward recovery of the goals.

Explicitly *recognize improvements* by thanking the individual (and his or her manager, if it is not you) for improved performance.

If problems persist, meet again. If several cycles yield no improvement, consider alternative ways to meet your project's requirements, or, as a last resort, engage your project sponsor or management in **problem escalation**.

46

Presentations

What: Organizing, summarizing, and formally presenting project information.
When: Throughout the project.
Results: Broad awareness of project progress, accomplishments, issues, and future plans.

Define

Clearly outline the *purpose* of your presentation. State your objective for the **meeting** and the reasons why the presentation is necessary. Some presentation objectives include **project review** summaries, **problem escalation**, **project life cycle** transitions, and other project reporting.

Identify *who will be attending* the presentation and determine what about your project matters most to them. Document issues and questions that they are likely to want addressed. Invite them, and confirm their attendance.

Schedule the presentation at a time that is convenient for the attendees. Decide how you will provide information in the presentation: projected slides, prepared posters or charts, materials shared via network, handouts, or other media. Reserve a place for the meeting (or for a distributed audience, the network and telecommunications facilities).

Prepare

Set an *agenda* for the presentation, including introductory material, specific content covering all relevant topics, time for questions, discussion, and closure. Start by telling your attendees what you will tell them, tell them, and end by telling them what you told them.

Organize your project information in a logical sequence. If the information is detailed and complex, analyze it and work to summarize the content using graphs, tables, and bulleted lists. Keep lists and presentation slides simple—four or five concise bullet points maximum, using large-size lettering. Add interest to presentations by using relevant figures, pictures, and some color, but don't overwhelm your message with clip art or distracting animations. Prepare a supplementary handout if you have complicated information to cover.

Develop an introduction for your presentation that focuses the group's attention. To start, consider "breaking the ice" with an appropriate humorous story or a thought-provoking question.

Edit your presentation, fixing errors and clarifying confusing text. Prepare no more than about one presentation slide for every five minutes and keep the overall length to a minimum. Leave at least ten minutes of planned time in the presentation for questions and discussion.

If you need any markers, sticky notes, paper, or other *supplies*, get them in advance or ensure that the meeting place is well stocked with what you need.

Rehearse

Practice your presentation in advance for at least one other person. Work on smoothly saying what you need to say to support your presentation materials, providing explanations and transitions *without reading the text verbatim*. If you prepare a script, use it only as guidance. Practice saying your message naturally, the way you normally speak.

Get feedback on your *body language*. Your speech patterns, gestures, and attitudes convey much of your message. Work on maintaining a positive, friendly demeanor and keep eye contact with the people attending the presentation. If you plan to demonstrate something or do anything complicated during your presentation, practice until you can do it without having to consciously think about it.

Make adjustments to your presentation based on the feedback you receive.

Deliver

Arrive early and *begin on time*. As people arrive, greet them and thank them for attending. After you open your presentation with an introduction, review your agenda.

Present your content confidently and efficiently, pausing for questions as appropriate. Move around during the presentation and vary your delivery to avoid monotony. Even if you are presenting remotely, smile—it can be heard in your voice. Ask questions every few minutes that relate to your presentation to keep people engaged. Resist becoming defensive or emotional in reaction to what people say or ask; use humor and factual data to restore order.

Close with a *summary* of what you have said. Capture any open issues or questions that came up and commit to responding promptly. Thank everyone for attending and end the presentation on time.

47

Problem Escalation

What: Delegating responsibility upward for resolution of decisions, problems, issues, and conflicts.
When: Throughout a project.
Results: Timely resolution of situations impeding a project that are beyond your control.

Establish the Escalation Process

Develop a process for problem escalation consistent with your organizational policies, expected project requirements, and **project infrastructure**. Identify when to use the process, expectations for timing, and who will be responsible for responding to escalation requests. *Document* the process in clear language.

Confirm your **sponsorship** and get explicit *commitment* for the process during **project initiation** from your sponsor, key stakeholders, and any others who may be involved in escalation responses. Reconfirm commitment to the process periodically and during **project reviews**.

Escalate as a Last Resort

Attempt resolution using *other options* first, such as:

- **Issue management**
- **Creative problem-solving**
- **Performance problem resolution**
- **Conflict resolution**
- **Influence without authority**
- **Decision-making**
- **Constraint management and plan optimization**

If a problem persists even after your team's best efforts at resolution, prepare a written summary of the situation. Include the results of all your attempts to deal with it.

Outline *possible approaches* for solutions that could be considered by others with more authority, including even those that you may not necessarily favor.

Quantify the costs and other consequences of these alternatives to the best of your ability. Also quantify any consequences of failing to resolve the problem promptly. When necessary, prepare for **negotiating project changes**.

Present the information to your sponsor (or other appropriate decision-makers in your organization). Define a due date for a response and get an explicit ownership commitment from the decision-makers.

Follow up, and be persistent when necessary to obtain a timely response.

Implement the Response

Implement the decision made, managing any major project shifts using **integrated change control**. Do your best to minimize adverse project costs or consequences and communicate any impact through **stakeholder engagement management**. If necessary, work to repair any bruised relationships. When escalations result in resolutions requiring changes to the **project objectives and priorities**, revisit **project baseline setting**.

Track the status of the escalation as an action item in your project reporting and explicitly assign it to the decision-maker. Continue tracking until resolution. If there is delay, report the status and *name names*.

48

Process Improvement

What: Identifying and developing beneficial changes in processes used to do recurring work.
When: Throughout a project.
Results: More effective, efficient work methods.

Plan

Identify a poorly performing process (for example, through **issue management**, **project variance analysis**, **quality control**, **quality assurance**, project reporting, **project reviews**, or lessons learned from **closing projects**). List the problems and defects of the process. Discuss the situation within your team and with others who may be affected. *Gain support* for a process change effort through **consensus-building for your ideas**.

Treat all process improvement efforts as projects, **delegating responsibility** to an owner who will manage it. Plan the project, defining the time, staffing, and other resources necessary to resolve the process problem. Set a deadline and quantify the improvement target. Verify **sponsorship** and *commitment* to do the work required.

Document the Process Baseline

Describe the *"as-is" process* using a system flowchart map or a detailed description of the present standard operating procedure (SOP). List the inputs and outputs for the process and the circumstances that trigger its execution. Use **cause-and-effect analysis** to identify the root causes of problems with the current process.

Gather data on the current process through interviews, project **status collection**, **project metrics**, observations, and trend analysis. Document the *measurement baseline* for the current situation and validate your quantified performance improvement goals against it.

Develop Changes

Analyze the "as-is" process and develop *options for a new process*:

- Inspect the process for work that adds little or no value.
- Identify decisions and branches in the process that are unnecessary or too late in the process.
- Find opportunities to reduce or eliminate rework.
- Consider automating repetitive process steps.
- Refine inputs or process steps to minimize effort or complexity.
- Devise ways to reduce or eliminate process loops.
- Identify methods to increase process flexibility.

List the options you found and select the most promising ideas. Describe a *"to-be" process* that incorporates these changes.

Present the new process to your stakeholders and get *approval* to proceed with replacement of the old process. Apply **integrated change control** principles.

Implement

Document a new SOP, using system flowcharting and written descriptions. Create any reference documentation, training, or other supporting materials needed. Develop a clear description of the benefits and objectives for all those affected.

Introduce the new process using effective **organizational change** practices and put the new process into effect.

Measure Results

Measure the results obtained using the new process and compare them with the original process baseline and your improvement goals. If the goals have been met and there are no significant unintended consequences, communicate your results and close the project.

The changes made may fail to meet your goals or your new process may even display harmful consequences. If so, revert to the old process, fix the process through additional changes, or initiate a new process improvement project.

49

Procurement Close-Out (PMBOK® Guide 12.4)

What: Verifying successful performance at the conclusion of outsourced work, completion of documentation, and closure of the contract.
When: Project execution or closure.
Results: Receipt of all contract deliverables, payment of final invoices, and termination of the contract.

Verify Completion

At the completion of contracted work, review your **procurement control** and compare the results achieved with the contract requirements (and any approved changes). Validate satisfactory achievement of each *specified requirement* though **scope verification**.

Work with the supplier to resolve any *significant issues or variances*, successfully completing all contract requirements. If your supplier is unable to complete some portions of the work, determine the consequences in terms of payments, penalties, or other actions.

If early *contract termination* becomes necessary, because of **canceling projects** or other circumstances, do it using the terms set out in the contract. Document all the completed work and determine the financial and other consequences of early termination.

Make Final Payment

Review the contract terms and the contract payment history. Approve prompt payment of the *final invoice*, consistent with all financial obligations remaining on the contract.

Close the Contract

Evaluate the performance of the supplier and document it for your lessons learned analysis. Be particularly thorough whenever contracted work ends substantially before **closing projects**.

File all contract communication, accounting reports, status and other project information, change history, and other relevant *documents* in your project management information system for use on future similar projects.

50

Procurement Contracting (PMBOK® Guide 12.2)

What: Determining and using the process for outsourcing project work and establishing a contractual commitment.
When: Project initiation and planning.
Results: A satisfactory signed contract consistent with project requirements.

Define the Proposal Process

Most outsourced work relies on evaluation of submissions from potential suppliers. Whether they are called *proposals*, bids, quotations, or something else, you must carefully define both the information that the responders will require and what you expect them to submit.

Review your **cost planning** and the *statement of work* (SOW) from **procurement planning** describing the work you intend to outsource. Include any performance or measurement requirements, acceptance and testing criteria, interface specifications, standards to follow, deadlines, significant constraints, and any other essential information.

Document all the information you require in a proposal, being as clear and specific as possible. Include requirements for:

- The details of a proposed solution
- All fees and pricing information
- Delivery dates
- Staffing and expertise
- Equipment and facility capabilities (if relevant)
- Related experience and references

Define an objective basis for **decision-making**. Verify supplier *selection criteria*, such as cost, experience, and reputation. Prioritize the decision criteria and quantify how you plan to evaluate each criterion in the submitted proposals.

Identify who will *evaluate* the proposals and who will make the final decision. Document the evaluation process and get support to proceed from the decision-makers.

Write an RFP

Collect all the information that potential suppliers will need into a comprehensive *request for proposal* (RFP). Some other names for a solicitation document include "invitation to bid" or "request for quotation." Whatever it is called, include:

- The due date for proposal submission and your schedule for a decision
- An SOW consistent with your **scope definition** and project timing
- Specific information required in a complete proposal
- Contact information for any questions or related communication
- Presentations, bidder conferences, or other meetings (if any)

In preparing an RFP, take full advantage of any guidelines, procedures, forms, or other available reference materials. Before finalizing the document, *have it reviewed* by legal, purchasing, personnel, procurement, or other specialists in your organization who have expertise in outsourcing to ensure that it is consistent with organizational and other requirements and regulations.

Identify Potential Suppliers and Distribute the RFP

Determine potential suppliers who would be interested in your work and capable of following through. Review lists of known suppliers, looking for those with successful past experience. *List the potential responders*, including names of individuals whenever you know who they are.

Send the *request for proposal* to the potential suppliers you have identified. Ideally, you should send out a sufficient number to ensure three or more responses. Allow enough time between receipt of the RFP and the proposal due date to permit a comprehensive response. Follow up to confirm RFP delivery.

Manage the Bidding Process

Encourage *communication*. Ask for questions and clarify anything in the RFP that is confusing. Reply promptly to all inquiries and provide copies of the questions and your responses to all prospective bidders. Approximately one week before proposals are due, send a *reminder* to each potential supplier.

As proposals arrive, check them quickly for completeness and formally *acknowledge receipt* to the bidders. If proposals arrive late, determine how you will deal with them and communicate the status to the bidders.

Log in each submission received. Review each one to determine that it is *complete and consistent* with the requirements of your RFP. If necessary, request additional or clarifying information for any proposals that have minor defects. *Screen out* any proposals that fail to meet your minimum RFP requirements. If you do not have a sufficient number of complete proposals (ideally, three or more), determine how to proceed. Possible options include:

- Evaluating what you do have
- Extending the time to solicit more responses
- Deciding not to outsource the work

Evaluate the Proposals and Contact the Finalist(s)

If you get a large number of proposals, read through them quickly and select the most credible three to six.

Follow up on *references* your potential suppliers provided and evaluate any work samples they submitted with their proposals. Use the quality of the proposal itself to judge the thoroughness and care the bidders bring to their work. Document any personal experience you have with each bidder.

Use a systematic decision-making process to sequence the proposals, and *thoroughly analyze* each submission. Determine how well each meets your established evaluation criteria and rank order the proposals.

Before finalizing the selection, contact each bidder you are considering to *discuss the details* of the proposal with at least one person who would be involved with the work. Use the discussion to assess whether you will be able to establish an effective working relationship and to ensure that the bidder understands what is required.

Negotiate and Sign the Contract

Pick the proposal that best meets your needs and finalize the selection by involving individuals who are empowered to enter into a binding legal agreement.

Negotiating contracts (or other agreements) for projects requires setting *terms and conditions* aligned with project work. Include processes for contract amendment and for possible early termination. Also incorporate incentives and penalties based on performance when necessary and use preestablished contracting forms whenever possible to comply with your organization's standards and to simplify and shorten the approval process.

Verify that the contract contains an unambiguous SOW that defines all milestones and metrics and includes a clear change management process. If the contract does not set a fixed price, set a "not-to-exceed" limit that will trigger reexamination of the contract and guard against runaway costs.

Before signing any contract, thoroughly discuss the terms and conditions to ensure that all parties have a clear and consistent understanding of what the contract states. *Sign the contract* and put it into force. Use the contract for **procurement control**.

51

Procurement Control (PMBOK® Guide 12.3)

What: Managing outsourced work and supplier relationships based on an existing contract.
When: Project execution.
Results: Two-way open communications, appropriate and timely deliverables, management of changes, and prompt payment for services.

Manage the Relationship

Establish a *contract liaison* for each supplier relationship initiated through **procurement contracting**. Either do this by taking it on yourself or by **delegating responsibility** to some member of your project team. A liaison's initial duty is to discuss the contract thoroughly with the primary contact for the other party to ensure that everyone understands the contract terms. In addition, he or she will be responsible for routine **communications management**, payment matters, managing any changes, issue tracking, and solving problems related to the contract.

Periodically, especially following any changes to the contract or staffing, *review* the terms and conditions in the contract.

Work to build **motivation** on the staff for outsourced work. Recognize people by thanking them for their efforts and praising good results. Strive to assign work required to *individuals who care* about it, and make ownership of tasks explicit.

Communicate

Be rigorous about **status collection** for outsourced work. Request written progress updates at least once per week. Find ways to *verify progress*: Participate in inspections, walk-throughs, interim tests, and other reviews. Schedule well-defined milestones with explicit deliverables frequently in contracted work, especially when using new suppliers. Make outsourced work as visible as possible. Maintain a record of all formal communication with suppliers in your project archives.

In addition to status communications, schedule a *general discussion* meeting with suppliers at least once a month, face-to-face if possible. **Communicating informally** is also necessary; keep the channels of communications open and work to maintain trust and a good, honest working relationship.

Measure Progress and Pay for Services

Evaluate all interim and final deliverables using criteria consistent with the terms and the statement of work in the finalized contract. Include the status of contracted work in your project reporting.

Note any *deviations* from the contract requirements, such as timing, accuracy, or quality. Work with the supplier and use effective **issue management** to resolve them, or at least minimize their impact on your project. When there are problems, focus on recovery and problem-solving, not on fixing blame. Whenever resolution proves beyond your control, promptly move to **problem escalation**.

Ensure that all *payments* called for in the contract are made based on successful achievement of project milestones and delivery of satisfactory results. Manage variances involving money as part of your overall project **cost control** efforts. If any payments are reduced due to performance or other issues, document the situation in writing and support any deductions by including relevant contract terms in your communications to the supplier.

Manage Contract Changes

Manage all changes using both the *documented process* in the contract and your process for **integrated change control**. Contract changes are often expensive and may have other undesirable consequences, so avoid them whenever possible. If a necessary change goes beyond the terms of the contract or exceeds its financial limits, amend the contract and get both parties to re-sign it, or reinitiate **negotiating contracts** to replace it with a new one.

52

Procurement Planning (PMBOK® Guide 12.1)

What: Determining whether and how to outsource project work.
When: Project initiation and planning.
Results: Analysis of costs and benefits, a defined statement of work, and good procurement decisions.

Review Project Information

Identify activities in the project **work breakdown structure** that are candidates for outsourcing. Review your **required skills analysis**, **responsibility analysis**, and **human resource planning** to determine whether there are skill gaps on your team or portions of the project with *resource shortfalls*.

Before beginning to consider contracting project work, review the process your organization uses for procurement. Familiarize yourself with all your available sources of *procurement expertise*. Identify all the individuals who should be involved, other resources you will need, and all the forms, approvals, and communication required.

Decide Whether to Make or Buy

Evaluate *issues* related to project activities that could be outsourced:

- Will outside work be more expensive than internal staffing?
- Does the work involve anything proprietary, confidential, or related to a competitive advantage?
- Will it be difficult to define the expected deliverables precisely enough to avoid integration problems?
- Does the work required involve one of your core competencies?
- Are changes in the specifications unlikely?
- Will there be someone on the project team with the time and expertise to manage the solicitation and contracting process, serve as liaison, review outsourced work, and approve payments?

Outline any expected *benefits* of outsourcing:

- Access to otherwise unavailable skills and expertise
- Faster execution through increasing the amount of work executed in parallel
- Advantages resulting from use of specialized equipment or other capabilities that will not be needed after the project

Consider the *risks* of outsourcing:

- Outsourcing work involving new technology or methods may cause staff **motivation** problems and may interfere with **team development**.
- Delays and problems may be hard to detect in advance.
- Staff turnover in contracting organizations may result in delays and excessive "learning curve" overhead.
- Communication problems and misunderstandings are more likely.
- There are high penalties for imprecise early planning and changing specifications.
- Finding and qualifying vendors may take more time than you have.
- Contracting for any required follow-on work may be difficult or expensive.
- Selecting the lowest-cost proposal could result in quality problems.
- There is potential for exposure of confidential information.

Weigh the issues, benefits, risks, probable costs, and other factors. Determine whether to outsource based on solid *business criteria* and good **decision-making**. Avoid contracting out project work based primarily on the lack of available staff.

Document the Work

For all project activity that you intend to outsource, develop a thorough *statement of work* (SOW), including detailed feature specifications, deliverable performance and acceptance criteria, the necessary timing, and any other relevant requirements. Ensure that the SOW is consistent with your project **scope definition**. Develop a rough estimate of expected expense and integrate your outsourcing plans with your **cost planning**.

Consider contracting options (such as fixed-price or time-and-materials) and determine how you will select a contract type. Decide how many proposals you will need to consider. Develop a *procurement management plan* that is consistent with your organizational practices and summarizes the criteria

you will use for procurement decisions. Identify timing and staffing for all necessary effort to manage outsourcing.

Get Approval

Present a summary of your SOW, supporting business data, and your procurement plans to your project sponsor. Be prepared to back up the summary with your detailed data. *Obtain approval* to begin **procurement contracting** and secure stakeholder commitment for the expected expense.

Initiate contact with contracting, legal, human resources, or other *procurement specialists* who will be involved in the process, and obtain their commitment to support your efforts.

53

Project Baseline Setting

What: Committing to a project plan based on bottom-up project information.
When: Project planning and execution.
Results: A solid basis for project tracking and control, with project expectations, deadlines, and budgets aligned with reality.

Review Plans and Objectives

Setting the project baseline is the *final component* of **project plan development**.

Assemble your project plan documents and verify that your planning is thorough, realistic, and could plausibly deliver the requested project results. Inspect your plans for omissions, excessive optimism, and other defects. Compare the total number of effort months your project plan requires with the effort used to complete similar past projects. Adjust your estimates and plans if the comparison shows your plans to be too optimistic.

Identify any differences between your plan and the initial **project objective and priorities**, in terms of timing, budget, staffing, or other stated goals. If there are important goals that are not consistent with your current bottom-up plans, work to remedy them through **constraint management and plan optimization**.

If the result of your best bottom-up planning still fails to meet key goals of the project, prepare *several plan variations* that do deliver on the highest project priorities.

Prepare

Summarize the data from planning to present to your project sponsor. Include an executive summary of the plan, as well as resource and cost analysis, schedule, risk plans, and other pertinent information. Presenting great volumes of planning information may be more distracting than helpful, so plan to bring detailed information along mainly for reference.

If you will be **negotiating project changes** before setting a baseline, prepare to *justify necessary modifications* with credible information and develop two or more proposals outlining realistic projects with solid business cases.

Confirm your **sponsorship** and set up a meeting to discuss your project. *Request sufficient time* with your sponsor to summarize the situation and gain agreement on your plans. Before the meeting, practice your **presentation** with a team member or two and encourage their criticism. Following the planning process, you are the world authority on your project; rehearse your presentation until you confidently sound like it. Work to improve your presentation, and use your strengths: your knowledge and experience, your background and skills, and your enthusiasm for the project.

Set the Baseline

Meet with your sponsor and present your project data.

When it is necessary, *shift project objectives* using fact-based negotiation and **consensus-building for your ideas**. Persuade project sponsors and stakeholders to support a realistic project that makes sense and serves everyone's interests.

Following presentation of the project plans, seek agreement on a specific deliverable, a resource commitment, and a deadline, all consistent with your credible plan. *Validate the plan* and verify that the resulting objective is acceptable both to the project sponsor and to your project team. Confirm stakeholder support and use your baseline for **stakeholder engagement management**.

Set the baseline plan of record using your project plans.

- Publish the final versions of the project documents.
- Communicate plans and arrange for distribution and access by the project team, online if possible.
- Save your baseline schedule in your **software and technical tools** and begin project **status collection**.
- Freeze all specifications and begin **integrated change control** and **scope change control**.

Manage the Project Baseline

Use the project baseline for **project plan execution**. Structure **status collection** around it and use it as the foundation for **communications management**, **project variance analysis**, and project reporting.

Never change a baseline without using your change control processes, and keep track of any baseline modifications made during the project.

Compare the baseline with actual results during **project reviews** and for analysis of lessons learned when **closing projects**.

54

Project Charter (PMBOK® Guide 4.1)

What: Developing a high-level project description to formally launch a project.
When: Set in project initiation and used throughout planning and execution.
Results: A reference document used to guide project planning, staffing, and control.

A project charter is a *formatted collection of information* assembled as a part of **project initiation** or soon afterward. Because projects may differ, this documentation may also be known as (or integrated into) a:

- Project definition document
- Statement of work
- Plan of record
- Project datasheet
- Envisioning document
- Proposal
- Reference specification
- Release plan

Whatever the project description documentation may be called, what is most important is that it be *written down*.

Collect Inputs

Review sponsorship information, including the business need, problem statement, or other rationale for the project. *Summarize* the desired results and goals, constraints and assumptions, and initial project staffing information. Document the business standards and organizational requirements relevant to the project.

Develop the Charter

A project charter begins with the *sponsor*. For charter information provided by the sponsor, review each part and validate your understanding of the information.

Charters vary in specific *content*, but most include:

- **Project objective and priorities**, including measurable success criteria
- High-level **scope definition**, describing all expected deliverables
- Description of the expected users or customers
- Results of **stakeholder identification**
- Business case for the project (benefits or **return on investment analysis**)
- Rough cost estimates
- Target milestones and deadlines
- Project leader and initial staffing information
- Identified dependencies
- **Project life cycle** and any methodology requirements
- Key constraints and assumptions
- Known issues and high-level risks

Document and Distribute

Validate the content of the charter with the project sponsor and use it to document expectations and to begin **stakeholder engagement management**. If the project is for an external organization or customer, use it in **contract negotiation** to ensure that all signed formal agreements are consistent with your project charter.

Add your charter to the project information archive and provide it to the project team and stakeholders *in writing*. Putting the charter online is best, but if it is on paper, set up a process for updating and replacing it following any adopted changes.

Use the charter as a basis for detailed **requirements collection**, other **project plan development** activities, and **project reviews**.

55

Project Infrastructure

What: Establishing a framework for project planning and control.
When: Set in project initiation and used throughout the project.
Results: Documented decisions ensuring thorough planning and effective project execution.

List Key Decisions

Infrastructure decisions provide a *foundation* for planning, execution, and control. Documenting infrastructure decisions clarifies how the project will operate. Infrastructure planning can vary in length from a few hours to several days of effort, depending on project scale.

Begin infrastructure planning at the start of each project by reviewing **project initiation** information. Make infrastructure decisions early; mid-project structural changes are difficult.

Create a list of *infrastructure decisions*. Model your list on the sample questions in Table 55.1, one from an earlier project, or a suitable template your organization uses. Add, delete, or change items as necessary for your project.

Consider the problems, challenges, and issues faced by recently completed projects. Include questions to address issues likely to create trouble for your project.

Table 55.1. A sample list of infrastructure decisions.

Make Project Initiation Decisions

- Is project **sponsorship** clear and well established? What is the stated business purpose of the project?
- How will the **project charter** be developed? Who will write it? Who will approve it?
- How will you determine the initial **scope definition**?
- How will you ensure **stakeholder identification** for this project?

- How will you complete **team acquisition**? What **team development** will be required?
- Might any work be outsourced? If so, how will you manage **procurement planning**?
- What will **communications planning** include? What communications facilities and tools will we use?
- How will we implement **integrated change control**?
- What process will we use for team **decision-making**?
- How will we perform **issue management**?
- What criteria will be used for **problem escalation**?
- How will we manage **conflict resolution**?

Make Project Planning Decisions

- What **project life cycle** will we employ? Will we need any changes?
- What standards or methodologies will we use?
- What are the major project checkpoints, iterative cycle timings, phase exits, stage gates, or milestones? What deliverables are required for these events?
- What are the agenda and timings for our project **start-up workshop**?
- What process will we use for **project plan development**?
- Who in addition to the project leader will be involved in **scope planning**? **Schedule planning**? **Human resource planning**? **Cost planning**? Overall planning?
- What **software and technical tools for project management** will we use? Will training be required?
- What are the deliverables of the project planning process?
- What methods will we use for **risk identification** and assessment?
- If outsourcing work, how will we manage **procurement contracting**?
- What plan-based predictive **project metrics** will we track?
- How will we use the overall project plan for **project baseline setting**?
- How will we manage **scope change control** and other project changes? Who will have change-approval authority?
- How much deviation from the plan will we accept before initiating a new project baseline derived from a modified project objective?
- Where will we store project planning and other documents? How will we manage security for our project management information system (PMIS)?
- If we have links to **multiple dependent projects**, how will we identify, document, and agree upon dependencies and interfaces?

Make Project Execution and Monitoring Decisions

- How, overall, will we manage **project plan execution**?
- Where and when will we hold project meetings? How will **virtual team** members take part?
- What methods will we use for **communications management**? **Communications control**?
- How will we do **status collection**? How frequently?
- Who will assess project progress using **project variance analysis**?
- Who will generate project performance reporting? How frequently?
- Who will receive project status reports? How?
- What criteria will trigger exception reports? Who will receive them?
- Who will archive and manage project documents in our project management information system (PMIS)?
- How will we ensure ongoing **stakeholder engagement management**?
- How will we manage **risk monitoring and control**?
- How will **communicating informally** with and among project team members be encouraged? What guidelines should we adopt for using social media?
- If outsourcing work, how will we ensure adequate **procurement control**?
- How will we manage team member **performance problems**?
- When will we conduct **project reviews**? Who will participate?
- What criteria will be used to determine **project cancellation**?

Make Project Closure Decisions

- What sign-offs and stakeholder approvals will be required when **closing projects**?
- How will we complete testing and **scope verification**?
- What post-project reporting will be required? Who will receive it?
- When will we meet to determine post-project lessons learned? Who will participate?
- How will we complete **procurement close-out** for outsourced work?
- How will we celebrate project completion with our project team?
- What will we do to ensure that all contributors and teams receive personal thanks and appropriate **rewards and recognition**?

Resolve Issues and Document Decisions

Review your list of infrastructure decisions. Add additional questions as needed and eliminate any that seem unnecessary; then distribute the list to your team.

Solicit recommendations, either in writing or at a meeting. Consider and discuss all recommendations and *reach agreement* on each issue.

Document your decisions and your key assumptions. Distribute a summary of the decisions to team members and other stakeholders. Use the decisions in managing your project.

Update the infrastructure as necessary following project changes and during project reviews.

56

Project Initiation

What: Obtaining formal commitment to begin a project.
When: Project initiation and early planning.
Results: Clear documentation of the project objective and naming of the project leader and initial staff.

Select the Project

Projects emerge when a perceived need or opportunity results in organizational **sponsorship** to take action. Identify why the organization is considering this *particular project*. Projects originate for a wide variety of reasons, including:

- To solve a current problem
- To respond to a stated request
- To meet (or create) a market demand
- To comply with shifting legal requirements or standards
- To improve a process or lower costs
- To exploit a technical advance or perform basic research
- To pursue a business strategy or opportunity

This process is an *overall summary* of many other processes throughout this book. The summary flowchart in Figure 56.1 indicates how some of the initiating processes may be related. Because all projects are different, there may be many other possibilities.

Document the Project

Draft the initial **project charter**, including:

- The overall business case for the project
- The **project objective and priorities**, including high-level descriptions of project deliverables, with timing and cost goals
- **Project life cycle** and methodology requirements

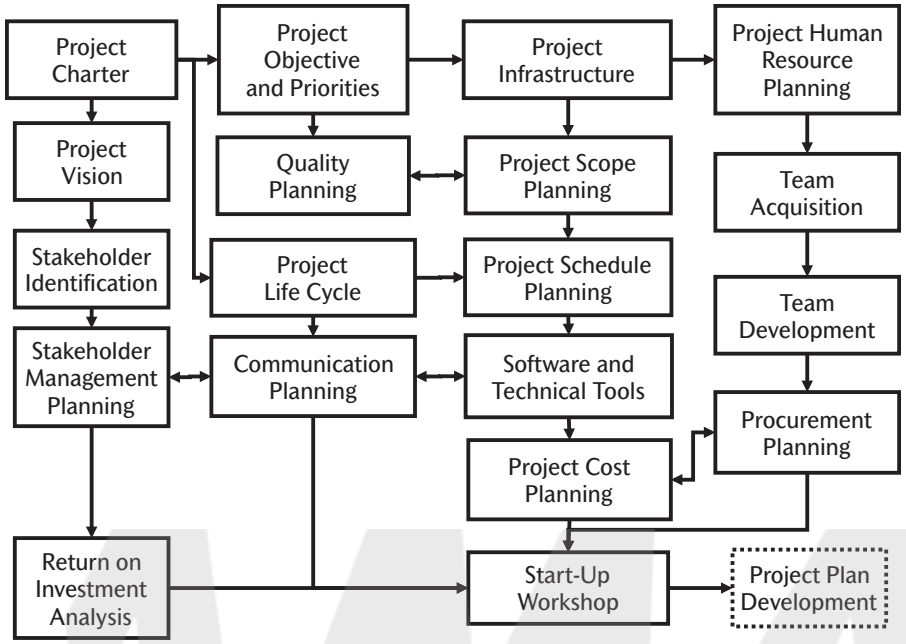

Figure 56.1. Initiating processes.

- Initial **requirements collection**
- Any relevant constraints and assumptions
- Information from **stakeholder identification**

Define the *expected value* of the project overall and describe why the project will make a difference, beginning with the process of setting a **project vision**.

Create a rough estimate of both the project *benefits and costs*. Draft a preliminary scope statement describing the principal deliverables. For each defined deliverable, determine the timing required and document the anticipated value represented. Although early **return on investment analysis** can be imprecise, it will often be central to your project's business case. Document known project constraints and make a rough appraisal of likely staffing and other project costs.

Review the results of (or initiate) a high-level feasibility analysis to validate that the project deliverables are *realistic*.

Commit Initial Resources and Prepare for Planning

Secure funding, equipment, and other *resources*, at least for **scope planning** and other plan development. Identify the project leader and the process for **human resource planning** and core **team acquisition** and begin to formally assign team members to the project. To prepare for overall project planning, establish a robust **project infrastructure** and select your **software and technical tools**. Complete your project initiation by scheduling and holding a project **start-up workshop**.

57

Project Life Cycle

What: Establishing and using a designed, common structure to enhance project oversight.
When: Set in project initiation and used throughout planning and execution.
Results: Enhanced project control and coordination with related projects.

Define Life Cycle Requirements

Even small, informal projects will have a few key milestone events to mark the *flow of work* that represents a simple life cycle. The Project Management Institute's PMBOK® process groups (Initiating, Planning, Executing, Monitoring and Controlling, and Closing) can be thought of as an informal, high-level life cycle, as Figure 57.1 shows.

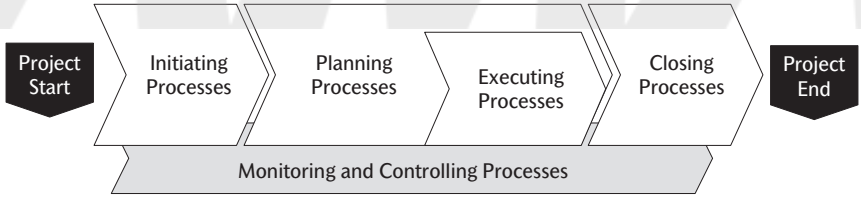

Figure 57.1. PMBOK® process groups.

Larger, more complex projects generally will benefit from a *formally defined* life cycle, made up of either a linear sequence of phases or of repeating work cycles. Factors determining the type of life cycle most appropriate for a particular project include organizational requirements, adoption of a specific project methodology, the need for inter-project coordination, and the project details.

Decisions on the project life cycle occur during project initiation as part of the **project infrastructure** and are documented in the **project charter**.

Project life cycles are closely related to *product* life cycles and run parallel to them, often sharing descriptions of the work and decision points. Product life cycles generally extend beyond **closing projects**, containing phases such as "maintenance" and "obsolescence" that follow the project life cycle.

Use Life Cycles with Sequential Phases

When most projects in an organization involve similar and predictable workflow, life cycles are generally made up of a linear succession of defined phases. These high-level aggregations of effort form a sequence that connects the initial concept for the project with the ultimate delivery of a result. Projects using this type of life cycle progress through milestone decision points (called phase reviews, stage gates, or something similar) at the end of each segment of the defined life cycle. Because this progression flows step-by-step from one phase to the next, it is often called a *waterfall* life cycle. There are at least hundreds of variations for this sort of life cycle, but the initial portion always focuses on thinking, the middle on doing, and the last part on testing and delivery.

A key milestone or decision point in all sequential life cycles involves making the business decision to commit full resources and proceed with the project. For projects done within an organization, this point generally follows an early phase following analysis, feasibility investigation, and planning. The business decision results in **project baseline setting**. A typical "waterfall" project life cycle for product development, information technology, and infrastructure projects appears in Figure 57.2.

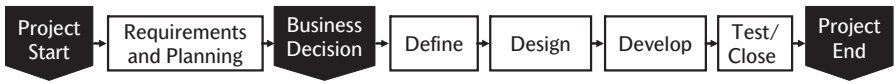

Figure 57.2. A typical waterfall life cycle.

The corresponding product life cycle would extend through phases with names such as Warranty, Support, and Retirement.

For projects undertaken for another organization, generally on a fee-for-service basis, there are often more initial phases leading to the decision to commit, such as acceptance of a project proposal and **negotiating contracts**. Figure 57.3 shows a sample life cycle for a construction, solution, or other fee-for-service project.

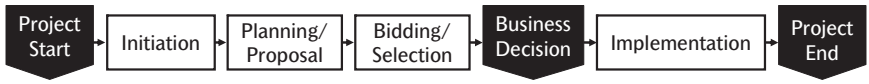

Figure 57.3. A typical fee-for-service project life cycle.

The corresponding deliverable life cycle would typically extend through phases with names such as Warranty, Maintenance, and Retirement.

Use Life Cycles with Cyclic Phases

When managing projects that are not very similar to past work, it can be useful to adopt an *iterative*, step-by-step approach. Small software development projects and other efforts where requirements collection can be difficult may benefit from incremental delivery of functionality, using feedback from users to ensure that the ultimate deliverable will be accepted and meet their needs. Although these "agile" projects may involve more overhead than "waterfall" approaches, taking an evolutionary approach may be the only reasonable option for truly novel situations. Spiral, cyclic, or other evolutionary methodology projects adopt a life cycle such as the one shown in Figure 57.4.

Figure 57.4. A typical iterative or agile life cycle.

The product life cycle would typically extend past this, through ongoing maintenance cycles.

Customize and Use the Life Cycle

Consider the specific *decisions and deliverables* at each life cycle or iteration transition point and include additions that will help you control your project. If some defined life cycle requirements seem unnecessary for your project, modify or drop them if you are able.

Incorporate effort for *life cycle deliverables* in your **work breakdown structure** and ensure consistency with your life cycle during **project**

plan development. Use life cycle decision and review milestones to synchronize work with other projects if your project is part of a program having **multiple dependent projects**.

Use your life cycle throughout the project to enhance monitoring and control throughout **project plan execution**.

58

Project Metrics

What: Defining and using a coherent set of project measures.
When: Project planning and execution.
Results: Encouragement of desired behaviors, objective baselines for measuring progress and performance, and timely triggers for action.

Document Desired Behaviors and Outcomes

Before deciding what to measure on projects, define the behaviors you seek. Measurement affects behavior, so clearly define *desired results* and use them to guide selection of metrics.

There are three types of metrics: *predictive*, *diagnostic*, and *retrospective*. Useful systems of metrics will generally include a good balance of measurement types.

- Predictive metrics use analysis to provide forecasts of future conditions. Most predictive project metrics are based on the estimates and analysis of **project plan development**.
- Diagnostic metrics provide current data on **project plan execution**. Based on **status collection**, they are used for **project variance analysis**, **communications management**, and project reporting.
- Retrospective metrics report on process performance following completion. Many retrospective project metrics correspond to predictive metrics. Retrospective measures are essential to **process improvement** and assessing post-project lessons learned.

Using your own project analysis or the following lists, select appropriate measures for your project.

Define Predictive Metrics

Predictive metrics are useful for developing a *deeper understanding* of the work and for comparing projects. These metrics support analysis for **integrated change control** and for **negotiating project changes** when necessary.

While the emphasis on predictive project metrics is greatest during planning, they are used throughout the project for **forecasting project completion.**

Predictive *schedule* metrics include:

- **Activity duration estimating**
- Project duration (calendar time)
- Aggregated schedule **quantitative risk analysis**

To assess project investment, identify predictive *resource* metrics, such as:

- **Activity resource estimating**
- **Cost estimating**
- Budget at completion
- Maximum staff size and other staffing statistics
- Aggregated resource and cost quantitative risk analysis

Predictive *scope* metrics can be useful in developing estimates:

- Project complexity (interfaces, algorithmic assessments, technical analysis)
- Size-based deliverable analysis (component counts, number of major deliverables, lines of noncommented code, subsystems on block diagrams)
- Volume of anticipated changes

Some *other* predictive metrics for projects are:

- **Return on investment analysis** and financial forecasts
- Number and severity of identified risks

Define Diagnostic Metrics

Throughout a project, you need to collect and communicate data on the overall health of the project. These metrics focus on prompt detection of adverse variances and providing visibility of project problems while they are still small.

Diagnostic *schedule* metrics include:

- Critical-path activity slippage
- Cumulative project slippage
- Number of added activities
- Activity closure index: the ratio of activities closed in the project so far to the number expected

Some diagnostic *resource* metrics are:

- Excess consumption of effort or funds
- Estimate at completion
- All metrics for **earned-value management**
- Amount of unplanned overtime

Diagnostic *scope* metrics concern the project deliverable. Consider:

- Results of tests, inspections, and walk-throughs
- Number and magnitude of approved scope changes

Other diagnostic metrics that may be worth keeping track of include:

- Risks added subsequent to **project baseline setting**
- Issue, risk, and problem statistics
- Communication metrics, such as **meetings** and volumes of email or voice mail

Define Retrospective Metrics

Retrospective metrics focus on the past, and many are assessed at the end of a project or phase. These metrics are most useful for longer-term **process improvement**. These backward-looking measures are an important part of lessons learned.

A few retrospective *schedule* metrics are:

- Actual durations and assessment of estimation accuracy
- Number of added unplanned activities
- Performance to expected estimates for standardized project activities

Retrospective *resource* metrics include:

- Actual budget
- Total project effort and assessment of estimation accuracy
- **Project life cycle** phase effort percentages
- Effort required for late project defect correction
- Staff turnover
- Variances in travel, communications, equipment, outsourcing, or other expense subcategories

Retrospective *scope* metrics relate to your development processes:

- Actual "size" of project deliverables (components, lines of noncommented code, system interfaces)
- Number of accepted changes
- Number of defects
- Performance of deliverables compared to **project objective and priorities**

Other retrospective metrics worth considering are:

- Number of project risks encountered
- Project issues tracked and closed

Select a Comprehensive Set of Measures

A project is a complex system, so one or two metrics will generally be insufficient for project control. Too many metrics are also undesirable, because important information will be lost in the jumble. Work to define a *minimum set* of metrics that provides a balanced view of your project.

When choosing metrics, strive for:

- *Objectivity*: Metrics evaluated by different people will yield similar results.
- *Accessibility*: Metrics that are difficult to collect may not be worth the effort.
- *Clarity*: Metrics depend on a clear collection process and use consistent units of measure.
- *Frequency*: Metrics can be assessed often enough to support the results you desire, without excessive overhead.
- *Importance*: Metrics are meaningful and will be used.
- *Tension*: Metrics in aggregate contribute to desired performance. (Assessing *speed* or *accuracy* alone could cause undesirable behavior, but together their tension results in appropriate trade-offs.)
- *No gaming*: Factors that could improve the measurement without achieving desired results have been minimized.

Define and document each project metric clearly in a *metric datasheet*. Include information such as: the name of the metric, the intended objective, required data, measurement units, frequency, collection method, any

formulas used, the target acceptable range, and who will make the measurement.

Establish a Measurement Baseline

Before using the metrics, collect data to define a *normal range*.

Baseline *predictive project metrics* using planning data. Verify predictive metric baselines using corresponding retrospective metrics from earlier similar projects. For example, compare activity duration estimates with actual durations for similar past work.

Diagnostic metrics are central to execution and **communications control**. Most diagnostic data is based on project status. For new diagnostic metrics, you can begin with planning data or educated guesses and then confirm the baseline using your first several cycles of data collection. For diagnostic metrics, ask these questions:

- Is the status information credible and reliable?
- What are the consequences of negative variances?
- Are issues detected in project variance analysis due to chronic or one-time factors?
- What project improvement options arise from positive variances?

Baselines for *retrospective* metrics are generally set using prior project history and trend assessments. Retrospective metrics are backward looking and are generally assessed when **closing projects** or ending project processes. These metrics are most useful for longer-term process improvement and for increasing the accuracy for predictive metrics for future projects.

Use the System of Metrics

Metrics drive behavior, so selecting appropriate factors to measure can have a significant effect on **motivation** and project progress. As Hewlett-Packard founder Bill Hewlett has been quoted saying, *"What gets measured gets done."*

Collect project data to support project **decision-making**, information distribution, and performance reporting. Project metrics also provide the basis for project control. Following significant project changes, review the measurement baseline and acceptable range for each metric.

Throughout the project, make the measurements *visible*. Use them for **issue management** and analysis supporting **integrated change control**.

Report the metrics and use them to ensure ongoing **stakeholder engagement control**.

Finally, work to ensure that all collected metrics are primarily used for process monitoring and improvement, *not for punishment*. Metrics used to criticize or rank people or for **canceling projects** will be gamed and generate unreliable data.

59

Project Objective and Priorities

What: A brief, high-level description of the desired project deliverable, timing, and investment, including explicit definition of relative project priorities.
When: Set in project initiation and used throughout the project.
Results: A clear, unambiguous statement of what is expected of the project that has been validated by its sponsor, and a clear basis for evaluating changes and making decisions.

Draft the Project Objective

The initial project objective should be based on **project initiation** data. A project objective (or mission) is a simple, *short statement* describing the project. The project leader is usually the author, developing it using inputs from the project team. In some cases, the project sponsor, a customer, or other project stakeholders may draft the objective.

As Figure 59.1 shows, a project objective defines the deliverable(s) (*scope*), the deadline (*schedule*), and the overall investment (*cost*). A good objective is about 25 words in length and captures project essentials concisely. Well-written objectives avoid technical jargon, acronyms, idioms, or other language that may result in misunderstandings. Describe deliverables

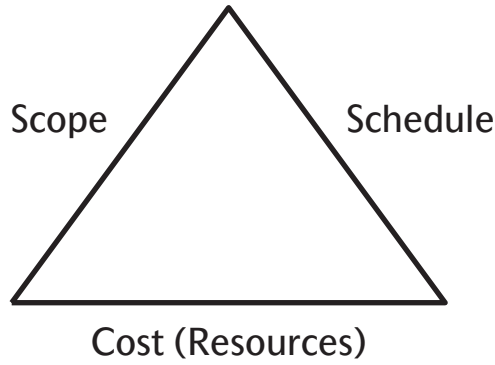

Figure 59.1. The three key parameters of a project objective.

using ordinary language that all project stakeholders will understand. Translate the information into any languages necessary and validate the translations before distribution. For timing, include the day, month (by name, not number), and year. Specify resources in clear monetary terms or in unambiguously described effort.

Here's an example: "I believe this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to earth . . . (for) $531 million in fiscal '62" (U.S. president John F. Kennedy, 1961).

Define Priorities

Review the project assumptions and constraints identified during project initiation. Explore the reasons for the goals and constraints and document the *consequences* of failing to achieve them. If necessary, probe for more information on constraints and goals with the project sponsor and key stakeholders.

For most projects, all three parameters—scope, schedule, and cost—are important. Setting priorities enables the project team to determine which of the three is *most essential*. These priorities support **scope definition**, **decision-making**, **constraint management and plan optimization**, **negotiating project changes**, and **integrated change control**.

Consider the *trade-offs* between scope, schedule, and cost by comparing small changes to the stated project objective. Would it be worse to slip the schedule a week beyond the deadline or to increase the project budget by 5 percent? Would it be more appropriate to drop a feature of a project deliverable or to add staff to the project team? Would a slightly longer project that delivers a more robust product be desirable? Questions such as these often arise late in a project, but it is much more useful to consider them early.

While exploring the costs, pain, and appropriateness of small changes, relative priorities emerge. Document these priorities using a *three-by-three matrix* (see Figure 59.2). Place one mark in each row, showing which parameter is *constrained* (least flexible), which one is to be *optimized* (somewhat flexible), and which of the three changes may be *accepted* (most flexible).

Consider each possible alternative (there are six), and discuss them within the project team to develop *consensus* on the priorities.

Validate the Project Objective and Priorities

Validate the project objective and priorities with your project sponsor before continuing with **scope definition** and other project planning. Discuss

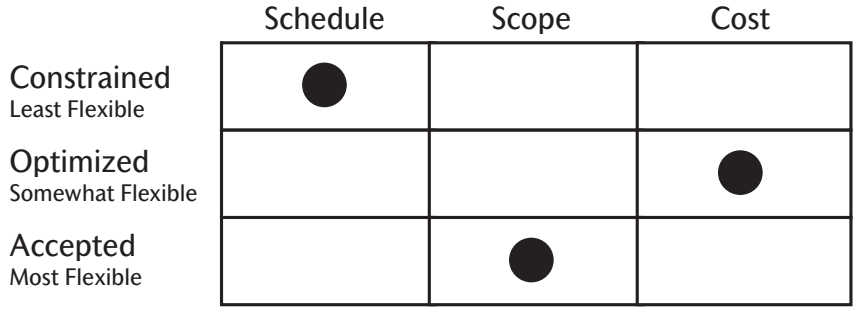

Figure 59.2. Project priorities.

your draft objective statement with your sponsor and other stakeholders to probe for potential misunderstandings. Work to clarify the details and to test interpretations, so you can correct any omissions or misunderstandings prior to commencing project work. The project objective is merely a restatement of the initial top-down goal, not a firm commitment, so ensure that the result of this validation represents only a *mutual agreement on the project goals*.

Also review your prioritization matrix with your project sponsor and make any adjustments needed based on your sponsor's feedback. For some projects, agreeing to constrain two of the three parameters may be necessary, but it is always unrealistic to limit all three, especially prior to **project plan development**. Strive for agreement and clearly document the lowest priority. Use your prioritization to set expectations during **stakeholder engagement management**.

Document and Use the Project Objective and Priorities

Finalize your project objective and stated priorities with your project team and document them as part of your **project charter**. Add your objective and priorities to project documents and use them in project **meetings** and **communications management**.

Use your project objective and priorities to establish a **project vision**, to make **project infrastructure** decisions, and to provide the foundation for project planning. Make your project objective and priorities central to **decision-making** and **scope change control**.

Periodically Review Objectives and Priorities

Keep your project objective and priorities *up-to-date*. If your project changes, reevaluate your goals and constraints to ensure that they remain appropriate. Revisit your project objective and priorities following business reorganizations and during **project reviews**. Whenever your project objective or priorities shift, revalidate them and update your project documentation.

60

Project Office

What: Using specialized staff to consolidate key project management responsibilities for a group of related projects.
When: Throughout large projects.
Results: Consistent processes and reporting for related projects, minimized overhead, and increased likelihood of success.

Justify

A competent and well-staffed project office (also called a program office, a project management center of excellence, a project support team, or another similar name) brings many *benefits*, such as:

- Centralized use of high-end **software and technical tools for project management**, avoiding excess investment in training and tool deployment
- Improved cross-project resource planning and control
- Better support for distributed **matrix teams** and **global teams**
- Avoidance of the "too many projects" problem through coherent portfolio management

Functions performed by staff members of a project office include:

- Helping novice project managers who are **transitioning to project leadership** and building and enhancing organization-wide project management skills and expertise
- Facilitating project **start-up workshops**
- Supporting standards for **project plan development** and **communications planning**
- Providing guidance for consistent and efficient creation of project planning documents
- Enforcing planning standards and auditing for completeness
- Centralizing of **status collection**, **communications management**, project reporting, **communications control**, and **integrated change control**

- Assisting with **project variance analysis** and recommendations for resolution
- Collecting and analyzing **project metrics** during **project plan execution**
- Assisting with **conflict resolution**, **decision-making**, management of timing, specification, resource, staffing, and other project issues, and facilitating **problem escalation**
- Planning, executing, and reporting for **project reviews** and lessons learned, and assisting in **closing projects**
- Assisting in outsourcing decisions and helping with **procurement planning**, **procurement contracting**, and **procurement control**

A project office also has *costs*, for staffing, communication, setup, training, equipment, and related expenses.

Before **organizing for project management** by establishing a project office, determine what functions and specialties are worth implementing. Carefully examine the *net value* of creating a dedicated project support team, considering the benefits against the costs and overhead.

Implement

Identify the functions that will be centralized in the project office and estimate the staffing. Use **required skills analysis** to determine what the staff members need to know, and work to *build the skills* through training, hiring, or other strategies. At a minimum, project office staffing should be adept at:

- Project planning
- Project communication support
- **Process improvement**
- **Coaching and mentoring** for project leaders
- Management of **organizational change**

61

Project Plan Development (PMBOK® Guide 4.2)

What: Developing a detailed, bottom-up description of the project work.
When: Project planning and execution.
Results: A basis for effective communication and a map for project success.

Prepare for Planning

Like a chess player, a good project manager looks several moves ahead. Whether for an entire project or for one or more delivery iterations, this requires planning. This process is an *overall summary* of many other processes throughout this book. The summary flowchart in Figure 61.1 indicates how some of the planning processes are linked. Because project planning is iterative, though, there are many other possibilities.

Prepare for planning by reviewing **project initiation** information, the **project objective and priorities**, and other available documentation, such as the **project charter**. Document **project life cycle** requirements and **project infrastructure** planning decisions to guide your efforts.

Involve the core team in planning, as well as any other stakeholders you need in order to effectively model and document the overall project plans.

Develop the Plans

Overall planning generally begins with **scope planning**, focused on *expected deliverables*. Capture project outputs through **requirements collection** and **scope definition**. Use this information to develop a thorough **work breakdown structure** (WBS) to serve as the bottom-up foundation for other planning activities.

Schedule planning builds on **activity definition** (derived from the WBS) and is usually next. **Activity duration estimating** and **activity sequencing** for each defined activity provide the information needed for *workflow analysis*. Done in parallel, their outputs feed into **schedule development**, often facilitated by **software and technical tools for project**

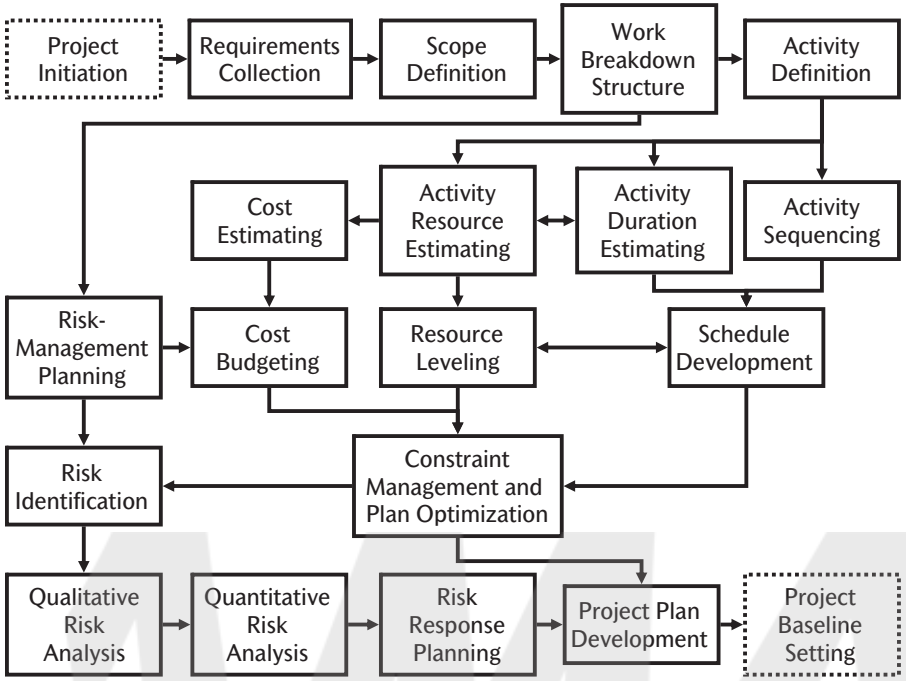

Figure 61.1. Plan development flowchart.

management. Using the preliminary schedule, you can create Gantt charts, activity networks, a critical-path analysis, and other time-oriented deliverables.

As the project timeline takes shape, the focus of planning shifts to **cost planning** to determine *resources* and staffing. **Activity resource estimating** uses the WBS data to do **required skills analysis** and **responsibility analysis**, and to support **team acquisition**. You then use activity resource estimates for effort analysis and **cost estimation**. Reconciling estimates of cost (based on effort) and duration (based on availability) leads to a resource-loaded refinement of the preliminary schedule and permits **resource leveling** analysis and a basis for **earned-value management**. You can then aggregate the cost estimates with other resource data and your **risk-management planning** for initial **cost budgeting**.

Unfortunately, the results of the initial bottom-up analysis are rarely consistent with the project's top-down objective. Seek to best meet your **project objective and priorities** using "what if?" analysis and **constraint management and plan optimization** to *explore trade-offs* in your preliminary plan. If you are unsuccessful in creating a satisfactory plan through replanning, develop several alternative project plans that are as close to the stated goals as possible.

The final part of plan development, because it relies on all other planning data, is *risk management*. **Risk identification** is a good idea throughout planning, as your analysis may reveal uncertainty, lack of enthusiasm, potential failure modes, and other exposures. As initial planning approaches completion, **brainstorm** and list additional risks. **Qualitative risk analysis** prioritizes identified risks, guiding risk-management decisions. Use **quantitative risk analysis** to assess the most significant risks, supporting your **risk response planning**. Integrate any risk prevention tactics into your plans and document any contingency plans you create.

If your project involves contributors outside your organization, include **procurement planning** and **procurement contracting** efforts in your plans.

Plan development culminates in inspecting the plan for any defects, correcting them, and *documenting* all planning deliverables in the appropriate format.

Finalize Your Plans

If your best plan fails to support the top-down objective, use plan alternatives to **negotiate project changes**. *Validate the plan* with your sponsor and complete **project baseline setting**.

62

Project Plan Execution (PMBOK® Guide 4.3)

What: Executing and controlling a project, using the baseline plan.
When: Project execution.
Results: Early detection of issues and problems, accurate and timely progress reporting, and effective project communications.

Prepare for Project Monitoring

This process is an *overall summary* of many other processes described throughout this book. A summary flowchart in Figure 62.1 indicates some process dependencies.

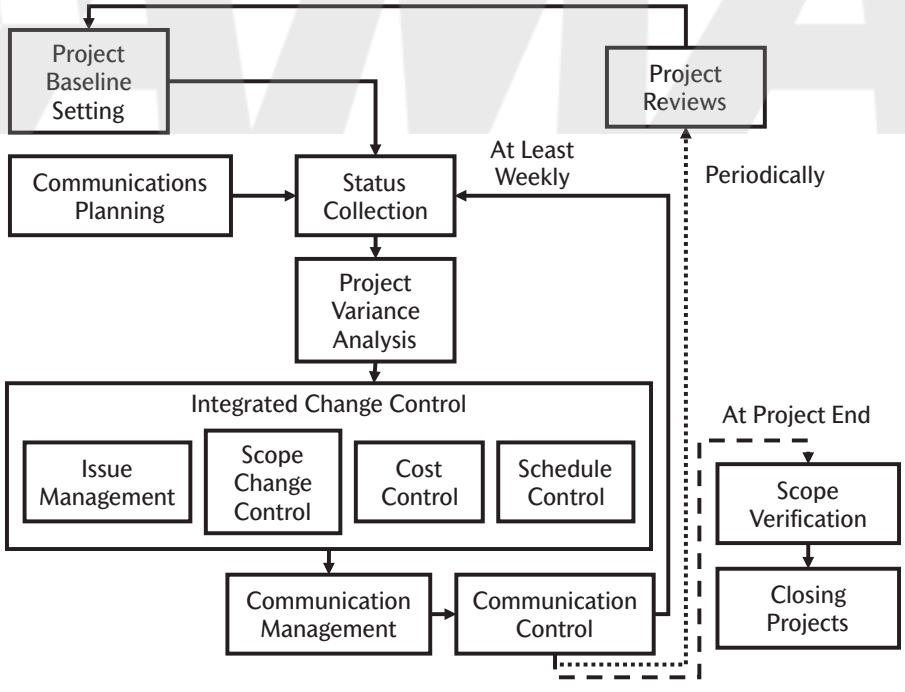

Figure 62.1. Plan execution flowchart.

Project execution processes commence with **project baseline setting**. Once deliverable specifications are frozen and you have a baseline plan, you have a foundation for project *tracking and control*. Review the process for **scope change control** with the project team and begin using it to resist unnecessary changes.

Refine your *communication processes* to meet the needs of your team, stakeholders, and sponsor. Document your **project infrastructure** execution decisions and your **communications planning**. Establish and start to deliver on expectations for communications, **meetings**, and reporting.

Set Up the Status Cycle

Project monitoring depends on a *four-stage cycle* that repeats (weekly for most projects) until the end of the project.

The first stage is *inbound communication*, engaging the project leader in **status collection**. Collect status at least weekly, and more frequently when dealing with significant problems. Projects employing agile methods gather status daily, usually during brief stand-up meetings.

The second stage of the cycle includes comparison of status data to the baseline plan, and **project variance analysis**. The *data analysis* also involves evaluation of diagnostic **project metrics**, including those used for **earned-value management** and **forecasting project completion**.

The third stage is for *project control*, which involves responding to any timing or resource problems using the processes of **integrated change control**, principally **cost control**, **schedule control**, and **scope change control**. Use **issue management** to track variances that will take more than one status cycle to resolve. For project variances that are beyond your ability to remedy, promptly seek help from those with more authority through **problem escalation**. If your project team includes outside contributors, also attend to **procurement control**.

The fourth and final stage is *outbound communication*, to inform people of what has happened on the project. This involves **communications management** and **communications control**, including reporting, **meetings**, archiving your information, and any project **presentations**. Defer most external communication until after completing your analysis and response planning for variances and issues so that you can include credible plans for recovery along with any bad news you need to deliver. In all communications, emphasize accomplishments and recognize contributions by your team to enhance **motivation**.

At the end of each cycle, *archive* all status, change, and other project reporting in the project management information system.

Review the Project

For projects longer than six months, conduct periodic **project reviews** to *revalidate* the project plans and collect new information. When necessary, **negotiate project changes** and validate a new project baseline to reflect current reality.

Projects employing agile methods do reviews every few weeks at the end of each development iteration to set the scope for the next cycle and adjust overall project plans based on user feedback and other information.

Close the Project

When the project is *completed*, get formal acceptance of your deliverable through **scope verification** and prepare a final status report to inform everyone that the project is over. **Closing projects** involves a number of tasks, including documenting the lessons learned for the project and analyzing your processes, results, and accomplishments. Consider opportunities for **process improvement** and act on your recommendations for change.

Thank all the team members for their contributions and use programs for **rewards and recognition** when appropriate to recognize significant accomplishments. *Celebrate* your successes.

63

Project Reviews

What: Periodically revisiting project plans, assumptions, and constraints during long projects.
When: During project execution.
Results: Revalidation of project objectives, improved project plans, and renewal of team motivation.

Plan and Schedule Periodic Reviews

Projects are all unique, so planning more than a few months in advance with precision is difficult. *Planning horizons* vary based on project type, but it's prudent on longer projects to schedule reviews every three to six months to refresh and adjust **project plan development**. Projects using agile methods conduct minor reviews at the close of each development iteration, generally every few weeks.

Weekly **status collection**, project reporting, and **integrated change control** are all necessary, but on longer projects they are not sufficient. Periodic reviews provide the project equivalent of planned *preventative maintenance*.

Project reviews are most useful at natural *project transitions*:

- At **project life cycle** phase, development iteration, or stage gate completions
- At major milestones or checkpoints
- Following significant project changes
- When project staff members are added or leaving
- After business reorganizations
- At the end of a fiscal quarter

Plan the review in advance, allowing sufficient time (several hours, minimum) to cover the items on your agenda, such as:

- Recognition of significant accomplishments
- Reinforcement of **team management**, building trust and relationships
- Review of the **project objective and priorities**

- Verification of **scope definition** and **requirements collection**
- Revalidation of project constraints and assumptions
- New **activity definition** and **risk identification**
- Revisions to **activity duration estimating** and **activity sequencing**
- Reassessment of **activity resource estimating** and **cost estimating**
- Review of **procurement control** status
- Adjustments to **project infrastructure**
- Analysis of project trends and changes
- Collection of lessons learned and opportunities for **process improvement**

Determine the *team members* who need to attend, and choose a time when they are available. Get their commitment to attend the **meeting** in person whenever possible.

Assemble *needed information* from the project archive and update any information such as **market research** or **customer interviews** that might be out of date.

Review the Project

Begin the project review by confirming your agenda. Discuss lessons learned, starting with things that went well and major accomplishments.

Focus the remainder of the review on new information and on potential *project changes*. Review the future project plans, the assumptions, evolving user needs and feedback, estimates, and other information in your current project plans using what you now know.

During the review, capture *decisions and action items* in writing and add items requiring later attention to your **issue-management** log.

Close the review with a discussion all the recommendations, suggestions, and decisions. Assign owners and due dates for all added project activities and action items. Set a date for updating any project documents affected by the review.

Implement Recommendations and Follow Up

Document the review. Summarize the meeting and distribute a report, generally to the same people who receive your project status reports. Replace any project plans and documents that are updated and archive all older versions, marking them as obsolete.

Implement recommendations that you have authority to make. For project changes, use your **scope change control** and **integrated change control**

processes, and make approved changes as soon as practical. If the project needs major redirection, use your data to support **negotiating project changes** and for revised **project baseline setting** or scoping adjustments for future development iterations or phases of work.

After the review, prepare a **presentation** to summarize the project's progress to date and your plans going forward. Invite stakeholders and people from related projects and *use the presentation* for **stakeholder engagement management**. Accentuate the positive to enhance project team **motivation**.

Also use project reviews as an opportunity for **rewards and recognition**. *Thank people* personally for their contributions and consider scheduling an event for the project team to recognize accomplishments. Long projects, especially, need more parties.

64

Project Variance Analysis (PMBOK® Guide 4.4)

What: Identifying differences between baseline plans and actual performance.
When: Project execution.
Results: Prompt recognition of project performance problems and issues.

Verify Status

Variance analysis is central to **project plan execution**. It follows **status collection** in the project-tracking cycle. Before beginning to analyze variances, *validate the status* information. Check it for completeness and consistency with past data and with other current status and **project metrics**.

Determine Variances

Compare the status reported with your commitments from **project baseline setting**. Note all *differences*, both beneficial and harmful. Positive variances may provide opportunities for project acceleration, and even small negative variances warrant prompt action to deal with them while they remain manageable. Determine the overall effect of any changes, issues, problems, and risks to your project schedule and budget.

Schedule variances are generally the most visible. Note all work that is completed either early or late. For continuing activities expected to finish late, forecast the delay. Determine variances for all current activities, not just critical ones.

Assess any *resource variances*, noting differences between resource estimates and actual results. For **earned-value management**, determine the baseline for variance analysis each cycle using a consistent method, such as the "50/50" rule (assuming half of the estimated cost at activity start and the remainder at the end).

Also note any *other variances*, such as performance issues related to project scope.

Analyze Impact

For each variance, determine the *impact* on the project. For positive schedule or budget variances, investigate to see whether any future project work might also have been overestimated. Determine specifically how each negative variance affects the project. Use status data for **forecasting project completion** to determine any shift from the baseline.

For each timing delay, estimate the *schedule impact* (if any) on project milestones and the deadline. Even for noncritical activities, use **cause-and-effect analysis** to determine the root cause of each slip. Similar optimistic duration estimates can recur later in the project on critical activities, resulting in project delays.

Determine the overall budget impact of any resource variances. Unlike schedule variances, all resource variances affect the project; every underestimated activity resource or cost contributes to budget overrun. Even early in the work, an excessive money or resource "burn rate" is a strong predictor of financial problems. It is very difficult to reverse resource overconsumption.

Assess the *overall impact* of other variances from the project baseline plans and objectives. If results of tests, feasibility studies, or other work fall below expectations, determine how they might be expected to affect the project. Significant variances may result in consequences such as:

- Scope deficiencies
- Schedule slippage
- Increased budget or other resource requirements
- Impact on other projects

Analyze Trends

Trend analysis need not necessarily be part of each tracking cycle, but it is useful to examine the trends in the status data at least during **project reviews**. Use trend analysis to detect budget, schedule, and other problems *proactively*. If trend analysis reveals a need for **negotiating project changes**, such as the project end date, the budget, staffing, or project deliverables, deal with this as early as possible. The sooner you propose needed changes, the more likely it will be that you will be able to gain support and agreement. Waiting too long to confront trends may lead to **canceling projects**.

Periodically also examine the variance data to uncover new risks, and update your risk register through **risk identification**.

Document Findings

Probe for the root cause of each significant variance and document both the *source* and *impact* of each problem for use in **schedule control**, **cost control**, **scope change control**, project reporting, and **performance problem resolution**.

65

Project Vision

What: A clear and motivating statement of why the project matters.
When: Set in project initiation and used throughout the project.
Results: Sustained team enthusiasm for the project.

Assess the Current Environment

Review the status quo. *Collect information* about:

- **Sponsorship** of the project
- The project basis from **project initiation**
- The **project objective and priorities**
- The background of the project and the specific problems it is expected to solve
- Data from **requirements collection** and long-term trends
- Overall business strategies and stakeholder opinions
- Organizational values
- Project team values

Draft the Project Vision Statement

Gather project team members to craft a vision statement. While some projects may not need a vision statement, a well-worded description of a desired future state provides a good foundation for **team management** and group **motivation**. Building a shared project vision strengthens relationships and trust.

Discuss how the *future will be better* following successful completion of your project (or, if your project is a part of a larger program, after completion of the overall effort). Think about the future for yourselves, your organization, your users or customers, and your project stakeholders.

Develop a *vivid description* of the resulting future, capturing the benefits and stating why they matter to you and to others. Emphasize how the project contributes to the desired future and use clear, engaging, and emotional words to convey a strong image.

Keep the end in mind. Describe why you want to get there, in *qualitative* terms. Metrics are necessary for individual goals and project objectives, but

effective visions are inspirational. The best visions are short, simple, and easy to remember.

Test each proposed vision statement within the team.

- Is it consistent with project team values?
- Does it pass the "What's in it for me?" test?
- Is the vision challenging and one the team can take pride in sharing?
- Is it sufficiently realistic to be motivational?
- Is it memorable?

Here is an *example vision*, used by Henry Ford:

[We will create] a motor car for the great multitude. It will be so low in price that no man making a good salary will be unable to own one. The automobile will be taken for granted . . . [and we will] give a large number of men employment at good wages.

Pursue the Project Vision

Document the project vision and make it part of **meetings**, **presentations**, **project reviews**, and reporting. Keep the vision visible using signs, websites, and other methods.

Frequently *remind* team members and stakeholders of the vision and use it in **communicating informally**. Show enthusiasm for the vision and reinforce it until people see it as inevitable. Projects do not succeed because they are easy; they succeed because people care about them.

Use the vision to overcome barriers, to manage change, and to support **decision-making**. Align **rewards and recognition** with the vision.

66

Qualitative Risk Analysis (PMBOK® Guide 11.3)

What: Assessing and prioritizing known project risks.
When: Project planning and execution.
Results: Identification of the most severe project risks, based on relative probability and impact.

Assess Listed Risks

Risk analysis involves using the processes defined in your project **risk-management planning** on each of the risks discovered in **risk identification**. Risk assessment is based on estimates of risk *probability* and risk *impact*. Qualitative analysis prioritizes project risks by combining range estimates for these two factors. **Quantitative risk analysis** uses specific numerical estimates to assess the consequences more precisely for significant project risks uncovered using qualitative rank ordering.

Define Probability Ranges

The likelihood or probability for a risk event must always be between zero and one. Qualitative risk assessment uses *probability ranges* between these limits, based on defined percentages.

Projects may use two, three, or more ranges for assessment, trading off between fewer (to simplify the process) or more (to improve precision). Using *three ranges* offers a reasonable balance between obtaining team agreement quickly and adequate rank ordering based on relative risk severity. Risk assessment using this method uses ranges of high, moderate, and low, often defined as:

- High: 50 percent or higher probability
- Moderate: Between 10 and 50 percent probability
- Low: 10 percent or lower probability

To increase the precision, you may define additional probability categories using narrower associated percentage ranges.

Define Impact Ranges

Risk impact can be difficult to pin down because it can have many dimensions. A given risk may reveal impact represented by additional time, increased cost, more effort, scope changes, lowered team confidence or **motivation**, diminished customer trust, and many other adverse consequences. As with probability, the minimum is zero, but the maximum amount of potential impact is specific to the risk. *Impact ranges* for qualitative risk assessment generally rely on categories based on the magnitude of risk consequences.

While any number of impact categories may be defined, for most projects adequate qualitative analysis can be done using *three ranges*, typically defined as:

- High: Project objectives will change (scope, schedule, resources, or some combination).
- Moderate: Project objectives can be met, but replanning will be necessary.
- Low: Objectives and plans will not significantly change.

Perform Assessment

Risk-assessment tables begin with the risk register and determine overall risk for each listed potential problem by combining its probability and impact assessments. This may be done by simply concatenating the range categories, or by assigning numeric values to the categories (such as 9, 3, and 1 for High, Moderate, and Low) and multiplying the factors together. Table 66.1 shows an example table for risk assessment.

Table 66.1. A table for risk assessment.

Risks	*Probability (H/M/L)*	*Impact (H/M/L)*	*Overall Risk*
1. Expert busy	M	H	HM
2. Component late	M	M	M
3. Test gear unavailable	L	L	L

Another qualitative assessment method uses a *risk-assessment matrix* to place risks in a two-dimensional grid. Categories of probability and impact define where in the matrix each potential exposure falls, with the most severe toward the top and to the right. Again, any number of categories may be used, defined as appropriate for your project, and risk-assessment matrices do not need to be square. Figure 66.1 is a sample risk-assessment matrix (or "heat map") displaying the same risks from Table 66.1.

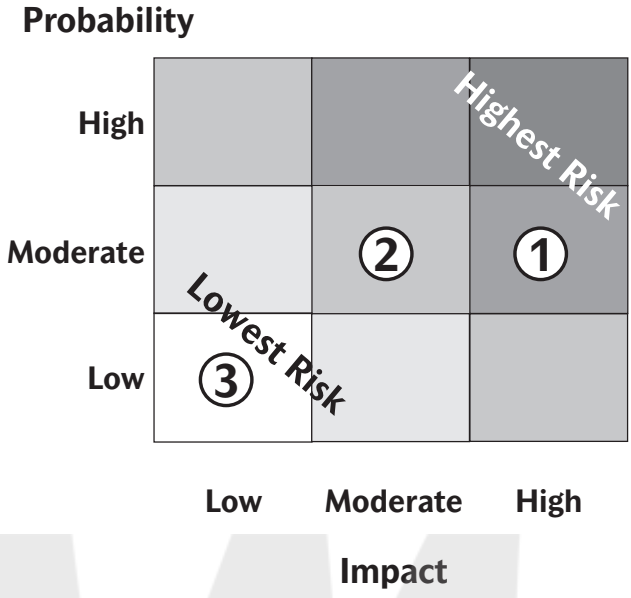

Figure 66.1. A matrix for risk assessment.

Prioritize Risks

Use qualitative risk assessment to sort the risks identified in your risk register into *rank order*, listing the most serious potential problems at the top and the more trivial risks at the bottom. Identify severe risks for quantitative analysis and **risk response planning**.

Use the sorted list to determine *overall project risk* and to increase the visibility of the potential consequences of the most significant risks.

67

Quality Assurance (PMBOK® Guide 8.2)

What: Routine tracking of project output against quantified objectives.
When: Project execution and closure.
Results: Prompt detection of process issues and revision of work methods.

Quality assurance serves two primary purposes on projects. It detects processes that are in need of revision, so they can be improved. It also enforces established standards to minimize work done using inappropriate methods.

Perform an Audit

Maintaining project quality requires periodic *process reexamination*. Some process audits are scheduled as part of **quality planning**. Audits may also be triggered by problems uncovered through **project variance analysis**, **quality control**, **project reviews**, or lessons learned analysis when **closing projects**.

Whatever the stimulus, begin your quality audit by listing all issues detected with the project processes involved and then probe to discover and document any additional problems. **Project metrics** outside established limits (both adverse and beneficial variances) may indicate potential process issues. Also consider cases where your project results may be acceptable but your execution efficiency is poor. Interview team members involved in project activities to discover processes that appear to be ineffective or unsuitable for the work. List all *issues and exceptions* for analysis.

Analyze Variances

Begin your analysis by verifying that the measurements are valid and that the work is being done using the appropriate process. If you detect that measurement inaccuracy or alternative work methods are causing problems, work

toward **performance problem resolution**. Discuss the situation with the individuals involved and secure their commitments to *accuracy and compliance*.

For significant process problems, use **issue management** to track progress toward resolution and **cause-and-effect analysis** to uncover *root causes*. Work with your project team and appropriate stakeholders to find options for **process improvement**.

If the problems impact project scope and seem irresolvable, prepare to **negotiate project changes** and use **scope change control** to manage any required specification changes. Through your analysis, determine necessary process and other changes and document the situation and your *proposed response*.

Implement and Track Actions

Resolving process problems that arise from organizational dependencies may require changes that are beyond your authority. "**Influence without authority**" techniques may prove effective, but in some cases resolution may require **problem escalation**. Use **stakeholder engagement management** to get any necessary *approval* for process changes. Document all new and updated processes and communicate the reasons for **organizational change** to all the people affected.

Implement your recommended process changes using **integrated change control**.

Monitor new or changed processes for expected results. If results fall short of expectations, or there are problematic unintended consequences, initiate further analysis and continue your process improvement efforts.

68

Quality Control (PMBOK® Guide 8.3)

What: Ongoing monitoring of project work compared with plans and standards.
When: Throughout a project.
Results: Prompt recognition of quality problems and delivery of satisfactory project deliverables.

Collect and Analyze Data

Project quality control depends on **quality planning**. **Project baseline setting** supports quality control by establishing **project metrics** and defining effective methods for *keeping metrics within acceptable limits*.

Use project **status collection** and *project deliverable data* from testing, checklists, and inspections to assemble current project information. Employ **project variance analysis** to detect differences between your measured results and your **scope definition**.

The field of statistics provides many *techniques* for detecting problems in deliverable quality and defects in development processes. Among them are:

- Scatter diagrams
- Histograms and sampling distributions
- Trend and control limit analysis
- Pareto charts

Use these techniques to detect problem situations, such as:

- Results that are outside an acceptable range
- Results displaying excessive variability
- Results that change in suspicious, nonrandom ways
- Results that reveal adverse trends

Plan

When responding to a quality issue, seek the *problem source* using **cause-and-effect analysis**, interviews, discussions, inspections, and observations. Use **issue management** to track problems in quality control. For significant quality problems, you may need to enlist assistance from specialists in quality, statistical measurement, or other disciplines.

Use your root cause analysis to frame an *appropriate response*. **Performance problem resolution** may be effective if the individuals doing the work are the source. If the inputs to a process are faulty, resolution could involve better monitoring and control of upstream work. Other situations may require recalibration, replacement or repair of some equipment you are using. If the process itself appears to be the problem, a process audit as part of ongoing **quality assurance** or a **process improvement** project might be the answer.

Select the most promising approach and document it.

Do

If necessary, obtain approval for any changes through **scope change control** and **integrated change control**. *Implement* the approach you selected for resolving the quality problem. Whenever needed changes are beyond your authority, seek help through **problem escalation**.

Implement changes to address the quality-control problem.

Check

Monitor project performance to verify the outcomes you expect and to detect any unintended adverse consequences.

Act

If there are remaining problems or newly created ones, *revisit your quality-control effort*. Back out any changes you made that result in outputs that are worse than the original situation, and seek better options.

If the changes you made prove effective, *update* your project plans, procedures, and other relevant documentation.

Communicate to affected individuals all changes made and incorporate the results of your efforts in your **communications management** and reporting. When necessary, update your testing and acceptance criteria and **scope verification** process and attend to **stakeholder engagement control**.

69

Quality Planning (PMBOK® Guide 8.1)

What: Defining measurable standards for project results that matter to stakeholders and determining how to achieve them.
When: Project initiation and planning.
Results: Quantified project standards and objectives, supported by explicit plans.

Quality management for projects borrows heavily from methodologies generally associated with production and manufacturing, including "Six Sigma" and Total Quality Management (TQM). The primary goal of project quality management is defining and delivering *satisfactory project deliverables*, so it is closely related to **scope planning** and management.

Determine Customer Requirements

Quality planning is essential to successful customer and **stakeholder engagement management**. Use techniques such as **customer interviews**, **market research**, and product benchmarking to ensure thorough **requirements collection**. Probe to *quantify the value* of the needs discovered, and state why they matter using the "voice of the customer."

Determine the cost of achieving the requirements and use *cost/benefit analysis* to decide which requirements are most important. Prioritize the list of requirements and reflect the most essential items in the specifications for your project deliverable.

Document Specifications

Review organizational quality policies, requirements, and relevant standards (such as those defined by the International Organization for Standardization [ISO] and similar bodies). Integrate necessary specifications from them into your final *project scope statement* as part of project **scope definition**.

Quantify each defined requirement and use the specifications to define all acceptance tests and evaluation criteria you will use in **scope verification**. Define the *final approval criteria* for project results at the project start, and

get sign-off for acceptance tests from appropriate stakeholders and customers during project planning. When necessary, seek the assistance of statistical or other experts in designing your tests.

Establish Quality Plans

Review your project management processes for *defects or potential problems*. Use process flowcharting and mapping techniques to determine opportunities for **process improvement**. Remember, quality is planned in, not inspected in. Capture any process defect issues you are unable to resolve in your project **risk identification**.

Add all *quality-related activities*, such as process audits, tests, and approvals, into your project **work breakdown structure**. Include all required quality efforts explicitly in your **activity definition** and **schedule development**, and include any costs for process conformance and any reserves established against nonconformance in your **cost estimates** and **cost budgeting**. Document your quality plans, either separately or as part of your overall **project plan development**. Also assemble any needed checklists, guidelines, and other process documentation you will require.

Establish **project metrics** with control limits you will use to evaluate project quality.

Determine the *people* who will have responsibility for project **quality assurance** (process assessment) and **quality control** (results assessment) and secure their commitment for the work. If your project requires participation from quality specialists, review your project with them to ensure that they understand and support your overall plans.

70

Quantitative Risk Analysis (PMBOK® Guide 11.4)

What: Assessing risk severity in numerical terms.
When: Project planning and execution.
Results: Anticipated risk impact estimates in absolute units, such as time, cost, or effort.

Quantitative risk analysis applies processes defined in project **risk-management planning** to risks documented using **risk identification**. Determine which risks warrant more precise quantitative analysis through prioritizing your listed risks using **qualitative risk assessment**. Quantitative analysis requires greater effort, but it generates *specific estimates* of risk probability and impact for the most severe project risks.

Convert Probability Ranges into Estimates

In place of the ranges used for qualitative risk analysis, quantitative assessment uses a numerical percentage, a specific fraction between zero and 100 percent. There are *three ways* to estimate probabilities:

1. Make a prediction based on calculations using a mathematical model.
2. Perform empirical analysis of historical data.
3. Select a number based on the best analysis available.

Some risk situations may be simple enough to model, and in a few cases there may be sufficient data to justify statistical forecasting. However, because many project risks are unique, complex, and rare, the third technique (better known as *guessing*) is most common. Because of this, quantitative risk probability estimates are rarely as precise as they look.

Convert Qualitative Impact Ranges to Estimates

Instead of the impact ranges used in qualitative analysis, quantitative impact assessment relies on *numeric estimates* made using defined units. For some risks, single-point estimates will be appropriate, but for others risk estimates may be better expressed using a statistical distribution or a histogram

of possibilities. Quantitative risk impact is measured in days of project slip, additional money, increased effort, or other suitable units. Many risks have impact in more than one of these dimensions, such as both time and cost.

Cost impact is straightforward, using resource and **cost estimating** techniques, and is measured in dollars, yen, euros, or some other monetary unit. Effort impact, measured in units such as person-days, is based on **activity resource estimating** methods.

Schedule impact is more complicated. Timing impact analysis relies on worst-case **activity duration estimating**, but not every activity duration increase will necessarily change the overall project schedule. Only the slippage in excess of any float determined though critical-path analysis and **schedule development** will result in a change to the project deadline.

Other impact categories, including staff productivity, scope modifications, or other adverse changes, must also be identified and estimated as precisely as possible, using appropriate **project plan development** techniques. Although the data used for quantitative risk impact analysis may seem precise, the accuracy of the estimates it relies on is quite variable.

Measure Risk

Quantitative risk assessments using *tables, grids, and matrices* comparable to those used for qualitative risk analysis employ similar formats, substituting the expected probability percentages and numerical estimates of impact for the ranges and categories. Matrices using numerical data are generally replaced by two-dimensional graphs. Because impact may be estimated in cost, schedule, or other units, several such graphs may be needed.

For simple projects, a quick inspection of the plan using the risk assessments will reveal the risks likely to cause the greatest damage. For more complex projects, *sensitivity analysis* is a fast way to identify risks (and combinations of risks) that are most likely to result in project delay. This can be easily done using copies of the schedule data entered into **software and technical tools** for project scheduling. For quantitative "what if?" scenario analysis, sequentially impose your timing risk impact estimates to reveal your schedule sensitivity to each significant schedule risk.

Decision trees can be used to quantitatively assess expected outcomes in cases where there may be several possible branch points in the project that depend on data not yet available. To assess risk for such projects, you can employ decision-tree analysis for time, cost, or other measurable project parameters.

Analyze Quantitative Models and Use Computer Simulation

Using a range of estimates for time (or cost) provides the basis of the Program Evaluation and Review Technique (PERT). PERT was originally created to quantitatively assess overall project risk, based on three estimates defining a range (optimistic, most likely, and pessimistic) for each activity. These three estimates can be used to calculate means (expected values) and variances (estimated risk) for individual activities.

You may also use *three-point* activity duration estimating to assess project schedule risk by using the range data as inputs for Monte Carlo computer simulation. Similarly, three-point cost estimating can be used in simulations to determine overall project budget risk.

Document Risks and Specific Consequences

For significant activity-related risks assessed quantitatively, document measured *risk consequences* in the project risk register. Select significant risks for **risk response planning**.

Assess *overall project risk* by aggregating the quantitative risk assessments of your activities. Overall risk is high when accumulated **project metrics** show your project to be larger, longer, or more complex than work you have successfully managed in the past. Use quantitative risk-assessment data to justify and establish schedule reserve, budget reserve, or both.

71

Required Skills Analysis

What: Determining the skills required to complete the project.
When: Project planning and execution.
Results: A summary of the skills needed for project work, including experience and proficiency levels.

Review the Work Breakdown Structure

Skills analysis is a key portion of **human resource planning**. For each **activity definition** at the lowest level of the project **work breakdown structure** (WBS) hierarchy, list the owner and any other contributors who are committed to the work. A **responsibility analysis** matrix is one way to summarize *activity staffing* for WBS activities.

Determine the Skills Needed

List the *necessary skills* and the background needed to complete each activity, including:

- Knowledge in specific domains
- Proficiency with tools and equipment
- Experience with applications and systems
- Communication and language abilities
- Amount and level of experience in a given field

Drawing a "mind map," such as the one in Figure 71.1, for each identified project activity is an effective way to get started:

Identify Gaps and Document Capabilities

List unmet skill needs. Identify all specific skill requirements where you lack a credible commitment from a capable, named individual.

Also list the *available skills*. Consider alternative work methods during **project plan development** that could use skills available on your team. Begin work to resolve remaining skill gaps through **team acquisition**, or

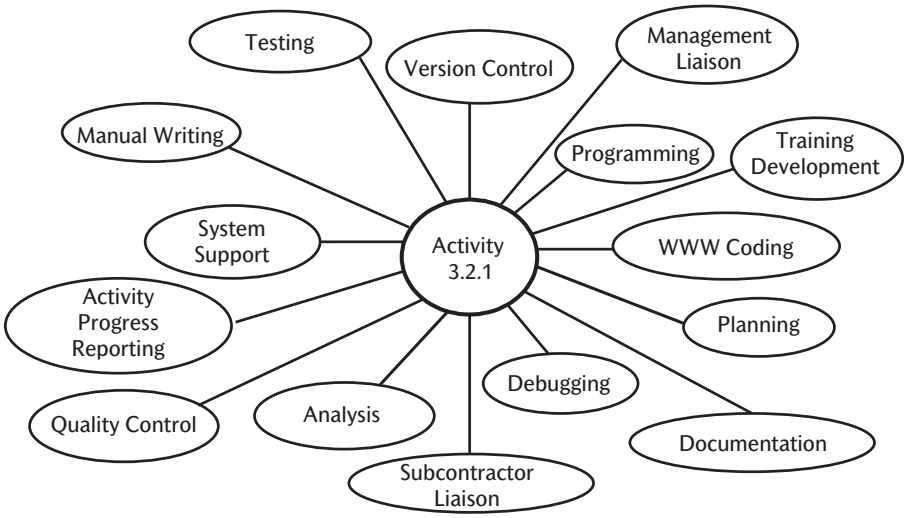

Figure 71.1. Mind map of needed skills.

when necessary through **procurement planning** and **procurement contracting**.

Staffing a project with only specialists can be risky, as problems will undoubtedly arise that cross functional boundaries or fall outside the fields covered by staff specialists. Include "*generalist*" as a required skill at the project level, and work to include people who have proven to be adept at handling unexpected situations.

72

Requirements Collection (PMBOK® Guide 5.2)

What: Understanding what the users of your project results require and will accept.
When: Project initiation and planning.
Results: Project deliverables that meet needs and deliver business value.

Organize and Set Objectives

Begin your *requirements analysis process* consistently with your **scope planning**, **project charter**, and **project infrastructure** decisions.

Deliverable requirements emerge from **project initiation**, but you rarely begin with sufficient data. Work to fill in any gaps by working with stakeholders who will interact with your project deliverable(s), including:

- People who use it to do their jobs
- People who buy or pay for it
- People who deliver, install, or maintain it
- Testers, evaluators, and approvers
- Managers of any of these people
- Other key individuals from your **stakeholder identification**

Requirements are based on user needs, both *stated and unstated*. Stated needs are generally the easiest to uncover, because they relate to features and performance. Unstated needs include basic needs (requirements that may be taken for granted by most users) and "excitement" needs, which may be based on new technology or ideas that may not even seem possible to most users. Thorough needs discovery requires observation, research, creativity, and imagination.

Identify any user information you need for **scope definition** that is not available. For any missing information, frame clear, specific questions that must be answered, and decide in advance how you will put the information to use. *Set objectives* and plan the activities required to achieve them.

Project teams may lack skills required for thorough assessment of user needs, requiring *assistance* from specialists experienced in product management or marketing. Identify any cross-functional talent and outside resources that may be required. Even if you are not directly involved in collecting user information, ensure that staff from your core project team are at least involved in setting objectives at the start and in analyzing and summarizing the results at the end.

User assessment may require significant time and effort. If so, obtain necessary funding and *management commitment* in advance.

Identify What You Know

Review *available user information*. Strategic planning at the organization level generally summarizes information on customers and users. Look for any other relevant research or publicly published data.

Document what you know about user needs based on existing data.

Resolve Unmet Information Needs

Determine *additional information* you require. For projects that develop products or services to be sold, plan for **market research**. For projects having a predefined finite number of users, plan and schedule representative **customer interviews**. If needed, conduct workshops and facilitated meetings with users and stakeholders to determine and validate requirements.

Work to *creatively understand opportunities* for new technology or ideas, and test alternative options and combinations of concepts. Use **brainstorming** and **creative problem-solving** techniques to seek the best options.

For projects facing significant unknowns (due to highly novel deliverables, multiple alternatives to be considered, or other uncertainties), consider using agile methods to manage requirements through a series of incremental, iterative deliveries and adjustments.

Document and Use the Data

Summarize user needs information and discuss it with your project sponsor, the team, and other stakeholders. Determine what the information means for the project. Coordinate your requirements analysis with your **quality planning** and use it to complete your **scope definition** and **project plan development**. Use requirements data in setting your **project objective and priorities** and to manage **scope change control** and **integrated change control.**

Develop a process for managing requirements throughout the project, using a procedure such as a traceability matrix or a "burn down" list. Verify that planned development efforts and testing are consistent with your documented requirements, are fully integrated into your project **work breakdown structure**, and support your requirements for **scope verification**.

For longer projects, *revisit* the user needs assessment during each **project review**. For projects adopting agile methods, update requirements and priorities following each development iteration based on user feedback and test results.

73

Resource Leveling

What: Reconciling project plans with available resources by minimizing overcommitments and identifying underused staff.
When: Project planning and execution.
Results: A bottom-up project resource plan and schedule consistent with committed project resources.

Profile Required Resources

Use **activity resource estimating** and **schedule development** to create a resource-loaded schedule for both the project as a whole and for all key resource categories. You may use **software and technical tools for project management** to automate this, but you can also use spreadsheets, project databases, and other methods to develop *resource histograms* or tables for staff and other important project resources. Figure 73.1 shows a sample resource histogram (formatted using Microsoft Project).

Identify Deficits and Surpluses

Inspect the analysis using your histograms, spreadsheets, or tables. For each project contributor or resource category, identify *overcommitments*—periods when the planned work exceeds the available capacity. Also note any periods for contributors where the current draft plan indicates that there may be unused capabilities.

Repeat the analysis for the project as a whole, to identify the places in the preliminary project plan where *overall staffing* is insufficient.

Reconcile Differences

Project management software tools generally provide an *automated function* for resource leveling. Although the function may sometimes prove useful, automated leveling generally renders project plans unrecognizable. Before you try it, back up your plan data.

Another approach to leveling is to identify resource bottlenecks in the plan

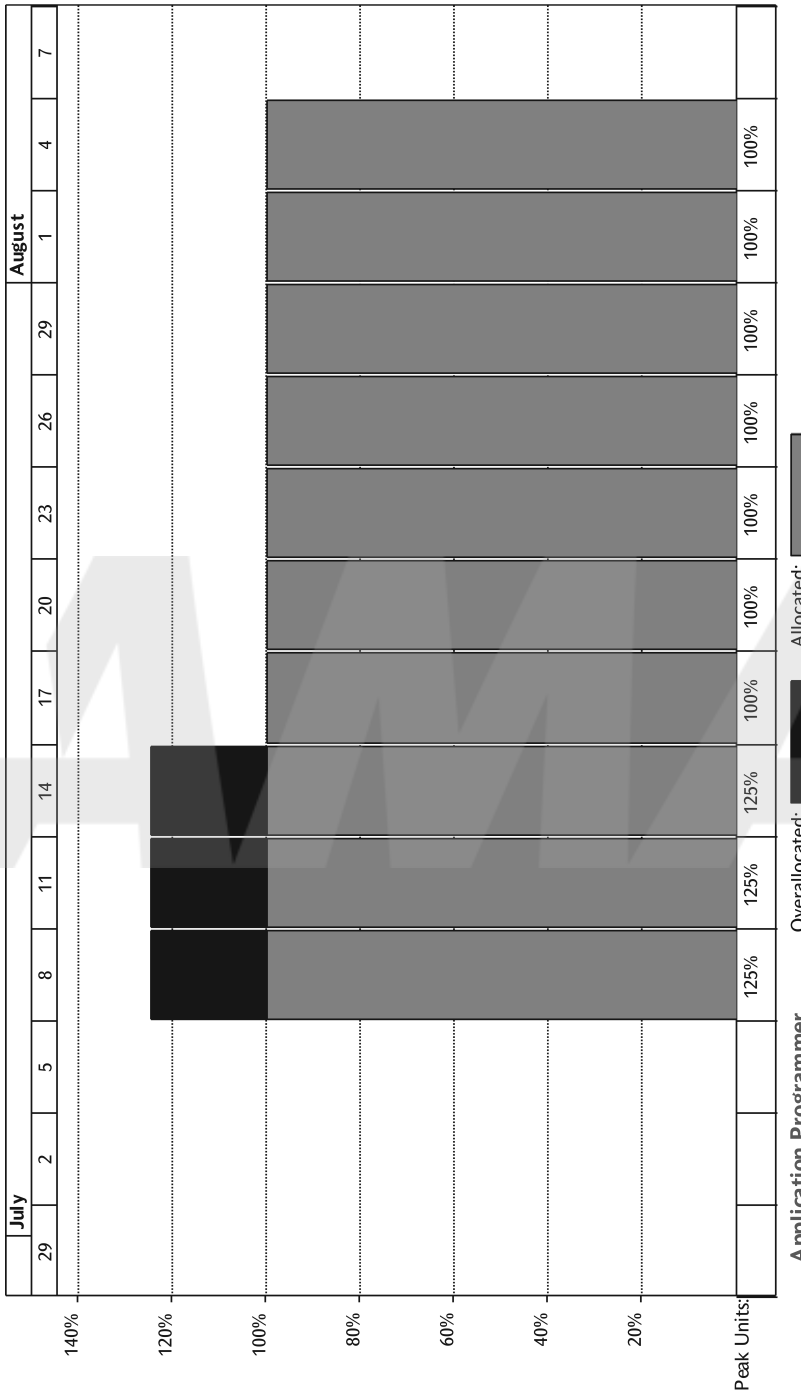

Figure 73.1. A resource histogram.

and then to consider *manual revisions*. Modifications to minimize resource conflicts include:

- Shifting planned resources use to better conform to the available pool
- Shortening some activity durations using undercommitted project staff
- Proposing scope modifications or delivery postponements
- Building a case for additional **team acquisition** or **procurement planning**
- Splitting activities into discontinuous effort having one or more timing gaps
- Changing the planned rate of effort by revising your **activity duration estimating**

Identify options available for your project using suitable "what if?" analysis (a separate copy of a scheduling tool database is a quick and effective way to do this) and *select ideas* that resolve your resource capacity constraints.

Update project plans, schedules, and other planning documents to reflect all adopted changes.

74

Responsibility Analysis

What: Determining that all defined project activities have an owner and sufficient other staffing.
When: Project planning.
Results: A two-dimensional responsibility matrix summarizing coverage and responsibilities for project work.

Construct a RACI Matrix

Define roles for each task in your **activity definition** using a RACI categorization:

- R: *Responsible* (Contributor)
- A: *Accountable* (Owns the work—one "A" per activity)
- C: *Consulted* (Approvers, decision-makers)
- I: *Informed* (Provided with information)

Summarize the staffing for project activities using a two-dimensional responsibility assignment matrix listing the defined project activities on one axis and the project staff *by name* on the other. Include an extra "to be hired" (tbh) column on the staffing axis to keep track of unmet staffing needs. Table 74.1 shows a simple RACI example.

Table 74.1. A RACI matrix.

RACI Matrix	*Hawkeye*	*Margaret*	*Trapper*	*Radar*	*tbh*
Activity 1.1.1	A		R	C	R
Activity 1.1.2	C	A		I	
Activity 1.2.1	R	I	A	C	RRR
Activity 1.2.2	C	R	R	A	

Analyze the RACI Matrix

Inspect the matrix to ensure that each activity has one, and only one, accountable owner. For each activity, assess whether the staffing seems adequate and whether you believe that the contributors involved are capable of the work. For each individual, check to see that he or she is not assigned more project responsibility, particularly ownership accountability, than seems appropriate. Check that the talents available are consistent with your **required skills analysis**. Use the "tbh" data to assist in **team acquisition** and **procurement planning**.

75

Return on Investment Analysis

What: Analyzing project costs and benefits.
When: Project initiation and planning.
Results: A quantitative assessment of a project's overall financial value.

Review ROI Methods

All project return on investment (ROI) estimates are predictive **project metrics**. ROI analysis combines *cost and benefit data* (project-related monetary outflows and inflows). Because these calculations are based on future benefits estimates that may be overly optimistic, the accuracy of project ROI metrics can be highly variable.

Most ROI methods are based on the *time value of money*, assuming a discount rate (or rate of interest) that makes a sum of money in the future *less valuable* than the same sum of money today. The formula for this is: $PV = FV/(1 + i)^n$, where: PV is the present value, FV is the future value, i is the periodic interest rate, and n is the number of periods. (If the period is a year and the interest rate is 5 percent [.05] per year, then $1.00 today has a future value of $1.05 one year from now.) Interest rates for ROI calculations are generally based either on the current cost of borrowing money or on a target return rate expected for the organization's investments.

There are a number of ways to calculate ROI, and each has benefits and drawbacks. Although all ROI measures rely on similar data, they can yield different results when used to compare projects. Typical *methods* include:

- Simple payback
- Discounted payback
- Net present value
- Internal rate of return
- Economic monetary value

Evaluate Simple Payback

The least complicated method for project ROI assessment calculates a *payback period* without considering the time value of money. Project costs are

estimated using **cost budgeting**. You next need to create forecasts of project benefits, savings, or revenues following project completion sufficiently far into the future to balance the project costs. The payback period is the time required for the project to reach breakeven and pay for itself. Benefits of simple payback are that it is easy to calculate and can be validated against actual data in a reasonable time frame. However, it does not consider any benefits following payback and it ignores project magnitude.

Evaluate Discounted Payback

This method is identical to simple payback, but it uses a *discount rate*. Estimates of future costs and benefits are worth less than those closer to the present. Because project costs are in the near future and project benefits are more distant, the discounted payback period is always longer than the simple payback period. For short projects, the difference is negligible, but for longer projects it can be substantial. Benefits and drawbacks are similar to those of simple payback analysis.

Evaluate Net Present Value

Net present value (NPV) uses the same process as discounted payback analysis, but it continues past the break-even point defined for payback. NPV costs are based on the project budget, but the calculation considers *all* the estimated future benefits over the expected life of the project deliverable. Instead of estimating the amount of time required to recover costs, NPV adds up all the discounted estimated benefits minus all the discounted estimated costs. This calculation yields the project's total *monetary worth*. You can use NPV to compare projects with very different financial profiles and timescales. However, NPV favors large projects over smaller ones, requires more estimates, and the time frame for validation is very long.

Evaluate Internal Rate of Return

Internal rate of return (IRR) is the most complex of the ROI metrics. IRR uses the same estimates for costs and benefits required to calculate total NPV, but instead of assuming an interest rate and calculating an overall project value, IRR calculates the interest rate that results in a project net present value of zero. IRR is useful for comparing projects of different sizes and lengths, but it requires at least spreadsheet software or a financial calculator. Also it requires more data, and, like NPV, it takes a long time to validate.

Evaluate Economic Monetary Value

Economic monetary value (EMV) has the same basis for calculation as net present value, but it provides for multiple scenarios. Each scenario may have different cash flows and an estimated likelihood. All the associated scenario probabilities must sum to 100 percent. Although EMV introduces the apparent precision of decision trees and **quantitative risk management** into ROI analysis, its predictive value depends on estimates of probability and financial return, both of which may be wildly inaccurate.

76

Rewards and Recognition

What: Formal acknowledgment of individual and team accomplishments.
When: Throughout a project and especially at project closure.
Results: Better cooperation and teamwork, as well as successful current and future projects.

Rewards and recognition are a key aspect of **team management**. Generally they are most effective when *tailored* to the individual or team, so determine for each case whether recognition should be public or nonpublic and verify what rewards will be most appreciated by **communicating informally** and building relationships with your team members.

Use Intangible Rewards and Recognition Frequently

Recognition using techniques involving negligible or no cost is a powerful way to increase **motivation**, and you can express appreciation using these ideas frequently. Intangible rewards are most effective when used intermittently, so work to employ them when they are *unexpected*. These are some examples of random positive reinforcement:

- *Thank people personally* for their accomplishments. Do it face-to-face whenever possible, or by telephone or electronic mail for distributed or **global teams**. Stay alert and express gratitude even for small things.
- In your **communications management**, *include team member's names* in your project reports, **presentations**, and other documents. Be specific and summarize why their accomplishments and results matter.
- *Formally recognize achievements* of **matrix teams** to the team members' supervisors, in writing. Submit thorough reports on team members in advance of their performance evaluations.
- *Thank people in public meetings* (if culturally appropriate) for significant contributions.
- *Discuss individual and team results* in project status **meetings** and **project reviews**.
- *Let people represent the project team* at management or customer meetings.
- *Increase responsibility* within the team.

- *Issue certificates or tokens* (buttons, pens, and other small items) to acknowledge performance.

Publicly Use Tangible Rewards and Recognition with Discretion

Public recognition using rewards with financial cost can be effective if the rewards are *appreciated and aligned* with individual preferences. Expensive events and items that people do not like can actually be de-motivating, as can undesired public attention. Some examples of effective rewards are:

- *Team-planned events or celebrations* to commemorate project successes
- *Nomination of individuals or teams* for monetary or other award programs, either internal or external to the organization
- *Substantial rewards for performance* for the whole team, such as clothing, food, or other visible gifts
- *Travel and support for attendance* at professional conferences or training classes
- *Promotion* or other formal expansion of responsibility

Privately Use Tangible Rewards and Recognition When Appropriate

Except in very rare circumstances, rewards involving money should be private. *Monetary rewards* are most effective when infrequent, because when they are expected they are no longer perceived as rewards. (Do you consider your salary a reward?) Depending on the project structure and the authority of the project leader, some of these could be:

- Recommendations for *salary increases*
- *Financial rewards*, such as bonuses or stock options
- *Gift certificates,* allowances for meals, tickets to an event, or other individual rewards that cost money

Where *programs* for such recognition exist, take full advantage of them.

77

Risk Identification (PMBOK® Guide 11.2)

What: Documenting and diagnosing potential project problems.
When: Project planning and execution.
Results: A robust list of known potential project problems.

Review Risk History

Review *previous project difficulties*, historical data, and databases containing risk information, both inside your organization and from public sources. Explore lessons learned from **closing projects** to see what unexpected problems arose in earlier, similar work.

Note Risks Uncovered in Project Planning

Throughout **project plan development**, note all the project risks that surface as you *analyze the work*. Follow the processes you defined in **risk-management planning**.

During **scope planning**, **requirements collection**, and **scope definition**, consider *scope risks*, such as:

- Technical system complexity
- Conflicting or inconsistent specifications
- Extreme performance, reliability, or quality requirements
- Mandatory use of new technology
- Requirements to invent or discover new capabilities
- Incomplete or poorly defined acceptance or completion criteria
- Unclear or potentially changing customer requirements
- Impact of component availability or potential defects
- External sourcing for a key subcomponent or tool
- Overall size of the project **work breakdown structure**

In **schedule planning**, **activity definition**, **activity duration estimating**, **activity sequencing**, and **schedule development**, identify *schedule risks*, looking for:

- Activities without a willing owner
- Activities with durations longer than two weeks that resist breakdown
- Activities with uncertain duration estimates
- Activities with significant worst-case (pessimistic Program Evaluation and Review Technique [PERT]) duration estimates
- Activities on the project critical path or with minimal float
- Multiple simultaneous critical activities
- Activities or milestones with multiple predecessors or with external dependencies
- Work scheduled past a realistic planning horizon
- Cross-functional or subcontracted activities

During **cost planning**, **activity resource estimating**, **cost estimating**, **team acquisition**, and **procurement planning**, document *resource risks*, including:

- Activities with unknown staffing
- Activities with effort estimates greater than 80 hours that resist breakdown
- Weakly committed staff or other likely loss of team members
- Activities requiring skills not currently available
- Activities dependent on specific key individuals
- Activities staffed using part-time or remote team members
- Activities with uncertain effort or cost estimates
- Activities with significant worst-case (pessimistic PERT) effort or cost estimates
- Understaffed activities or groups of activities
- Outsourced and contract work

Uncover Additional Risks

Identify *additional risks* outside the overall planning process by determining other exposures, such as:

- Communications or language challenges
- Possible regulatory or other external changes

- Potential market or user shifts in project requirements
- Potential business reorganization or loss of project sponsorship
- Loss of proprietary or confidential information

Augment the risk list of identified risks with the whole project team. Gather to **brainstorm** additional risks by:

- Examining project assumptions and constraints
- Inspecting project documents
- Capturing potential risks from Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis
- Developing project scenarios and exploring them for worst cases and risks
- Assessing the impact of potential delays and slips

Not all uncertainty on projects will hurt you. Before closing your risk identification, spend a bit of time considering *uncertain opportunity situations*, and add these to your listed risks.

Document Risks

Create a *risk register* containing all identified risks. Clearly describe each listed risk. Define the potential consequences to the project for each risk. For every risk, identify a trigger event that will reveal that the risk has occurred or is about to occur.

78

Risk-Management Planning (PMBOK® Guide 11.1)

What: Documenting how you will deal with project risks.
When: Project planning.
Results: Understanding of project stakeholder risk tolerance and a systematic approach for dealing with project risk.

Assess Stakeholder Risk Tolerance

Different organizations have radically different *perceptions of risk*. Assess the willingness to accept risk among the sponsors, stakeholders, and team members through:

- **Meetings**
- Discussions and interviews
- Review of organizational policies
- Development of the **project charter** and other initial project documents

Test project assumptions by asking clarifying questions of the people listed in **stakeholder identification**. *Validate risk tolerances* with project stakeholders.

Determine Risk-Management Processes

Ensure that risk management is part of **project plan development** and **project plan execution**. Plan for use of existing templates and standards for risk identification and management and *integrate risk activities* into the project methodologies and development methods you plan to use. Use historical project information from **closing projects** and lessons learned on earlier work as a foundation to identify opportunities for risk-management **process improvement**.

Adopt an overall process including:

- **Risk identification**
- **Qualitative risk analysis** and, as appropriate, **quantitative risk analysis**

- **Risk response planning**
- **Risk monitoring and control**

For small projects, risk planning may be informal, but for large, complex projects, you may want to document your *plan for risk management*. As part of **cost budgeting**, secure *commitment for funding* and staffing of risk management.

Typical risk plans include:

- A summary of your approach for managing risk
- Stakeholder attitudes and other information
- Planning processes, tools, and **project metrics**
- Existing standards, definitions, and report formats for risk management
- Risk-focused activities during periodic **project reviews**
- Planned project risk-management activities

Use Risk Surveys and Overall Assessments

Use *risk questionnaires*, surveys, or other methods to assess overall project risk. Probe for exposures related to your **project objective and priorities**, customers and users, development methods, and your **project infrastructure**.

Using paper forms, online surveys, or interviews, identify sources of *overall project risk* and propose **organizational change** to reduce systemic project risk.

79

Risk Monitoring and Control (PMBOK® Guide 11.6)

What: Tracking identified project risk triggers and responding as necessary.
When: Project execution.
Results: Fewer project surprises and prompt and effective response to problems.

Monitor Risks

This process is part of **project plan execution**. Throughout your project you need to use your **risk-management planning** to monitor and resolve both the known risks documented during **risk identification** and unanticipated risks that arise as your project progresses. Be proactive. Have the owners for each contingency plan developed during **risk response planning** monitor for specific *risk triggers*. Identify developing risk situations during your project **status collection** and **project variance analysis**.

Use *trend analysis* of **project metrics** (such as **earned-value management**) to identify potential future risks.

Periodically reevaluate project risks during **project reviews**. Update the risk register, analyze and prioritize the risks, and plan responses for all significant *new risks*.

Respond to Risks

When a risk occurs, whether anticipated or not, *respond promptly*. If there is a contingency plan established for the problem, begin its execution as soon as practical.

For unexpected risks or risks you chose to accept, involve the project *team members* in the response planning. Develop a response to the risk using techniques for **schedule control** and **cost control** and attempt to *recover quickly*. Seek work-arounds and ad hoc responses that are consistent with your **project infrastructure** decisions. Track your recovery using **issue management**.

If *major changes* appear to be necessary, validate your proposed response using **integrated change control** processes before committing to it. Discuss any major changes with the project sponsor and appropriate stakeholders. When necessary, use **problem escalation** to obtain approval. Responses to major risks may require **negotiating project changes** and result in new **project baseline setting**.

Inform the project team and appropriate stakeholders of your plans and *implement the risk response*.

Verify That the Response Was Effective

Following your response, monitor to ensure that your response obtained the *expected results* and did not lead to adverse unforeseen consequences.

If the risk situation continues, seek a better solution through *additional risk response planning*.

Document Risk History

As part of risk control, *update project documents* that are affected by your responses and report the results of your efforts in your project **communications management**.

Add the information about resolved risks to your project information archive and add descriptions of new risk situations encountered to *risk checklists*, templates, and databases. Analyze risk data during project reviews and in capturing lessons learned when **closing projects**.

80

Risk Response Planning (PMBOK® Guide 11.5)

What: Determining how best to deal with high-severity known risks.
When: Project planning and execution.
Results: Adjustments to the project plan dealing with preventable risks, with contingency plans for other risks.

Identify Risks Requiring Response

Read down the risk register sorted using **qualitative risk analysis** or **quantitative risk analysis**. *Select* the significant risks from your **risk identification** that you should manage (typically, these will have at least moderate probability and impact).

Review the *trigger events* for these risks and determine when on the project's timeline the risk is most likely to occur. As Figure 80.1 shows, risk management involves prevention and planning in advance of a risk trigger and risk responses after the trigger.

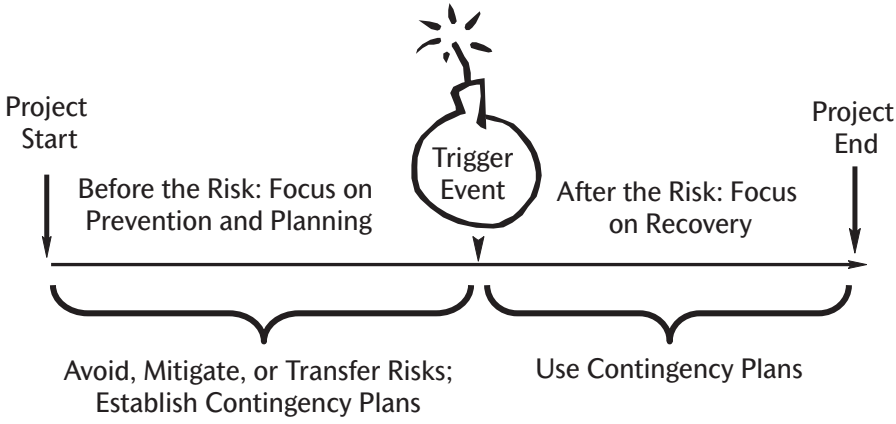

Figure 80.1. A risk on the project timeline.

Categorize Each Risk

Seek the *root cause* of each risk to be managed. Use **cause-and-effect analysis** to determine the source(s) of the risks, striving to better understand the risks and to determine whether they are potentially controllable. Probe deeply to uncover the source of each risk, not just its symptoms.

When risk sources are under your control, *prevention strategies* may provide solutions; for uncontrollable risks, risk management requires *recovery strategies*, as shown in Figure 80.2.

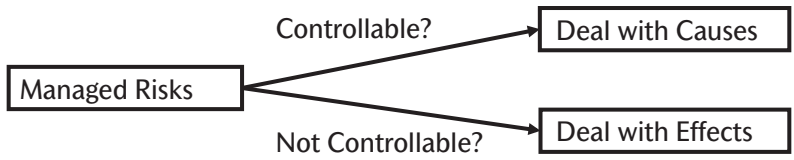

Figure 80.2. Risk response strategies.

Deal with Risk Causes

Risk prevention strategies include *avoidance*, *mitigation*, and *transfer*.

Risk *avoidance* involves replanning project work to remove the source of the risk entirely. Avoiding risks may involve changes such as:

- For scope risks: Committing to the minimum acceptable deliverable, avoiding new technology, buying instead of making components.
- For schedule risks: Reducing the number of activity dependencies, scheduling the high-risk activities early, decomposing lengthy activities.
- For resource risks: Getting names and commitments for all work, building needed skills, eliminating overcommitments.

For risks that you cannot plan around, **brainstorm** ideas for *mitigation*, reducing the risk probability or impact (or both). Mitigation tactics include ideas such as:

- For general situations: Improving **communications management** and risk visibility, securing strong **sponsorship**, employing **stakeholder engagement management**, keeping users involved, documenting and enforcing the **project objective and priorities**, **negotiating project changes** to remove root causes and reduce uncertainty.

- For scope risks: Freezing specifications, rigorously managing **scope change control**, building models and prototypes, adopting agile methods, keeping all documents current.
- For schedule risks: Using "expected" **activity duration estimating**, scheduling the highest-priority work early, holding **project reviews**, tracking rigorously.
- For resource risks: Avoiding overtime, building trust and teamwork, maintaining a rigorous focus on **procurement control**.

In situations involving significant financial risks, *transfer* may be effective. For some projects, insurance against large unexpected expenses may be justified in the project budget.

Examine each risk prevention idea, comparing its *costs* (such as time, money, and effort) with its *benefits* in risk reduction. Select any ideas that lower project risk impact at justifiable cost, and update your project plan. After incorporating your risk responses into your plans, update your risk register and reprioritize it to reflect the changes.

If you uncovered any significant uncertain opportunities in your risk identification, update your project plans to take advantage of them as well.

After adopting all appropriate responses and adjusting your plans, reassess your listed risks and update your risk register.

Deal with Risk Effects

For all significant risks that remain in your risk register, consider plans for *recovery*. Recovery responses may be either determined in advance (*contingency planning*) or coincident with the risk event (*acceptance*).

Prepare *contingency plans* for the most significant risks you cannot prevent. Use your **project plan development** process to create a plan for recovering from each risk. Ideas include:

- General strategies: Using schedule or budget reserve, raising the project priority.
- Scope risk strategies: Relaxing some specifications, reprioritizing features.
- Schedule risk strategies: Postponing noncritical activities, using alternative methods or known work-arounds, shifting staff, rescheduling work.
- Resource risk strategies: Using overtime, outsourcing work, getting staff from lower-priority projects.

For each contingency plan, identify *triggers and owners*. Assign an owner to monitor each risk, and clearly specify the trigger event that the owner will monitor.

For some risks, it may be impractical to plan for risk-recovery in advance. When developing a detailed risk response is not an option, you may choose to *accept* the risk, proceeding with no specific risk response. This tactic is generally used for very minor risks (including all the risks on your risk register that you chose not to manage).

Use Risk Information

Evaluate overall project risk and use risk data in your **project baseline setting**. For undertakings that appear especially risky during planning, **canceling projects** before devoting additional effort could be your best option.

Document all risks and keep them *visible*. Post a "top ten" list.

Projects are unique, so not every risk can be identified. Use historical norms and past experiences to gauge unknown risk. Compile contingency planning, worst-case consequence data, and other risk analysis to justify and establish schedule and budget *reserves*.

81

Schedule Control (PMBOK® Guide 6.7)

What: Monitoring project activities and managing project timing.
When: Project execution.
Results: Accurate project activity tracking and plan adjustments as required to meet milestones and deadlines.

Determine Status and Analyze Variances

Schedule control is central to **project plan execution**. It follows **status collection** and **project variance analysis** in the project-tracking cycle. It is necessary in any cycle where you discover a significant schedule variance. For each variance, use **cause-and-effect analysis** to understand the *root cause and impact* on the project timeline. If the root cause relates to contributor underachievement, work toward **performance problem resolution**. Determine whether the impact is a onetime or short-term issue, or if the source might be a longer-term, chronic problem.

Plan Responses

Review your **project infrastructure** decisions and **integrated change control** process to *ensure consistency* with agreed-upon principles and your **schedule planning**.

For each schedule variance you uncover, involve your project *team* in **issue management** and response planning. Engage as many perspectives and problem-solving points of view as practical.

Determine the impact of schedule variances on the overall project by **forecasting project completion**. Depending on the severity of the problem and its root causes, the *response* may be:

- A minor change consistent with the **project objective and priorities**
- Implementation of a contingency plan developed during **risk response planning**
- A major change to the project

For *short-term* schedule problems, consider "brute force" solutions, such as working overtime in the evenings or on nonworkdays.

For more significant problems, **brainstorm** approaches that could bring the project back on schedule. Explore options using the processes of **project plan development**, especially **constraint management and plan optimization**. Develop plans that deal with the root causes of each variance, not just the symptoms. **Software and technical tools** can be very useful when exploring "what if?" planning scenarios. Avoid adopting the first alternative you develop; work to generate a number of credible *responses*. Typical responses include:

- Changing the logical flow of the work
- Breaking future activities into smaller tasks executing in parallel ("fast tracking")
- Finding new, faster ways to expedite project work
- Adding resources to compress duration estimates ("crashing")
- Working extra hours (even though "planned overtime" adds risk and reduces **motivation**)
- Reassigning available team members (or the project leader) from less-time-critical activities
- Reducing the scope of the project deliverable
- Implementing responses that have been effective in similar past situations

For problems that cannot be solved using conventional analysis, use **creative problem-solving**. Allocate a reasonable amount of time to plan a response, but avoid "analysis paralysis." Set a time limit for planning and use systematic **decision-making** to promptly choose the *best idea* available.

Take Action and Document Results

Validate the response you select before you implement it. Verify that your proposal is consistent with your project priorities. If the response involves changes to the deliverable, get approval for it through **scope change control**. Discuss any major changes with the project sponsor and appropriate stakeholders. If necessary, use **problem escalation** and **stakeholder engagement control** to engage high-level decision-makers and to obtain their approval. Major changes may require **integrated change control** and may result in new **project baseline setting**.

Inform your project team, stakeholders, and others involved about your plans and *implement the response*.

Following implementation, monitor to ensure that your response obtained the *expected results* and did not lead to adverse unforeseen consequences. If problems persist, seek a better solution through additional planning.

Update any project and *planning documents* that are affected by the actions, and keep people aware of project status in your reporting and **communications management**.

82

Schedule Development (PMBOK® Guide 6.6)

What: Developing a project schedule based on calendar dates.
When: Project planning and execution.
Results: Identification of critical paths and a schedule that can be used for analysis, negotiation, and tracking.

Document Relevant Nonproject Dates and Factors

Schedule development is an essential part of **project plan development**. It combines **activity duration estimating** with **activity sequencing** to determine *calendar dates* for the project, based on bottom-up analysis and based on your **schedule planning**.

Begin the process by creating a *project calendar*. Identify all significant dates important to the project, including the project start date, any timing constraints, expected interim and final deadlines, and any key dates when your project will interact with other scheduled work. Also include information about the project team from **responsibility analysis** and **human resource planning**, such as:

- *Weekends* you plan to work (if any)
- *Holidays* and other nonworkdays—for all locations doing project work
- Each team member's *planned vacations* and other timing conflicts
- *Mandatory organizational events*, key dates, and meetings
- Planned *site closures*
- Scheduled *equipment downtime* for maintenance

If you are using **software and technical tools**, *enter calendar information* into them. Establish your project calendar in the database before entering project activity estimates and dependency data.

Analyze and Document the Project Schedule

You can determine the project's *critical path* (or paths) by combining your duration estimates and activity dependencies. A critical path has the longest

total duration of any continuous connected string of activities in your project. Critical-path analysis may be done either manually or using computer software. Manual analysis may be difficult for projects having more than about 100 activities.

Critical-path methodology (CPM) relies on two analysis passes through the project: a *forward* analysis pass to calculate the earliest date each activity could be scheduled and a *reverse* analysis pass to calculate the latest date for each activity consistent with the end date established by the forward pass.

Determine the early schedule for each activity first, working forward in time along each of the project network's activity paths. The early schedule defines the dates when work can begin and can be expected to end. Early schedules are normally used for project execution and tracking.

Perform the same type of analysis by working backward in time from the end of the longest (or critical) activity path to determine a *late schedule* for each activity. The late start and late finish for each activity reveal the maximum timing delay that can be tolerated without extending the project critical path.

Project activities that have a positive timing difference between their late schedules and early schedules are identified as *noncritical*, and the calculated difference between the two schedules is called *float* or *slack*.

Project activities with zero float (having identical early and late schedules) are on the project's *critical path*. All activities with no float are linked to other critical activities through dependencies, and these connections in aggregate define at least one project critical path. (Activities are also critical when they have *negative float*, which can occur if the project deadline must be a date earlier than the calculated end date for the critical path.)

Computer scheduling tools *automate the analysis* (which can be quite tedious) and generally display the noncritical activities in soothing blue and the critical activities in scary red.

Computers are able to generate time-scaled bar charts of project activities, also called *Gantt charts* (after their originator, Henry Gantt). Simple Gantt charts, such as the one in Figure 82.1, can display dependencies (as in this example, created using Microsoft Project), but network charts are best for showing workflow for complex projects.

Adjust Plans to Meet Project Constraints

Use your calendar data to review project workflow, particularly activities scheduled in parallel. If there are timing problems, *modify activity duration estimates* as needed, or adjust dependencies or delay work as necessary to

ID	Task Name	Duration	Predecessors
1	**Project Skywalker**	**50 days**	
2	Start	0 days	
3	Determine Specifications	5 days	2
4	Design System	5 days	3
5	Develop Test Plan	2 days	3
6	Document System	7 days	4
7	Buy Hardware	10 days	4
8	Write Software	15 days	4,5
9	Identify Test Users	3 days	5
10	Build System	10 days	6,7,8,9
11	System Built	0 days	10
12	Install User Systems	5 days	11
13	Perform User Tests	2 days	12
14	Fix User Test Defects	7 days	13
15	Release System	1 day	14
16	End	0 days	15

Figure 82.1. A Gantt chart generated by a computer tool.

resolve any conflicts. Analyze the effort requirements needed throughout the project timeline and use **resource leveling** to extend the schedule if necessary when the effort required exceeds your project team's capacity. You may also need to change activity timing to manage dependencies and interfaces if your project is part of a program made up of **multiple dependent projects**.

Refine your plan to *manage risks*, through **risk identification**, analysis, and **risk response planning**. Add any new activities for risk avoidance and risk mitigation to the project plan and adjust your schedule accordingly.

The schedule resulting from timing, resource, and risk analysis may not be consistent with your desired **project objective and priorities**. Work to *minimize schedule issues* through **constraint management and plan optimization**. If an acceptable alternative plan emerges from your analysis, document it and use it for **project baseline setting**.

If your best planning efforts fail to support stated project objectives and constraints, develop one or more realistic project *plan alternatives* that are close, and present these options when **negotiating project changes**.

Document and Use the Schedule

Capture your *schedule documentation* using a Gantt chart in a computer tool or at least in a table, computer spreadsheet, database, or notebook.

Computer simulations using project management applications that provide Monte Carlo schedule analysis can be used to analyze timing risks. Such tools can display project schedules using distributions and histograms and forecast probabilities associated with project completion on or before specific calendar dates.

Use the early activity schedule dates for **status collection** and **project plan execution**, and keep your schedule *current* through **schedule control**.

Revalidate your overall schedule periodically during **project reviews**, especially for lengthy projects.

83

Schedule Planning (PMBOK® Guide 6.1)

What: Documenting the scheduling processes for a project.
When: Project initiation and planning.
Results: A clearly defined process specifying how project workflow will be determined and managed that provides control of timing requirements throughout a project.

Prepare for Schedule Planning

Schedule planning is part of overall **project plan development**. It begins with a review of project information from **project initiation**, including:

- **Project infrastructure** decisions
- **Sponsorship** and **stakeholder identification**
- The **project objective and priorities**
- **Project charter** components, especially those related to constraints, staffing and funding assumptions, and timing expectations

Identify any *missing information* you require, and determine what you will need to do to provide it.

Also consider **project life cycle** and methodology requirements for your project. Scheduling for traditional projects involves significant up-front effort to prepare a credible planned workflow for the project as a whole, while projects employing agile methods plan broadly for a sequence of delivery cycles, and in detail only for the next iteration or two. *Align your schedule planning* with the approach best suited to your work.

Scheduling for most modern projects also depends heavily on **software and technical tools**. In preparing to develop the schedule for your project, *determine your needs*. Small projects can be easily managed without specialized software, and for small projects, the effort involved in learning and using a new application may represent unnecessary overhead. However, projects longer than a few months or with more than 100 tasks in their **activity definition** will generally derive benefits from using at least low-end project management software. Considerations in selecting an application include:

- *Cost* (software, training, support, upgrades, or other expenses)
- *Adoption by peers* (with resulting access to local expertise)
- *Ease of use* (installation, learning curve, operation, updates)
- *Compatibility* with organizational standards and related applications
- Need for specialized *risk analysis* and modeling
- Extensive *resource analysis* and tracking requirements
- *Customized reporting* capability
- Requirements for *import and export* of project information
- Coordination and analysis of schedules for **multiple dependent projects** with workflow dependencies
- Internet or other remote access

Adopt a tool that *meets your needs*, without a lot of excess capability that will increase the cost and make operation confusing. For projects lasting six months to a year and having a modest number of external dependencies, midrange tools (such as Microsoft Project) are generally adequate. For larger projects or projects requiring more access and analysis capabilities, high-end "enterprise" tools (such as the suite of applications from Primavera or similar offerings) may be a better choice. Although multiuser packages can be a lot more costly and difficult to master, they offer capabilities not present in the midrange scheduling tools and can be very useful when working with a **project office**.

If you decide to employ a software application to support your project scheduling, *master the tool*. To get the full benefit from any project management tool you are not familiar with, you will need to find a mentor or attend training. Build your skills through practice and use of the tool. Even if you are experienced, work to increase your efficiency through collaborating with others who use the same software. Work with your peers to create project plan templates that contain all the standard activities included in typical projects and strive to improve these boilerplate plans.

Also, commit to *effective use* of any software tools you select. All project scheduling tools are fundamentally just databases packaged with some associated reporting and analysis capabilities tailored for project management. No tools can plan or manage your project for you, but if you use them wisely, they can make your job easier. If you capture your project workflow using bottom-up analysis of project dependencies (as opposed to "must start on," top-down imposed deadlines), a scheduling tool can be a great help in "what if?" analysis, **constraint management and plan optimization**, and **risk response planning**. As you proceed into **project plan execution**, you can also use a dependency-based schedule to collect and compare actual schedule and cost information with plans for your project reporting and **communications control**. Throughout your project, use the software in analyzing

consequences of timing issues and **forecasting project completion**, and to support ongoing **integrated change control**.

Develop Scheduling Plans

Determine who from your project team needs to contribute to the scheduling efforts, and secure their commitment to be involved with **activity definition** (derived from the **work breakdown structure**), **activity duration estimating**, **activity sequencing**, and other work required for workflow analysis and **schedule development**. Schedule a project **start-up workshop** and integrate scheduling activities into its agenda and other planning **meetings**.

Decide how you will do **status collection** of **project metrics** related to timing and how you plan to *manage schedule information* in your project management information system and in any scheduling tools you plan to use. Define your **communications management** for scheduling information, including the formats you plan to use in your reports, **presentations**, and other documentation. Also determine the methods you will use for **schedule control** throughout your project. Plan for appropriate security and how you will manage storage and remote-access requirements for your tools.

Finalize and Use Your Schedule Plans

Validate your scheduling processes with your sponsor, document your plans, and communicate your intentions to your project team members.

Use your plans to develop your project estimates and schedule. Coordinate your schedule plan with your **scope planning**, **cost planning**, and other project planning efforts. Use your schedule plans to finalize your **project baseline setting**.

84

Scope Change Control (PMBOK® Guide 5.6)

What: Managing specification changes to the project deliverables.
When: Project execution.
Results: Acceptance of changes that represent net benefits, and rejection or deferral of other proposed changes.

Define the Process for Change Control

Once the project **scope definition** and the **project baseline setting** are finalized, use a *documented* scope management process to deal with scope changes. Managing the specifications for project deliverables is essential for **integrated change control**. Although the formality of the control process may vary, even on short or agile projects a written process helps in maintaining scope stability and control. Effective processes default to a response of "reject." An effective scoping process forces all proposed changes to establish their business value before becoming part of the project. Figure 84.1 shows a typical change management process flowchart.

Effective change control also requires appropriate *authority* for the people who will review, analyze, and decide on proposed changes. To guard against frequent unnecessary change, approvers need the power to say "no" (or at least "not yet") and make it stick.

Review Change Proposals

People who propose scope changes generally do so either to solve project problems or to respond to opportunities. Whatever the source or motivation, document all proposed changes *in writing* and include information such as:

- The situation that makes a change necessary or desirable
- A quantitative assessment of benefits from the change
- The estimated consequences of the change on schedule, cost, and other project factors
- Specific resources needed for the change

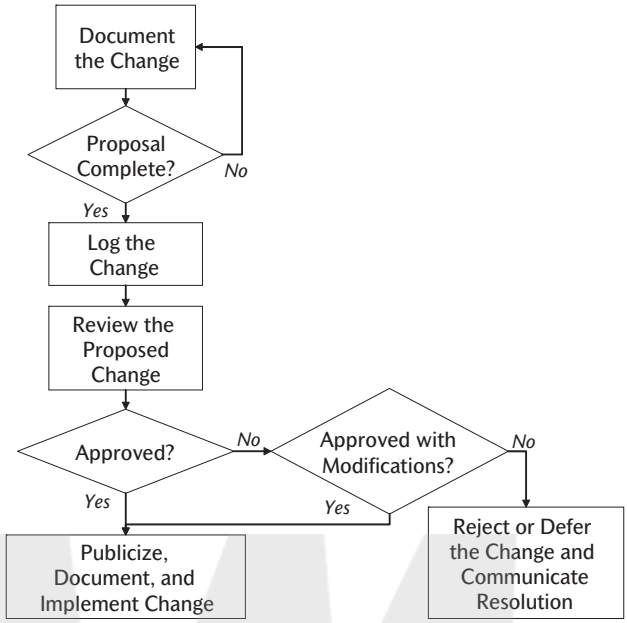

Figure 84.1. A change management process flowchart.

Following submission, review each proposed change for *completeness*. If the information is unclear or data is missing, return the request to the author for revision before further consideration.

When the proposal is satisfactory, *log* the submission and set a time for its review. Provide information on the change to the people who are responsible for evaluation, review, and approval, and let the submitter know when to expect a decision. Some project leaders find it useful to categorize changes as *small* (negligible effect on the deliverable or project), *medium* (some change to scope but low impact to the project plans), or *large* (significant change to both scope and the project baseline).

Analyze and Decide on Each Proposed Change

For each change, review the current situation and verify that the change proposed is the best alternative available. *Validate* that the change proposed is feasible and that it could realistically achieve the result expected while avoiding unintended consequences.

Analyze the *impact* of the proposed change. Determine its effect on:

- The project schedule
- Additional project activities and effort

- Costs for additional equipment, components, training, rework, or scrap
- Contracts for purchasing of materials or outsourced services
- Customer satisfaction
- **Project objective and priorities**
- Other projects

Assess the *benefits* of the proposed change. For problem-solving changes, determine the expense impact and any schedule slippage. If the change is a response to an external shift (modified legal requirements, new standards, competitor actions), estimate the impact of failing to respond. Project changes involving opportunities must be supported by credible (not optimistic) estimates for increased sales, value, or usefulness as a result of the change. If a change is in response to a customer request, determine why the customer needs it and what he or she believes it is worth.

Analyze the *net benefits* of each change. Determine the overall value of the change by contrasting the costs and other consequences of accepting the change with its reasonably expected benefits. When considering multiple changes at the same time, prioritize them based on realistic net benefits and other relevant criteria.

Use a consistent process for **decision-making** and *make decisions* promptly. For each potential change, there are four alternatives: approval, approval with modification, deferral, and rejection. Reject all changes that lack a compelling, credible business case. Before approving a beneficial change, verify that all of it is necessary and consider the impact of deferring it to a later time. Approve changes sparingly and only when supported by significant business needs and consistent with project constraints.

Communicate and Document

Document the decision for each change request in writing. Note the reason for the decision and *communicate the results* to team members, appropriate stakeholders, and the submitters.

Log the *disposition* of each change and add the change decisions to your project information archive, for use in **project reviews** and analysis of lessons learned when **closing projects**. Maintain a list of deferred changes for use in future iterations, phases, or follow-on projects.

Update project plans and documentation as necessary and revisit **project baseline setting** following any accepted major changes.

Implement all approved changes promptly and monitor for expected results and any unintended consequences.

85

Scope Definition (PMBOK® Guide 5.3)

What: Formally specifying the project deliverables.
When: Project initiation and planning.
Results: A clearly written scope statement and specifications for all deliverables.

Assemble Deliverable Data

Begin your *scope definition process* using your **scope planning** and **project infrastructure** decisions.

Collect project information that emerges from the **project initiation** process. Input data for scope planning includes:

- **Project objective and priorities**
- **Project charter**
- **Requirements collection**
- Constraints and assumptions

Involve the core team and others as needed to review the available information.

Assess project data for completeness, considering aspects such as:

- Regulatory, legal, and standards compliance
- Analysis of alternatives and competition
- Measurable performance and other goals
- Delivery, support, training, documentation, installation, distribution, and other aspects
- Technical and other risks

Document what is known about each project deliverable and *identify data gaps*.

Resolve Unknowns

If you lack any information on user needs, conduct or encourage **customer interviews** or other **market research**. For significant *missing information*, determine the work necessary and identify the activities that will need to be added to the project. If needed information remains unavailable, note it in project **risk identification**.

For each project deliverable, minimize fuzzy specifications using an "*Is/Is not*" list. Document all requirements and constraints that must be met in the "Is" part of the list. List features and aspects of the scope that are desirable, but not required, in the "Is not" part of the list. Use **brainstorming** and **creative problem-solving** techniques to explore opportunities, and select your best deliverable options.

For projects employing agile methods, also identify requirements for future development cycles or phases based on value, priority, urgency, or other relevant criteria. Focus particularly on detailed deliverable definitions for the next iteration or two, outlining your specific plans for future adjustments to manage unknowns as you proceed.

Define *measurable standards* for each project deliverable and document the processes that will be used for testing and evaluation during **scope verification**. Identify who must approve the results of testing and sign off for approval.

Document Scope

Write a high-level *scope statement* that includes a brief description of all committed project deliverables.

For *each deliverable*, specify:

- What it is and what it is not
- Needed functionality
- Interface and usability requirements
- **Quality planning** standards for performance, reliability, and **quality control**
- Documentation, training, and support needs
- Acceptance tests

Document how you will *manage scope* throughout the project, with emphasis on **scope change control**.

Obtain Approval

Validate your scope statement, deliverable definitions, and plans for scope management with your project sponsor, and with users, customers, and other stakeholders as needed. Resolve misunderstandings early in planning to avoid later rework and changes. When necessary, get formal sign-off for your scope documentation.

Use the scope planning data for activities as a basis for your **work breakdown structure** and other **project plan development** efforts and for your **integrated change control**.

86

Scope Planning (PMBOK® Guide 5.1)

What: Documenting the scoping processes for a project.
When: Project initiation and planning.
Results: A clearly defined process specifying how project deliverables will be determined and managed throughout a project.

Prepare for Scope Planning

Scope planning is part of overall **project plan development**. It begins with a review of project information from **project initiation**, including:

- **Project infrastructure** decisions
- **Sponsorship** and **stakeholder identification**
- **Project objective and priorities**
- **Project charter** components, especially those related to expected results

Identify any *missing information* you need and begin working to develop it, updating your project documentation as necessary.

Also consider **project life cycle** and methodology requirements for your project. Scoping for traditional projects involves significant up-front effort to lock in stable specifications and requirements for the project as a whole, whereas projects employing agile methods plan for step-by-step delivery of results based on feedback and frequent scope adjustments. *Align your scope planning* with the approach best suited to your work.

Develop Scoping Plans

Determine who from your project team needs to contribute to the scoping process, and secure each individual's commitment to be involved with **requirements collection**, **scope definition**, and development of your **work breakdown structure**. Schedule a project **start-up workshop** and integrate scoping processes into its agenda and into other planning **meetings**.

Decide how you will collect and *maintain scoping information* and how you will manage it in your project management information system. Define the formats for scoping reports, **project metrics** related to your deliverables, and the processes you will use for **scope change control** throughout your project. Plan for use of **software and technical tools** to facilitate storage, remote access, and **communications management** of your scoping information.

Closely align your scope planning with your **quality planning** and ensure that your overall project plans support both achieving the documented specifications through **scope verification** and *satisfying the needs* of your customers, users, and stakeholders.

Finalize and Use Your Scope Plans

Validate your scoping processes with your sponsor, especially your **scope change management** process. Document your plans and communicate your intentions to your project team members.

Use your plans to create and document your project scope. Coordinate your scope plan with your **schedule planning**, **cost planning**, and other project planning efforts. Use your scope plans to complete your **project baseline setting**.

87

Scope Verification (PMBOK® Guide 5.5)

What: Obtaining formal acceptance of project deliverables.
When: Project execution and closure.
Results: Sign-off by customers and other appropriate stakeholders for intermediate and final project outputs.

Review Acceptance Criteria

As part of **schedule development**, incorporate activities for testing, validation, and obtaining *formal approval* of project deliverables. Scope verification is an important part of **closing projects**, but verification activities may occur throughout a project. Base scope verification on your **scope planning** and coordinate it with your project **quality assurance** and **quality control**.

Review the **requirements collection**, **scope definition**, **work breakdown structure**, performance objectives, and other scoping documentation. Document the processes, standards, and equipment required for acceptance testing and ensure that the resources will be available and operating properly when they are needed. Whenever requirements are modified through **scope change control**, update your specifications and acceptance tests as necessary.

Test and Evaluate

As project outputs are completed, do an *internal assessment* with your project team, inspecting, examining, and checking the results. Identify any defects or problems, revise your plans as needed, and work to correct any deficiencies.

For project deliverables requiring *external validation*, involve stakeholders responsible for sign-off in testing and evaluations to verify that the deliverables meet all documented requirements.

If the project deliverables are consistent with the specifications, get *formal approval*. If the deliverables *fail to meet* the measurement standards, do one of the following:

- Address the issues promptly and obtain sign-off.
- **Negotiate project changes** consistent with the results achieved and obtain sign-off.
- Capture status information and plan for additional effort.
- Initiate other efforts for resolution (or for **canceling projects**).

Document Sign-Off (or Status)

Incorporate the *outcome* of your scope verification in your **communications management** and project performance reports and add the results of all inspections and tests to your project management information system.

88

Software and Technical Tools for Project Management

What: Using computer applications to facilitate project management processes and communications.
When: Throughout a project.
Results: Lower overhead and effort and better-quality project information.

Software Tools

Modern project management increasingly depends on technology for organizing information, communicating, and other functions. Choosing and effectively using appropriate tools can significantly contribute to project success and reduce stress (and the wrong tools can do the opposite).

Select Tools for Planning and Scheduling

Small projects can be easily managed without specialized tools, but large projects can benefit significantly from the use of project management software. *Selection criteria* for picking tools start with a survey of what your peers are using. Adopting a tool that others find effective for similar projects makes a lot of sense, and it never hurts to have local experts you can consult when you need help. Also consider factors such as cost, functionality, ease of use, and reporting capabilities. If you have one, get a recommendation from your **project office**. You will find specific tips for selecting, adopting, and using scheduling software in the chapter on **schedule planning**.

Once you have adopted a tool, *use it*. While no software tool can plan or manage your project for you, it can make your job easier. The tool's database can help in collecting and organizing project information for **project plan development**. Your scheduling tool will be a great help in "what if?" analysis, **constraint management and plan optimization**, and **risk response planning**. Use the software to assist you in **status collection** and to support your **schedule control** and **cost control** throughout **project plan execution**.

Select Tools for Communication

Consider all reasonable *communications options* in your **communications planning**. Use technology for **communications management** and **communications control** to support project reporting and archiving of project data needed by the project team.

When working with *distributed teams*, carefully choose any technological tools you will use. For communication with **global teams**, adopt tools and techniques that all the team members can and will use effectively, and conduct tests to ensure compatibility.

For **meetings**, *teleconferencing* is the most common tool. Telephones, videoconferencing, and computer networking methods can all be effective. Specialized media rooms set up for videoconferencing and web-based meetings are particularly useful when participants need to share images, graphics, software applications, live video, or other complex visual information. For technology-assisted meetings, select technology that all the participants can competently use, and integrate it into your **project infrastructure**.

Formal communications via email and other *computer messaging* technologies are also vital to virtual teams, especially when there are significant time differences. Resolve any issues of access, technical compatibility, and security early, enabling team members to communicate freely. Whenever software upgrades or new versions are scheduled, give everyone prior warning. Repeat your compatibility tests after any changes or new releases. Check that attachments to emails and files stored on computer networks are accessible using software available to all team members. If some team members have limited network access, avoid techniques that require very large files or significant bandwidth.

Consider using social media, instant messaging, or other electronic communications as part of **communicating informally** throughout your project. Work to maximize the benefits in relationship building and teamwork while minimizing the potential for interruptions and lowered productivity.

Also determine whether the file-sharing and *collaboration tools* that you plan to use will provide sufficient compatibility, performance, and security. Use of web-based tools, E-rooms, file servers, project management software applications, and other distance collaboration tools can be very effective in technical projects when carefully planned and aligned with project requirements.

Consider Other Tools

Risk-management software (including both applications compatible with scheduling software and functions built into high-end project management software) can be useful for **quantitative risk analysis** and project modeling.

Decision support software applications can be very effective for **decision-making** in complex project situations where evaluation will be based on weighted criteria.

Issue-tracking systems, either purchased or based on a spreadsheet or other database, will facilitate effective **issue management** and **integrated change management** on large programs.

Time- and resource-tracking software can support detailed reporting requirements for government and large commercial projects. Such software can also support automated collection of **earned-value management** metrics and assist in accurately **forecasting project completion**.

89

Sponsorship

What: Establishing and maintaining management and organizational support.
When: Throughout a project.
Results: A fast project start, protection of project resources, prompt decisions, removal of barriers, and management of escalations.

Define the Role of the Sponsor

Project sponsors have *responsibilities* throughout projects, not just at the start:

- *Initiation*—Committing resources, providing data, getting work started
- *Planning support*—Providing guidance, validating plans
- *Execution support*—Making decisions, solving problems, providing approvals

Initiate Sponsorship

Sponsors select projects, but often they do not provide all the information needed to get them going. If the **project objective and priorities** are unclear, or the **project charter** is incomplete or missing, you must fill in the gaps. Find out the *purpose* for the project from the sponsor.

Work with your sponsor on **stakeholder identification**, listing those who will contribute to the project's successful completion. Verify that **project infrastructure** decisions for reporting and **communications planning** will adequately support your **stakeholder engagement management**.

Verify the initial *resource commitments* for the project, for staffing, funding, equipment, travel, training, and any other identified expenses.

Get approval from the sponsor to hold a project **start-up workshop** to get the project off to a *fast, effective start*. Involve the sponsor in the workshop if possible, either at its start or at the end.

Following initial analysis of the project data and **scope planning**, *check your understanding* of the project with the sponsor by validating the **scope definition** and overall priorities.

Project sponsorship can be time-consuming. Sponsors who begin more than six projects, even if they are small, will probably support at least one of them inadequately. Discuss the *ongoing support* you need throughout your project and secure commitment for it from your sponsor.

Support Planning

Throughout **project plan development**, *keep the sponsor informed* of (but not necessarily involved with) your progress.

As planning continues, *consult* with the sponsor as necessary to get guidance for **decision-making** and for managing trade-offs during **constraint management and plan optimization**.

Establish procedures during the planning process for **problem escalation**, **scope change management**, and other practices for project control. Verify support for *control processes* with your sponsor, document them, and request explicit approval.

At the close of planning, assemble your planning documents. If the expected results based on your *best* plan fall short of your sponsor's expressed objectives, also document two or more bottom-up plans supporting alternative, credible projects. Use this data when **negotiating project changes** with your sponsor. *Validate* a realistic plan, freeze the scope specifications, and complete **project baseline setting**. Finalize your baseline and use it for **communications management** and **stakeholder engagement control**.

Guide Execution

Communicate *summary-level project information* to the sponsor frequently. Provide factual reports promptly, even when they contain bad news. Meet with your sponsor regularly to discuss the overall progress of the work and to keep the project visible.

When any aspect of **integrated change control** represents *impact to the project objective*, involve the sponsor in evaluating options and making decisions.

Whenever project progress stalls because of sponsor delay in responding to a **problem escalation**, a necessary approval, or a project decision, use **issue management** to *set due dates and communicate consequences* of any continued holdup. When necessary, delegate ownership upward and track the status in your project status reports.

Whenever a sponsor will be *unavailable* for more than a few days, locate a named individual who will have decision and signature authority to ensure continuity.

When **closing projects**, use **scope verification** to obtain your sponsor's approval of final deliverables.

Promptly Replace Lost Sponsors

If you lose your sponsor (through job change, health problems, promotion, resignation, or retirement), *find a new sponsor*. Document the value of your project and the consequences of failure to convince an appropriate high-level individual to support your project. Possible candidates include people who will be negatively affected if your project fails, key influential stakeholders, and managers who could (and might) cancel your project. Use **influence without authority** techniques to secure continuing support for your project from a new sponsor.

90

Stakeholder Engagement Control (PMBOK® Guide 13.4)

What: Maintaining relationships and stakeholder support for your project.
When: Throughout a project.
Results: Realistic stakeholder expectations and continuing good relationships with key individuals connected to your project.

Set Expectations

Engage stakeholders in setting the **project objective and priorities** using the decisions you made in **stakeholder management planning**. Use inputs from relevant people listed during **stakeholder identification** in your project **requirements collection**. Validate your decisions regarding specifications throughout **scope definition** and **project plan development** with key stakeholders, especially those responsible for your project **sponsorship**. Involve stakeholders responsible for **scope verification** in your **project baseline setting**, obtaining explicit approval for your detailed evaluation and testing criteria, timing, and other parameters.

Actively Manage Expectations

Keep stakeholders *informed* as outlined in your **project infrastructure** and **communications planning**. Practice ongoing **stakeholder engagement management** as part of your **meetings**, project reporting, and other **communications management**.

Use effective and prompt **issue management** whenever *problems* arise, increasing your communication and involving stakeholders in resolution when necessary. Be open and honest in all communications and provide stakeholders with specific information about your recovery plans and progress toward resolution.

When making *project changes*, follow your defined processes for **integrated change control**. For all major changes, involve stakeholders in

negotiating project changes as needed, and inform all stakeholders of any shifts in your project baseline.

On lengthy projects, also involve your stakeholders in **project reviews**, at least providing summary **presentation**s or reports outlining your results and any changes or recommendations.

91

Stakeholder Engagement Management (PMBOK® Guide 13.3)

What: Communicating timely and accurate project status to stakeholders.
When: Throughout a project.
Results: Clear and realistic project understanding by key individuals connected to your project and straightforward closure at project end.

Establish Stakeholder Communications

Set up stakeholder communications based on your **communications planning** and **stakeholder management planning**. Use communication methods your stakeholders find effective and convenient, and ensure that all communication **software and technical tools** you and your stakeholders plan to use are compatible.

Use *standard formats* for routine **communications management** to ensure that your stakeholders can locate the information they need. Tailor reports to maximize their effectiveness for key individuals (such as your sponsor). Minimize the use of acronyms, technical jargon, idioms, and other potentially *unfamiliar language* in stakeholder communications, and always clearly define any terminology you do need to use that might be confusing.

Maintain Stakeholder Communications

Distribute reports and other communications throughout the project as established in your **project infrastructure** planning. Provide reports when they are expected, even in times of stress or when you are reporting bad news. If you do have bad news to report, always be honest and open about the situation and provide specific details about your plans for resolving the problems.

Use your project reporting to keep your project progress visible and support your **stakeholder engagement control**. When providing *formal project*

information to influential stakeholders, review what you have written before sending it. Read it from the perspective of the recipients and thoroughly explain situations they may find complicated. Clarify technical information using graphs, diagrams, and simple descriptions for stakeholders who are not directly involved with your project. Rewrite anything that could be misinterpreted and edit out extraneous detail in all your reports and **presentations**.

Meet, or at least speak on the telephone, with your stakeholders regularly. Focus your *conversations* on project matters, but also spend at least a little time **communicating informally** to maintain the good relationships and trust your project success depends on.

92

Stakeholder Identification (PMBOK® Guide 13.1)

What: Discovering the key individuals who are, or could be, connected to your project.
When: Project initiation and ongoing.
Results: A comprehensive list of all who can affect, or could be affected by, your project.

Find Your Stakeholders

Some stakeholders are individuals who can affect your project, either positively or negatively. Primary among these are the people responsible for **sponsorship** of the work—those who get the project going and then fund and oversee your efforts. Other stakeholders who can potentially impact your project include those who supply resources and staffing, managers of related projects and programs, organizational decision-makers, regulators, and others with influence over your work. For publically funded projects, the potential list of stakeholders may be huge.

In addition, the results of your project will affect others, and these people are stakeholders too. These stakeholders include customers and users, project team members, and potentially many others both within and outside your organization.

Describe and List Stakeholders

As part of **project initiation**, make a list of your known project stakeholders. Drawing a "mind map" diagram similar to the one shown in Figure 92.1 is an effective technique for uncovering related individuals and functions.

As soon as you are able, indentify your stakeholders by name. For stakeholder categories where you lack specific names, add activities to your **work breakdown structure** to identify at least the key individuals for your project. Incorporate the needs of your stakeholders into your **stakeholder engagement planning** and **communications planning**. Discuss the project with your identified stakeholders and use the opportunity to probe for additional stakeholders.

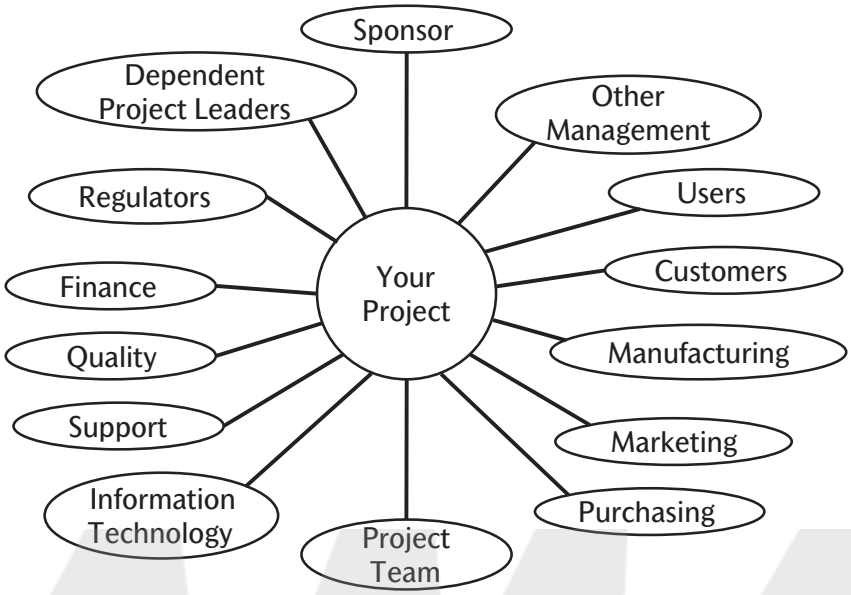

Figure 92.1. Project stakeholders.

For each stakeholder, document contact data, roles and responsibilities, and other information you will need for **stakeholder engagement management** and ongoing communications.

In all stakeholder interactions, strive to be friendly and open. Use all opportunities to build trust and a strong foundation for **stakeholder engagement control**.

93

Stakeholder Management Planning (PMBOK® Guide 13.2)

What: Documenting how you will interact with project stakeholders.
When: Project initiation and planning, primarily.
Results: A basis for communication and cooperation with key individuals connected to your project.

Involve Stakeholders in Project Planning

Involve relevant stakeholders when defining your **project infrastructure**. Include *stakeholder inputs* in your **project charter** and in other relevant project documentation. Work to uncover any conflicting expectations concerning your project held by stakeholders who could affect your project. Initiate contact to begin resolving the differences between them and the people responsible for your project's **sponsorship**.

Determine Stakeholder Requirements

Work with your stakeholders to decide how best to handle formal *project communications*. Define any specialized reporting you will need to provide in your **communications planning** and set up any routine **meetings**, **presentations**, or other interactions. Plan to use the most effective communications methods available and take full advantage of **software and technical tools** in your **communications management**. Also plan for **communicating informally** to establish and maintain trust and good relationships.

As your project gets under way, provide your stakeholders with sample reports and get their feedback on content and format so you can make adjustments needed to improve your **stakeholder engagement management**.

Not all stakeholders may fully support your project, especially initially. If you detect resistance or *potential conflict*, work to understand it, especially in cases where the stakeholders have a lot of organizational power and influence over your project. For stakeholders you have good relationships with who appear to have reservations about your **project objective and priorities**,

work to understand their perspectives and align your project's goals with their needs. For influential stakeholders who support the project but with whom you have no personal relationship, work to establish a connection through your interactions, shared colleagues, and inclusion in **project plan development** and **decision-making**. For all stakeholders, consider possibilities for enhancing relationships and for using **influence without authority** techniques to minimize potential harm. In extreme situations where you have identified stakeholders who may prove to be adversaries or project opponents, work with your sponsor to identify options that might avoid, or at least minimize, their involvement.

Document Plans for Stakeholder Interaction

Establish a schedule and specific *requirements for communication* as part of your **stakeholder engagement control**. Provide for any specialized equipment necessary for stakeholders who are distant and plan any anticipated communication changes well in advance to ensure ongoing compatibility.

Document what access stakeholders will have to your project management information system (PMIS), including how you will set up appropriate security to control what your stakeholders will (and will not) be able to access or update.

Also set up and begin ongoing meetings, one-on-one discussions, and other stakeholder interactions. Involve stakeholders as appropriate in **scope change control**, **integrated change control**, and any **project reviews**.

94

Start-Up Workshop

What: A meeting to initiate project efforts and to build teamwork.
When: Project planning or project execution (or both).
Results: Consistent understanding of project goals and plans, a quick start on the work, and a cohesive project team.

Project start-up workshops go by *other names*, including project kickoffs, project initiation meetings, project planning workshops, and project launches.

Plan the Workshop

Justify the project start-up workshop by outlining the benefits you expect to achieve. One primary benefit of a face-to-face meeting is a solid foundation for **team management** based on relationships and trust among the project team members. For **global teams** and other virtual teams, an initial in-person meeting can be the difference between project success and disaster. Additional benefits include unambiguous understanding of the project, fast and efficient project initiation, collaborative **project plan development**, and team **motivation**. With these benefits come costs—for travel, time, and additional project expense. Build the business case for a workshop and work with your sponsor to get approval for all (or at least most) contributors to attend in person.

Prior to the workshop, assemble the *project documents* you will use, including the **project objective and priorities**, **project charter**, data from **requirements collection**, your **project infrastructure** decisions, and any other project and **scope definition** documents available. Consider distributing key documents in advance of the meeting.

Develop an *agenda* to support your workshop objectives. The length and content of the agenda will vary depending on the type and size of the project, but allow a minimum of a half day even for shorter projects. Significant programs may benefit from a series of multiday workshops. Begin the agenda with introductions and a review of project expectations. Allow sufficient time for each major analysis, planning, or other result you expect from the workshop. Include time for team-building activities to allow your staff to get to know one another.

Determine who in addition to the core project team should participate, and *schedule* the workshop when they can attend. In advance, obtain commitment from all participants to attend the entire meeting.

Plan the logistics for your **meeting**. You will accomplish more if you get away from interruptions, so arrange to use a suitable location outside the normal workplace. Set up the room for a productive workshop and bring any supplies you will need, such as pens, tape, flip-charts, and yellow sticky notes. If some of your team members must participate remotely, plan to use the most effective **software and technical tools** available to involve them as much as possible. While it is possible to facilitate your own workshop, getting another person to lead the meeting will allow you to participate and contribute more fully.

Hold the Workshop

Begin with *introductions* and encourage people to interact with each other. Clarify each person's contribution to the team. Spend some time reviewing the agenda and objectives for the workshop, and discuss the project (involving your sponsor if possible) to ensure that everyone understands the goals.

During the workshop, use flip-charts or other means to *capture data*: issues, relevant assumptions, decisions, plans, and action items. Use the workshop to build on the foundation of available information. Work to understand the overall goals and priorities. Work to improve the deliverable documentation using "Is/Is not" analysis on the project deliverables. If the planning process has begun, review the **work breakdown structure** and refine **activity duration estimates**, **activity resource estimates**, **schedule development**, **resource analysis**, and **risk identification**.

Include activities in the workshop where *people work together* in pairs or small groups for **team development**, and use collaborative processes such as **brainstorming** and **creative problem-solving**. Have some fun during the workshop.

Wrap up the workshop by reviewing what you have accomplished and identifying the next steps. Assign an owner and a due date for all action items and tasks. End by verifying team commitments and thanking all participants.

Follow Up After the Workshop

Document the results of the workshop and distribute the information to the team members and appropriate stakeholders. Discuss workshop results with your sponsor.

Follow up on all action items and unfinished business of the workshop.

If you are using a computer-based tool for **schedule planning**, enter the results of the workshop into the database. Continue the *planning process* to develop the remaining data needed for **project baseline setting**.

95

Status Collection

What: Periodic collection of project activity information.
When: Project execution.
Results: Timely, accurate progress data and early detection of problems.

Select Effective Methods

Collecting project status is a primary responsibility of the *project leader*. Determining the process for status collection is a key part of **communications planning**, and it is central to **project plan execution**. Status collection begins the project-tracking cycle and is a primary input for **project variance analysis** and **procurement control**.

Decisions regarding status collection are part of **project infrastructure** planning. There are many ways to *collect the data*, although most people prefer to do it in writing to minimize confusion and to retain a tangible record. Typical methods include:

- Email
- Paper or online forms
- Using the services of a **project office**
- One-on-one meetings
- Telephone conversations
- Project team meetings

Use a method that works for you, and make collection as *simple* as practical. On most projects, people are very busy. If your status-gathering process is complicated or time-consuming, you will not get the information you need.

The *frequency* of data collection also varies, but most status collection is done at least weekly. Projects using agile methods generally collect status quickly at daily stand-up meetings. Collecting information too infrequently will result in **schedule control** problems and other issues.

Collect Status

Project status information is of two types: *hard data* (facts and figures) and *soft data* (anecdotal information, rumors, and less-specific information). Both types of status are useful. Variance analysis, **communications control**, and project reporting all depend on hard data. Soft status information reveals root causes of current problems and can provide early warning of potential project problems and risks.

Hard data includes all the diagnostic **project metrics** that you are tracking, including any *metrics* you are using for **earned-value management**. Collect schedule, cost, and resource metrics routinely every status cycle and gather scope and other metrics as necessary. Typical hard data examples are:

- Activities completed or delayed
- Actual activity start and finish dates
- Duration adjustments for incomplete activities
- Milestones completed or missed
- Actual activity effort and cost data
- Effort and cost adjustments for incomplete activities
- Data regarding recent or proposed specification changes
- Results of deliverable tests

You will also uncover less tangible information, both during status collection and when **communicating informally**. This *soft data* includes information such as:

- Priority conflicts arising from parallel projects or other work
- Productivity problems of team members
- Potential changes to the project environment
- Rumored delay of required project inputs
- Problem situations that have root causes that might impact your project
- Impending conflicts requiring more than your authority to resolve
- Delayed resolution of **problem escalations**

Avoid Pitfalls

There are many *common problems* that can result in inadequate status information. Good practices for avoiding these are:

- Do not "shoot the messenger" who brings bad news. If team members are criticized or punished for reporting problems, they will stop providing truthful information.
- Always collect the status data, every cycle. Good, timely information is even more essential during times of high stress and crisis, so consider increasing your status collection frequency.
- Acknowledge and use the information you collect. If it looks like you do not care about the information received, your team members will stop taking the process seriously. Make use of status information from all contributors in your **communications management**.
- Work hard to get status data from distant team members on **global teams** and from external contributors. Be persistent, make multiple requests when necessary, contact them when they are at work (regardless of the time where you are), and verify the data you collect.
- Listen actively. Paraphrase what you are told to ensure that you understood what was said. Ask open questions that require more than a yes or no answer, and probe for the root causes that underlie the status.

96

Team Acquisition (PMBOK® Guide 9.2)

What: Obtaining project staff required to complete project work.
When: Project planning.
Results: A roster of project team members including relevant information, supported by credible commitments.

Identify Any Staffing Shortfall

As part of **project initiation**, most (or perhaps all) of the project team may be assigned and committed. If your **human resource planning** reveals a *need for additional staff*, determine what you lack.

During **activity resource estimating**, identify the project's specific *unmet needs*:

- Missing skills identified through **required skills analysis**
- Unstaffed but required roles based on **responsibility analysis**
- Portions of the project with resource overcommitments

Document your project team requirements, with supporting data on project timing, costs, and other consequences of not resolving your staffing shortfall.

Resolve Gaps

Use existing organizational procedures and resources to fill out your project team through reassignment of *internal resources* whenever possible.

If staffing issues remain, develop a *staffing plan* to resolve them through:

- Negotiating increased commitments from part-time team members
- **Team development** of current staff to build new skills
- **Procurement planning** and **procurement contracting** to add external staffing
- Recruiting and hiring additional contributors
- Other methods for obtaining additional staff

If you *cannot add needed staff* in a timely manner, begin **negotiating project changes** to scope or timing consistent with the resources you have. Rely on planned overtime only as a last resort, and if you must schedule overtime, add it as a significant resource risk during **risk identification**.

Document

Update the *project roster* to add all new project team members, along with their roles and responsibilities, telephone numbers, email addresses, and other information.

97

Team Development (PMBOK® Guide 9.3)

What: Ensuring that the project staff builds required skills and functions well as a team.
When: Throughout a project.
Results: A cooperative, effective team capable of completing the project.

Identify the Skills the Project Requires

As a project leader, be constantly on the alert for opportunities on your team for building new skills. Enabling team members to *develop skills* increases **motivation** and may provide your project with better staffing options, especially if your team is dependent on single individuals who have unique talents.

Based on the project's **resource planning** and **required skills analysis**, identify any *needed skills* that no one on the team possesses. For skills that you are unable to add through **team acquisition**, look for capable team members who may wish to learn the new skills.

Another place where skill gaps can surface is **performance problem resolution**. Some *missed commitments* are a consequence of team members who lack necessary knowledge or skills.

Monitor your **scope change control** and other *project shifts* for modified project work that no one currently on the team knows how to do.

Build New Skills

Acquire *new skills* on your team through:

- Training
- **Coaching and mentoring**
- Networking with others
- Self-development

Even in cases where urgency requires that you bring in outside talent, involve contributors on your team in the work to begin building the skills you will need on the next project.

Build an Effective Project Team

Begin team building by conducting a project **start-up workshop**. Develop trust and interpersonal relationships through team-building activities and make connections within the team using pair and group interactions.

Align the **project objective and priorities** with individual goals. Build motivation by identifying "What's in it for me?" for each person on the team when setting the **project vision**. Incorporate individual preferences into your decisions when **delegating responsibility**. Employ **influence without authority** to get reliable commitments, especially with team members who report to others.

Particularly on distributed or **matrix teams**, work to foster good *working relationships*. Encourage one-on-one and small group interactions. Get to know new team members quickly and identify common interests, experiences, education, or backgrounds. Co-location, even for short periods, helps in avoiding later disagreements and in **conflict resolution**. Periodic face-to-face meetings are essential for building the relationships and trust that a team depends on in times of project stress.

Establish honest, *open communication* and stay abreast of what is going on with your team through **communicating informally** on a regular basis. In **global team** communication, be sensitive to cultural preferences and time zone differences. Employ **software and technical tools** that are available and acceptable to all. Periodically shift conference call schedules to spread the pain caused by time zone inconveniences. Global team work styles also vary, so adjust your **leadership** styles and **communications management** to enhance teamwork and cooperation.

Use *positive feedback* to build team cohesion, whether through personal thanks, via specific mentions of project contributions in communications and project reporting, or through other **rewards and recognition**.

98

Team Management (PMBOK® Guide 9.4)

What: Establishing and maintaining team productivity, cooperation, engagement, and trust.
When: Throughout a project.
Results: Less conflict and chaos, and faster, less costly projects.

Create a Good Foundation

Define *team objectives* in very specific terms. Involve everyone in **requirements collection** and **scope definition** for the project, and verify that the team understands the **project objective and priorities** and **project vision**. Involve team members in **project plan development** and enhance buy-in and commitment through **delegating responsibility** and ownership for project work.

Staff the team with capable people who have the talents identified in your **required skills analysis**. Clearly identify the *roles and responsibilities* for each team member, and focus **team acquisition** efforts on finding individuals with good interpersonal skills, general knowledge, and minimal conflicting priorities.

Get to know your team members and determine the best *leadership style* for your project. Use your experience and knowledge of the people to strike an appropriate **leadership** balance between consensus management and autocratic control.

Establish a team identity or name that the team can identify with and take pride in. *Structure* the team to work effectively. Determine a **project infrastructure** that facilitates team productivity and ensure effective information flow through **communications planning**. Identify unneeded overhead and work to minimize it.

Teamwork emerges most easily through proximity, so if it is possible, *co-locate* the team where members can work near each other permanently throughout the project. If co-location is not possible, schedule a face-to-face project **start-up workshop** that involves all your team. Enhance communications for **virtual teams** by employing the best available **software and technical tools**.

Maintain Team Relationships

Meet face-to-face regularly, at least weekly when practical. Meet face-to-face as a team at least twice a year even on **global teams** to renew and reinforce interpersonal relationships.

Be disciplined in your *project communications*. Monitor project progress through frequent **status collection**, **project variance analysis**, **communications management**, and project reporting. Organize and conduct effective **meetings**. In addition to formal communication, build trust by **communicating informally** with your team, and encourage informal interaction among your team members.

When *conflicts* arise, deal with differences promptly in a constructive, nonjudgmental environment. Use **conflict resolution** as an opportunity to learn, to improve the project, and to build mutual respect within the team.

Encourage *fun and humor*. Periodically schedule events, chosen by the team, to get the team members together outside the project. Find opportunities as a team to eat together (being mindful of individual preferences and dietary restrictions); food is something everyone has in common and is very effective in connecting people.

Manage Team Performance

Track individual performance through diligent **status collection**. If **project variance analysis** reveals problems, work with the contributors involved on **issue management**. Confront and resolve problems quickly. When team members fail to meet commitments, promptly begin **performance problem resolution** with them individually. Involve your team members in all **decision-making** where they have a stake. Use team analysis and **creative problem-solving** to resolve difficulties within the team whenever possible. Manage performance issues with team members who are contractors through **procurement control**. For situations that exceed your authority or that you are unable to resolve within your team, expedite closure through **problem escalation**, but only as a last resort.

Be consistently fair and honest in formal periodic appraisals for all team members who report to you. Provide input for and participate in performance evaluations for those on your team who report to others, and be generous in your praise and specific about significant contributions and accomplishments. Throughout the project, conduct frequent one-on-one discussions of individual performance with all of your team members.

Maintain **motivation** by demonstrating *loyalty* to the team and praise team members who help each other or fill in when others are absent. Find frequent opportunities to thank people for their accomplishments and take full advantage of programs for **rewards and recognition**.

99

Transitioning to Project Leadership

What: Understanding the changes required when moving from a project contributor role to leader.
When: As necessary.
Results: A quick and successful transition into project leadership.

Understand the Project Leader's Role

The daily work of a project leader *differs* in many ways from the work of other project team members, as shown in Table 99.1:

Table 99.1. Differing roles of project contributors and leaders.

Project Team Members	*Project Leaders*
• Seek excellent solutions	• Seek workable solutions
• Work with "stuff"	• Work with staff
• Are subject-matter experts	• Are generalists
• Are evaluated on personal efforts	• Are evaluated on team efforts
• Focus on individual goals	• Focus on project and overall goals

The transition to a project leadership role can be very difficult and frustrating because the jobs are so different, and new leaders are often reluctant to give up technical responsibilities. Because project leaders need to allocate about 10 percent of their time for each core project team member, any project leaders with sizable teams who retain significant technical responsibilities will find themselves responsible for *two full-time jobs*.

Project leaders need to keep a *systems view* and focus on the overall objectives. They also need to develop a tolerance for multitasking, working effectively through frequent interruptions.

Focus on Communication

One of the most important responsibilities of the project leader is **communications management**: **status collection**, information distribution, and

project reporting. Project leaders need to be conduits, not barriers, for *formal project communication*. Good leaders also become adept at **communications control**: summarizing, filtering, and transferring clear data up (to management and sponsors), down (to contributors), and laterally (to leaders of related projects). In addition, effective project leaders devote substantial effort to **communicating informally** throughout their projects.

Most project leaders conduct many **meetings**, so *meeting planning and execution* skills are crucial for minimizing the time invested and maximizing overall value. Good **presentation** skills are also essential.

Learn to Motivate

Project leaders need to be *people-oriented*. They need to understand their project teams to determine what **leadership** styles will work best. **Team management** involves **delegating responsibility** for project activities to team members, and it requires a facility for building teamwork and **motivation**. Getting people from other organizations to cooperate depends on exerting **influence without authority**. Project leaders also provide **coaching and mentoring** for team members, and they must take advantage of opportunities for **team development**.

Plan Thoroughly

Project plan development is a very visible responsibility of any project leader. The project leader is responsible for *creating the plans* and determining how to store the information. The project leader must become proficient at using **software and technical tools for project management**. The leader is also responsible for **negotiating project changes** that are necessary to ensure a realistic foundation for **project baseline setting**.

Have a Business Focus

Project leaders need to understand the project user needs through **requirements collection**, the perspective of the sponsor, and **stakeholder engagement management**. *Project finances* and **cost budgeting** are essential to the overall success of the project, and showing how the project's value justifies the investment being made is a key responsibility of any project leader.

100

Work Breakdown Structure (PMBOK® Guide 5.4)

What: Creating a hierarchical, comprehensive description of the project work.
When: Project planning and execution.
Results: A project work breakdown structure that serves as the foundation for realistic planning and effective tracking.

Prepare

Begin creating your *work breakdown structure* (WBS) based on your **scope planning** and **project infrastructure** decisions.

Developing a WBS is a *team process*. Thoroughly identifying project work requires the perspective of all contributors—from other functions, from support organizations, and from people who may not be involved until later in the project. Involve the core project team and other stakeholders who can help in understanding the project.

Plan the *logistics*. For large projects, WBS development can require significant effort. Allocate at least two hours for even modest projects, and seek a quiet place away from your normal work area with ample room and open wall space. Provide necessary supplies, such as thick, dark pens, yellow sticky notes, and tape or pins for posting large sheets of paper on the walls.

Assemble *project documentation* from **project initiation** and **scope definition**, such as the **project charter**, **project objective and priorities**, scope statement, and **project vision**. Review the results of **requirements collection**, and your documented project testing, **scope verification**, and acceptance criteria. Also provide work breakdowns developed for earlier similar projects and any relevant WBS templates.

Before beginning to decompose the work with your team, break *larger programs* into smaller projects that can be delegated to teams of no more than about a dozen people.

Identify Project Work

The goal of the WBS process is to describe the project in much smaller pieces, or *work packages*. A project WBS is a structured hierarchy, with work packages at lower levels representing smaller portions of the overall project. The lowest-level work packages are often called "tasks," "stories," or "activities," but terminology varies widely.

A WBS is typically developed by breaking the overall project deliverable into major subsets of work and then continuing the process of *decomposition* down through multiple levels. Identify work through **brainstorming** and using lists of activities from earlier projects.

Document each work package on a separate sticky note, giving each one a *verb-noun description*. The verb defines the effort, and the noun identifies the deliverable. Examples are "Test user interfaces" and "Interview customers."

Strive for as *complete* a set of activities as possible. Include key project management tasks and any training, integration, and testing activities. Identify missing tasks that must come before or after tasks already identified. Break large tasks into shorter tasks.

Continue the breakdown process until lowest-level activities are:

- *Small*. Guidelines vary, but strive for *durations* of between 2 and 20 workdays or *effort* of no more than 80 person-hours. Project work broken down to this level of detail provides a good foundation for **activity duration estimating**, **activity resource estimating**, **cost estimating**, **schedule development**, **risk identification**, **status collection**, and **communications management** for performance reporting.
- *Assignable*. Each activity can be unambiguously delegated to a single owner.
- *Measurable*. Completion criteria are specific and clear.

Organize the Work

Once activities are identified and documented, use the sticky notes to develop a hierarchy that shows the overall project in a *logical structure*. Major deliverables are commonly used for the first level below the project objective, but there are other possible organizing principles for project work:

- By organizational function (marketing, R&D, manufacturing)
- By discipline (carpentry, masonry, plumbing, electrical, painting)
- By skill set (programming, accounting, marketing)
- By geography (Stuttgart, Bangalore, Topeka, Taipei, Bogotá)

- By iteration for projects using agile methods (in detail for next phases and provisionally for future work)
- By **project life cycle** phase (analyze, design, build, test, deploy)

When your WBS is organized in a tree structure, test each lower level for *aggregation*; ensure that each resulting decomposition is equivalent to the work package it branches from. Work breakdowns are most easily understood and used when leaders break work packages into seven or fewer parts. WBS branches may vary widely in levels and complexity.

Document and Use

Document the WBS using an indented outline format, a prioritized backlog (or "burn down" list), or as a graphical display similar to the example in Figure 100.1. Assign codes or identifiers to the work packages reflecting your hierarchy. WBS data may be organized into a WBS dictionary or documented using **software and technical tools for project management**.

Use the WBS as a basis for **project plan development** and as your scope baseline throughout the project. Update your WBS throughout **project plan execution** whenever it is affected by **scope change control** and on lengthy projects during **project reviews**.

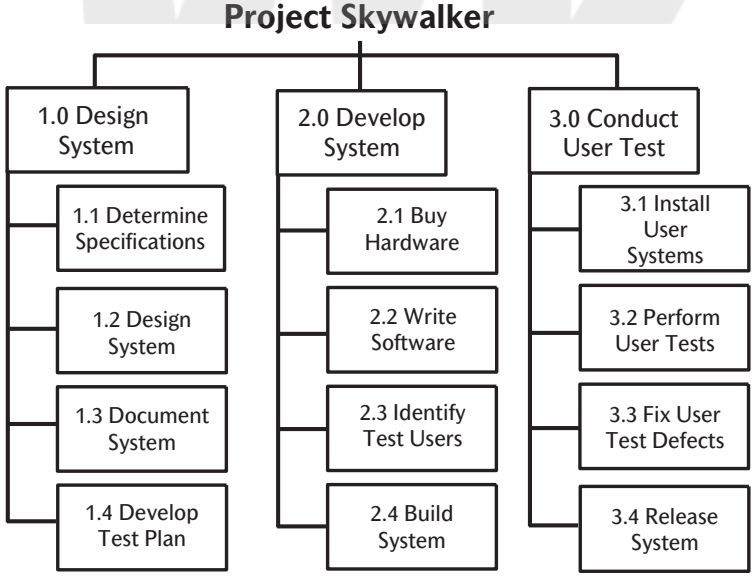

Figure 100.1. An example graphical WBS.

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About the Author

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Here's a free sample from the book . . .

PART 1

An Introduction to Emotional Intelligence

1

My Growth in Emotional Intelligence

A Dangerous Situation

"Do you have any idea how dangerous it is not to be in touch with your feelings?" This question was posed to me in the summer of 2001 by Rich, a therapist who has since become my career coach and mentor. His words stopped me in my tracks. Dangerous? That was a curious word choice. What could be dangerous about not being in touch with my feelings? I was thirty-nine years old and had been a successful project manager (PM) for over seventeen years. I had a record of slow but steady career progression. I had been certified as a Project Management Professional (PMP) since 1995. I owned my own project management consulting business and lived, taught, and even breathed project management. No one had ever asked me about feelings before. No one had ever mentioned that there might be danger involved. What could be dangerous? What was so important about feelings?

Rich's question resonated with me, but I wasn't sure why. It didn't feel dangerous to be out of touch with my emotions. However, I had a nagging sense that he saw or knew things that I didn't. On some level I recognized that the way I approached work wasn't always effective. Hard work did not always make the difference in the outcomes of the projects I managed. I wondered how others seemed to succeed with less effort. I also felt insecure about the lack of personal and professional relationships I had built, and I suspected that it was hurting me. As much as I wanted to deny that my career and relationship challenges might be related to my emotions, I began to suspect that Rich might be right.

The truth was that I wasn't aware of my feelings or emotions. I was about as emotionally aware as a small green soap dish. If I could have taken an emotional intelligence test at that time, I would have been considered the village idiot.

With Rich's help, I began to see a connection between my lack of emotional awareness and my limited success in project management. Up to that point, my project management career had been a bumpy road. While not quite a dead end street, my career path hadn't exactly taken a superhighway either. Lately that road didn't seem to be taking me anywhere. I had recently been passed over for a key promotion at Unisys. My career ladder had literally run out of rungs. Perhaps I had been promoted to my level of incompetence and was therefore living proof of the Peter Principle.

Eventually I found I could no longer ignore Rich's question about the danger, and I decided to do something about it. I knew I needed to make some changes. I was ready to make more of an investment in my emotions and relationships. Initially, it wasn't for personal reasons. It was all about ROI, my return on investment for improving my emotional intelligence. I believed that my career would benefit from it. And after spending most of the last five years working on my emotional intelligence, I am happy to report that my career has benefited significantly.

As I grew, I learned how my work relationships reflected my world view. Until then, my relationships with my project teams and other stakeholders were weak or nonexistent. That was largely the result of my project management style as a taskmaster. I was all business. Unfortunately, I placed a higher value on tasks, productivity, and outcomes than on relationships. I lacked empathy. I had a way of driving the people on my project teams that was hostile and irresponsible. My coworkers may have called me driven, but they would never have characterized me as a warm and fuzzy relationship person. At best people warmed up to me over time.

My big shift came when I began to recognize the value of emotions and relationships in the workplace. I became aware of feelings and learned to trust them as a source of information. I learned to recognize and acknowledge when I felt angry, scared, or happy. I also began to pay attention to what those around me were feeling and to consider that information when making decisions. By doing this, I was able to better manage my projects and to be a better leader of people.

I learned the importance of stakeholder relationships and invested in relationships with friends, coworkers, and other leaders. I learned how critical relationships and support were to achieving success on large projects. My relationships began to grow, along with my ability to lead others.

The results were nothing short of impressive. The investment and changes I made began to improve my effectiveness as a PM. Within a year of beginning

my work on emotions and relationships, I was asked to lead a fast-moving project of twelve people. As I demonstrated success with this team, my responsibilities grew until I was managing seventy-five people across the United States and internationally. As I continued to learn and apply my skills in this area, I was able effectively to lead large teams, build strong relationships with project stakeholders, and achieve the goals of the projects I was managing.

■ Emotional Mastery for Project Managers

I am quite sure that many of you are thinking "of course, you idiot" when I talk about mastery of emotions leading to success as a PM. You were probably among the five million people who bought one of Daniel Goleman's books on emotional intelligence—and then actually read it. Yes, of course emotions play a role at work, no matter what your position. They are of special concern to those of us in project management and leadership. Emotions play a direct role in our success as PMs and leaders.

I was not one of the five million people who bought Goleman's first book, *Emotional Intelligence: Why It Can Matter More Than IQ,* when it came out in 1997. In fact, I wasn't even sure what emotional intelligence was when I first began working on my emotional awareness. It wasn't until I decided to include emotional intelligence as part of the curriculum for the project management course I taught at Northwestern University that I began to read the published materials on the topic. By then I had accepted the fact that I lacked emotional intelligence, proving, I suppose, that admitting I had a problem was the first step toward resolution. More than that, I had begun to grow, make changes, and experience greater success as a PM.

After my own powerful experience with emotional intelligence, I conducted research to see what experience other PMs had with emotional intelligence. In late 2005, I conducted a brief survey of over 100 PMs to determine their beliefs and attitudes about emotional intelligence. The results were interesting. Most of the PMs I surveyed thought that emotional intelligence was important to success as a PM and were interested in learning more. However, the survey also indicated that most PMs didn't know very much about emotional intelligence.

Since 2005, I've presented this topic at over forty different events attended by thousands of PMs. Most people identify readily with the topic. While there are some who are "naturals" at emotional intelligence, most of the people I spoke with wanted to know how they could learn more about emotions and emotional mastery.

Is this surprising? Not really. Sure, PMs understand basic project management techniques and the contents of the *Guide to the Project Management*

Body of Knowledge (PMBOK® Guide). They have also pursued PMP certification and become black-belt masters of project scheduling tools, such as MS Project, Artemis, or NIKU. In fact, those are prerequisites for success even as a junior PM; consider them entry criteria. But to advance your career, you will need strong interpersonal skills or soft skills—and emotional intelligence provides the framework for those skills. Do you see a connection between emotional intelligence and your own success as a PM? Are you trying to advance your career? Do you ever feel frustrated by lack of opportunity even though you have done all you can to improve your technical project management skills? Perhaps you are doing things the hard way as I did, working harder to make up for soft skills.

You cannot make up for soft skills with hard work.

To advance as a PM requires understanding and mastery of emotional intelligence concepts. Yes, mastery of emotional intelligence. PMs who master emotional intelligence can develop their careers by delivering more consistently and by taking on larger and more important projects. In fact, success with large and complex projects depends largely on the level of emotional intelligence of the PM.

PMs who master emotional intelligence will set themselves apart from other PMs. They will be able to achieve more with the same team. They will excel in their careers. And they will feel more satisfied with themselves and their relationships with others.

PMs who master emotional intelligence will set themselves apart from other PMs.

■ Project Management Is Competitive

Most PMs feel the need to set themselves apart from other PMs. If you feel under pressure to compete, you are not alone. Project management is a very competitive field. As an example, consider the growth in PMP certification as shown in Figure 1-1. PMs increasingly seek certification as a way to differentiate themselves from other PMs. PMP certification has skyrocketed as a result. When I achieved my PMP certification in 1995, I was number 4,410. By the end of 2006, shortly before the first edition of this book was published, the total number of certified PMs had exploded to 221,144. By the end of

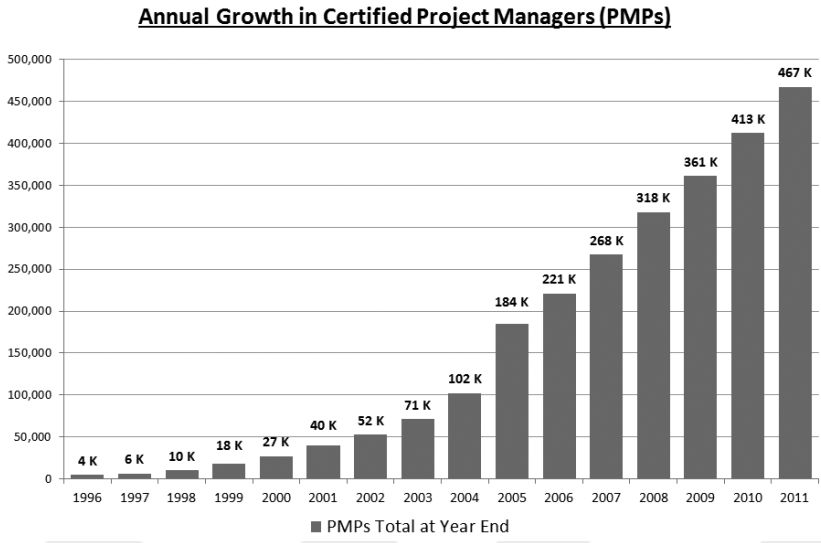

Figure 1-1: Growth in Certified Project Managers (PMPs).

2011, that number had more than doubled to 467,390, and it continues to grow steadily. In addition, the PMI has introduced five other project management certifications that allow PMs to further differentiate themselves.[1]

PMP certification does not in itself make a PM more capable; it simply proves that you have the requisite project management experience and can pass the multiple-choice certification exam. To be truly effective, you need to be able to implement projects and work well with your team. Emotional intelligence will help you do that.

Emotional intelligence and certification are two very different things. However, the pursuit of PMP certification demonstrates that PMs are seeking every advantage they can get. Emotional intelligence can be just one more way of setting themselves apart. I believe that this will lead to an increased interest in developing and applying emotional intelligence to project management.

The Rules for Project Managers Have Changed

When I started in project management back in the late 1980s, the project triple constraints ruled. On time, on budget, and within scope was the PM's mantra.

[1]Project Management Institute (PMI). *PMI Today*. Project Management Institute, Inc. 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011.

That may still be true, but I think that things have gotten a whole lot more complicated, and I think there are a lot more expectations of PMs today.

Have you heard the phrase "do more with less?" You are not alone. Not only do PMs need to manage the triple constraint, they need to do it with fewer resources. This could include project administrators or support people who directly aid the PM, but it might also include key resources needed for the team.

In addition to doing more with less, PMs are expected to be domain experts. The days of being a good PM who could lead any team are over; PMs today need to be SAP savvy, or have a Lean 6 Sigma black belt, or have CRM, CPA, or MSCE certification. I've seen ads for project management positions that require ITAR—and I don't even know what that is!

Finally, I believe there is more pressure on PMs to lead the way through change. All organizations are under pressure to change and innovate. One has only to look at what happened to Kodak or Sears as prime examples of what happens when you don't change fast enough. Both Kodak and Sears were once leaders in their industries. Now they are mere shells of their former selves because they didn't change as fast as their competitors. Organizations often use projects or programs to introduce or drive change. So PMs are usually the ones who come face to face with resistance and inertia and must be good at implementing change for their projects to be successful.

■ What Is Emotional Intelligence?

The term emotional intelligence was actually coined by two psychologists, Peter Salovey and John D. Mayer, in 1990. I am a little surprised they didn't call it the Salomayer Principle or something similar. I bet if they had known that Daniel Goleman would come along in 1995 and use the term for the title of his best-selling book, they would certainly have used their own names. In any case, they simply called it emotional intelligence and gave it the following definition:

> Emotional Intelligence: "the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and action."
> —Peter Salovey and John D. Mayer[2]

[2]Peter Salovey and John D. Mayer. *Emotional Intelligence, Imagination Cognition, and Personality*, Volume 9, No. 3. Amityville, NY: Baywood Publishing Co., 1990.

While Salovey and Mayer continued their research work, in 1995 Goleman wrote *Emotional Intelligence: Why It Can Matter More Than IQ*. This was the right message at the right time, and soon Goleman was a best-selling author whose name became synonymous with emotional intelligence. Goleman has since gone on to write several more books on the topic. In a recent book, Goleman and coauthor Cary Cherniss state that emotional intelligence, at the most general level, refers to:

> "the abilities to recognize and regulate emotions
> in ourselves and in others"
> Daniel Goleman and Gary Cherniss[3]

As a PM, I hold a pragmatic view of emotional intelligence, thinking of it as "knowing and managing our own emotions and those of others for improved performance." I am interested in the application of emotional intelligence to life in general, as well as specifically to the field of project management. In a project setting, the understanding and use of emotions helps us to have more enjoyable, predictable, and successful projects. That is what the remainder of this book is about.

■ Measuring Your Emotional Intelligence

Each of us has some level of emotional intelligence. The question is, how do we know what that level is? It would certainly be convenient if emotional intelligence were as easy to measure as height or weight. Unfortunately, that is not the case. Numerous different assessments of emotional intelligence are available. The instruments tend to differ in three areas: the person providing the assessment, the mechanism for measurement, and the underlying framework.

In terms of who provides the assessment, most of the available emotional intelligence assessments are self-reported. In other words, the individual being assessed completes the instrument himself or herself. For a more objective and complete view, there are also multirater instruments that can provide 360-degree reviews.

Emotional intelligence assessments also vary in how emotional intelligence is measured. Some are based on traits, and others on abilities. Examples

[3]Cary Cherniss and David Goleman. *The Emotionally Intelligent Workplace*. Hoboken, NJ: John Wiley & Sons, Inc., 2001.

Table 1-1: Emotional Intelligence Mini-Assessment

	YES	NO
1. Do you feel like you should be more excited about a special event than you are?	☐	☐
2. Do you find yourself not crying under circumstances when you believe others would cry?	☐	☐
3. Do you pride yourself on never getting angry?	☐	☐
4. Have you ever been told you are abrasive, unfeeling, or uncaring?	☐	☐
5. Are you frequently surprised that your expectations of others differ from what actually happens?	☐	☐
6. Do you feel that the problems others have are largely their own fault?	☐	☐
7. Do you find it difficult to work with people on your team whose background differs from your own?	☐	☐
8. Do you find yourself upset or unable to focus when your spouse or a team member is upset?	☐	☐
9. Do you blow up with your spouse, children, or project team over seemingly innocuous remarks or circumstances?	☐	☐
10. Would your closest friends or spouse say that you had problems managing your emotions?	☐	☐
11. Do you frequently make jokes or use sarcasm?	☐	☐
12. Do you storm out of meetings, send flaming emails, or slam doors?	☐	☐
13. Are your relationships with your project team, managers, or sponsors superficial and limited to the task at hand?	☐	☐
14. Do you find that you have minor skirmishes with specific individuals on an ongoing basis?	☐	☐
15. Do you feel like the victim of others or that you say yes when you really want to say no?	☐	☐
16. Do people leave your project teams because of you?	☐	☐
17. Do you find it difficult to communicate?	☐	☐
18. Are you ever surprised that your team doesn't understand your project objectives?	☐	☐
19. Do you experience conflict on projects that never seems to get resolved?	☐	☐
20. Do you want to do a better job of establishing charisma or presence as a leader?	☐	☐
TOTAL	____	____

of assessments that measure traits include answering questions about how individuals respond in various situations. The instruments that measure abilities might follow a photo or a short video with a series of related questions.

Finally, assessments vary in terms of the underlying framework of emotional intelligence competencies. As shown in Chapter 2, many researchers have developed their own frameworks for emotional intelligence. Some of the best known are Daniel Goleman, Peter Salovey, John Mayer, and Rueven Bar-On.

All of the assessments suffer from a question of validity. By validity, I mean the ability to consistently and reliably measure emotional intelligence in individuals. While the authors of each assessment instrument will tout the validity of what they are measuring, there are no validated instruments for measuring emotional intelligence. See Appendix F for a review of the more popular instruments available and their claims to validity.

Before we entirely give up the idea of measuring emotional intelligence, we should take a look at what some of the existing tools can tell us about ourselves. It is possible to get an idea of your level of emotional intelligence using a simple set of questions, such as those shown in Table 1-1. Though the outcome will be subjective, it will provide some information about your level of EQ. Take the mini self-assessment by reviewing each item and checking "Yes" or "No" as it applies to you.

To score the mini-assessment, count the total number of no responses and use Table 1-2 to interpret your results.

Table 1-2: Scoring the Emotional Intelligence Mini-Assessment

Score	What it means
17–20	You are doing great; you are in the minority of PMs who understand emotional intelligence. This book may help you to fine tune your approach.
13–16	You are doing well, but could use some improvement in a few key areas.
7–12	You have some strong areas but also have opportunities to improve in others. Some work on emotional intelligence will help you to deliver more consistently.
1–6	You have significant opportunities to improve your emotional intelligence. An investment in this area will provide a great pay-off for you in terms of project outcomes and career success.

The Good News About Emotional Intelligence

The good news about emotional intelligence is that no matter where you are now, most experts agree that you can improve your level of emotional intelligence. In fact, experts agree that you can continue to improve your level over the course of your life. I know this to be true because I have done it. Over the last five years I have gone from "village idiot" to being aware of and managing emotions. Maybe "emotional genius" is in reach for me!

Here is more good news. Improvements in your emotional intelligence will help your career as a PM. No matter what your emotional starting point is, if you improve your level of emotional intelligence, you will do a better job of managing projects. The remainder of this book is going to tell you how to do just that. We are going to discuss in detail the various aspects of emotional intelligence; how they apply in the project management environment, and the specific activities and exercises you can use to help you improve your emotional intelligence. This will undoubtedly also help you to succeed as a PM.

Applying Emotional Intelligence to Project Management

My own experience has shown that emotional intelligence makes a big difference in terms of performance as a PM. Apparently, I wasn't the only one who thought there was a likely correlation between emotional intelligence and performance in project management. The PMI has commissioned at least two research studies to dig into this topic.

The first PMI study was conducted in 2005 and documented in the 2006 book, *Choosing Appropriate Project Managers*, by J. Rodney Turner and Ralf Mueller. It details research that Turner and Mueller conducted on four hundred projects around the world. They wanted to test the relationship between the success of a particular project and the PM's competency. They broke that competency down into IQ, emotional intelligence or EQ, and the PM's competency in managerial terms (MQ).[4]

It wasn't a big surprise that their research showed a strong correlation between emotional intelligence and project success. It was a little surprising that little or no relationship existed between project success and IQ. In other words, emotional intelligence was more important than pure intelligence.

[4]Project Management Institute *(Choosing Appropriate Project Managers)*, Project Management Institute, Inc. (2006). Copyright and all rights reserved. Material from this publication has been reproduced with the permission of PMI.

Specifically, the competencies of self-awareness, conscientiousness, sensitivity, and communication were found to be significant for all types of projects. In Turner and Mueller's words, "Consistently with the general management literature we found that the emotional group of competencies, EQ, was the most significant for successful project outcomes." Turner and Mueller concluded that "project managers must be emotionally intelligent."

> "Project managers must be emotionally intelligent."
> —J. Rodney Turner, PhD, and Ralf Mueller, DBA

This was exciting, not just because it confirms what many of us already believed, but because it is one of the first studies to officially link the PM's emotional intelligence to the success of the project.

Turner and Mueller used their data from the 400 projects to further analyze what success looked like. They found that a core set of emotional competencies were required for all projects. Those core competencies include:

- Self-awareness
- Motivation
- Conscientiousness
- Interpersonal sensitivity
- Emotional resilience
- Influence

In case you are wondering about the title, *Choosing Appropriate Project Managers*, the point that Turner and Mueller were making is that certain emotional competencies are shown to be important to the success of various types of projects. Organizations should consider that information and *choose* their PMs based on those competencies.

The second PMI sponsored research was presented in the 2009 book, *Emotional Intelligence and Projects,* by Nicholas Clarke and Ranse Howell, which documents a research project carried out on 67 project managers. The project sought to identify relationships in the following areas:

1. Relationships between emotional intelligence abilities and specific project manager competencies identified as critical within project contexts.
2. Relationships between emotional intelligence and transformational leadership behaviors.

The research by Clarke and Howell built on the previous research by Ralph Mueller and J. Rodney Turner. Clarke and Howell studied the relationship of those emotional intelligence measures to competencies that previous research has shown to be important to success as a project manager: communications, teamwork, attentiveness, and managing conflict.

Another interesting aspect of this study was that the researchers attempted to control for personality, general intelligence level, and PM certification. I was a little puzzled at first by the control for personality. If my personality turns out to be ineffective, does this mean I cannot be a project manager? Not to worry—the control for personality is to try to isolate any characteristics that may be inherent and unchangeable from those characteristics, like EQ, that can be trained.

The bottom line from the Clarke and Howell research? Project managers interested in growing in their project management and leadership abilities should invest in emotional intelligence. Specifically they should develop their ability to use emotions to facilitate thinking, understand emotional meanings, in empathy, and in their overall level of emotional intelligence. These were shown to be linked to the PM competencies of teamwork, managing conflict, and attentiveness. These were also impacted by the personality traits of emotional stability and openness.[5]

Based on my own discussions with PMs and surveys of PMs, I have come to believe that most PMs understand emotional intelligence at a conceptual level. The challenge is that they lack the tools to apply it to projects. After all, how do you apply emotional intelligence to project management? It wasn't immediately apparent to me. My research showed that it wasn't all that apparent to others either. The research says that it is important, but what has been missing is a practical guide to how to actually do it. This book is the first book of its kind to spell out in detail how to apply emotional intelligence to projects.

The starting point for applying emotional intelligence is when we acknowledge that project management is getting work done through others. As PMs, we are dependent on others for our success. To achieve anything significant, we need a team. Big, important projects generally require large, effective project teams as well as an effective PM. As a PM, I personally want to take on larger and more complex projects since I believe that is going to advance my career. That is where the application of emotional intelligence pays off big.

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[5]Project Management Institute *(Emotional Intelligence and Projects)*, Project Management Institute, Inc. (2009). Copyright and all rights reserved. Material from this publication has been reproduced with the permission of PMI.

"Project management is getting work done through others."

Emotional intelligence can help PMs to:

1. Develop stakeholder relationships that support the project's success
2. Anticipate and avoid emotional breakdowns
3. Deal with difficult team members and manage conflict
4. Leverage emotional information to make better decisions
5. Communicate more effectively
6. Create a positive work environment and high team morale
7. Cast a vision for shared project objectives that will attract, inspire, and motivate the project team

Let's look at each of these benefits in more detail.

1. Develop Stakeholder Relationships That Support the Project's Success

Relationships are the key to success as a PM. This includes the relationships with our team members as well as with the other project stakeholders. Strong relationships with all project stakeholders will buffer us during difficult times, help us gather more complete information, support us when we need it, and enable us to make better decisions. We will address stakeholder relationships in detail in Chapter 6, Relationship Management.

2. Anticipate and Avoid Emotional Breakdowns

Emotional breakdowns happen when we lose it. They are the office equivalent of road rage. Over the life of a project, we can experience significant stress. For some of us, this stress will push us over the edge and cause us to do something undesirable. In Chapter 4, Self-Management, we will discuss underlying causes and triggering events for emotional breakdowns, ways we can recognize when we are at risk of a breakdown, and techniques for avoiding breakdowns.

3. Deal with Difficult Team Members and Manage Conflict

In an ideal project, there are no difficult team members and conflict is manageable. Unfortunately, that is rarely the case in practice. When we seek out high-performing individuals for our teams, we often encounter difficult team

members. Emotional intelligence can provide us the tools to work with difficult individuals, help us identify ways in which we contribute to the problem, and help us to work through issues with those parties. It helps us in a similar way to address the inevitable project conflict. Emotional intelligence can help us to recognize or even anticipate conflict and deal with it before it derails the project. After the groundwork for recognizing and anticipating conflict is laid in Chapter 5, Social Awareness, we will address stakeholder relationships in Chapter 6, Relationship Management.

4. Leverage Emotional Information to Make Better Decisions

In their 2004 book titled *The Emotionally Intelligent Manager*,[6] David R. Caruso and Peter Salovey identified six principles of emotional intelligence. The number one principle cited in their book was Emotion Is Information.

> "Emotion Is Information"
> —David R. Caruso and Peter Salovey

Our emotions are like our own personal radar. They provide us with a steady stream of information about ourselves, our team members, and our environment. When we are in touch with and able to access our emotions, we can leverage that information to make better decisions. If we are not in touch with our emotions, we are missing out on vital information about our environment (see Figure 1-2).

Emotions provide us with the extra data points that we need to make better decisions. They give us an intuitive or gut sense of what we need to do next. In a world where being right 51 percent of the time is often enough to make the difference, those extra data points may be just what it takes for us to be successful. We will discuss emotional data throughout the remainder of this book. We will examine decision making in Chapter 7, Project Team Leadership.

5. Communicate More Effectively

Emotional intelligence helps us to understand ourselves as well as those around us. By understanding the emotions and motivations of our team members

[6]David R. Caruso and Peter Salovey. *The Emotionally Intelligent Manager; How to Develop and Use the Four Key Emotional Skills of Leadership*. Hoboken, NJ: John Wiley & Sons, Inc., 2004.

Figure 1-2: Personal Radar Warning.

and other stakeholders, we can choose the words and messages that will make our point and resonate with the audience. We can anticipate difficult moments and take extra care to send just the right message with the correct emotions, whether we are speaking one-on-one with a stakeholder or addressing a group. We will address communications using emotional intelligence in Chapter 7, Project Team Leadership, as well as in Chapter 8, Creating a Positive Team Environment, and Chapter 9, Leveraging Emotional Intelligence on Large and Complex Projects.

6. Create a Positive Work Environment and High Team Morale

As PMs, we are responsible for the emotional tone of the project. We can approach this in a number of ways. We can leave the emotional tone of the project to chance or to the various members of our team. The results we get will be unpredictable. Alternatively, we can systematically and proactively manage that project environment to create the positive outcomes we are seek-

ing. The strategic application of emotional intelligence will allow us to create a productive and successful environment with high morale and esprit de corps. We will address this in Chapter 7, Project Team Leadership, as well as in Chapter 8, Creating a Positive Team Environment.

7. Cast a Vision for Shared Project Objectives That Will Attract, Inspire, and Motivate the Project Team

Shared project objectives are important for getting buy-in and commitment from our project team. Unfortunately, this is not always as easy as it sounds. Establishing shared objectives requires understanding the emotions and objectives of those on our project teams and then casting a vision for the project that enables those individuals to fulfill their objectives within the project. One of my first project management mentors always told me that as a PM you are dependent on your resources for success. He used to say:

> "As a PM, you live or die by your resources."

As my career has progressed, I have come to fully appreciate what he meant. The ability to attract and inspire the best project resources is going to make our projects succeed; without this ability, our chances of success are greatly diminished. We will address resources in Chapter 8, Creating a Positive Team Environment.

■ Emotional Intelligence Is Vital to Project Managers

While emotional intelligence is important to managers and leaders of all types, the unique environment of projects makes the application of emotional intelligence critical to PMs for three reasons. First, each project is unique. As PMs move from project to project, we constantly experience a change of teams, sponsors, and other stakeholders. Only rarely do we have the benefit of the same stakeholders and project team. This puts pressure on us to assess, understand, and manage the emotions of our team and stakeholders to build relationships. We need to do this each time we start a new project.

The second reason is that projects are temporary. Unlike general management, projects have a beginning and an end. This puts pressure on PMs to move quickly. We don't have the luxury of time to develop strong rela-

tionships and create a positive team environment. If we don't work on relationships early in the project lifecycle, our projects can get derailed and never have a chance for success. We cannot afford to get our projects off on the wrong foot.

The third reason is the limited power and authority of the PM. In most cases, PMs do not have direct authority or power over the project team members. They cannot simply direct others to do what is needed. PMs need to use more sophisticated strategies to get their team members to achieve the desired outcomes. Without an understanding of the application of emotional intelligence, PMs may struggle to get the work of the project completed.

Given the importance to PMs, it may surprise you to find that emotional intelligence is not directly addressed in the *Guide to the Project Management Body of Knowledge* (PMBOK® Guide), which addresses the technical aspects of Project Management in detail. The closest the PMBOK® Guide comes is in the area of interpersonal skills, which has been relegated to an Appendix. Interpersonal skills are broken down in the Fourth Edition of the PMBOK® Guide as follows:

- Leadership
- Team building
- Motivation
- Communication
- Influencing
- Decision making
- Political and cultural awareness
- Negotiation[7]

You can see that there is quite a bit of overlap between the PMBOK® Guide and the emotional intelligence topics. I firmly believe that our ability to leverage these interpersonal skills is directly related to our level of emotional intelligence. Unfortunately, the PMBOK® Guide falls short of providing steps on how to develop and apply the interpersonal skills listed above. This book will provide the detailed guide to developing and applying those interpersonal skills.

If this emotional intelligence business seems a little daunting, take heart. Improving your awareness of emotional intelligence and applying it to projects is not difficult. It has the potential to provide rich rewards for you.

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[7]Project Management Institute (*A Guide to the Project Management Body of Knowledge),* Project Management Institute (2004). Copyright and all rights reserved. Material from this publication has been reproduced with the permission of PMI.

Even small steps can make a large difference in your life and in your projects. All it takes is the desire to learn and grow and the courage to step out of your comfort zone. It may even require change.

Change is difficult for all of us. In fact, we resist change because it is easier to let inertia keep us on our current course. Staying the course was familiar to me, yet on some level I knew that it wasn't giving me the results I wanted. Once I realized how much danger was involved in staying on my previous course, I became very motivated to try something new. One definition of insanity is trying the same thing and expecting different results. If you want to get different results or different project outcomes, consider trying something different by learning about and applying emotional intelligence techniques.

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