Project Management Maturity Model

Third Edition

J. Kent Crawford

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Contents

Acknowledgments

It is with great pride that I recognize the work of our many associates at Project Management Solutions, Inc. (PM Solutions). Over several years, our consultants have provided the best of business practices for our first two editions of *Project Management Maturity Model*. This third edition incorporates refinements from more than ten years of real-world experience with many of the world's leading organizations. I want to say "thank you" to each of the consultants of PM Solutions who have used the Project Management Maturity Model (PMMM[SM]) to measure organizational maturity, recommend cultural change improvements, and implement the intricacies of the model for our clients. Your work enabled the fine-tuning we are now able to share here in the third edition.

Because of this continuous improvement of the model by consultants in the field, the work you hold in your hands is not the last word on the model. In fact, already more improvements are being made to the "living documents" on which the book is based.

This edition would not have been published without the careful and thoughtful work of Jeannette Cabanis-Brewin, our editor. Jeannette's tireless efforts in research, manuscript rewrites, editorial comments, and publishing have made possible this improved and updated edition of the *Project Management Maturity Model*.

Thanks to you, the readers, for your interest in project management and your eagerness to learn from the many years of experience represented in this book. By building a successful project management culture in your organization, you continue to develop and expand the world's most dynamic and growing profession.

J. Kent Crawford
CEO, PM Solutions

Introduction

Project Management Solutions, Inc. (PM Solutions) is a management consulting, training, and research firm dedicated to helping companies optimize business performance and successfully execute their strategies through project management improvement initiatives. Core services include project portfolio management, project staffing and outsourcing, organizational project management maturity assessments, process and methodology development, project office deployment and enhancement, project management technology integration, value measurement, and corporate training delivered through the PM College®.

A cornerstone product of PM Solutions has been its Project Management Maturity Model (PMMM^{SM}). This model has contributed to widespread success in assisting organizations in improving their project management processes. The model has been used also to baseline project management practices industry-wide, becoming the industry standard in measuring project management maturity. This book describes the model in full and provides you with a comprehensive tool to help you improve your organization's project management practices.

PM Solutions' Project Management Maturity Model provides your organization with a conceptual framework within which specific project management processes can be optimized to efficiently improve the capability of your organization.

The Project Management Maturity Model provides best practices to help you to

- Determine the maturity of your organization's project management processes.
- Map a logical path to improve your organization's processes.
- Set priorities for short-term process improvement actions.
- Discern the need for a project management office and assess where it fits in your organizational structure.
- Track progress against your project management improvement plan.
- Build a culture of project management excellence.

By focusing on specific processes, your organization can best leverage the resources for improvement activities, while rallying the organization around specific goals. A project management maturity model can be a roadmap showing an organization how it can systematically move to more mature levels of performance and do it in more effective and efficient ways. After an objective assessment, your organization can set its goals for increasing the capability of its processes. The ultimate goal of this book is to help you improve the capability of your organization's project management processes.

This reissue of the *Project Management Maturity Model*, first published in 2002, reflects not only important changes in the project environments within companies, but also in our thoughts about the role of project management, both within a company and in the larger business world. Since this model was first presented to the public, changes in the economy, in world markets, in the levels of computer security threats, and in legislation governing business practices have made the discipline of project management ever more critical to the successful implementation of business strategies.

In addition, the fifth edition of the Project Management Institute's standards document, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* was

released in 2013. Since our own model reflects the logic of this standard, the changes within the new edition of the *PMBOK® Guide* had to be addressed. Many of these changes were minor but there were significant alterations in the language used to describe project processes and knowledge areas. But some of them reflect new emphasis on and improved understanding of planning and stakeholder management processes. In addition, a broadening of the language used to describe processes and inputs makes the standard—and our model—applicable to a wider range of project settings in various industries.

This third edition also includes our expanded, updated Project Portfolio Management Maturity Model.

How This Book Is Organized

Chapter 1 describes project management maturity and offers a brief description of the PM Solutions Project Management Maturity Model. The chapter also describes the process of assessing your organization using this model, and provides best practices for using an assessment.

Chapters 2 through 12 are the heart of the Project Management Maturity Model. Chapter 2 defines the levels of project management maturity (from Level 1 through Level 5). The following chapters are based on the ten project management knowledge areas specified in the Project Management Institute's standard, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Fifth Edition*. In these chapters, each knowledge area is defined at each level of maturity.

In order to provide as complete a definition as possible, these knowledge areas have been broken down into their specific components. Then progressive maturity is described, level by level, for each component (see Figure I.1). Chapters 3 through 12 are organized as follows:

- *PMBOK® Guide* knowledge area (chapter title)
- General description

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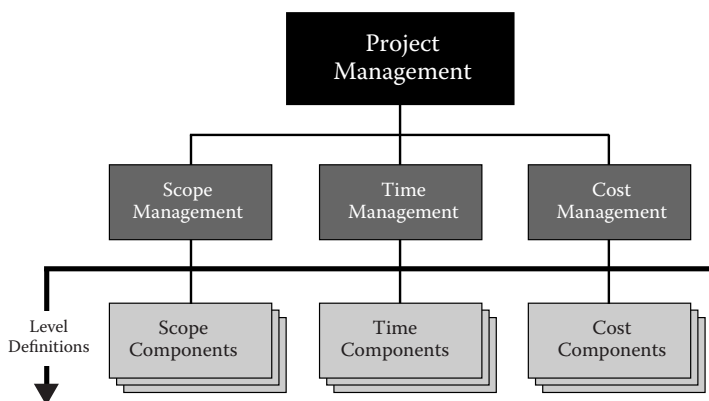
Figure I.1 Project management knowledge areas are broken down into their process components.

- Components of knowledge area
- Maturity level characteristics (for Levels 1 through 5), with descriptions of component qualities at each level

Note: Definitions of component maturity are grouped by level within a knowledge area. Achievement of a given knowledge area level by an organization is cumulative—that is, for each succeeding PMMM level, the assumption is that all criteria for the preceding levels for that knowledge area are being (or have been) fulfilled. Level 5, for example, assumes that Levels 1 through 4 have been fulfilled.

In Chapter 13, we address the question: Now what? The assessment of process maturity is not an end in itself, but a springboard to process and organizational improvement. Strategies for moving forward to deploy the self-knowledge you have gleaned from the assessment process are covered here. Readers of previous editions will note that the section on how to use the results of an assessment has been moved from Chapter 1 and incorporated here.

Finally, the appendices provide a checklist for self-assessing your organization's project management maturity and an updated version of PM Solutions' Project Portfolio Management Maturity Model.

Chapter 1

Describing Project Management Maturity

Until recently, the concept of "maturity" was seldom used to describe the state of an organization's effectiveness at performing certain tasks. Today, we find this maturity concept used increasingly to map logical ways to improve an organization's services—particularly across the software industry. Why has this concept evolved in this industry and why not in other areas? And why is it of interest to the project management profession? The answer to both of these questions rests in the underlying complexities that go into the successful completion of a project—software development or otherwise.

Looking at the software engineering industry where the existing maturity models originated, it is easy to see that there are many ways to approach the resolution of any single software problem. Software development efforts typically include many more variables, unknowns, and intangibles than we would consider "normal" for projects in many other industries. Because of this complexity, the expected result of a particular software project may be more dependent on the "star" developer in a company than anything else. Unfortunately, star developers go away, and when they do or when projects get

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so large and complex that the developer's influence on them is no longer dominant, the variation in project results becomes great and leads to inevitable frustration and disappointment. Obtaining predictable results becomes a real challenge.

Hence the extensive, government-funded research into how to evolve and measure an organization's effectiveness at developing software resulted in the Software Engineering Institute's first Capability Maturity Model. However, as we have seen through repeated use of this model in assessments, getting organizations to the "repeatable results" level can be challenging—never mind moving toward optimization of processes.

It is logical that those of us in the project management arena learn from the efforts to improve effectiveness in the software industry. Applying project management concepts in any organization has many similarities to the complexities and intangibles of software development. Obtaining consistent results in any project environment involves understanding and measuring as many variables as those that exist in the software development industry. We have all seen the results of heroic efforts from project managers—efforts that rise above the processes and systems that support them. Take this single project manager (just like the single "star" developer in the software environment) out of the picture, and there goes the ability to ensure success. Organizations cannot afford to rely on heroic individuals, however; they need repeatable, reliable processes that become institutionalized. Hence the need to look at an organization's complete picture of project management effectiveness or project management maturity.

Project Management Maturity Model

In organizations where we have done assessments, we have seen that the evolution of project management typically lags behind development of other capabilities within a company.

Only when the need for project management becomes critical do many organizations pay attention to improving their project management skills. This lack of foresight frequently creates an environment in which the project management systems and infrastructure are not in place to support the needs of the practicing project management community.

Eventually, it becomes necessary to start taking a proactive look at the infrastructure necessary to progress in project management capability. In short, the need becomes so great that the organization must respond to growing business pressures. Often, this happens when executive management decides to take proactive action—but the question is: action in what direction and to what end?

There are a great number of interrelated challenges to deal with in improving an organization's infrastructure: project managers aren't getting the information they need to manage effectively; management fails to receive accurate forecasts of completion data; there is inconsistent understanding of expectations. These areas are often where the value of a maturity assessment comes into play.

Any model selected to measure project management maturity must point out a logical path for progressive development. It may not be so important to know you are a Level 2 organization; what is important is to know what specific actions must be implemented to move the organization forward. What is most important is that the organization has a vision and is moving to improve the capability of project management with precisely targeted efforts. Improving project management is a series of smaller steps, not giant leaps, and many organizations will never need to realize Level 5 maturity. Many organizations will achieve significant benefit by reaching the "repeatable process" level. In effect, a good model for the measurement of project management maturity creates a strategic plan for moving project management forward in an organization.

Model Description

Key Attributes of Knowledge Areas

The Project Management Institute's *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* is an excellent point of reference for starting an examination of project management capability. It is already an accepted standard, and a great deal of "best practices" information focuses on the knowledge areas outlined in the Guide. Unfortunately, the Guide presents a huge mass of knowledge to deal with. Measuring an organization's effectiveness in any one area requires that the area be broken down further into major components that relate the area to the successful implementation of project management.

   The model that PM Solutions developed utilizes the *PMBOK® Guide's* ten knowledge areas and is patterned after the Capability Maturity Models of the Software Engineering Institute (SEI). The model has five distinct levels of maturity and examines an organization's implementation across the ten project management knowledge areas (Figure 1.1). The five levels, similar to those in the SEI models, are described below. Each level represents a discrete organizational capability based on summary-level characteristics.

Levels of Project Management Maturity

   Level 1: Initial Process
      Ad hoc processes
      Management awareness
   Level 2: Structured Process and Standards
      Basic processes; not standard on all projects; used on
         large, highly visible projects
      Management supports and encourages use
      Mix of intermediate and summary-level information
      Estimates and schedules based on expert knowledge and
         generic tools

Project Management Maturity Model

	LEVEL 1 Initial Process	LEVEL 2 Structured Process and Standards	LEVEL 3 Organizational Standards and Institutionalized Process	LEVEL 4 Managed Process	LEVEL 5 Optimizing Process
Project Integration Management					
Project Scope Management					
Project Time Management					
Project Cost Management					
Project Quality Management					
Project Human Resource Management					
Project Communications Management					
Project Risk Management					
Project Procurement Management					
Project Stakeholder Management					

Maturity Levels

Knowledge Areas

PM Solutions Project Management Maturity Model combines SEI-type maturity measurement and PMI's *PMBOK® Guide* industry standard in identifying key areas of project management to be addressed.

This unique approach to measuring project management maturity gives an organization a firm understanding of their strengths and areas for improvement as well as a sound and structured way to develop an action plan for improvement.

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Figure 1.1   PM Solutions' Project Management Maturity Model utilizes the *PMBOK® Guide's* ten knowledge areas and the Software Engineering Institute's five levels of maturity as the basic framework.

 Project-centric focus

Level 3: Organizational Standards and Institutionalized Process

 All processes standard for all projects and repeatable

 Management has institutionalized processes

 Summary and detailed information

 Baseline and informal collection of actual data

 Estimates and schedules may be based on industry
  standards and organizational specifics

Organizational focus
Informal analysis of project performance
Level 4: Managed Process
Processes integrated with corporate processes
Management mandates compliance
Management takes an organizational entity view
Solid analysis of project performance
Estimates and schedules normally based on organization specifics
Management uses data to make decisions
Level 5: Optimizing Process
Processes to measure project effectiveness and efficiency
Processes in place to improve project performance
Management focuses on continuous improvement

General Component Description

Because the knowledge requirement is very large within each of the *PMBOK® Guide*'s knowledge areas, it was necessary to break down each of the ten areas into key components (see Figure 1.2). This is where the real measurement of maturity takes place. For example, under the Project Scope Management knowledge area, there are six components that must be measured to effectively understand maturity. The six areas that we have identified within scope management include

- ◼ Scope Management Planning
- ◼ Requirements Collection
- ◼ Scope Definition
- ◼ Work Breakdown Structure
- ◼ Scope Validation
- ◼ Scope Change Control

These six components are examined independently to determine the adequacy of defining and controlling the project scope.

Project Management Maturity Model

	LEVEL 1 Initial Process	LEVEL 2 Structured Process and Standards	LEVEL 3 Organizational Standards and Institutionalized Process	LEVEL 4 Managed Process	LEVEL 5 Optimizing Process
Project Integration Management					
Project Scope Management					
Project Time Management					
Project Cost Management					
Project Quality Management					
Project Human Resource Management					
Project Communications Management					
Project Risk Management					
Project Procurement Management					
Project Stakeholder Management					

Each knowledge area is broken down into specific components.

For example, under the scope management knowledge area, there are six components that must be measured to effectively understand maturity.

The six components that we have identified under the scope management area include:

■ Scope Management Planning
■ Requirements Collection
■ Scope Definition
■ Work Breakdown Structure
■ Scope Validation
■ Scope Change Control

Specific components are used to measure maturity and develop action plans

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Figure 1.2   Each of the ten knowledge areas in the model has been broken down into key components.

Scope Management Planning is the "how to" of defining the project scope. This process describes how the project team develops a detailed project scope management plan that documents how the project team defines, validates, and controls project scope.

Requirements Collection is the assessment and development of processes, procedures, and standards relating to the collection of the business and technical requirements of the project.

Scope Definition describes how a detailed description of the project or product is developed.

Work Breakdown Structure examines the formality with which an organization identifies the complete scope of work to be performed. This includes looking at the related dictionary.

Scope Validation covers the verification of elements of the scope statement as acceptable deliverables.

Scope Change Control looks at the process of incorporating additions, changes, and deletions to a project.

From a quick look at these six components, it's easy to see that understanding the intricacies of project processes is a key element in determining project management maturity. All knowledge areas must be broken down similarly.

Three Special Interest Components

PM Solutions determined three areas that exert significant influence on the adoption of project management practices: the project management office (PMO), management oversight, and professional development. Each area is given special attention in the maturity model (see Figure 1.3).

Project management office—The PMO makes the lives of project team members easier by supporting the team in the areas of scheduling, status reporting, project management tools, and training, among others. Some of the key items of support that the PMO provides include consulting and mentoring of current staff, developing and promulgating methodologies and standards relating to project management, and serving as a central source for help in planning and managing efforts.

The PMO facilitates improvements in project management maturity by serving as the focal point for consistent application of processes and methodologies. Often, without a PMO, the project management efforts of an organization are not consistent and are not focused toward a common vision. The PMO serves as the proverbial "glue" that holds the project management efforts of the organization together. Because the PMO

Project Management Maturity Model

	LEVEL 1 Initial Process	LEVEL 2 Structured Process and Standards	LEVEL 3 Organizational Standards and Institutionalized Process	LEVEL 4 Managed Process	LEVEL 5 Optimizing Process
Project Integration Management	Project Management Office				
Project Scope Management					
Project Time Management					
Project Cost Management					
Project Quality Management	Management Oversight				
Project Human Resource Management	Professional Development				
Project Communications Management					
Project Risk Management					
Project Procurement Management					
Project Stakeholder Management					

PM Solutions highlights three areas within the knowledge areas that experience has shown are key to rapidly developing a sustainable project management culture. In the PM Solutions Project Management Maturity Model, three specialty areas are highlighted:

■ Project Management Office
■ Management Oversight
■ Professional Development

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Figure 1.3　Three additional areas of significance influence the adoption of project management practices. These components are given special attention in the maturity model. The figure above shows where these special components—The PMO, Management Oversight, and Professional Development—are covered.

is an important facilitator of project management integration, this special component is covered in Chapter 3, titled "Project Integration Management."

Management oversight—Another key component in facilitating an increase in project management maturity is the amount of management oversight and involvement that key

leaders of the organization have in the project management function. The bottom line here is that if management does not demonstrate active interest, it is unlikely that project management processes will improve. If no one is holding the project manager responsible for project accomplishment and consistently measuring project performance, an unwritten signal is being sent to the project management community. Managers must make use of the data provided by the project management community and find ways to use the information to improve organizational performance.

Management oversight is covered in Chapter 7 ("Quality Management") based on its impact on process quality.

Professional development—The continued development of project managers is essential. Project management constitutes an odd mixture of technical skills, management skills, and leadership skills that few people naturally exhibit. Most of us require continued refinement and renewal of such skills. The project management profession also continues to broaden its knowledge base, so there are always new skills to learn. Many research studies, including our own study, "Strategies for Project Recovery" (2011), have noted the key roles that appropriately trained project managers play in project and organizational success. Professional development is covered in Chapter 8, titled "Human Resources Management."

Five Levels of Maturity

Why SEI CMMs Serve as Standards

As mentioned earlier in this chapter, research into why software projects commonly were completed late, exceeded budget, and failed to deliver what the end user really wanted resulted in the Software Engineering Capability Maturity Model (SW-CMM), a way of measuring an organization's maturity in those software engineering processes generally accepted as

crucial to successful project completion. SW-CMM and later Capability Maturity Models (CMMs) have become de facto standards for process modeling and assessing an organization's maturity in several process areas (e.g., personnel management, systems engineering). Since the CMM concept has received such widespread acceptance, it makes sense to develop a Project Management Maturity Model (PMMM) that follows the same structure.

The Key Practice areas of the CMMs include topics familiar to those who read the *PMBOK® Guide*: project planning, execution, monitoring, and control. Our PMMM further decomposes those topics into the component processes associated with each knowledge area as described in the *PMBOK® Guide*.

Notes on Measuring against the Five Levels

Too often we see new tools or techniques implemented as panaceas to solve all problems. Maturity models can be misapplied the same way. First, there is the possibility of error in the performance of an assessment. Determining the correct level of maturity of an organization is less than science but more than art. Many factors play roles in determining maturity level, including individual interviews and evaluating artifacts, processes, standards, knowledge, and company culture. There is a subjective nature to determining the level although it's unlikely that a wide margin of error will occur. It is extremely important to use an assessment tool that has been tested and proven to achieve consistent and correct results.

What takes place during a maturity assessment? Any thorough assessment has the following four ingredients (at a minimum):

- Personal and/or group interviews
- Artifact collection and evaluation
- Widespread survey input
- Benchmark comparisons to established standards

There is little substitute for the sense of discipline, understanding, and buy-in that can be obtained from a direct personal interview with a project management practitioner. This is a necessary element of an assessment to uncover the degree to which policy is put into practice. Coupled with this is the collection of evidence (artifacts) supporting the implementation of project management.

Are all the documents required by policy complete? Are they of high quality? Are the concepts of project management understood and utilized by the major population that should have knowledge about the policies and procedures? What is the general view of the project management requirements? Finally, synthesizing the data and comparing this information against an established standard that is logical, sound, and clear to provide a path forward is essential. Any assessment that does not consist of at least these elements may leave an organization wondering where the benefit of the process lies.

Assessing Your Level

How do you determine where your organization is now? There are two kinds of assessments that can be conducted.

The first approach is the independent assessment. Project management experts possessing a strong blend of project controls, organizational structure, project management, professional development, and management skills plus an in-depth understanding of the PMMM conduct the assessment. Using a prescribed set of tools and processes (like PM Solutions' PMMM Assessment and HealthCheck^{SM}), these experts can determine your organization's maturity levels in the various knowledge areas and present the results to your management team. The management team and the assessors would then work together to develop your improvement plan. This independent

approach is the preferred method when an external "expert voice" is needed to communicate to senior executives.

The second approach is a facilitated self-assessment. A small team of experienced assessors would team with representatives from your staff to conduct a self-assessment. Following the same procedures that an independent assessment would follow, this team of individuals determines your organization's maturity levels in the various knowledge areas and then works with your management staff to develop an improvement plan to achieve your desired maturity level. The primary challenge in the self-assessment approach is maintaining the confidentiality of individual findings.

The assessment fact-finding activities include staff interviews. The quality of the information provided in these interviews can be skewed if staff members are not comfortable sharing negative information with other staff members. The self-assessment approach can also suffer from an inherent bias toward a higher level of maturity, as no employees like to hear (or admit) that they are at Level 1 maturity.

PM Solutions' approach to minimizing the time for advancing an organization's project management maturity is to first perform an exceptionally detailed gap analysis between the organization's current practices and its desired level of maturity. Then, working with the executive leadership of the organization, PM Solutions charts a roadmap of improvement initiatives and detailed implementation and change management plans for improvement activities.

By carefully sequencing the path to project management performance improvement, an organization can significantly reduce the time required to achieve higher maturity ratings and realize valuable results such as shorter project completion times, better control of project costs, improved strategic management decision making, and sustainable growth and profitability over the long term.

Maturing to Level 3 and Beyond

Most organizations (roughly 90% of all companies regardless of size or industry, according to PM Solutions' research studies) are at Level 1 or Level 2 maturity. Some organizations are comfortable achieving a Level 2 rating. Most organizations, though—especially larger ones—recognize that achieving a Level 3 maturity rating is going to provide them with a significantly greater return on investment (ROI).

The path to Level 3 is not an overnight journey. And for those organizations that seek to achieve a Level 4 or 5 maturity rating, the path may require several years of continual improvement activities. All this may seem to make maturity improvement a daunting feat, but that's not necessarily the case.

PM Solutions' PMMM identifies several hundred criteria organized into manageable groups that an organization must meet before it can be considered to have achieved a Level 3 maturity rating. Many organizations already meet a large number of these criteria and have much of the infrastructure in place to begin a rapid move toward improving their project management capability. Frequently, though, the component pieces (training programs, management support, repeatable processes, proactive governance, etc.) necessary for advanced maturity have not been combined properly and have, in some instances, stagnated or lost momentum.

Often many of the project management ingredients are reusable and do not have to be discarded as the organization moves to improve its capabilities. Rather, a well-designed roadmap of properly sequenced—and organizationally appropriate—activities will ease the path, reducing the cost, resource requirements, and timeframe for an improvement initiative.

To achieve Level 3, all project management processes must be in place and established as organizational standards. These processes involve clients and internal customers as active and integral members of the project team. Most projects use these processes with few exceptions. Management has

institutionalized the processes and standards with formal documentation existing on all processes and standards. Management is regularly involved in input and approval of key decisions, documents, and project issues. The project management processes are typically automated. Each project is evaluated and managed in light of other projects.

Of note, at Level 3, the processes must become tailorable to the characteristics of each project. An organization cannot blindly apply all processes equally to all projects, nor would it want to. Consideration must be given to the differences between projects (complexity, size, duration, etc.). The important issue is to note how the processes are tailored, that is, does the organization have a process to customize the implementation of applicable activities and policies to a particular project?

Attaining Level 4 Maturity

To attain Level 4, an organization's project management processes, standards, and supporting systems must be integrated with other corporate processes and systems. Level 4 organizations' projects are managed by considering how they performed in the past and what is expected for the future. Management uses efficiency and effectiveness metrics to make decisions about projects and understands the impacts these decisions will have on other projects. All projects, changes, and issues are evaluated based on metrics from baseline cost and schedule estimates, actual status, and earned value calculations.

Management clearly understands its role in the project management process and executes it well, managing at the right level, and clearly differentiating management styles and project management requirements for the different sizes and complexities of the organization's projects. Ultimately, project information is integrated with other corporate systems, including finance and accounting, strategy management, and resource management systems, to optimize business decisions.

Attaining Level 5 Maturity

Organizations that achieve Level 5 are essentially best-of-breed organizations and set the standard for the project management discipline within their respective industry sectors. Those working within such organizations are highly organized and optimize project management practice through continual improvement activities.

There are formal processes in place that are used to continuously improve project management activities. For example, lessons learned are regularly examined and used to improve project management processes, standards, and documentation, increasing the probability of success for future projects. The metrics collected during project execution are used not only to understand the performance of a project, but also for making effective organizational management decisions going forward.

Conclusion

The benefits of a structured assessment of project management maturity lie in setting direction, prioritizing actions, and beginning cultural change rather than in understanding the current level at which an organization is performing. The emphasis is on "structured." It is important that the assessment be repeatable, provide consistent measurements and results, and promote some degree of benchmarking with other organizations. The structure provides the basis for any assessment to be utilized as a "checkup" tool to measure progress and identify the next logical steps forward. Like it or not, maturity assessments may be here to stay in this complex project management world we live in—not too distant or different from the software development world and SEI's maturity models.

Chapter 2

Definitions of Maturity Levels

The levels of the PM Solutions Project Management Maturity Model are as follows:

Level 1: Initial Process

Although there is a recognition that project management processes exist, there are no established practices or standards, and individual project managers are not held to specific accountability by any process standards. Documentation is loose and ad hoc. Management understands the definition of a project, that there are accepted processes, and is aware of the need for project management. Metrics are informally collected on an ad hoc basis.

Level 2: Structured Process and Standards

Many project management processes exist within the organization, but they are not considered organizational standards.

Documentation exists on these basic processes. Management supports the implementation of project management, but there is neither consistent understanding and involvement nor an organizational mandate to comply for all projects.

Functional management is involved in the project management of larger, more visible projects, and these are typically executed in a systematic fashion. There are basic metrics to track project cost, schedule, and technical performance, although data may be collected or correlated manually. Information available for managing a project is often a mix between summary-level data and detail-level data.

Level 3: Organizational Standards and Institutionalized Process

All project management processes are in place and established as organizational standards. These processes involve clients and internal customers as active and integral members of the project team. Nearly all projects use these processes with minimal exception—management has institutionalized the processes and standards with formal documentation existing on all processes and standards. Management is regularly involved in input and approval of key decisions and documents and in key project issues. The project management processes are typically automated. Each project is evaluated and managed in light of other projects.

Note: At Level 3, the processes must become tailorable to the characteristics of each project. An organization cannot blindly apply all processes equally to all projects. Consideration must be given to the differences between projects. The important point is to note how the processes are tailored, that is, to determine whether there is a process to customize the implementation of applicable processes and policies to a particular project.

Level 4: Managed Process

Projects are managed with consideration as to how they performed in the past and what is expected for the future. Management uses efficiency and effectiveness metrics to make decisions regarding a project and understands the impacts on other projects. All projects, changes, and issues are evaluated based upon metrics from cost estimates, baseline estimates, and earned value calculations. Project information is integrated with other corporate systems to optimize business decisions.

Processes and standards are documented and in place to support the practice of using such metrics to make project decisions. Management clearly understands its role in the project management process and executes it well, managing at the right level, and clearly differentiating management styles and project management requirements for projects of different sizes and complexities. Project management processes, standards, and supporting systems are integrated with other corporate processes and systems.

Level 5: Optimizing Process

Processes are in place and actively used to improve project management activities. Lessons learned are regularly examined and used to improve project management processes, standards, and documentation. Management and the organization are focused not only on effectively managing projects, but also on continuous improvement. The metrics collected during project execution are used to both understand the performance of a project and to make organizational management decisions for the future.

Chapter 3

Project Integration Management

The purposes of project integration management are to
(1) initiate the project; (2) coordinate project activities and integrate all efforts into a project management plan; (3) integrate, analyze, and report the project results from carrying out the project management plan; (4) control changes to the baseline plan; (5) collect, integrate, and organize project information in a project information system; and (6) close the project in an orderly and disciplined fashion.

Components

Project Charter Development—The project charter authorizes a project to commence and allows the project manager to access organizational resources in support of it. The charter also gathers together definitions of project scope, assumptions, and constraints. Are projects always begun with a project charter? Are scope, assumptions, and constraints regularly tracked for projects?

Project Management Plan Development—Project management plan development integrates planning information from the other knowledge areas to create a project management plan. The project management plan provides a roadmap for project execution and is the integration vehicle that ensures all project management areas are addressed, developed, and managed within the context of the project. The outcome of this component is a project management plan.

Project Execution—Execution is performing the work by carrying out the project management plan. During project execution, work progress is examined from the perspective of each knowledge area (i.e., scope, time, cost, quality, etc.). The status and performance of the project from the perspective of each knowledge area are consolidated and integrated into progress reports. The main product of this component is information on the work results, usually depicted in project status and performance reports.

Monitoring and Controlling Project Work—This component covers the processes necessary to keep a project on track within the parameters of the scope statement. It involves tracking, reviewing, and reporting on the progress made against the objectives stated in the project management plan.

Integrated Change Control—Integrated change control addresses managing the project baseline. It also includes implementing a change control system (to include configuration management), identifying and assessing changes to the baseline, coordinating the changes across the knowledge areas, managing the authorized changes, informing stakeholders, and identifying corrective actions. The main products of this component include change requests, updates to the project plan, corrective actions, and lessons learned.

Project or Phase Closure—Closure includes those processes associated with the orderly closure of a project, whether the project is completed or cancelled. This process involves all activities to ensure contractual obligations are met, requirements have been fulfilled, deliverables accepted by the

client, and contractual and administrative closure procedures have been performed. Furthermore, organizational knowledge and project artifacts are collected and preserved for learning purposes and potential reuse in other projects.

Project closure includes actions involved with vendor management during contract performance, acceptance by the client, payment for the services, and close-out activities. The purpose is to assure that the seller performs in accordance with the terms of the contract and receives proper reimbursement (in both quantity and timing).

Special Interest Component: Project Management Office (PMO)

The PMO is an organizational entity (a physical office or a virtual organizational structure) that is staffed by project management professionals who serve their organization's project management needs. Among the responsibilities of PMOs, we commonly find project management support services, project management consulting and/or mentoring, development and maintenance of project management methodologies and standards, training of project managers and other project staff, and acting as a pool and manager of project managers for major project initiatives. The following types of integration activities may be expected from a PMO.

Project Support—The PMO assists project teams by providing support in the areas of project scheduling, report production and distribution, operation of project management software, maintenance of the visibility room (or some virtual version thereof), and maintenance of the project workbook.

Consulting and Mentoring—As organizations mature in project management, the PMO satisfies an increasing need for internal project management consultants. These people provide the organization with the expert insights it needs to execute projects effectively.

Processes and Standards—The PMO is the unit within an organization that develops and promulgates common methodologies and standards related to project management.

Training—The PMO trains project managers, team members, and clients regarding project management principles, tools, and techniques. Both training materials and instructors originate in the PMO, or the PMO participates in the development and selection of materials and instructors with human resources departments.

Project Management—The PMO can house a group of professional project managers who are assigned to carry out the organization's projects; in addition, the PMO often provides project expertise from specialty positions such as schedulers and controllers, methodologists, business analysts, and the like.

Project Management Software Tools—As a PMO matures, it becomes the focal point in the organization for software tools supporting project management efforts.

Level 1: Initial Process

There is recognition of the need for accepted processes, but there are no established practices or standards. A rudimentary PMO may exist, but this is rare. Work is performed in an ad hoc fashion. Individual teams or groups within the organization may have their own ways of doing things, but documentation of their processes is loose and inadequate documentation makes it difficult to repeat the activities elsewhere. Management is aware of the importance of project integration, however, and at times asks for information on work results.

Project Charter Development

There is no formal requirement for a project charter; one may not be developed. If a project charter is produced,

no prescribed format is followed. The content and layout vary by project and project manager.

Project Management Plan Development

Some project managers have developed individual versions of project management plans on an ad hoc basis; thus each plan looks different with varying amounts of content and levels of detail. If a project management plan exists, it may include a scope statement and work breakdown structure (WBS) that consists of a basic set of milestones and, occasionally, deliverables. The plan may include independent milestones and key resource requirements.

Project Execution

Assignment of work is informal and is typically through verbal communications.

Monitoring and Controlling Project Work

The information on work results is developed on an ad hoc basis, in response to specific requests.

Integrated Change Control

Changes are communicated in an ad hoc manner to the project manager and in some cases directly to the team without project manager awareness or involvement. The project manager sometimes documents changes. The organization has no documented change control process and individual project managers apply their own approaches to managing and controlling changes. Changes are unequally managed and in many cases not monitored. Configuration control of deliverables is loosely managed and controlled, if managed at all.

Project or Phase Closure

The final product or service is delivered informally, with or without customer acceptance. No procedures exist for dispersion of project team members or collection of project data. Contracts for projects are loosely managed with minimal reporting requirements delineated in contracts. In large part, vendors and contractors are managed to end dates only.

There are no procedures for shutting down a project that has been cancelled. No central system collects, integrates, and organizes project-related information tools, processes, and procedures across knowledge areas. Each project manager uses whatever system she or he desires.

Special Interest Component: The Project Management Office

An informal PMO may exist that generally consists of one or two people who have an interest in bringing project management standards to the organization and are acknowledged as successful project managers. This is a PMO in name only. More often, a Level 1 organization has no PMO. Aspects of project management are handled as described below.

Project Support—Assistance to project teams regarding the scheduling of projects is available from the PMO.

Consulting and Mentoring—No help is available within the organization. Each project manager manages his or her project in the manner he or she desires.

Processes and Standards—Each project manager manages his or her project in the manner he or she desires.

Training—No formalized training is available. If training is requested, individuals are directed to seek outside sources. Guidance on project management concepts may be available to individuals upon request.

Project Management—Guidance on project management concepts may be available to individuals upon request.

Project Management Software Tools—Each project manager uses whatever scheduling tools and methodologies she or he desires. There is no tool commonality in the organization.

Level 2: Structured Process and Standards

There are basic, documented processes in place for developing project plans for integrating, analyzing, and developing reports on work results. Although the processes are in place, they are not considered organizational standards. Management is involved only on high-visibility projects.

Project Charter Development

Project charters are used for larger and more complex projects. A basic template is provided but the content varies among projects.

Project Management Plan Development

The organization has a documented process for developing a project management plan. The process is mandatory for large, highly visible projects and optional for others. The project management plan incorporates information from the project charter, scope statement, and top-level WBS. The plan also includes a summary-level cost estimate; schedule showing major milestones, key resource requirements, and identified risks; a list of key stakeholders; and a communication strategy listing key individuals. The plan outlines basic staff management items such as time reporting and vacation request procedures. The project management plans are updated to reflect approved scope changes following the change control process.

Project Execution

Summary-level information on work results is developed. Status information is integrated with cost and schedule data to depict project status.

Monitoring and Controlling Project Work

Both status and performance reports are produced to track progress toward achieving scheduled milestones. Basic metrics (such as planned budget and milestone percent complete) are collected and integrated into project performance reports.

Integrated Change Control

The organization has a defined and documented change control process for scope changes. For large and highly visible projects, scope changes are identified with a change request form, are tracked on a change request log, are formally approved, and project plans are updated, with corrective actions incorporated, if necessary. Cost and schedule changes are not controlled since the use of baselines is not yet a common practice or established as an organizational standard. Large, highly visible projects are required to follow the change control process.

Project or Phase Closure

Formal acceptance and contract closure occur, but a standard process is not established or documented. Corrective action information and other changes are managed via the project integration management process, resulting in project management plan updates. Closure information and formal acceptance are handled by way of the communication management process. Finance provides final performance numbers to the project manager. The project manager notifies the personnel assigned to the project to report back to their functional supervisors.

There is no standard process for closing down a cancelled project; however, it is generally known that the project manager maintains a file of documentation and information generated by project efforts to date.

Close-outs of larger, more visible projects receive more attention, both administrative and contractual; smaller projects are not scrutinized.

A basic project system collects, integrates, and organizes project-related information tools, processes, and procedures across knowledge areas for large and highly visible projects. The system may be something as simple as a central file system. There are guidelines for acceptable information systems for individual project teams, but the responsibility for selection and deployment lies with the project managers.

Special Interest Component: Project Management Office

A basic PMO is established and recognized by upper management as having the responsibility to define the processes and standards by which projects should be managed. The individuals within the PMO (sometimes part-time roles) advise and offer input when asked.

Project Support—The PMO assists project teams in the creation and maintenance of their project workbooks. Assistance is offered to project teams on developing scope, project scheduling, and issue and change control upon request.

Consulting and Mentoring—On major projects, the PMO is asked to provide personal consulting and mentoring to project managers on project initiation and planning processes.

Processes and Standards—The PMO has in place a basic project management process; it is not considered an organizational standard, and only large or highly visible projects utilize the process.

Training—Basic project management concepts training is made available to project managers.

Project Management—A database of all project managers in the organization is maintained, along with information about their experience and skill sets.

Project Management Software Tools—An accepted project management scheduling tool serves as a guideline. However, the responsibility for tool selection and deployment lies with the project managers.

Level 3: Organizational Standards and Institutionalized Process

Project integration efforts are institutionalized via procedures and standards. The PMO is beginning to integrate project data. Additional processes have been developed and documented, and there is a coordinated effort within the organization to have a common information system. Project management processes are considered standard practice for projects. Management supports project management and is actively involved, particularly on large, visible projects.

Project Charter Development

A project charter is required for all projects and a standard template is provided. The process for documenting, reviewing, and approving the project charter is in place. The level of detail and rigor required vary based on project classification.

Project Management Plan Development

The project management plan development process is fully documented and implemented within the organization and is applied to all projects. The organization's process for developing project management plans incorporates management plans (procedures, processes, etc.) from cost, schedule, risk,

quality, procurement, communications, and human resources (staff management and staff development) processes. In addition to management plans for each knowledge area, project plans typically include specific scope, time, cost, and risk information at an appropriate level of detail.

For example, the project management plans include the project charter, scope statement, and WBS (possibly down to Level 3). The plan also includes cost estimates and schedule information at the level needed for visibility and control. The plan includes the cost and schedule baseline and identifies key resource requirements from the staff management plan. It also identifies risks and planned mitigation strategies as appropriate, and includes a list of key stakeholders and the communication strategies for dealing with those key individuals.

Project management plans are updated to reflect project changes approved under the change control process. Program plans are developed for common, related projects.

Project Execution

Summary and detail-level information on work results is integrated and analyzed, and reports are developed. Report templates may exist. Status and performance reports contain information from knowledge areas such as risk, quality, human resources, and procurement management (in addition to scope, time, and cost).

Monitoring and Controlling Project Work

Status and performance reports are produced to address items such as project performance, time spent on project activities, and the hours or dollars spent. Reports cover variances and performance measurement analyses. Actual statistics are estimated by project teams as opposed to being extracted from corporate finance and accounting systems. Metrics are

collected from the knowledge areas and integrated into project performance reports.

Integrated Change Control

There is a defined and documented project change control system that incorporates the change control processes for scope, cost, and schedule. The process documentation includes change control request and analysis forms and change logs. The project integrated change control system and processes are implemented and utilized by the project teams (changes are identified, assessed, coordinated, and managed; stakeholders are informed; and corrective action is taken).

The process is documented and repeatable; project plan updates are consistently incorporated with corrective actions and approved changes. Baselines are established, adhered to, and managed.

Project or Phase Closure

Project reporting and deliverable acceptance processes are defined and used consistently. Any changes or issues are communicated immediately via the project manager to appropriate project stakeholders.

Clients are involved in product testing and sign off on deliverables. After the customer has signed off on the acceptability of delivered items and all appropriate documentation has been received, the project sponsor signs off on the project acceptance document and closure actions take place.

Standard closure processes dictate who is to receive communications of project closure and specify the type, format, and recipients of financial data to be provided. Project data is captured in a repository. Project team members receive project performance evaluations and are afforded the opportunity for 360-degree reviews.

A project system collects, integrates, and organizes project-related information tools, processes, and procedures across knowledge areas. The systems are becoming standardized across projects and may encompass a central file system and project workbooks. The PMO provides guidance and coordinates the selection and implementation of project management systems. A process is in place to "shut down" projects cancelled by management.

Special Interest Component: Project Management Office

The functions and services of the PMO are defined and communicated throughout the organization. The PMO is considered by most project managers as a reference site and an overseer of project management methodology. It is considered by organizational management as the focal point of the project management thrust for the organization. A comprehensive standardized project management methodology is in place and project team resources are being actively trained in its use. The PMO is an accepted part of the organizational project management landscape and is involved integrally with the project managers in the organization.

Project Support—The PMO closely monitors issue and change control systems and is consulted on change (scope) decisions on large, highly visible projects. The PMO monitors risk analysis on large, highly visible projects and is involved in the risk analysis and control processes on these projects. Assistance is offered for project resource and cost estimating. The PMO offers assistance to project teams in preparing project performance reports and monitors time reporting on projects. It also assists project teams in preparing schedules and reports. All support roles (schedulers, etc.) report to their line organizations.

Consulting and Mentoring—The PMO works closely with the project teams of major projects in the planning

process. This assistance is also available to smaller projects upon request.

Processes and Standards—Project management methodology is enhanced with templates and samples for deliverables. The PMO actively works with project managers to ascertain the best practices for the organization; these are documented in the project management methodology. The PMO provides quality standards and processes. A project management guide serves as a reference for project managers on the entire life cycle of managing a project. It integrates with the more basic process and the templates and samples already in place. The PMO is involved in regular quality walk-throughs and checks throughout the project life cycle.

Training—Project management essentials training is considered mandatory for project managers and is made available to some project team members.

Project Management—The PMO is consulted for the assignment of project managers to major projects, and works closely with the project managers on major projects. The PMO has an initial, generic resource listing (labor categories) in place for the use of project teams. Resource leveling is performed at the project level. There is concern about balancing and scheduling key resource usage at an organizational level, but no such tools are in place. This task is performed manually, if at all.

Project Management Software Tools—The PMO provides guidance and coordinates the selection and implementation of project management software tools. Project managers in the organization are involved in tool selection.

Level 4: Managed Process

All processes are in place, documented, and utilized by all projects. Processes and standards are integrated with other corporate processes and systems. Integration includes

incorporating project and program plans into organization strategic plans. In addition, the reporting process and project information system are integrated with the PMO, finance and accounting, strategic planning systems, and risk management process. There is a mandate to comply with the organizational project management processes and procedures. Decisions are based on performance metrics.

Project Charter Development

All project charter processes are in place, documented, and used. Project charters are integrated into and support organization strategic plans and objectives.

Project Management Plan Development

All processes are in place, documented, and being utilized. Project management plans and program management plans are integrated into and support organization strategic plans. Data from project management plans feeds into financial and other organizational systems to complement business execution.

Project Execution

All processes are in place, documented, and being utilized. The status and performance reporting process is integrated with the PMO, finance and accounting, strategic planning, and risk management systems.

Monitoring and Controlling Project Work

Formal variance and performance measurement analysis is conducted and reported. At this point, the actuals are extracted from corporate finance and accounting systems. Metrics are collected from all knowledge areas and integrated into project performance reports.

Integrated Change Control

All change control processes are in place, documented, and being utilized. The project change control process (including configuration management) is integrated with the organization's control systems, monitoring programs, and risk management process. Functional, physical, and data configurations are documented, maintained, managed, and controlled consistently for all projects.

Project or Phase Closure

Projects report progress against the plan using a standard project management tool and technique. All project resources, including vendors, are fully integrated into the project closing activities. A process and repository exist for capture of appropriate project information and presentation of/access to historical project information for reuse in estimating, risk management, and planning future projects. The organization provides resources and time for conducting lessons-learned briefings upon project closure. Project teams are recognized for their efforts.

The central project system collects, integrates, and organizes project-related information tools, processes, and procedures across knowledge areas. The systems are standardized across projects and integrated with the PMO and other corporate systems as applicable. Minimal effort is required to transmit data to and from the project manager.

All projects that are terminated prematurely follow a standard process for capturing all relevant artifacts and data. Lessons learned from terminated projects are captured and reviewed.

Special Interest Component: Project Management Office

Project management best practices are collected by functional area and maintained at the PMO. Realistic management-level reporting is in place. "Ego-free" reviews of major projects

are regularly compared against standard methodologies and processes. Realistic resource projections are generated by the PMO. There are few surprises on projects.

Project Support—The PMO is responsible for the organizational skill inventory database, coordination of assignments of critical resources, organizational resource leveling, and resource projections (involved in the requisition of additional and replacement resources). The PMO provides project-level variance analyses to organizational management and designs and produces executive dashboard management reporting on all approved projects. The PMO maintains visibility rooms for all major projects and allots space for smaller projects to share. The PMO determines the project report consolidation process for management reporting and is responsible for carrying it out on a regular cycle.

Consulting and Mentoring—A project audit process is in place. Projects in trouble are immediately put into a project recovery process managed by the PMO. A formal mentoring process is in place for all project managers.

Processes and Standards—The project management methodology operates as a standard. All projects use these processes as their normal operating process. A central project documentation repository is in place and is actively monitored by the PMO. Project participants utilize this repository. The PMO conducts benchmarking of selected projects to ascertain estimate accuracy and improve estimating techniques.

Training—Advanced project management training is mandatory for all project managers. A training plan tied into career planning is created for each project manager. Project management essentials training is made available to project managers. Project management essentials training is mandatory before a project manager is assigned to manage a project and is suggested for all team members.

Project Management—Performance reviews of project managers are conducted jointly by the line organization and the PMO. There is an accurate resource repository in place

and the PMO is responsible for maintaining information that is used for organizational resource projections.

The project managers report to the line organization; however, they also have dotted-line responsibility to the PMO. Regular status reports go to both the line organization and the PMO. A small cadre of senior project managers who report to the PMO manage the more complex, visible projects for the organization.

The PMO provides input for the project manager performance reviews. The PMO is responsible for updating resource information (especially for key resources) and also manually ties resource leveling into resource availability at an organizational level. The PMO is responsible for integrating project performance reports into a consolidated report, which is sent into the management oversight process.

Project Management Software Tools—Estimates data is entered for all projects. The PMO tracks and records estimated and actual costs. It also drives the selection of project management software tools, soliciting input from the line organization. The PMO is responsible for deploying PM software tools, including tools that contain resource repository information.

Level 5: Optimizing Process

Project integration improvement procedures are in place and utilized. Lessons learned are regularly examined and used to improve documented processes.

Project Charter Development

A process is in place for continuous improvement of project charters. Lessons learned are captured and used. Project charters are used to support strategic organization decisions and decisions regarding projects. The value of project charters is clearly understood and included in the planning process.

Project Management Plan Development

A process is in place for continuous improvement of project management plan development. Lessons learned are captured and used to improve planning efforts. Project and program plans are used to support strategic organization decisions and decisions regarding projects. A process utilizing the project and program plans for such decisions is developed, documented, and in place.

The organization has evolved to the point where project planning is clearly understood and its consumption of resources is planned as well.

Project Execution

A process is in place for continuous improvement of project management plan execution. Lessons learned are captured and used to improve execution efforts. Overall project performance data is used to support decisions regarding the project and organization strategy.

Monitoring and Controlling Project Work

Project status and performance reports are analyzed to determine the efficiency and effectiveness of a project during execution. A process utilizing project metrics to support management decisions is developed, documented, and in place.

Integrated Change Control

Project changes are included in the determination of project efficiency and effectiveness.

In addition, evaluation and analysis of potential changes include efficiency and effectiveness considerations. A process utilizing such metrics for management decisions during project execution is developed, documented, and in place.

Another process is in place for continuously improving the project integrated change control process to include configuration management.

Lessons learned are captured in a repository and used to improve monitoring and control efforts. Historical changes on projects are examined to identify trends in change control actions and improve upon the initial project planning process.

Project or Phase Closure

Project closure processes are evaluated on a periodic basis and enhancements are incorporated continuously. The organization adheres to a high standard of project performance and quality in its products or services.

Information about lessons learned from the management of large and highly visible projects is retained, and effectiveness and efficiency (e.g., processing project information and documentation, integrated change control, and vendor management) are evaluated. A database captures project performance information and includes vendors and contractors.

All cancelled projects undergo a review process to determine root causes for lessons learned.

A process is in place for continuous improvement of the project information system. Lessons learned are captured and used to improve project systems. The project information systems support the collection and organization of project efficiency and effectiveness metrics. In addition, the system employed to collect, integrate, and organize project information becomes more efficient and effective.

Special Interest Component: Project Management Office

The PMO manages the project portfolio, provides project management tools and training, and oversees scoping of projects. Project managers are significantly accountable to the

PMO. The PMO is responsible for organization-wide resource leveling and assignment of critical resources. The PMO has processes in place to capture lessons learned from projects completed, and modifies project management methodologies as a result. Projects are measured against best practices. Lessons learned are captured and applied. Project management is accepted completely as standard practice throughout the organization.

Project Support—A project management help desk function is available from the PMO. The PMO is involved in the closure of every major project and many smaller ones. The office provides, as part of management reporting, full-cost tracking, including data required for earned value calculations by project.

Lessons learned are captured and applied. Additionally, customer satisfaction surveys of PMO support are conducted and improvement areas identified and acted on.

Consulting and Mentoring—The PMO staff coaches project managers in the managing of smaller projects within the organization. The office works closely with project managers and business clients on business analysis and proposal preparation for major project initiatives.

Processes and Standards—A process is in place whereby project management methodologies are improved as better practices are discovered. All project management methodologies, processes, templates, and samples are available on an Intranet site maintained by the PMO.

Training—Project management essentials training is mandatory for project managers, and is suggested for all client personnel who will be involved in projects. An evaluation is made at the end of every major project to ascertain weak skill areas. This information is used to bolster training plans for individuals, modify existing training courses, and create new courses.

A full training program is available, usually leading to certification as a Project Management Professional (PMP®), although in some cases organizations have established internal certifications.

Project Management—The project manager works closely with the line organization to anticipate new programs and projects on the horizon. There is an active program for feedback from all parts of the organization for project management improvements.

Many project managers in the organization report to the PMO, with dotted-line responsibilities to line organizations. The PMO conducts performance reviews of project managers with input from their line organizations. Project managers are well integrated into the client organization (although they may report to the PMO) and are considered parts of the client management teams. Resource leveling is done in an automated fashion at the organizational level.

Project Management Software Tools—On every project, part of the closure process is a review of the project management software tools and their interfaces to ascertain improvements. These lessons learned are regularly integrated back into the tools and interfaces through a standard process. The project management software tool provides earned value reporting, which the PMO has made a part of the executive dashboard reporting. The resource repository is now integrated with the human resources system for the organization. The project management software tool is integrated with the corporate accounting system to aid budgeting and cost reporting and with the organizational procurement system for obtaining actual costs of goods and services.

Chapter 4

Scope Management

Scope management consists of the processes required to ensure that a project includes all the work required, and only the work required, to complete the project successfully.

Components

Scope Management Planning

Value and improvement are key considerations when planning scope definition and management. The project scope management plan includes instructions for measuring value of scope changes, considerations for the cost of rigor applied to each project, and a process for recording and disseminating lessons learned.

Requirements Collection

This involves the assessment and development of processes, procedures, and standards relating to the collection of the business and technical requirements of projects.

Scope Definition

Scope definition covers the process for developing a detailed description of the project. How well does the organization turn requirements into a clear, actionable vision of the end state or product?

Work Breakdown Structure

The WBS process covers the development of a work plan and involves the quality, quantity, and overall sophistication of the organization's use of the WBS. Has the organization developed a WBS dictionary? Does the WBS form the basis for the automated plan? Is the WBS tied to the accounting system for reporting purposes?

Scope Validation

Scope validation is the process of formalizing acceptance of completed deliverables. Having a process for acceptance of deliverables increases the likelihood that a project will successfully meet stakeholder expectations.

Scope Change Control

This component covers the change management processes as they relate to project scope. It covers the regularity of use and the overall evaluation of proposed changes. Are changes really evaluated and prioritized or are they merely listed? Is the change management process tied into the issues tracking system? Is there regular follow-up and reporting? Is the change management process closely tied to the organizational management process?

Level 1: Initial Process

Scope definition is limited to a general statement of business requirements. Documentation and management of all elements

(issues, changes, etc.) is very loose and ad hoc. Despite an awareness of the need for managing project efforts, there are no standards in the organization for project management. Management is generally aware of the scope of the initiatives, but typically only to the point of defining a few key milestones.

Scope Management Planning

No scope management plan exists. Scope is inferred through other documents and statements from management. A project charter or statement of purpose may be the only initiating documentation available.

Requirements Collection

Business requirements are collected in an undocumented and ad hoc manner and may be limited to a statement of purpose. Technical requirements may be more formally documented and contain some general definition of what will be produced if deliverables are met.

Scope Definition

A project scope statement document is compiled. The first tier of the WBS is defined and contained in the statement.

Work Breakdown Structure

A WBS document is generated during the scope definition process. The WBS consists of a very basic set of identified work tasks to be accomplished and may list deliverables. The WBS may not be a true decomposition of the project and may be more of a listing. The project may have a schedule, but that schedule has no real basis in work to be performed, and there

are no specific guidelines as to how the work plan or schedule should be developed.

Scope Validation

Scope validation occurs throughout project execution in an ad hoc manner; this means that variations in scope may not be handled proactively, and are dealt with in reaction to unforeseen changes in requirements, schedule, or costs.

Scope Change Control

A process to monitor project status exists. The scope baseline is managed during the life of a project, but changes are communicated in an ad hoc manner to the project manager, who may not document them systematically. There is no documented scope change control process.

Level 2: Structured Process and Standards

A basic scope management process is in place. Scope management techniques are regularly applied on larger, more visible projects. There is a process to involve management in the project scope management process, but not all management participates in the process. Many of the organization's projects utilize the standard project management process to identify and manage project scope. Management supports the project management processes and the scope management process in particular.

Scope Management Planning

Development of a scope management plan is part of the project management process. The plan establishes some of the rules for defining and managing the project scope. Most large and visible projects develop and utilize a scope management plan.

Requirements Collection

There is a set of standard methods for collecting and documenting business requirements so that the quality of collected requirements is uniform. All large or high-value projects require business requirements documents. A documented process is in place in which project managers request and receive management sign-offs (from individual managers or a management team) approving the business requirements. There is also a basic process for establishing a base set of technical deliverables for a project. Management signs off on the technical expectations for planned deliverables; there is agreement on how those deliverables will operate when produced.

Scope Validation

A standard scope statement template exists. The process for completing the template is documented. All large or high-value projects require scope statements. A minimum of one tier of the WBS is required in the scope statement. Requirements documentation is used as input into the scope definition process. Change control processes exist to manage scope.

Work Breakdown Structure

A standard WBS template exists. The process for completing the template is documented.

The project scope statement is used as input into the WBS creation process. The WBS is structured to include a built-in codification (task numbering) structure so that management reporting can "roll up." All large or high-value projects require a WBS. Management reviews and approves each WBS developed for a new project.

These WBS structures are used to develop project schedules and serve as communication vehicles with sponsors, and as primary vehicles for communicating project status.

Development of a technical requirement document is part of the project management process if needed.

Scope Validation

A process exists for validating project deliverables. All large or high-value projects require validation of scope. Management reviews project deliverables. The project manager (or team) always verifies project scope (what is to be included in or excluded from the project) with the client or customer.

Scope Change Control

Standard templates exist to monitor project status and manage scope baseline. All large or high-value projects require monitoring of project status and management of scope baselines. A defined and documented scope change control process is in place, but not all of the projects follow it. Management supports the documented scope change control process and monitors compliance for larger, more visible projects. A high degree of compliance with the scope change control process is mandatory for large projects.

Level 3: Organizational Standards and Institutionalized Process

The organization maintains a full, rigorous project management process documented and standardized for the organization; this process is in use for most projects. All project management processes involve clients as active and integral members of the project team. This team develops requirements, scope, and other project components. The team as a unit seeks management input and approval of key decisions and documents. Management is involved actively and integrally in key project

decisions and issues. Stakeholder management is also involved in scope management. The process requires and management actively participates in key decisions that pertain to project scope issues.

Scope Management Planning

A scope management plan template exists and is consistently used for all projects. A requirements management plan is generated as an output of the scope management planning process. This document defines in detail how the project scope is to be defined and controlled.

Requirements Collection

A documented and mandatory process specifically prescribes the steps that must be executed to compile requirements. Tools and techniques such as rapid development methods are employed to establish requirement lists. Targeted stakeholders are included in the processes.

The quality of collected requirements is strictly enforced. A requirements traceability document is a necessary output of this process.

Scope Definition

There is a standardized, documented, and mandatory process in place that specifically prescribes the steps to execute the process of defining project scope. Change control processes are documented and must be followed to change scope after sign-off.

Work Breakdown Structure

A standardized, documented, and mandatory process specifically prescribes the steps for creation of the WBS. Outputs from the process include but are not limited to the WBS,

WBS dictionary, scope baseline, and requirements traceability document. Management is involved in the development and approval of a WBS for each project.

Scope Validation

The organization maintains a standardized, documented, and mandatory process to control the validation of scope of each project. Inputs into the process include requirements documentation, requirements traceability documentation, work performance data, and other items as required. Management is involved intimately with the acceptance of project deliverables. Outputs from the process include accepted deliverables and change requests.

Scope Change Control

There is a standardized, documented, and mandatory process to monitor project status and manage the scope baseline. Requirements traceability and work performance data are inputs for controlling the scope change process. Scope baselines are established, managed, and met.

Level 4: Managed Process

Project management processes serve as norms and are used on all projects. Projects are managed and evaluated in light of other projects. An "organizational view" applies to all projects. Organization management

- Understands its role in the project management process.
- Is regularly involved in the project management process.
- Manages at "the right level" (delegating when appropriate and managing at a lower level when necessary).

▪ Holds the project managers and project teams accountable for deployment against a comprehensive project management process at appropriate levels. On large, complex projects all steps of the project management process should be performed, all project management deliverables created, etc. On smaller, simpler projects a scaled-down set of steps and deliverables may be followed.

▪ Manages projects against the improved processes, not against the basic processes.

Scope Management Planning

Scope planning and management are mandatory for all projects, and both processes are tailored to the size and type of project involved and the organizational environment. Expert judgment and project archives are used to develop scope management plans.

Requirements Collection

Requirements collection takes careful account of existing functions, systems, and other active projects. The requirements traceability document or addendum reflecting impacts to existing functions or other active projects is a necessary output of this process.

Business requirements are fully documented by the project team. The business requirements take careful account of existing functions, systems, and other active projects. If, in the course of deploying the project, changes affect business requirements, the change control analysis includes an evaluation of impacts on existing functions and other active projects.

Technical requirements and specifications are fully documented by the project team and based in part on organizational standards. These specifications are created only after an analysis of the ramifications of the proposed system on the current technical environment, other existing systems (both interfaces and performance ramifications), and other active projects.

Scope Definition

Scope definition takes careful account of other existing functions, systems, and other active projects. Change control analysis should include the impacts of a project on existing functions and other active projects.

Work Breakdown Structure

The WBS is included in the change control process. The creation of the WBS is closely aligned with documentation of deliverables. This process identifies acceptable levels of change to the WBS that a project manager may make without approval. WBS changes that impact scope, time, costs, or other major decisions must be approved at the appropriate level of the organization.

Scope Validation

The completion and acceptance of project deliverables are broadcast routinely to active, dependent projects and activities. Methods are in place to allow actions based on feedback that may affect project scope.

Scope Change Control

All processes involving scope changes are in place, documented, and utilized. They are integrated with the organization's control systems, monitoring programs, and risk management process. Scope, cost, and schedule reports are integrated with technical status reports.

Level 5: Optimizing Process

The organization focus is on effectively managing all projects and also on *improving the manner* in which future projects

can be managed—that is, process improvement. Projects are managed with *high utilization of value considerations.* Effectiveness and efficiency metrics are regularly calculated and tracked and drive project scope decisions by appropriate levels of management.

The organization has a clear understanding of a project's value. All changes and issues that arise are evaluated based upon effectiveness and efficiency metrics. Scope determinations are made by the appropriate level of management based on quantitative metrics determined by the project team.

Scope Management Planning

Value and improvement are key considerations when planning scope definition and management. The scope management plan includes instructions for measuring the value of scope changes and also details costs for maintaining quality for the project. Lessons learned from the planning process are recorded and disseminated.

Requirements Collection

There is full change control on business requirements, A change is initiated only if it is fully understood and documented; management approval at appropriate levels is required. Change decisions for improvements, modifications, and additions to business requirements should include judgments as to value (impacts on costs, time, etc.). Value metrics are in place for making change decisions. Lessons learned relating to requirements collection are recorded and disseminated.

Scope Definition

Scope definition processes are constantly inspected and refined for improvement.

Lessons learned regarding the scope definition process are recorded and disseminated.

Work Breakdown Structure

The process of determining WBS and work plans is regularly examined (generally at project close) to ascertain lessons learned about process improvements. WBS and work plans are monitored regularly and carefully. Projected changes are anticipated and documented carefully.

Scope Validation

Post-production value data is evaluated for requirement quality performance. Deliverable inspection techniques are measured against industry standards to ensure best practices. Lessons learned regarding the validation process are recorded and disseminated.

Scope Change Control

A process is in place to continuously improve the scope control process. Lessons learned are captured and used to improve monitoring and control efforts. Metrics are gathered and analyzed to ascertain the accuracy of the scoping process. Scope variances are incorporated into the determinations of project efficiency and effectiveness. A process utilizing scope variances and cost assessments for management decisions during project execution is developed, documented, and in place.

Chapter 5

Time Management

The overall purpose of time management is to develop a project schedule, manage to that schedule, and ensure that the project completes within the approved time frame. Time management involves defining project activities, developing the schedule, executing the schedule, and controlling the plans during project execution.

Components

Time Management Planning

Time management planning includes those processes related to the establishment of policies and procedures for schedule development and control.

Activity Definition

Activity definition involves identifying and documenting project activities that must be accomplished to produce the products or services identified in the work breakdown structure. The outcome of this component is a list of all activities

with all supporting detail, including activity definitions, constraints, and assumptions.

Activity Sequencing

Activity sequencing involves sequencing project activities and depicting when each product or service must be accomplished relative to other activities. Activity sequencing also includes the development of dependencies between activities. The outcome of this component is a project network diagram.

Activity Resource Estimation

Resource estimation includes identifying what resources and quantities are needed for a project. Resources include labor categories, hours, material, and equipment. The outcome of this component is a listing of the project resource requirements.

Activity Duration Estimation

This component comprises those processes related to estimating the time (hours or other work periods) necessary to complete the activities previously identified, using the resources identified and estimated.

Schedule Development

Schedule development involves determining durations and calculating the start and finish dates for each project activity. Using the project network diagram, activity durations are established, resource requirements are confirmed, a project schedule is created, and a baseline schedule is established. This component includes the development of a schedule management plan. The main products of schedule development include the project schedule and a schedule management plan.

Schedule Control

Schedule control involves managing the schedule baseline to ensure project completion within the approved time frame. Managing the schedule baseline involves implementing a schedule control system, publishing schedule status reports, analyzing schedule performance metrics, determining changes to the schedule baseline, managing the authorized changes, informing stakeholders, and taking corrective action. The main products of this component include schedule reports, schedule performance analyses, and revised schedule baselines.

Schedule Integration

This component involves the integration of major components of project schedules. Schedules are integrated throughout the organization to ensure accurate understanding of the impacts of changes. Program schedules reflect the integration of projects within a program to clearly portray the impact of project changes on the organization's overall program. The main products of this component are integrated project, program, and organizational schedules.

Level 1: Initial Process

No established planning or scheduling standards exist. This lack of documentation makes it difficult to achieve repeatable project success.

Time Management Planning

No time management plan exists. Project schedules are defined loosely. Little or no project initiation documentation is available.

Activity Definition

The way activities are defined is ad hoc, not documented, and varies by project (milestones are not standard). A scope statement is generally prepared, but the work breakdown structure consists of a basic set of milestones and perhaps deliverables. The schedule is elaborated at the milestone level. Functional support areas may be overlooked.

Activity Sequencing

Project activities are sequenced on an ad hoc basis, if at all. If project activities are sequenced, they seldom reflect dependencies. Individual project teams may have access to and understand sequencing methods, but the methods are not standardized throughout the organization. Network diagrams revealing dependencies do not usually exist.

Activity Resource Estimation

Project managers have developed their own ways of identifying resources and quantities needed (labor categories, hours, equipment, and materials).

Activity Duration Estimation

Project managers have developed their own ways of estimating hours, so there is no consistency across projects or departments. As a result, it is difficult to use historical information to improve estimate accuracy.

Schedule Development

There is no organizational process (only an ad hoc approach) for developing a schedule that includes using network diagrams, determining activity durations, identifying and prioritizing

resources, developing schedules, and baselining projects. Schedule development is limited typically to independent milestones. Durations between milestones are rough guesses. Project managers have their own ways of identifying resources and quantities needed. An ad hoc approach determines who is available to work on projects.

No help is available from the PMO in developing schedules or identifying scheduling tools. Project teams and segments of the organization use various methods to develop schedule baselines using milestones. There is no tool commonality in the organization.

Schedule Control

Individual project teams and segments of the organization apply their own approaches to managing and controlling schedules. Schedule milestone changes are unequally managed and, in many cases, not monitored; and changes seldom involve corrective actions. Ad hoc schedule reports are provided upon request.

Schedule Integration

Occasionally, there is an informal ad hoc grouping of project schedules for umbrella program schedules or integrated organization schedules. On request, individuals group together project schedules to depict program milestone status and organization-wide accomplishments.

Level 2: Structured Process and Standards

Basic processes exist but are not required for planning and scheduling. Standard scheduling approaches are utilized for large, visible projects.

Time Management Planning

Development of a time management plan is part of the project management process. Such a plan establishes some of the rules for defining and managing project schedules. Most large and visible projects develop and utilize time management plans.

Activity Definition

Generally, a scope process exists and a scope statement is prepared; however, management does not require adherence to the process.

Summary activities are defined for near-term and long-term efforts. The organization maintains a basic, documented process for defining activities with standard milestones and exit criteria established for projects. Scope statements are prepared as standard practice on large, visible projects, and such projects follow the basic process, WBS template, and standard milestones and exit criteria. There is WBS template that goes down to at least Level 3.

Project schedules for large, visible projects are at a detailed level and activities are defined to achieve the scope, to at least Level 3 in the WBS, including milestones and deliverables. Generally, a scope process exists and a scope statement is prepared but management does not require adherence to the process.

The activity definition process is documented and repeatable. The top-level WBS template, an identified set of key milestones and exit criteria, and the activity definition process are standardized for large, visible projects. Small projects are encouraged to use the process.

The planning process is supported by management and is becoming accepted throughout the organization.

Activity Sequencing

The organization has a basic, documented process for sequencing activities and establishing precedence and dependencies.

The activity sequence process includes the formal identification of constraints and assumptions that impact the sequencing of activities. The process for sequencing activities and establishing precedences and dependencies serves as a standard for large, visible projects.

The organization has access to various activity sequencing methods (precedence, arrow, and conditional diagramming). Mandatory dependencies are identified at a summary level. Network diagrams exist at a summary level and depict mandatory dependencies. Both discretionary and mandatory dependencies are identified at the detailed level. Network diagrams at the detailed level describe discretionary and mandatory dependencies.

Activity Resource Estimation

Detailed activities and the resources required to complete them are defined for near-term efforts. The activity definition process is expanded to collect historical information about activities on similar projects. A complete resource listing is defined for all labor categories, equipment, and material requirements. All project participants are encouraged to utilize the listing as a checklist for identifying resources. The checklist is standard practice for large, highly visible projects.

A documented planning process describes resource listings and methodologies for determining quantities. A generic resource listing is maintained in the PMO's resource repository and project-specific requirements are manually input into the repository.

Activity Duration Estimation

The organization makes available industry standard tools, techniques, and/or factors for the project teams to approximate quantities but their use is not mandatory.

Schedule Development

The basic guidelines represent a full, documented, repeatable process for developing schedules. In addition, the process includes the development of a historical database to collect data on activity durations. A schedule management plan and process have been developed and documented. Large, highly visible projects follow the guidelines as standards and other projects are encouraged to apply them.

The PMO closely monitors and supports the determination of project activity durations, development of schedules, and establishment of project baselines. It is the norm to have a project schedule at a detailed level (showing the level at which the structure begins to "flesh out" the deliverables for each product or service group).

To calculate durations, project teams rely upon expert knowledge and access to industry methods, standards, and factors as well as commercial databases. Factors and standards may include capability and resource dedication measures.

The organization maintains complete resource listings and industry standard tools, techniques, and/or factors for the use of project teams in estimating quantities. Teams develop staffing plans and work with line management to acquire resources.

The resources are inserted into the schedule. Cost estimates are used to support schedule development. Project risks are considered. The organization has a documented process for allocating, time phasing, and baselining projects. Baselines are established, but may change frequently. Project management software tools are standard for large, visible projects, and integration (dependency) is accomplished within projects.

Schedule Control

A process is developed and documented for managing and controlling schedules. A schedule change control system is introduced. The process includes schedule status determination

methods, change control forms, a change log, and forms and logs for reporting issues.

Summary and detailed schedule reports are developed and provided to key stakeholders. The reports are produced from a central system. Schedule status is tracked by comparing planned versus actual data and percent complete figures for milestones.

Schedule baselines are established, but may change frequently. The organization is capable of simple variance analysis of schedule status (using planned versus actual status). Metrics such as schedule baseline, planned status, and actual status are collected.

Schedule Integration

At the summary level, project schedules are manually grouped together to depict program and organization-wide schedules. No attempts are made to integrate the dependencies and relationships within program schedules or the organization-wide schedules. At the summary and detailed levels, project schedules are still manually grouped together to depict program and organization-wide schedules. Thought is given to integrating program and organization-wide schedules. Guidelines to integrate schedules are in the early stages of formulation.

Level 3: Organizational Standards and Institutionalized Process

Time management processes are documented and utilized by most projects. Organization-wide integration includes inter-project dependencies.

Time Management Planning

Schedule templates exist and are used consistently for all projects. A scope statement is used to build a WBS as a basis

for developing a project schedule. These documents, combined with time management plans, define in detail how project schedules are to be defined and controlled.

Activity Definition

Scope statements with project assumptions and constraints serve as organizational standards for all projects. The WBS is always used as the basis for determining project activities, and defining activities required resources. A detailed schedule with detailed activities is the organizational standard practice.

Detailed activities are defined for near-term efforts and beyond, if appropriate. The activity definition process is documented and repeatable. The activity templates are integrated into the standard scheduling software environment. Metrics such as number of activities per project are collected and retained.

Definition of project activities includes key tasks external to the project that may impact the project (external dependencies) that need to be monitored and managed. They may be program- and/or organization-related.

Activity Sequencing

The activity sequencing process is expanded to include external dependencies and activity network templates. The network templates depict common, sequenced activities and dependencies.

The repeatable process is an organizational standard for all projects. Project teams document their network diagram approach, and unusual aspects are documented. Detailed level network diagrams depict discretionary, mandatory, and external dependencies. The network templates are integrated into the standard scheduling software environment. Historical information, such as the type of external dependencies, is collected and retained.

Activity Resource Estimation

The WBS is always the basis for determining project activities. The information it contains is used to define the required resources. Resource estimation is integrated into planning processes. Documentation details all planning processes and standards for identifying resource requirements. Project resource requirements are uploaded into the PMO's resource repository. Metrics covering the types and availabilities of resources required by projects are collected and analyzed to determine organizational efficiency in identifying and utilizing resources.

Activity Duration Estimation

Project teams are beginning to identify external dependent activities. Historical information about common activities exists, and the activity definition process is expanded to include activity templates with definitions specific to the organization. Use of industry standard tools, techniques and/or factors to approximate quantities is mandatory for all projects.

Schedule Development

It is the norm to have a project schedule at the appropriate level of detail in line with the project scope and WBS. A historical database is established and the organization is starting to collect and analyze actual project durations for similar activities. To calculate durations, project teams may rely upon expert knowledge, industry standards, simulation techniques, and organization-specific standards and factors.

A process to identify resource requirements is fully implemented by the organization. The scheduling process is fully integrated with the PMO, strategic planning systems, and risk management process. The PMO manages all resource prioritization.

Baselines are established, adhered to, and managed. Project management software tools are standard for all projects, and projects are integrated within program areas. Cost and schedule information is integrated. Metrics are collected and analyzed in areas such as duration standards, capability factors, and resource dedication factors. All processes are in place, documented, and being utilized.

Cost and schedule information is integrated with technical data. The organization has access to various scheduling methods: deterministic CPM (specified network logic and single duration estimates), probabilistic GERT (probabilities in network logic and duration estimates), and weighted average PERT (sequential network logic and weighted average duration estimates).

Schedule Control

The schedule change control system, schedule reporting process, and earned value analysis processes are followed by project teams. Schedule status and changes are identified, evaluated, and managed, and stakeholders are informed. A documented performance measurement process evaluates project schedule status and enables the organization to take corrective action.

Schedule baselines are established, followed, and managed. Cost and schedule reports are integrated. Performance metrics (such as schedule variance and estimates at completion) are monitored and analyzed, and corrective actions are implemented.

All documented processes are utilized. The schedule change control system is integrated with the organization's control systems, monitoring programs, and risk management process. Cost and schedule reports are integrated with technical reports.

Schedule Integration

A program scheduling process depicts and integrates program schedules at summary and detailed levels. Program integration is conducted at the organization level, is accomplished easily, and is repeatable. A unified process, system, and approach are employed for integrating programs and schedules across the organization. The organization develops, analyzes, and distributes integrated program and master schedules to appropriate parties. Key external dependencies are identified, monitored, and managed. A program and organizational view is portrayed and analyzed.

Level 4: Managed Process

Time management procedures utilize historical data to forecast future performance. Management decisions are based on efficiency and effectiveness metrics.

Time Management Planning

Time planning and schedule management are mandatory for all projects. These techniques are tailored to the size and type of project involved and to the organizational environment. Expert judgment and project archives are used to develop plans.

Activity Definition

All processes are in place, documented, and utilized. Project activities are monitored regularly. The focus is on information that is dependent upon other projects or programs in the organization. Management uses such information to make decisions about projects and related efforts. A documented process for utilizing such information for making management decisions is in place and followed. Lessons learned are captured.

The planning process is fully integrated with the PMO for resource prioritization and scheduling and, at a more strategic level, with the human resources project management process for resource acquisition, assignment, and forecasts.

Activity Sequencing

Project dependencies are regularly monitored and focus on dependencies between projects and programs throughout the organization. Management uses the dependent relationships to support decisions regarding projects and related efforts.

A documented process utilizing project dependencies to understand the full impact of management decisions is in place. Lessons learned are captured.

Activity Resource Estimation

All processes related to resource estimation are documented and utilized. Resource requirements are regularly monitored with a focus on information that is dependent on other projects or programs throughout the organization. Management uses this information to make decisions about projects and related efforts. A documented system for utilizing this information for making management decisions is in place and lessons learned are captured.

The planning process is fully integrated with the PMO for resource prioritization and scheduling and, at a more strategic level, with the human resources project management process for resource acquisition, assignment, and forecasts.

Activity Duration Estimation

All estimating processes are documented and utilized. Estimates are regularly monitored and management uses the resulting information to make decisions about projects

and related efforts. Lessons learned are captured. Planning processes are integrated fully with the PMO.

Schedule Development

Baseline estimates (both revised and original) are not only used to manage individual projects, but also used to make management decisions regarding project execution. Resource utilization is maximized and variance reports measure performance metrics of efficiency and effectiveness. Schedule status is used to support management decision-making.

A process utilizing baseline, resource utilization measurements, and schedule status for management decisions is developed, documented, and in place. Lessons learned are captured. The baseline process is fully integrated with the organization's strategic planning systems and risk management process.

Schedule Control

Schedule assessments are incorporated and included in the determination of project efficiency and effectiveness. For certain projects, earned value and performance status reporting is integrated with cost and schedule systems.

The schedule supports earned value analysis; the capability exists to calculate the budgeted cost of work scheduled and performed and schedule estimate at completion. All earned value techniques are used, including performance indices, to compare project performance to the project baseline and make forecasts as appropriate.

Earned value techniques are used to update project schedules (revise baseline costs) and support the determination of project efficiency and effectiveness. A process using schedule assessments and earned value techniques for management decisions during project execution is developed, documented, and in place. Lessons learned are captured.

Schedule Integration

A process utilizing the integrated program and organization schedules for management decisions during project execution is developed, documented, and in place. Lessons learned are captured. Independent audits have been introduced to identify and recommend areas for improvement.

Level 5: Optimizing Process

Improvement procedures are utilized for time management processes. Lessons learned are examined and used to improve documented processes.

Time Management Planning

Value and improvement are key considerations when planning time management activities such as tracking and measuring variances. Time management includes recording and disseminating lessons learned related to the planning process.

Activity Definition

A process is in place to continuously improve activity definition to completely identify all activities effectively and efficiently using templates, past experience, and industry standards.

The process improvement also focuses on ensuring all constraints and assumptions are properly identified and captured. Lessons learned are captured and used to improve activity definition efforts, and improved processes are developed, documented, and used.

Activity Sequencing

Activity sequencing is improved continuously in order to better identify mandatory, discretionary, and external dependencies

and determine when each product or service must be accomplished relative to other activities. Lessons learned are captured and used to improve activity sequencing events.

Activity Resource Estimation

A process is in place to continuously improve resource planning to completely identify all resource requirements as early as possible and in the right quantities. Lessons learned are captured and used to improve resource-planning efforts.

The planning process includes a method to identify organizational priorities for obtaining additional resources during project execution. The priority designator is linked to management decisions and gives project teams the ability to identify the priorities of their resource requests. The enhanced process is developed, documented, and utilized.

Activity Duration Estimation

A process is in place to continuously improve estimates. Lessons learned are captured and used to improve estimating efforts. The enhanced process is developed, documented, and in place.

Schedule Development

A process to continuously improve schedule definition is in place and involves using project network diagrams, establishing activity durations, confirming resource requirements, creating project schedules, and establishing baselines.

Schedule Control

The organization maintains a process for continuous improvement of the schedule control process, including schedule performance analyses. Lessons learned are captured and used to improve the monitoring and control efforts.

Schedule Integration

A process is in place to continuously improve the schedule integration process, for programs and across the organization. Lessons learned are captured and used to improve the measurement effort.

Chapter 6

Cost Management

The overall purpose of cost management is to determine the total costs of a project, manage to those costs, and ensure the project completes within the approved budget. Cost management involves estimating the costs of identified resources, developing a project baseline, comparing progress against the baseline, and controlling costs.

Components

Cost Management Planning

This component covers the processes whereby the policies and procedures for cost management are established. These include documenting, planning, managing, expending, and controlling the project costs.

Cost Estimating

Cost estimating is an analytical process using factors, equations, relationships, and expert knowledge to develop the cost of a product, service, or process. If detailed resources are

identified, cost estimating applies rates and factors to determine the costs. The main outcome is a project cost estimate.

Budget Determination

This component involves developing a project cost baseline by allocating cost estimates to individual elements in the work breakdown structure. Cost budgeting includes time phasing cost estimates to develop the baseline. The main product of budget determination is a project cost baseline.

Cost Control

Cost control involves managing the cost baseline to ensure that a project completes within the approved budget. Managing the cost baseline requires implementing a cost control system, publishing cost status reports, analyzing cost performance metrics, determining changes to the cost baseline, managing the authorized changes, informing stakeholders, and taking corrective actions. The main products are cost reports, cost performance analyses, revised project cost baselines, and lessons learned.

Cost budgeting also includes the earned value processes previously included as a Performance Measurement component in earlier editions of this model. Earned value is calculated by comparing the cost baseline to actual performance. The main products are a comparison of actuals to baseline costs and earned value metrics.

Level 1: Initial Process

The organization recognizes accepted processes but no established practices or standards are in place. Cost process documentation is ad hoc and individual project teams follow

informal practices. This makes it difficult to replicate processes across projects. Management may be aware of the importance of cost management and periodically request cost metrics.

Cost Management Planning

No cost management plan exists. Project budgets are defined loosely. Little or no budget initiating documentation is available.

Cost Estimating

Estimates are developed on an ad hoc basis and may or may not capture all costs. Generally, the project manager will have a scope statement and a schedule consisting of a basic set of milestones and perhaps a list of deliverables to serve as a basis for estimating. The documentation for estimates is incomplete, limited, and not required by the organization. Individual project teams may have access to some tools and techniques, but they are not standardized throughout the organization.

Budget Determination

Project teams and segments of the organization may have adopted ways of developing cost baselines (allocating and time phasing cost estimates), but the organization has no established practice; documentation of the processes is incomplete.

Cost Control

Individual project teams and segments of the organization apply their own approaches to managing and controlling costs. Cost changes are managed inconsistently and, in many cases, not monitored. Ad hoc cost reports are provided on request. When cost performance is tracked, it is by the use of nonstandard practices.

Level 2: Structured Process and Standards

Processes exist for cost estimating, reporting, and performance measurement. There are documented processes for identifying generic key resources (labor categories, hours, equipment, and materials) and for monitoring basic cost metrics. However, these processes are not considered organizational standards.

Cost management processes are used for large, visible projects and management supports efforts to apply them. Metrics exist for basic cost information (such as planned budget, percent complete), although they may be collected and correlated manually. Where processes are documented, they are repeatable. Additional processes are likely to exist for resource cost planning, historical cost database development, earned value techniques, and cost performance analysis.

Cost Management Planning

Development of a cost management plan is part of the project management process. The plan establishes rules for defining and managing project budgets. Most large and visible projects develop and utilize such plans.

Cost Estimating

The organization has a documented process for generating and maintaining project cost estimates. Generally, a scope statement is prepared, a top-level WBS template (Levels 1 and 2 showing the organization's preferred work breakdown structure) exists, and a summary schedule is normally in place. These items support the development of summary-level estimates for the upper levels of the WBS.

A basic cost estimating template is established and may include items such as descriptions of costs, WBS elements, work hour estimates, resource requirements (equipment,

materials, travel expenses, risk factors, estimate back-up data, and key assumptions). Average billing rates are developed for generic resources.

A cost estimating historical database exists to develop cost standards and factors. A documented cost management plan and the processes it details serve as a standard on large, visible projects. The organization has access to tools, techniques, commercial databases, and industry cost standards and factors. Organization-specific cost standards and factors are in the early formulation stages.

Scope statements are prepared as standard practice on large, visible projects. It is the norm to have a project schedule at least to Level 3 in the WBS. The capability exists to estimate most levels of the WBS (using the scope statement and WBS template) to generate detailed project cost estimates. Project risks are considered.

A system is in place to record project estimates and collect actuals ("estimated" actuals from project teams and actuals developed by corporate accounting) for future comparison. Average resource rates are developed for resources where standards can be established.

Budget Determination

Baselining is not yet a common practice nor established as an organizational standard, except for large, highly visible projects. The organization has a documented process for allocating, time phasing, and baselining projects. Each project has a staff management plan that supports the development of the time-phased baseline.

The organization has the capability to baseline projects and most projects develop and document baselines at differing levels of detail. Baselines are established in line with project schedules but may change frequently.

Cost Control

A documented process details publishing and distribution of cost reports. Periodic cost reports are developed at the summary level and provided to key stakeholders. Summary cost reports are produced from an integrated system.

Basic cost metrics (planned budget and percent complete) are collected and reported. A documented process is in place to manage and control costs and the concept of cost change control is introduced. The process includes items such as cost status reporting, change control forms, change logs, and issues logs.

Baselines are established in line with the project schedule, but may change frequently. Summary and detailed cost reports are developed and provided to key stakeholders. "Estimated" project actuals are provided by project teams (as opposed to extracting accounting actuals from corporate systems).

Level 3: Organizational Standards and Institutionalized Process

All cost processes are in place and documented. Cost processes are considered organizational standards and are utilized by most projects. Cost estimating has expanded to include analyses of alternatives. The performance measurement process goes beyond simple variance analyses. A cost change control system is in place and implemented. All processes are repeatable.

Systems are becoming more integrated: resource requirements are uploaded into the PMO's resource repository, project baselining is integrated with the PMO's automated or other scheduling system, and cost reporting is easily accomplished.

Metrics are collected and analyzed on the types of resources, cost estimates and project performance and efficiency are collected and analyzed. The project teams reconcile "estimated" actuals to actuals from corporate financial

and accounting systems. Management fully supports the cost management processes and has institutionalized the procedures and standards.

Cost Management Planning

Budget templates exist and are used consistently for all projects. A scope statement, schedule, estimates, and resource staffing plan are used as the bases for developing a project budget. These documents along with a cost management plan define in detail how a project budget is to be defined and controlled.

Cost Estimating

The cost estimating process is further expanded to include cost analyses of alternatives. The entire process is fully documented and repeatable. The process outlined in the cost management plan is implemented. Organization-specific cost standards and factors are developed. Comparisons are made between actual project costs (forecasts based upon actuals to date) and the original estimates. Metrics are collected, analyzed, and reported. A historical database is established, and data are collected and analyzed for future reference and quantitative application.

Budget Determination

Projects develop and document project baselines at the lowest reasonable level. The baselines are established in line with project schedules. The capability exists to enter the time-phased estimates into project software or a comparable system at an appropriate level of detail. The baseline process is fully integrated with the PMO's project schedule system, documented, and repeatable. Baselines are established, adhered to, and managed.

Cost Control

The cost change control process, cost reporting process, and performance measurement analysis process are followed and utilized by project teams. Cost status and changes are identified, evaluated, and managed; stakeholders are informed.

Baselines are established, adhered to, and managed. Cost and schedule reports are integrated. Performance status reporting is integrated with cost and schedule systems. Performance metrics (such as schedule variance, cost variance, and estimates at completion) are monitored and analyzed; corrective actions are implemented. Project teams reconcile "estimated" actuals versus actuals generated by corporate financial and accounting systems.

Level 4: Managed Process

Cost planning and tracking are integrated with the PMO, financial, and human resources systems. Standards are tied to corporate processes. The organization mandates compliance with project management processes and procedures. Management takes an "organizational view" of projects.

Cost Management Planning

Cost planning and budget management are mandatory for all projects. The level of rigor and detail required for cost planning and budget management is tailored to the size and type of project and the organizational environment. Expert judgment and project archives are used to develop plans.

Cost Estimating

All estimating processes are documented and utilized. Cost estimation is fully integrated with the PMO, finance and accounting, strategic planning, and risk management groups.

Organization-specific cost standards and factors exist for elements of the WBS that are consistently used and serve as project standards.

Budget Determination

All processes are documented and utilized. The baselining process is integrated with scheduling, the organization's finance and accounting, strategic planning, and risk management systems.

Cost Control

All processes are documented and utilized. The cost change control system is integrated with the organization's other control systems, monitoring programs, and risk management process. Cost and schedule reports are integrated with technical status reports. Actuals are provided by the corporate financial and accounting systems and analyzed by project teams. A documented performance measurement process is used to evaluate project cost status and formulate corrective action. The cost control process is documented and repeatable.

Level 5: Optimizing Process

Lessons learned improve documented processes. Management actively uses efficiency and effectiveness metrics for decision making. Metrics are used to understand the performance of a project during execution and for making management decisions for the future.

Cost Management Planning

Value and improvement are key considerations when planning cost management activities. Planning includes tracking actual

spending against budget and measuring variances. Cost management utilizes lessons learned from the planning process; the lessons are recorded and disseminated.

Cost Estimating

A process is in place to continuously improve cost estimating to enable the organization to better forecast project costs and improve cost management plans. Lessons learned are captured and used to improve cost management efforts.

Comparisons are made between forecasted project costs based upon actual figures to date and the original estimates. Management uses this information to allocate required resources for continued support of project activities and also to make project decisions. A documented process utilizing cost estimates for making management decisions before and during project execution is in place.

Budget Determination

A process is in place to continuously improve the cost budgeting and baselining processes. Lessons learned are captured and used to improve baselining efforts. Both original and revised baseline estimates are used to manage individual projects and also to aid management decision making related to project execution. A documented process utilizing baseline measurements for making management decisions during a project is in place.

Cost Control

Cost control measures are subject to continuous improvement. A documented process utilizing cost assessments for management decisions during project execution is in place. Lessons learned are captured and used to improve monitoring and control efforts. Full earned value techniques are used to update project costs (revise baselines) and support the determination of project efficiency and effectiveness.

Chapter 7

Quality Management

The overall purposes of quality management are (1) satisfying customers, (2) conforming to requirements, (3) achieving fitness for purpose, and (4) ensuring products or services are fit for use. All these activities or tasks are required to make sure an organization's products or services satisfy all needs for which they are intended (as documented in the statement of work) from the perspectives of processes and the people needed to make quality an effective and efficient aspect of successful project completion. Management oversight is included as a special interest component of this knowledge area because executive support is key to improving and ensuring process quality, as well as the quality of deliverables.

Components

Quality Management Planning

Quality planning involves identifying quality standards, practices, and associated activities. Planning for quality should be done in parallel with other project planning processes. The main product of quality planning is a quality management

plan that identifies the specific practices, resources, and activities relevant to a project and its deliverables. Quality planning includes strategies for implementing quality assurance and control.

Quality Assurance

Quality assurance requires an organization to develop and assess processes, procedures, and standards to assure that projects will meet relevant quality standards.

Quality Control

Quality control involves monitoring actual project results to see if they comply with relevant quality standards and identifying ways to eliminate causes of unsatisfactory results. Quality control activities are necessary to ensure that project deliverables meet the quality objectives and attributes defined in the project team's quality management plan.

Special Interest Component: Management Oversight

The purpose of management oversight is to understand, support, and participate in project management activities. Oversight involves two subcomponents:

Awareness and Support—Management must be cognizant of the importance of project management activities, have high-level understanding of project management processes, and advocate organization-wide implementation of project management processes and standards.

Involvement—Management involvement covers participation by management in project management activities, processes, and standards.

Level 1: Initial Process

Although management is aware of the need for quality management, no established project quality practices or standards are in place. Management is considering how to define quality.

Quality Management Planning

No formal quality management plan exists or is required. Project standards are defined loosely. Some project teams may develop high-level quality management plans on an ad hoc basis; each project manager proceeds as he or she sees fit.

Quality Assurance

There are no established practices or standards for quality assurance. Some project teams establish procedures for their project teams and perform ad hoc checks to ensure their groups follow the procedures.

Quality Control

No established practices or standards enforce quality control. Project team members may ask someone to review their work products before submission to management.

Ad hoc testing may be performed on specific units or products of development-based projects, for example, in an IT environment each analyst or programmer may perform his or her own testing to determine whether a component works.

Special Interest Component: Management Oversight

Management recognizes that project management processes are followed on an ad hoc basis by individual project managers. Management understands the definition of a project and is aware of the need for project management.

Awareness and Support—Management is aware of project management processes and recognizes the difference between the requirements for project management and operational management. Management also supports individual interests in applying project management standards or processes on an ad hoc basis at the discretion of the project manager, but does not require conformity of use.

Involvement—Management's involvement in daily project activities is limited to inquiring about project status when the need for such information arises.

Level 2: Structured Process and Standards

A basic organizational project quality policy has been adopted. Management encourages quality policy application on large, visible projects and is supportive of the time required to enhance project quality by defining and implementing quality control metrics. The organization's quality policy has been expanded to include quality objectives, acceptable levels of quality, and the roles and responsibilities of members of the organization who are tasked with executing the policy and ensuring quality.

Quality Management Planning

Development of a quality management plan is a component of the management process for most large and visible projects. The plan establishes rules for defining and managing the project and product standards. Standard project management templates exist and are used consistently for all projects. The quality planning process has been enhanced to include such quality assurance processes as flowcharting, operational definitions (metrics), and quality control measures. Metrics consist of results of reviews and tests against criteria, specifications, quality standards, and business requirements.

Most people in the organization consider the quality planning process as the standard way of ensuring quality of the organization's project products or services. Most projects—and all large, highly visible projects—utilize these quality planning processes, including the development of quality management plans. Management signs off on quality plans for these larger projects.

Quality Assurance

There is a basic approach for quality assurance. For large, highly visible projects, teams establish procedures and use walk-throughs or peer reviews to ensure the team follows the procedures. The team may identify points in the development process that may require extra quality measures.

Quality assurance processes, including tools and techniques such as flowcharting and operational definitions, are treated as standard approaches on large, highly visible projects. The PMO provides a policy and project management processes and standards to support the quality assurance measures. Project teams devise checklists for use in checking and promoting quality throughout project life cycles. Other project teams use tools and techniques such as designing conceptual experiments throughout a project.

Quality Control

The basic quality process provides guidelines for

- Document review
- Inspections and functional tests
- Drawing checks
- Testing specific units or portions of products
- Integration tests (to ensure compatible fit)
- Reviews of individual project deliverables and products by the project team. For example, in an IT environment,

> guidelines cover the testing of modules and programs
> to ensure that each system component works and also
> require overall system testing after the modules and
> programs are integrated.

Summary-level testing metrics are collected and evaluated. The
quality control processes are used on large and highly visible
projects and their use is encouraged for all other projects. Full
acceptance criteria and specifications are developed, including
business requirements and quality standards.

The tools utilized include acceptance criteria, performance
standards, business requirements, specifications, and quality stan-
dards covering reviews and testing. The quality process includes
a document review process and templates and guidelines for

- Testing of individual components of products
- Testing of deliverables and products, including evaluations
  by customers
- Integration testing to determine how the major assemblies
  of products work together

The project team performs unit and integration testing. Both
summary-level and detailed testing metrics are collected
and evaluated.

Special Interest Component: Management Oversight

Basic project management processes exist but are not consid-
ered organizational standards. Only large or highly visible proj-
ects are required to use them. Basic summary-level metrics have
been established for projects to track cost, schedule, and tech-
nical performance (triple constraint). Management understands
the value of project management and endorses its use through-
out the organization. Although management is not consistently
involved in project management throughout the organization,
it consistently plays an active role in larger, more visible projects.

Awareness and Support—Management oversight on large or highly visible projects encourages the establishment of cost, schedule, and technical performance planning and tracking. Management provides project managers with the tools and/or training required to develop such project planning elements.

Management receives status reports and formal acceptance notification of project completion. It supports the use of the standardized project management processes across the organization for all projects and furnishes the training and/or tools required by project managers to implement the processes.

Large or highly visible projects are required to implement project management processes because the organization recognizes that such processes contribute to project success.

Involvement—On large or highly visible projects, management encourages summary progress reporting of project performance (schedule and cost) at milestone level. If issues or changes require management approval, management provides approvals. Management approves the project charter and assigns project managers. On large projects, management plays an active role in requiring status reports that show baselined project plans and actual performance metrics.

Management expects to be apprised of project performance and provides appropriate responses. It plays a role in approving change control items that impact the triple constraints and is involved in handling escalations and resolution of issues that cannot be resolved by the project team. If requested, management takes an active role in small and medium-sized projects, but otherwise requires performance reporting from project managers as needed. Management signs off on project completion.

Level 3: Organizational Standards and Institutionalized Process

Quality processes are well documented and applied as organizational standards. Management participates in quality

oversight for most projects. Quality has a program focus: how well does a product or service perform within the context of all systems in the immediate domain of the product or service? Management supports the development of quality functions and identified one or two people to focus on organizational project quality standards and assurance.

Quality Management Planning

Quality planning and standards management are mandatory for all projects. Quality planning is tailored to the size and type of project and also to the organizational environment. Expert judgment and project archives are used to develop plans.

The quality planning process has been enhanced to include guidelines for designing experiments (analytical techniques that help identify variables that exert the most influence on outcomes). The emphasis is on quality milestones and standardized checklists for the use of the project teams in creating their quality plans.

The process includes templates for creating formal quality plans and requires organizational management participation at key approval points. Quality planning includes review of the scopes and perspectives of other entities in the immediate domains of projects. For example, in an IT environment, when a product is a new system, the systems with which the new product interfaces are included in quality plans. The organization has assigned one or two people to focus on organizational project quality standards and assurance.

Quality Assurance

Tools and techniques, such as design of experiments and quality assurance checklists, are standard approaches on large, highly visible projects and suggested for use by all projects. A proactive project approach to quality includes plans for

regular walk-throughs with management staff and other project teams as major milestones are met. This proactive approach ensures that a product or service will perform correctly and function with other elements of its environment.

Quality Control

Project performance standards have been established and progress is measured against them. The quality process includes reviews of documents and drawings, inspection of hardware, and monitoring of rework procedures. The client is actively involved in product review and acts as the final acceptance station for deliverables.

Special Interest Component: Management Oversight

All project management processes are repeatable, and most project teams are expected to use them. The processes involve clients as active and integral members of a project team. Management has institutionalized and fully supports the processes and standards. Management also provides input to and approves key decisions and documents, and participates in resolving key project issues.

Awareness and Support—Management is required to attend project management awareness training geared toward its role in project management and establishing expectations for project outcomes. Management supports projects by ensuring visibility and prioritization. In addition, management recognizes and supports the project management discipline as a distinct profession that includes leadership and support roles.

Involvement—Informal variance analysis for comparing project baselines and actuals is expected by management on most projects. Management then uses the information to evaluate the relative progress of a project in comparison to other projects. Management is involved actively in key

project decisions related to change control, issue escalation, risk response, quality assurance, and customer interaction. Management co-assigns project managers.

Level 4: Managed Process

Organizational management has mandated that all projects use quality planning standard processes. Quality is viewed from an organizational perspective: the quality of the product is evaluated in light of all other products and systems in the environment and the product's ability to meet overall organizational business objectives. The PMO coordinates quality standards and assurance.

Quality Management Planning

Value and improvement are key considerations when planning quality management activities, and tracking and measuring variances are required. Quality planning encompasses the entire environment into which the product of the project is placed. A quality office is established, and the organization benchmarks its project results against industry-standard results.

Quality Assurance

Projects are subject to walk-throughs and reviews by organizational management and other project teams as major parts of a project are completed to ensure that the results will meet business requirements and specifications. Documentation procedures require that each major component (subsystem, database, interface, etc.) be fully documented before a project moves into final production mode. Most projects use quality assurance processes specified by the quality standards.

Metrics collected throughout a project's life cycle are compared regularly to industry standards to ascertain potential problem areas.

Quality Control

The organization maintains performance standards. Project results are reviewed, inspected, and tested against these standards consistently. The organization also has functional standards in place and they undergo the same review, inspection and testing.

The quality process includes templates and guidelines for review and testing that the products integrate with other products/systems in the organization. All segments of the organization affected in any way by a project have opportunities to test those effects adequately.

Special Interest Component: Management Oversight

Project management processes are integrated with corporate processes. Management clearly understands its role in project management and executes it well, at the right level, and clearly differentiates management styles and project management requirements for different sizes and complexities of projects. An organizational mandate requires compliance with project management processes.

Awareness and Support—Management actively endorses the project management processes as keys to organizational success by ensuring that outcomes are successful. For example, the PMO is integrated into the organizational framework as a fully functioning area or division. Management perceives the value of projectizing the organization and utilizing matrixed resources. Resource pool management is in place. Performance measurements promote efficiency and effectiveness.

Management also encourages the evolution of the project management profession and actively supports the needs for project management expertise and technical skills on all projects.

Involvement—Management expects formal variance analysis comparing project baselines to actuals for all projects. It also takes an active role in performance measurement metrics to assess the efficiency and effectiveness of corporate systems and project management processes. Management regularly serves in project-related roles and may act as a sponsor, participate in change control, serve as a customer liaison, and provide project mentoring.

Level 5: Optimizing Process

The quality process includes guidelines for feeding improvements back into the process. Metrics are key influences on quality decisions, including benefit-and-cost comparisons, effectiveness and efficiency decisions, and final decisions on product quality.

Quality Management Planning

Quality management includes lessons learned from planning; these lessons are recorded and disseminated. Lessons learned are utilized to improve performance of the process for future projects. The quality planning process itself is critiqued throughout each project and integrates the use of metrics and data from early stages of a project with data from other projects for benefit-and-cost comparisons and making decisions. Quality planning utilizes metrics and data collected to make value-related trade-off decisions related to quality.

Quality Assurance

Feedback is gained from the quality assurance processes and used actively to improve management practices for future

projects. Effectiveness and efficiency of both the product and the processes are measured regularly using metrics collected throughout the lives of projects.

Quality Control

Quality control testing results are examined regularly throughout a project to generate improvements to project processes. Management uses quality control results to make decisions on the usability, fit, and acceptability of products and services. Quality control results are used for inspection, review, and testing processes that validate and verify deliverables.

Special Interest Component: Management Oversight

Improvement procedures are in place and utilized. Lessons learned are regularly examined and used to improve documented processes. Projects are given high value within the organization; thus there is high visibility of individuals who are actively involved in projects on a regular basis. All projects, changes, and issues are evaluated based upon efficiency and effectiveness metrics. Management plays an active role in oversight and sponsorship of projects.

Projects are integral to the financial success of the organization; individuals in project-related positions are accountable for successful project performance.

Awareness and Support—A continuous improvement process is in place to enhance management's awareness and support of projects and their needs. Lessons learned are captured and used to improve monitoring and control efforts. Projects are managed with consideration given to past performance and expectations for the future. Management understands the need to capture lessons learned and the value of making decisions based on efficiency and effectiveness metrics.

Involvement—A continuous improvement process is in place to improve management's involvement in all aspects of

managing projects. Lessons learned are captured and used to improve monitoring and control efforts. Management uses the data obtained from project efficiency and effectiveness metrics to make decisions. Lessons learned about management's involvement in project operations and overall project success are captured.

Chapter 8

Human Resources Management

The overall purpose of human resources management is to identify the requisite skill sets required for specific project activities, identify individuals who have those skill sets, and assign roles and responsibilities for projects while ensuring high productivity of human resources and forecasting future resource needs.

Components

Human Resources Management Planning

This type of planning involves identifying, documenting, and assigning project roles, responsibilities, and reporting relationships for projects.

Project Team Acquisition

This component includes the identification, solicitation, and acquisition of necessary resources for a project.

Project Team Development

Team development is the act of creating synergies among project team members to enhance productivity, efficiency, and overall project success.

Project Team Management

Are there guidelines and standards in place to promote team buy-in of a project? Team members participate in requirements analysis, scope development, and other project activities. The project management team also tracks team member performance, provides feedback, and resolves issues.

Special Interest Component: Professional Development Management

The overall purpose of professional development of project management personnel is to improve the professionalism of project managers and members of the project team resource pool. Professional development management reflects how an organization views and supports the professional requirements for project management. Professional development management has the following subcomponents:

Individual Project Management Knowledge—An individual's project management knowledge base derives from the training and education received in the discipline—a degree, certificate, or certification—or the awareness of a need for project management education.

Individual Project Management Experience and Competence—This is simply an individual's actual experience in working on or leading projects. A project manager should have experience as a project controller, planner or scheduler, estimator, or process expert or have filled an administrative support role (change control, contract compliance, reporting, etc.). Competence is measured by determining the

effectiveness of an individual's work efforts and his or her ability to lead projects of varying size and complexity successfully.

Corporate Initiative for Project Management Development—If an organization acknowledges project management as a cornerstone for building corporate success, it will incorporate environmental success factors such as formalized professional development programs and project management career paths. These initiatives may involve training, compensation plans, performance measurement, and motivational rewards and initiatives, and programs should be available to team members and project managers.

Level 1: Initial Process

The organization recognizes the need for a human resources project management process, but no repeatable processes are applied to planning and staffing projects. Project teams are informal. Human resources time and cost are not measured.

The ad hoc process generally follows the "warm body" assumption: anyone available can serve in whatever capacity is necessary. Documentation is loose and may consist only of a list of individuals working on a project.

Human Resources Management Planning

Ad hoc processes determine the number of people required to work on project activities. An informal reporting relationship exists. Project staff members know that they must get their assignments from the project manager.

Project Team Acquisition

An ad hoc process is used to decide which individuals are available to work on projects and ask line management to provide resources for projects.

Project Team Development

Team development occurs on an ad hoc basis. Ensuring that project team members work together in a professional manner may consist only of assigning individuals with complementary skill sets and personalities to the same project teams. Occasional team meetings may be held to explain the direction of the organization in relation to the scope, WBS, and deliverables of a project.

Special Interest Component: Professional Development Management

There are pockets within the organization that recognize that the skills and abilities required to lead a project successfully are different from the skills and abilities needed for other job functions, and thus project management may be considered a separate job function. However, no corporate standards or processes provide the justification for a professional project management career path. Individual managers may recognize and give credit to specific individuals for their project-related accomplishments on an ad hoc basis.

Individual Project Management Knowledge—Some individuals may be recognized for knowing more than others about some project management skills, such as the ability to use scheduling tools, understanding budgeting mechanisms, or the capability of developing a general project scope statement.

Individual Project Management Experience and Competence—Some individuals may be acknowledged for their successful work on or management of a project. This success is considered unique to the abilities of the individual and recognition is on an individual basis.

Corporate Initiative for Project Management Development—Some managers may recognize the accomplishments of individuals who participated in or led projects with successful outcomes, but there are no corporate recognition or reward programs in place.

Level 2: Structured Process and Standards

A repeatable process defines methods for planning and managing human resources and details suggested inputs, tools and techniques, and outcomes. Formal teams assigned to large projects are held accountable for following the human resources management process. Management expects project managers to create human resources plans for large projects.

Project team evaluations are conducted and project managers are expected to report on the performance of team members to appropriate line managers when projects end. These reports may or may not form the bases for compensation or rewards. Resource tracking is utilized only for highly visible projects.

Human Resources Management Planning

Each project manager creates a basic overview of the types of skill sets required by a project and the approximate time frames during which the skills are needed. Basic responsibilities are defined via a responsibility assignment matrix by major deliverable. A project organization chart indicates all project reporting relationships.

An informal analysis (team discussions of project elements and responses without submission of formal documentation to management) is conducted to define the project's organizational, technical, and interpersonal interfaces. There is an understanding of the constraints that may affect their ability to obtain required resources such as the type of organization (hierarchical or project-oriented) and individual preferences to work on certain projects.

Written descriptions delineate the responsibilities of key project personnel. A staffing plan specifies when resources will be needed. As a project progresses, planned and actual measurements are compared to staffing plans. Updated planning information will result from project integration and the staffing plan will indicate needed corrective actions.

Project Team Acquisition

Team acquisition involves identifying the individuals who have the requisite skill sets and time availability to work on a project. The project manager requests line management to reserve team members for a certain time frame. A staffing requirements document is submitted by cost management as input for the staffing management plan.

A "first come, first served" process grants the request of any manager for a specific team member. When a resource is assigned by line management to a project, the resource's labor category is documented to enable the project manager to use the information for costing purposes. Organizational management may remove a resource from a project for a short time if a project with higher priority requires his or her capabilities.

The staffing management plan defines the desired parameters for project team members (minimal experience, personal interests and characteristics, and availability to fit well with other team members). However, the project manager must accept resources assigned by the line manager. Project human resources management and the PMO coordinate resource pool management.

Project Team Development

The organization maintains a specific method for involving project teams in developing scope and work plans. Management requires team buy-in to ensure that teams are involved actively in planning and managing projects. Staff development plans are maintained and updated with the group responsible for professional development initiatives.

Guidelines are in place for inclusion of project teams in initiation meetings, status reviews, business reviews, technical reviews, and regular and ongoing project reviews. Reviews include the team and foster team buy-in. Regular status and progress meetings are conducted to keep project team

members apprised of progress and deal with issues that arise. The project manager contributes to the performance evaluations of the team members. A rewards and recognition system is established to acknowledge individual and team performances. A conflict management process is developed.

Special Interest Component: Professional Development Management

The organization acknowledges and documents each individual's knowledge base, experience, and competency as contributing factors to the successful outcomes of projects. Project managers assigned to large and highly visible projects are expected to have adequate knowledge of project management. The project team is made aware of what is expected of them in regard to project planning components. The organization expects individuals assigned to projects to know how to apply the fundamentals (triple constraints) of the corporate project management process. In addition, the organization has started defining specific project-related roles.

Individual Project Management Knowledge—Project managers in charge of large projects are expected to follow a defined process for meeting the triple constraints (scope, schedule, and cost) by documenting and tracking these elements. Individual project team members are expected to understand their roles in meeting the constraints, for example, contributing to scope validation, identifying schedule activities, and estimating time requirements for completing scheduled activities. Individuals working on projects are expected to know how to define and track the triple constraints.

Managers of large and highly visible projects are expected to be capable of developing and managing complete project plans. Project team members are able to recognize project-related areas of specialization such as scheduling, budgeting, and project management methodologies, etc.

Individual Project Management Experience and Competence—Project managers assigned to large or highly visible projects are required to have managed successful projects in the past by controlling outcomes, managing the triple constraints, and achieving positive customer evaluations. It is expected that project team members have also had experience working on other projects. They demonstrate the ability to work individually and as team members and are capable of timely delivery of high-quality results.

Most project managers have been project managers on previous projects and generally have a track record for successfully completing projects within the triple constraint parameters. Some individual project team members are beginning to demonstrate strengths in project-related specialty areas such as planning, scheduling, estimating, or applying methodologies.

Corporate Initiative for Project Management Development—The organization acknowledges the need for a defined project management process and trains managers and team members assigned to large or highly visible projects in how to utilize this defined process. In addition, the organization maintains a system to recognize and compensate individuals and teams who complete large projects successfully.

The organization makes a project management essentials course available to all project participants and encourages them to take this course to gain a basic understanding of project management concepts and applicability. The organization is also beginning to define specific project-related roles for project team members and recognizes that these specific roles will require different training, compensation, and motivation programs.

Level 3: Organizational Standards and Institutionalized Process

Most projects follow the organization's established resource management process. External stakeholders and customers are

treated as integral parts of project teams. The professional development program includes a project management career path.

Human Resources Management Planning

A formal analysis is conducted to define the organizational, technical, and interpersonal interfaces within the organization. Constraints that may be prevalent in attaining required resources are analyzed and responses are developed. Narrative descriptions delineate the responsibilities of all project personnel.

Project Team Acquisition

Project managers work with the PMO and line managers to prioritize and manage resource pools. They may need to negotiate with line management to obtain specific resources or may have preassigned team members. On occasion, a project manager may need to look outside the organization for specific expertise.

Project Team Development

Management is involved in the team buy-in process. Each fully integrated project team includes a business unit, technical groups, strategic groups as required, clients, and other stakeholders. Individual team member evaluations may be conducted by peers. A conflict management process has been developed and is utilized on most projects. Stakeholder input is solicited and incorporated into project planning and execution.

Special Interest Component: Professional Development Management

The organization has a defined project management process and all project managers are expected to follow it when planning and managing their projects. The organization has

set specific project-related roles and expects that the individuals pursuing project-related career progression will analyze the gaps between their current project management knowledge and experience and their desired states to determine their specific development needs.

Individual Project Management Knowledge—All project managers are expected to have solid knowledge of planning and tracking projects. They must follow the defined project management methodology of the organization that covers all knowledge areas. In addition, project managers are encouraged to pursue memberships in professional project management associations and work toward certifications or degrees in the field. Team members who are interested in the profession of project management are encouraged to define special areas of interest and work to attain the knowledge required.

Individual Project Management Experience and Competence—Project manager evaluations are based on project performance (ability to meet the triple constraint parameters, customer satisfaction, and team member satisfaction) and a defined competency range is utilized for defining effectiveness.

Project team members actively pursue organizationally defined project roles and effectiveness measurements that define competency in each of these roles. Client satisfaction surveys are conducted periodically to ascertain the abilities and impacts of project managers. This information is used to determine competency and performance-related compensation.

Corporate Initiative for Project Management Development—The organization insists that all internal project stakeholders attend a project management essentials course that covers the basic elements of project management and the specific roles and responsibilities of stakeholders such as executive managers and project sponsors. The organization also conducts a series of courses geared toward the career progression of project managers and courses in recognized project team specialty areas.

The organization recognizes that effective project management is a cornerstone to success and understands that it is responsible for defining project-related professional tracks to create an environment for success. The organization has defined various roles and associated compensation, training, and motivation programs for roles at or below the level of project manager: project controller, planner, scheduler, estimator, and project administrative support. Individuals interested in pursuing careers in project-related disciplines undergo gap analysis and develop plans to gain the knowledge and skills required.

Level 4: Managed Process

Resource forecasts are used for project planning and prioritization. Project team performance is measured and integrated with career development plans.

Human Resources Management Planning

Project organizational planning is integrated into resource pool management and prioritization. An action plan is developed to deal with the organizational, technical, and interpersonal interfaces within the organization. Constraints to resource planning are managed. All stakeholders are committed to the definitions of the roles and responsibilities in staffing plans. Integrated decision making (evaluation of decisions based on their impacts on projects and the organization) is instituted.

Project Team Acquisition

The PMO has effective resource pool management (including skills inventory database) and prioritization processes in place. The processes are used by the line and project managers to meet project resource needs. Resource variance reports are developed for all projects.

Project Team Development

A team development process requires teams on medium and large projects to demonstrate improvements. Team member training needs are identified and communicated to the PMO and line management. Both groups work with team members to meet those training needs. The team buy-in process is engaged and applied by most projects.

Special Interest Component: Professional Development Management

Management supports the integration of professional project-related tracks into the corporate human resources structure. Individuals are hired based upon their project management knowledge and competence in planning and executing projects.

Individual Project Management Knowledge—Project managers undertaking large projects are expected to have degrees, project management professional (PMP) certifications, or similar qualifications. Managers of small or medium-sized projects are encouraged to pursue degrees, certifications, or other foundation sets that demonstrate a solid knowledge base in project management. Team members who have chosen to focus in project-related specialty areas actively pursue related education or certification.

Individual Project Management Experience and Competence—Project-related role competency measurements have been defined, and individuals are given plans targeted to performance measurement and career growth. Client satisfaction surveys are conducted periodically to ascertain the abilities and impacts of project managers and team members. This information is utilized to help determine competencies and performance-related compensation.

Corporate Initiative for Project Management Development—The organization actively staffs and

maintains a complete training curriculum for each project-related role, from scheduler to project manager to project sponsor. Additional project-related positions are defined for those who have the ability and interest to progress beyond the project manager role and advance to project management process expert, methodologist, mentor, advisor, or program manager. A compensation package for each role is in place and is based on relevant performance measurements.

Individuals are motivated based on career progression within the project management track by incentives built into the system to ensure successful project performance and customer satisfaction.

Level 5: Optimizing Process

All projects are expected to follow the established human resources planning process. Teams consistently document project lessons learned. Improvements are incorporated into the human resources management process.

Human Resources Management Planning

Organizational planning is evaluated periodically. Enhancements are incorporated into the process continuously. Performance metrics for human resources are utilized to define the efficiency and effectiveness of resource utilization throughout project life. Stakeholder effectiveness and efficiency are evaluated to ensure continuous involvement and sign-off throughout project life.

Integrated decision making (evaluation of all decisions based on their impacts on other projects) occurs in all projects. Lessons learned are captured for future use in organizational planning.

Project Team Acquisition

Enterprise resource forecasting is used to ensure continuous improvements and enhancements. The project manager's resource requests are evaluated against the resource pool constraints and prioritization to ensure that resources are utilized to optimal effectiveness and efficiency. Resource variance reports measure performance metrics of efficiency and effectiveness. Lessons learned about the effectiveness of acquiring resources are captured and used to improve resource utilization.

Project Team Development

One common question, particularly at project closures, is whether the organization could have achieved better team buy-in. The information gained is used to improve project processes. Team member training needs are projected and acknowledged as value-added investments. Lessons learned about effective means of developing team synergy are captured and used to improve processes. Conflict management processes are integrated into corporate management systems and efficiency and effectiveness measurements are gathered. Team satisfaction is measured.

Special Interest Component: Professional Development Management

Improvement procedures are utilized. Lessons learned are regularly examined and used to improve documented processes. Projects are given high value; high visibility surrounds individuals who are regularly and actively involved in projects. Projects are directly tied to organizational and financial success. Project-related staff members are acknowledged for successful project performance.

Individual Project Management Knowledge—A process is in place to continuously improve staff members' knowledge of project management. Lessons learned are captured and used to improve monitoring and control efforts. All senior project-related personnel are certified or degreed in their specialty areas and serve as mentors and advisors to individuals pursuing project-related career paths. All non-senior project personnel actively follow their chosen project-related career paths. Lessons learned about assessing individual project management knowledge are captured and used to improve processes.

Individual Project Management Experience and Competence—The organization maintains a plan to achieve continuous improvement of the ability of individuals to attain experience and improve competency in project management. Lessons learned are captured and used to improve monitoring and control efforts. All senior project-related personnel are seasoned professionals with multiple years of successful work experience in their specialty areas.

Corporate Initiative for Project Management Development—A process has been designed for ongoing improvement of the organization's ability to enhance the project management professional track and opportunities. Lessons learned are captured and used to improve monitoring and control efforts. The corporation supports and sponsors project manager- and team member-related certification programs, for example, requiring all project managers to be PMP® certified. The corporation expects individuals who define project management as their profession to complete the requisite corporate training curriculum.

Senior project-related personnel are represented at or participate in executive meetings and help define the strategic direction of the organization. Lessons learned about the development of project personnel, turnover, and their roles in successful project outcomes are captured and used to improve processes.

Chapter 9

Communications Management

The overall purpose of communications management is to oversee and control project data processes from collection to categorization to dissemination to utilization and decision making.

Components

Communications Management Planning

The purpose of communications planning is to determine the information and communications needs of all project stakeholders: who needs what—when, where, and how?

Communications Management (Information Distribution)

Communications management encompasses the methods or means of making information available to the project stakeholders and includes information retrieval and distribution systems.

Communications Control

This type of control is applied to all information that is gathered and distributed during project execution and control. It includes status reporting, progress measurement, and forecasting, which are consolidated and analyzed from project reports received from the project integration process.

Issues Tracking and Management

What kinds of issue tracking and management processes are in place? Are they used regularly? Are issues evaluated and prioritized or are they merely listed? Is regular follow-up and reporting required?

Level 1: Initial Process

Management utilizes an ad hoc communications process whereby project status is reported informally.

Plan Communications Management

No established standards for communications planning are in place. Project managers may provide status reports to management when required.

Manage Communications

Communications are managed in an ad hoc manner, usually as responses to specific requests or questions about projects directed to the project managers.

Control Communications

Informal reports covering issues and project status may be obtained from project managers. Performance reporting is handled on an ad hoc basis and may be discussed in meetings.

Issues Tracking and Management

Issues are handled on an ad hoc basis and may be discussed in meetings.

Level 2: Structured Process and Standards

A basic communications management process is established. Project status and progress reports are distributed regularly and stakeholders are notified of phase and project completion activities. Large, highly visible projects follow the procedures and documentation details how communications management should work. Management understands the need for regular communication of project activities to ensure that the organization has the necessary information for input into decision making processes. The focus for communications is on summary status and progress reporting on the triple constraint items (scope, schedule, costs).

At this level, the following activities are required for large and highly visible projects, and encouraged for other projects:

■ Applying detailed communications management processes, including analysis of communications requirements and technology parameters
■ Identifying communications vehicles that will be used to exchange information
■ Obtaining formal acceptance of project deliverables from customers

The communications management process is fully documented and repeatable. Communications templates are readily accessible and integrated with other project planning elements. Management values the output of communications management and requires utilization of project management tools and techniques to communicate project outcomes and adherence to the triple constraint parameters.

Plan Communications Management

Management encourages managers of large and highly visible projects to provide summary reports regularly throughout the expected lives of projects. Communication requirements are defined by combining the type and format of information required with an analysis of the value of that information. A communications management plan is developed for all large and highly visible projects and use of such plans is encouraged for all projects.

The communication plan identifies and describes all communication needs from project commencement to closure, including a post-project review at the end of a project for purposes of compiling lessons learned. Communications technology factors are analyzed and include immediacy of information needs, availability of technology, expected project staffing, length of the project, and project risks.

Manage Communications

Information is distributed via electronic medium or hard-copy documentation. Basic retrieval and distribution processes are in place. Effective inter-team communication retrieval of actual project data is established. Project stakeholders are directed to a specific shared site where they can retrieve needed project information. The project manager is responsible for ensuring that project information is retrieved in a timely fashion and that the stakeholders obtain the information they need.

Control Communications

Three types of summary reports covering status, progress, and phase completion are generated at periodic intervals throughout the life of a project. These reports track milestone attainments of scheduled items.

Projects are baselined and actual data are collected. The three consolidated reports (status, progress and phase

completion) detail hours and/or costs of project activities and indicate how much time has been spent on project activities and how much on technical performance.

Customers execute formal documents to acknowledge their acceptance of project deliverables and indicate project closure. At the conclusion of the project there is a formal sign-off. Project deliverable completion and formal acceptance as well as project closure are reported.

Issues Tracking and Management

There is a documented issues management process in place. Issues are collected, documented, managed, and brought to resolution. This process is encouraged for large and highly visible projects, and followed at times (though not enforced) for smaller projects. Project deliverable completion, formal acceptance, and project closure are reported. Management expects to be involved with the resolution of issues for large and highly visible projects, in the form of either notice or escalation, and encourages other projects to keep it informed.

Level 3: Organizational Standards and Institutionalized Process

The communications management process has been institutionalized and formal communications management plans are expected for most projects. Management is involved actively in project performance reviews. Key management is involved in approving all changes that impact the triple constraints.

Plan Communications Management

Communications plans are expected to be generated for all projects.

Manage Communications

A formal information retrieval system allows project stake-
holders to retrieve information from a repository. A formal
information distribution system disseminates information about
project meetings and other activities via access to databases.
Project managers regularly confirm stakeholder satisfaction
with information dissemination.

Control Communications

Performance reporting, including graphics such as S-curves (which
indicate how funds and work hours are used), histograms, and
tables accompany narrative reports of project status and progress.
Informal variance and trend analyses can be conducted to compare
actual to planned project results. Trend analysis is done to deter-
mine estimate-to-complete statistics for budgets and schedules.

Analysis at this level is informal because the estimates and
actuals do not result from integration with other corporate
systems. Issues are addressed during regular, full-team meetings.
Management is involved in the identification, analysis, and
approval (or rejection) of changes in project plans. Performance
reviews are conducted to assess project status or progress.
Project reports are archived for future reference.

Issues Tracking and Management

Issues are consistently addressed during regular project team
meetings. The entire team takes part in determining issues and
coming up with proposed resolutions and actions.

Level 4: Managed Process

Communications management plans are mandated for all
projects. Communications plans are integrated into corporate
communications structure.

Plan Communications Management

There is a method for updating and refining the communications management plan as a project progresses and develops and is incorporated into corporate information systems.

Manage Communications

The organization maintains an automated information retrieval system based upon a database structure and inquiry process. The information distribution system includes varying formats and multimedia distribution. Project management confirms stakeholder access to and satisfaction with the information dissemination system.

Control Communications

All projects are expected to capture performance measurements (such as earned value) to ensure that management understands and can analyze project performance. Formal variance and trend analysis is conducted on projects.

Issues Tracking and Management

The impacts of project issues on other areas of the organization are understood and project issues are prioritized for resolution and to minimize impact to the organization. Management receives regular reports on issues identified, their status, potential for escalation, and resolution.

Level 5: Optimizing Process

A process is in place to continuously improve project communications management. Lessons learned are captured, incorporated into improvement initiatives, and documented into

repeatable processes. Management is involved actively in project reviews and process enhancements. Functional management is aware of, supports, and is involved in project communications and uses the information to evaluate the impacts of projects on functional operations. Efficiency and effectiveness metrics are incorporated into projects and used to communicate value-added data about project progress.

Plan Communications Management

Communications planning documentation and lessons learned are analyzed for value-added impacts. Communications planning is tightly linked with organizational planning. Lessons learned about effective communications planning are collected for future use.

Manage Communications

Total documentation for each project is available for review during administrative closure and lessons learned are evaluated to determine continuous quality improvement measurements to be implemented. Project stakeholders have been educated to access all required project-related information in a timely fashion. Lessons learned about effective information retrieval and distribution are collected for use in future projects.

Control Communications

Performance metrics are utilized to define efficiency and effectiveness metrics for projects. These include measures of stakeholder satisfaction with the communications processes.

Lessons learned are analyzed and the results are fed back into the processes for continuous enhancements and future reference.

Issues Tracking and Management

The issues tracking and management process is evaluated periodically to determine potential enhancements. Issues are evaluated and prioritized based on their impacts on project performance metrics of efficiency and effectiveness. Lessons learned about the effectiveness of the issues tracking and management process are collected.

Chapter 10

Risk Management

The overall purpose of risk management is to identify, analyze, respond, and control risk factors throughout the life of a project. Risk management requires understanding risk events, assessing their impacts on a project, determining the best way to deal with them, developing and executing a plan for managing them, and monitoring progress.

Components

Risk Management Planning

This component is used to determine how to conduct risk management activities and defines the role of and steps for developing risk management plans.

Risk Identification

Risk identification involves determining which risks are likely to exert impacts on a project and documenting the characteristics of each risk. The main results of this process are listings of potential risk events and triggers.

Qualitative Risk Analysis

This component covers risk prioritization based on analyses that consider how likely a risk is to occur, how significant its impact will be, and what actions should be implemented to mitigate it.

Quantitative Risk Analysis

Risk quantification means evaluating risks and assessing the potential outcomes. It involves examining all identified risks; determining interactions, relationships, and implications to projects; developing probabilities of occurrence; determining which risks warrant responses; and assessing the range of possible project outcomes. The main product is a prioritized list of quantified risk events.

Risk Response Planning

Risk response planning involves defining the steps to managing identified risks. Planning determines how best to respond to risks and establish contingency plans, reserves, and agreements necessary to contain risks. Planning strategies are developed to avoid, mitigate, or accept risks. Risk response includes the development of risk management plans, maintenance of project reserves, and determining mitigation strategies.

Risk Control

Risk control obviously involves controlling risks, deciding how to handle them, and deciding on and implementing corrective actions. The first step of risk control is identification of concerns. Risks are controlled in accordance with a risk management plan and established procedures. The main documentation products are a risk register, corrective action data, and risk management plan updates.

Risk Documentation

Risk documentation starts with establishing a project database to collect historical information on risks encountered and related resolutions. Documentation includes a historical database and post-project assessment data.

Level 1: Initial Process

The organization recognizes the need for risk management but no established practices or standards are in place. Documentation is minimal and results are not shared. Risk response is reactive rather than planned and proactive.

Risk Management Planning

No risk management plan exists. Risk management is anecdotal and incidental. A project charter or other statement of purpose may be the only initiating documentation that references potential risks.

Risk Identification

Risks are not identified routinely. However, individuals may discuss items of special interest to management or stakeholders, typically when a risk has become a current problem instead of a future possibility. To help identify risks, a project manager will generally have a scope statement and a WBS that details a basic set of milestones and perhaps deliverables. The project manager may also have a top-level milestone schedule. Risks revealed by project scope and milestone information are discussed only on an ad hoc basis.

Qualitative Risk Analysis

If risks are identified, the project manager may speculate on impacts on a project if the risks occur. Impromptu speculation

without any analysis, planning, or standard process is the typical approach.

Quantitative Risk Analysis

Little or no quantitative analysis of identified risks takes place. Speculation typically involves no analysis, forethought, or standard approach.

Risk Response Planning

In large part, risks are considered as they arise. Teams seldom determine mitigation strategies or plan for contingencies for future risk events.

Risk Control

Project teams perform more day-to-day problem solving when new risks occur. They develop work-arounds to address the events instead of working from a risk management plan and identifying additional risk response strategies.

Risk Documentation

No historical database maintains records of typical risks encountered and related experiences; team members rely upon their own past experiences and team discussions.

Level 2: Structured Process and Standards

Risk management processes are developed and documented for all component areas, but are utilized generally only for large projects. Project team members understand macro- and some detail-level risks, and most projects are expected to include strategies for dealing with risks. Teams use a structured

approach to quantify the impacts of risks in an effort to rank their importance. Management is involved consistently with risks on large, visible projects where risks are critical or of great magnitude; risk management is recommended for other projects. All documented processes are repeatable. Risks are examined and controlled on a project-by-project basis.

Risk Management Planning

Development of a risk management plan is part of the project management process. A risk management plan establishes rules for defining and managing project risks. Most large and visible projects develop and utilize such plans.

Risk Identification

The organization has a documented process for identifying project risks. Use of the process is encouraged for all projects, but serves as standard practice on large, highly visible projects.

A conscious effort is made to identify total project risks (near- and longer-term in as much detail as makes sense). Risk discussions include inputs from key stakeholders.

To help identify risks, a project team will generally prepare a scope statement and WBS at least to Level 3, a very detailed project schedule, and a comprehensive project cost estimate. The team will also examine the procurement management and staffing management plans in an effort to identify risks. Risk discussions typically focus on project scope, schedule, and cost risks. Top-level risks are included in project management plans. Project teams rely upon expert judgment and industry lessons learned to identify risks.

Qualitative Risk Analysis

A documented process details a standard methodology for assessing the probabilities and impacts of risks. The common methodology may explain low, medium, and high risk ratings.

Quantitative Risk Analysis

The documented process includes a standard method to ensure consistent assessment of risk items. The methodology may include assigning numeric ratings to low, medium, and high risks and determining the expected financial impacts of risks using simple probability and value calculations. Project teams attempt to employ more objective approaches to quantify the potential impacts of risks. Risks continue to be evaluated on a project-by-project basis.

Risk Response Planning

Project teams develop risk management plans that document procedures intended to manage risks. The plans provide for integration into overall project management plans. The teams may informally consider strategies for dealing with future risk events and discuss the strategies among themselves. Large, highly visible projects include contingency plans for near-term risks and mitigation strategies for all areas of concern.

Risk Control

During project execution, teams apply their own approaches to managing and controlling risks. They typically assign responsibility for each risk item as it occurs. Risks may be discussed in team meetings and current status is documented in meeting minutes.

Management is generally informed about the risk status of large, highly visible projects. A documented procedure is followed to report risk status to key stakeholders. The risk control process may include a risk log or register that identifies the risk items, responsible parties, potential impacts, probabilities, mitigation strategies, and current status.

Risk Documentation

Historical data concerning risks is compiled and a database is established. Information collected describes current risks and typical risks on similar projects, but the information is not collected or used consistently.

Level 3: Organizational Standards and Institutionalized Process

Risk management processes are considered organizational standards and are utilized for most projects. The procedures are expanded to include efficient ways to identify risks. A risk control system is developed and established. Systems are becoming more integrated: risk information and status is provided to the project integration process. Metrics are used to support risk decisions at the project and program levels. Management fully supports the risk management processes and institutionalizes the procedures and standards. Risks are examined and controlled on a program basis.

Risk Management Planning

A standard risk management plan exists and is applied consistently to all projects. Every project follows a standard process and template to identify, evaluate, and manage risks. A risk management plan is an expected project management artifact. It defines, in detail, how project risks are identified, monitored, and controlled.

Risk Identification

The organization has and follows a documented, repeatable process for identifying project risks. Documentation covers

all processes and standards for identifying risk events and describes tools for teams to use to identify risks (checklists, automated forms, etc.). Teams identify symptoms of risk (risk triggers) for inclusion in the historical database. A conscious effort is made to identify total project risks and program risks (interrelationships among related projects). Risk discussions include inputs from similar projects, industry lessons learned, and key stakeholders. Risk information and indications are consolidated and integrated.

Qualitative Risk Analysis

The risk analysis process is expanded to encompass more advanced procedures for evaluating risks qualitatively, including anecdotal references to potential impacts to projects. The process is fully documented and repeatable. Risks are prioritized based on narrative descriptions rather than mathematical calculations.

Quantitative Risk Analysis

The risk quantification process uses advanced procedures for quantifying risks, including multiple criteria for prioritizing risk items. All steps of the process are documented fully and are repeatable. The advanced process may include methodologies such as range predictions, optimal calculations using simulation tools and decision trees, and weighted average calculations. Risks are prioritized using multiple factors such as expected monetary value, criticality, timing, and risk type and are evaluated on a program or organizational basis.

Risk Response Planning

Standard processes that address which risks warrant responses are documented and utilized by all projects. The risk response development process includes templates for risk management

plans. Project teams typically maintain contingency plans and mitigation strategies for all identified risks. The organization is capable of allocating project reserves to cover such items.

Risk Control

A specific process is utilized for managing and controlling risks. Project risks are actively and routinely tracked and corrective actions are taken. All risk management plans are updated as risk events take place and conditions change. Project plans are adjusted accordingly. Metrics are collected, analyzed, and may be expanded to include risk mitigation success rates.

Risk Documentation

The organization collects historical data about common risks, their triggers, and compiles and saves such information in a historical database.

Level 4: Managed Process

All documented processes are utilized for most projects. Management is actively engaged in organization-wide risk management. Risk systems are fully integrated with time, cost, and resource systems. Staff members are mandated to comply with the organizational risk management processes and procedures.

Risk Management Planning

Risk planning and risk management are mandatory for all projects. The level of detail required is tailored to the size and type of project and also the organizational environment.

Expert judgment and project archives are used to develop risk management plans.

Risk Identification

All documented processes are utilized. The risk identification process is fully integrated with cost management and time management processes and with the PMO. A conscious effort is made to identify total project risks (within individual projects, within programs, and between projects and programs). In other words, risks are identified with the organization and project in mind.

Qualitative Risk Analysis

All documented processes are utilized. The qualitative analysis of risk includes information about potential impacts on cost management, time management, finance and accounting systems, and strategic planning processes. Risks are evaluated on an organizational basis.

Quantitative Risk Analysis

All documented processes are being utilized. The risk quantification process is fully integrated with cost management, time management, finance and accounting, strategic planning, and the PMO. Risk quantification considers the risks from other projects and other parts of the organization. Risks are evaluated on an organizational basis. The organization has established criteria to measure the effectiveness of its risk management program.

Risk Response Planning

All documented processes are utilized. The risk response development process is fully integrated with cost management,

time management, finance and accounting systems, strategic planning processes, and the PMO.

Risk Control

All processes are documented and utilized. The risk control system is integrated with the organization's other control systems, monitoring programs, and cost and time management programs.

Risk Documentation

The risk information system is integrated with other project document systems. This allows project status reports and dashboards to reflect critical information about timelines, budgets, conflict issues, and risks.

Level 5: Optimizing Process

Improvement processes are utilized to ensure projects are measured and managed continuously against value-based performance metrics. Lessons learned are regularly examined and used to improve documented processes. Projects are managed with consideration of how similar projects performed in the past.

Risk Management Planning

Value and improvement are key considerations when developing risk management plans. The plans include provisions for measuring the derived value of risk management. Lessons learned related to planning processes are recorded, disseminated, and used to improve practices.

Risk Identification

A process is in place to continuously improve risk identification by identifying all risks as completely and as early as possible.

Lessons learned are captured and used to improve risk identification activities. Risk identification involves identifying organizational priorities for projects. The priority designator is linked to management decisions and gives project teams the ability to set priorities for their risk concerns. The enhanced process that results is documented and followed.

Qualitative Risk Analysis

A process is in place to continuously improve the risk response development process and devise risk management plans. Lessons learned are captured and used to improve the development of strategies for identifying risks.

Quantitative Risk Analysis

A process is in place to continuously improve risk responses and develop risk management plans. Lessons learned are captured and used to improve the identification and handling of risks. Use of project reserves is included in the determination of project efficiency and effectiveness. A process for tracking the use of project reserves supports management decisions during project execution.

Risk Response Planning

A process for tracking the use of project reserves is in place and supports management decisions during project execution. Project reserves are included in determinations of project efficiency and effectiveness. A process for tracking the use of reserves is in place and supports management decisions during project life. Lessons learned are captured and used to improve methods for identifying risk strategies.

Risk Control

A process is in place to continuously improve the risk control process. A documented process utilizing risk assessments and

current risk status data aids management decisions during project execution. Lessons learned are captured and used to improve the monitoring and control efforts. Risk assessments are incorporated and included in determinations of project efficiency and effectiveness.

Risk Documentation

A process is in place to continuously improve risk documentation and maintenance of a historical database. Lessons learned are captured and used to improve data collection. Post-project assessments are conducted.

Chapter 11

Procurement and Vendor Management

Procurement and vendor management constitute the processes and actions undertaken by a project manager and/or project team to acquire goods and services in support of a project. They also include the activities involved in managing contracts throughout the period of performance and closing contracts upon completion.

Procurement management involves planning for all purchases, acquisitions, and contracting. All the processes and actions of procurement planning must conform to the constraints of the overall organizational structure and policies. Generally, the process involves contracting with outside vendors to acquire goods and services in a timely manner, in appropriate quantities, and within defined quality standards. In fact, the terms *contracting* and *procurement* are often used interchangeably.

As outsourcing has become a more common feature of organizational life, the skills and processes associated with vendor management have become more complex.

Components

Procurement Management Planning

Procurement planning involves determining whether to procure or produce materials in-house, deciding how to procure them, identifying items and quantities, and determining when to procure. If any goods or services are to be acquired outside the project team, the written specifications should cover all details, including major milestones, timing and scheduling procedures, initial cost estimates, and budget impacts. The product of procurement management planning is a procurement management plan.

Procurement Requisition and Solicitation

This component aligns with the *PMBOK® Guide* process titled "Conduct Procurements." Requisitioning bridges the gap between identifying the requirements and contracting with vendors. The process of planning to contract includes identifying potential vendors, determining solicitation type (oral, verbal, invitation for bid, request for proposal, etc.), deciding the type of contract, developing procurement documents, and other tasks. It also involves source selection—finding suitable vendors and negotiating contracts. Other aspects of requisitions include soliciting information from industry, receiving bids and proposals, evaluating the information received, negotiating contracts, and finalizing contract awards. The outcome of this component is the award of a contract or contracts.

Procurement Control and Vendor Management

This component covers the processes of managing contracts over a project life cycle until closure. Developing and managing relationships with vendors and contractors are major factors in project success. Changes in scope, market risks that

impact purchases of materials or services, and other uncer-
tainties will arise. Project managers must inspect the quality
of vendors' products, assure that changes in contracts are
approved and communicated properly, and mitigate risks
that may arise from procurement issues. Project managers
also have opportunities to build relationships with suppliers
that can benefit current projects, future projects, and their
entire organizations.

Procurement Closure

Closure follows vendor management during the life of a project:
it includes acceptance by the client, payment for services, and
close-out activities. Closure ensures vendors have performed
in accordance with the terms of their contracts and that they
receive proper reimbursements based on quantities provided
and timing. Additionally, lessons learned about vendors, contract
management, and the services or materials procured must be
captured to improve future procurement practices.

Level 1: Initial Process

The organization has no project procurement process in place,
but recognizes the potential value of having a defined process.
Some project managers recognize the need to procure outside
goods and services in a methodical manner, but their methods
are ad hoc and inconsistent. Contracts are managed at final
delivery level and no attempts are made to build relationships
with vendors.

Procurement Management Planning

There is no recognized practice for procurement planning.
On an ad hoc basis, project managers determine basic require-
ments and timing based on lists of milestones and deliverables

and developed planned approaches to purchasing goods and services as needed.

Procurement Requisition and Solicitation

Project requisitions are prepared similarly to the way the organization prepares documentation to acquire more typical goods and services. The organization has no specific approaches for acquiring materials for projects. No standards or practices covering vendor contacts, evaluations, and negotiations are in place. Occasionally, the organization will shop several vendors and compare prices.

Procurement Control and Vendor Management

Contracts for projects are managed loosely. Minimal reporting requirements are delineated in contracts. No processes for managing changes and risks or communicating with vendors exist. Responses to supply chain issues are reactive.

Procurement Closure

In large part, vendors and contractors are managed to end dates only. Ongoing relationships with vendors are pursued informally. Contract closures may be informal; payment procedures are usually outside the purviews of project managers. Communication failures may occur during and after the closure of a project. Audits and the settlement of issues are reactive and may lead to litigation.

Level 2: Structured Process and Standards

A document process covers the procurement of goods and services, but it is not a standard practice. The procurement organization drives the process with some input from

project teams, organizational management, and clients. The procurement process is mostly utilized by large or highly visible projects. Organizational management is more involved, with input from client departments. Procurement involves the project team and capitalizes on its expertise and knowledge. Contracts are managed at an appropriate level of detail; status is reported periodically.

Procurement Management Planning

The procurement process specifies that project managers participate in decisions to acquire goods and/or services after the procurement group receives a project request. The first step in procurement is creating a statement of work or a product description. The statement helps define the scope management process. Scope statements describe required goods and services.

The project manager (and possibly team members) perform an informal analysis to determine whether to acquire goods and services. This analysis relies heavily on the scope statement. The manager and team members make recommendations to management. In cases where organization management decides to purchase goods or services, the procurement group and project team jointly create a procurement management plan that details procedures, item descriptions, costs, quantities, quality requirements, and delivery schedules.

Procurement Requisition and Solicitation

A scope statement is reviewed (and changed if necessary), and a scope approval is issued per the scope management process. If the decision is to buy the goods or services in question from an outside vendor, the procurement organization determines which vendor(s) to contact and also takes the lead in preparing procurement documentation with limited participation from the project team.

A process is defined for identifying contract requirements, identifying potential vendors, selecting the appropriate contract type and determining the best procurement approach, and developing documentation. The organization establishes clear evaluation criteria to use for proposal evaluation. The procurement approaches may vary and the organization has defined the different approaches for use by project teams. Large, highly visible projects follow the process to obtain contract services.

Usually, the procurement organization contacts vendors and conducts price comparisons. The vendors commit to final delivery dates for services with key milestones. Vendors are requested to provide schedules and plans at appropriate levels of detail. The quality of the required product or service is specified to each vendor based on project quality standards.

Both the project manager and the purchasing department are involved in evaluating bids and proposals based on established evaluation criteria. A process is defined to solicit information from industry, evaluate vendor information, negotiate contracts, and finalize awards. The process is used on large, highly visible projects and recommended for other projects.

Procurement Control and Vendor Management

Vendors are expected to provide project managers with periodic status reports reflecting progress toward meeting key milestones. No specific format or frequency is documented.

Changes to the plan may represent scope changes, in which case the normal change management process within the project integration process is used for large, highly visible projects. Vendors report on a regular basis (usually weekly) according to stipulations in contracts. The format of reporting is specified in the procurement process, and the reporting frequency follows the procurement management plan and contract.

Information on work results is provided to the project communications management process for use in internal progress reporting. When a plan changes, for example, due to date

slippage, the project manager inputs corrective action information to the project integration management process and plan updates are generated.

Procurement Closure

Formal acceptance and contract closure occur, but they follow no standard or documented process. Typically, closure and formal acceptance information are integrated into the communications system. Lessons learned are captured informally.

Level 3: Organizational Standards and Institutionalized Process

The procurement process acts as an organizational standard and is used by most projects. Procurement is based on a definitive program view—management views other projects and products before making decisions. The project team and purchasing department are integrated fully into the procurement process. Contractors and vendors are asked to comply with applicable procedures that are standard throughout the organization.

Procurement Management Planning

The project team and procurement organization present a formal analysis and recommendation report to both organizational management and client management and they make acquisition decisions jointly. Acquisition recommendations and decisions consider effects and ramifications in such areas as organization capacity, method effectiveness, economic factors, and other issues.

Procurement Requisition and Solicitation

The organization developed an expeditious process to access vendors and contractors and maintains a preferred vendors

list. Vendor recommendations from the project team may be incorporated into this list.

The process for developing procurement documentation includes procurement templates for statement of work, status reporting, and other common procurement artifacts. The organization has classified the types of contracts to be used by project teams. These documents are incorporated into the project procurement management plan.

Vendors are asked to supply detailed plans, including work breakdowns and detailed sequenced activity lists in line with the project structure. Solicitation is carried out jointly by the purchasing department and the project team, with input from the legal department. Techniques such as seller rating systems and proposal evaluation criteria are established and used consistently.

Procurement Control and Vendor Management

Contractors and vendors are asked to comply with organizational project management processes and standards. All vendors should make timely reports to project managers to demonstrate progress of sequenced activities All changes and issues are communicated immediately to the project manager, who then enters them into the change management process for the project.

Procurement Closure

Clients participate in product testing and sign off on contract completion. After sign-off indicating acceptance of procured items and receipt of all appropriate documentation from vendors, the project manager signs off and closure takes place. Contract closure processes are now standardized and lessons learned are compiled for use in future procurements. The organization is devising a program for developing continuing relationships (partnerships) with key vendors.

Level 4: Managed Process

Organizational management mandates compliance with procurement procedures by all projects. Acquisition decisions are made from an organizational perspective. Vendors are integrated into the organization's project management mechanisms. Audits of procurement practices are performed to reveal how procurement actions may be improved. Lessons learned are captured and relied on to aid procurement planning for similar projects.

Procurement Management Planning

Acquisition decisions are made by a team composed of the project manager, organizational management, client management, and purchasing department. Organizational factors such as available production capacity in various areas, ramifications for other projects, impacts on other areas of the organizational environment, and other factors are considered in decision making. Input is requested from all stakeholders affected by a project.

Procurement Requisition and Solicitation

Project requisitions are fully integrated into the organization's procurement process. Solicitation and source selection for the project are fully integrated with the organization's solicitation process. As a result, the organization is in a position to leverage numerous requests to a given vendor and take advantage of economies of scale.

Procurement Control and Vendor Management

Vendors are required to report progress against their schedules or plans by using the organization's standard project management tools and techniques. Vendors provide status reports that are then integrated into the organization's standard

status reporting mechanisms. Vendors are involved in project planning activities.

Procurement Closure

Acceptance and closure processes are documented, repeatable, and treated as organizational standards. A formal program fosters partnerships with key vendors. Audits are regularly (proactively) performed to identify areas for improvement in contract and vendor management.

Level 5: Optimizing Process

The procurement process is reviewed periodically and enhancements are incorporated. The project managers and teams identify and support improvements to the procurement processes. At the conclusion of each project, lessons learned are captured, evaluated, and incorporated into the processes and used to improve practices and documentation. Management is actively involved in pursuing strategic alliances with preferred vendors that have reputations for delivering high-quality products and services in a timely manner. Ongoing process improvements focus on procurement efficiency and effective metrics.

Procurement Management Planning

Procurement planning is evaluated on a periodic basis and enhancements are added continuously. Historical data about projected costs are evaluated against actual costs to determine whether decisions made were sound and should be repeated in the future.

All acquisition decisions are evaluated based upon efficiency and effectiveness metrics. Just-in-time procurement

is incorporated to expedite procurement planning and reduce inventory carrying costs.

Procurement Requisition and Solicitation

The organization has preferred contract vehicles and a list of preferred vendors that can respond to the requisition process expeditiously. Solicitation/source selection is evaluated on a periodic basis and enhancements to the process are continuously incorporated. Contractors are evaluated based upon effectiveness and efficiency metrics with regard to project performance.

The project manager and team evaluate vendors at the end of the project to determine effectiveness, efficiency, responsiveness, timeliness, and quality of products or services. The results of these evaluations are measured against the preferred vendors list. Solicitations and source selections are evaluated regularly; enhancements to the process are incorporated continuously.

Procurement Control and Vendor Management

Contractors are evaluated based upon effectiveness and efficiency metrics of project performance. The organization considers strategic alliances with preferred vendors. Both parties adhere to high standards of performance and quality in their products or services.

The organization requires compilation of lessons learned from large and highly visible projects in relation to procurements, particularly effectiveness and efficiency (processing procurement documentation, following evaluation criteria to select sources, and the length of time required to process change orders). A performance database routinely captures information about vendor and contractor performance.

Procurement Closure

The project manager and project team evaluate the vendors at the end of each project to determine effectiveness, efficiency, responsiveness, timeliness, and quality of product or service. The results of these evaluations are fed back into the process and measured against the organization's preferred vendors list.

Contract management closure is evaluated on a periodic basis and enhancements to the process are incorporated continuously. Lessons learned form an integral part of continuous improvement of procurement processes.

Chapter 12

Project Stakeholder Management

Although new to the *PMBOK® Guide* as a knowledge area in the 2013 release, stakeholder management has always been a familiar and valued aspect of project management. Its elevation to a knowledge area in the standard confirms what project managers have long understood: managing the people associated with projects, whether they are team members, vendors, end users, executives, or customers, is a critical make-or-break area of expertise.

Stakeholder management encompasses the processes required to identify and engage with individuals or groups who may impact or be impacted by a project, address issues as they arise, and manage engagement or control expectations. The shift in terminology from "controlling expectations" to "managing engagement" brings a positive emphasis to the tasks associated with project stakeholder management. Recognizing and managing *current* and *desired* levels of engagement as part of stakeholder analysis are the most significant aspects of this new knowledge area.

Components

Stakeholder Identification

This component includes processes for identifying individuals or groups who impact or may be impacted by the activities of a project in process or the outcome or product of a completed project. Also included are processes for analyzing and documenting the influences, interests, and potential impacts of stakeholders on a project.

Stakeholder Management Planning

The development of strategies to manage and engage stakeholders throughout the life cycle of a project includes processes for determining both the current and the desired engagement levels of key stakeholders, identifying inter-relationships among stakeholders, and determining the communication requirements of stakeholders and what is needed to move each stakeholder from the current to the desired level of engagement that will most benefit the project.

Managing Stakeholder Engagement

Managing stakeholder engagement involves processes for communicating with stakeholders and working with them to be certain their concerns are addressed and needs are met. Addressing issues as they arise, especially with key stakeholders, keeps projects on track.

Controlling Stakeholder Engagement

Processes for monitoring and controlling stakeholder relationships allow project teams to address issues proactively and adjust plans and strategies as required.

Level 1: Initial Process

An ad hoc stakeholder management process is in place whereby projects manage stakeholders informally.

Stakeholder Identification

No established standards have been set to identify and analyze stakeholders and their needs and no plan exists for managing and controlling stakeholder engagement and expectations. The project manager communicates status and progress and issues reports on the project to management when required.

Stakeholder Management Planning

No established standards are in place for developing a strategy for managing and engaging stakeholders in projects. Project managers may provide status and progress reports to management when required, but engage in little or no advance planning to meet stakeholder needs.

Managing Stakeholder Engagement

Stakeholder needs are addressed in an ad hoc manner, usually in response to a specific request or question about the project directed to the project manager.

Controlling Stakeholder Engagement

Stakeholders are provided with informal project status reporting by the project manager.

Level 2: Structured Process and Standards

A basic project stakeholder management process is established. Large, highly visible projects follow the process and provide a structured approach for project stakeholder management.

Stakeholder Identification

A stakeholder analysis by which project stakeholders are identified and analyzed may be conducted but the process varies from project to project. Stakeholder management plans are developed for large and highly visible projects and are encouraged for all projects.

Stakeholder Management Planning

A stakeholder analysis is developed. Project stakeholders are identified and provided project summary information about status, progress, and phase completion. Management encourages large and highly visible projects to provide these updates at periodic intervals throughout the expected life of a project. Methods for planning strategies for stakeholder management vary from project to project.

Managing Stakeholder Engagement

The processes of communicating and working with stakeholders vary from one project to the next. Issues are addressed but the methods for handling them are not consistent. Activities conducted to engage stakeholders throughout the project life cycle vary according to the project.

Controlling Stakeholder Engagement

A process for monitoring project stakeholder relationships is in place but varies among projects. Strategies are adjusted by each project manager to maintain or increase the efficiency and effectiveness of stakeholder engagement activities as the project progresses. Stakeholder engagement activities are planned and controlled by each project manager.

Level 3: Organizational Standards and Institutionalized Process

There is a standard approach and process for project stakeholder management across the organization. Formal project stakeholder management plans are developed and executed for most projects.

Stakeholder Identification

Stakeholder management plans are expected to be developed for all projects. Project stakeholders are identified and the analysis includes potentially relevant information such as roles, departments, interests, knowledge, expectations, and influence levels.

Key stakeholders—those in decision-making or management roles who are impacted by the project outcome, such as sponsors, business and technical leaders, project managers, vendor representatives, and primary customers—are identified. Non-key stakeholders are identified and added to the stakeholder list so that all potential stakeholders are included. The potential impact or support of each stakeholder is analyzed and classified to define an approach strategy.

Stakeholder interests are prioritized to ensure efficient use of efforts to communicate and manage their expectations. Key stakeholders are assessed to determine how to influence and engage them, enhance their support, and mitigate potential negative impacts. Multiple classification models (power–interest, power–influence, influence–impact, etc.) are used for stakeholder analysis.

Stakeholder Management Planning

A standard approach across the organization covers development of stakeholder management strategies. Project managers

use analytical tools and apply expert judgment to decide on the level of engagement required from each stakeholder at each stage of a project. Project managers review and update the levels of engagement of key stakeholders as projects progress.

In creating a stakeholder management plan, the project manager uses the judgment and expertise of groups and individuals with specialized training, subject matter expertise, or insights into relationships within the organization and with external stakeholders. Project managers use one-on-one meetings, interviews, focus groups, surveys, and other techniques to obtain expert advice.

The current engagement level of key stakeholders is gauged and compared to the desired levels required for successful project completion. Current and desired engagement levels are classified and documented as unaware, resistant, neutral, supportive, or leading.

Managing Stakeholder Engagement

Results from stakeholder analysis are used to develop a communications management plan intended to address the targeted needs of specific stakeholders.

The current and desired levels of engagement for each stakeholder play an important role in defining a strategy throughout a project. The project manager engages stakeholders at appropriate stages to obtain and confirm their continued commitments to project success. The project manager decides, based on stakeholders' requirements, which communication methods are to be used in the project and how and when such communications will be delivered.

To ensure achievement of project goals, the project manager manages stakeholder engagement through negotiation and communication, and applies interpersonal skills to manage their expectations. Project managers address potential concerns that have not yet become issues and anticipate future problems that may be raised by stakeholders. Such concerns

are identified and dealt with early. The project manager applies management skills to coordinate and harmonize the stakeholder group in order to accomplish project objectives.

Controlling Stakeholder Engagement

Stakeholder engagement activities are included in the stakeholder management plan and are implemented during the life cycle of a project. Stakeholder engagement activities are continuously monitored and evaluated. Standard tools are used to capture, store, and distribute information to stakeholders about project costs, schedule progress, and performance. The project manager consolidates reports and facilitates distribution to meet project stakeholder needs.

Groups and individuals with specialized training and expertise are used to ensure comprehensive identification and analysis of new stakeholders and ongoing reassessment of current stakeholders. Methods including one-on-one meetings, interviews, and panel formats such as focus groups and surveys are used. Review sessions are used to exchange and analyze information about stakeholder engagement.

Level 4: Managed Process

Stakeholder management plans are required for all projects. The plans are integrated into all corporate planning systems, processes, and structures.

Stakeholder Identification

There is a method for updating and refining stakeholder management plans as projects progress and develop. Stakeholder management is incorporated into other corporate processes, systems, and structures.

Stakeholder Management Planning

The organization utilizes methods for updating and refining the stakeholder management plan as a project progresses and develops. The plan is also incorporated into other corporate processes, systems, and structures.

Managing Stakeholder Engagement

Automated information retrieval systems structured as databases with inquiry capabilities are in place to address stakeholders' needs for information on demand. Distribution systems include diverse alternative solutions from meetings to multimedia presentations. The project manager confirms stakeholders' access to and satisfaction with all methods for meeting their communication needs.

Controlling Stakeholder Engagement

All projects are expected to capture performance measurements to demonstrate understanding of stakeholder analysis. Formal analysis is conducted on an ongoing basis.

Level 5: Optimizing Process

A process is in place to ensure continuous improvement of project stakeholder management. Lessons learned are captured and incorporated into existing processes.

Stakeholder Identification

Stakeholder identification documentation and lessons learned, including processes for analyzing stakeholders and their needs, are evaluated for value-added impact. Stakeholder identification is tightly linked with other organizational planning components.

Lessons learned about effective stakeholder identification are compiled.

Stakeholder Management Planning

Stakeholder management planning documentation and lessons learned are analyzed for value-added impact. Stakeholder management planning is tightly linked with organizational planning. Lessons learned about effective stakeholder management planning are collected.

Managing Stakeholder Engagement

Documentation of the entire stakeholder management process is available for review. Lessons learned are evaluated to determine continuous quality improvements for the process. Stakeholders have been trained to access any project-related information they need in a timely fashion. Lessons learned about effective information retrieval and distribution related to stakeholder management are collected.

Controlling Stakeholder Engagement

Lessons learned about stakeholder management are captured and analyzed, and the results are used to modify the planning and execution of processes leading to continuous enhancements. Lessons learned are made available for future reference. Performance metrics are utilized to define the efficiency and effectiveness of stakeholder management plans.

Chapter 13

Now What? Using Your Maturity Assessment to Achieve Business Goals

Determining a maturity score for your organization may give you a sense of satisfaction, particularly if it is relatively high. However, the score alone is not the goal.

Business Impact of Improved Maturity

Project management maturity is a progressive process during which organizations experience notable improvements at different stages of development. Based on our experiences with clients who used the PMMM[SM] iteratively as a tool for improving their processes, improved maturity brings with it valuable results such as shorter project completion times, better control of project costs, improved strategic management decision making in only six months, and sustainable growth and profitability over the long term.

Ultimately, by the time an organization reaches its desired maturity level, it has adopted a project management culture able

to significantly optimize efficiency and profitability. A research report titled "Project Management Maturity: A Benchmark of Current Best Practices," based on a study conducted by PM Solutions Research (formerly the Center for Business Practices), showed that improving an organization's level of project management maturity results in significant performance benefits, especially in customer satisfaction.

This was the first study to find a direct correlation between organizational performance and project management maturity. We polled project management practitioners about their organizations' management practices and business results in the following eight performance areas:

- Schedule performance
- Budget performance
- Customer satisfaction
- Resource allocation
- Strategic alignment
- Estimation quality
- Employee satisfaction
- Portfolio optimization

The study found that organizations that scored high on these eight measures were also 38% more mature in their project management practices than organizations in general. Furthermore, improving the level of project management maturity in an organization resulted in significant performance increases in all eight areas.[*] Among other key findings of the survey:

- Improving the level of project management maturity results in significant performance benefits, especially in customer satisfaction (30% of organizations showed more than 25% improvement).

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[*] This study was renewed in 2014; visit www.pmsolutions.com/research for updated findings.

- The higher the level of project management maturity, the better the performance in all areas measured.
- Overall project management maturity grew by 26% over a five-year period, and the biggest improvements were in risk management, followed by procurement management and cost management.
- Nearly half of all respondents reported more than a measured 10% performance improvement across all eight areas (see Figure 13.1).

Ample evidence demonstrates that an organization that invests in improving project management capability in a disciplined and realistic way will reap significant returns on its investment. Each organization must determine what level of maturity it needs to achieve and how long the journey will take. A properly developed implementation roadmap that follows a detailed analysis of the organization's capabilities will
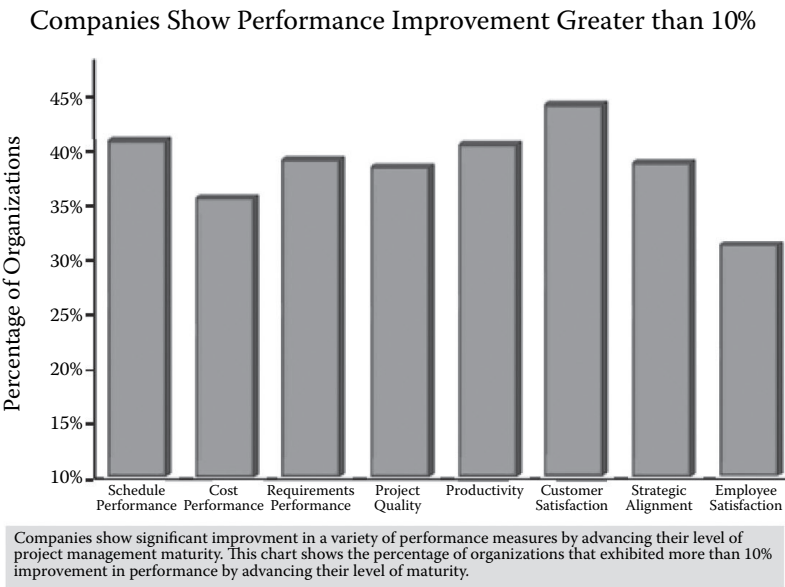
Companies Show Performance Improvement Greater than 10%

Companies show significant improvment in a variety of performance measures by advancing their level of project management maturity. This chart shows the percentage of organizations that exhibited more than 10% improvement in performance by advancing their level of maturity.

Figure 13.1 Advancing project management maturity improves organizational performance.

significantly reduce the period of time required to improve its maturity level.

Using Results of Assessment

The real value to be gained from performing an assessment comes into play across the several areas described below.

Culture Change and Employee Engagement

One of the more difficult and most important aspects of instilling project management discipline in an organization is changing the behavior and habits of the people doing the work. Through the process of performing an assessment, the work products and processes used will be evaluated and compared to some best-practice scenarios. As this process continues, staff members have opportunities to identify with the logic of the new processes and gain an initial understanding of what project management has to offer. Thus a culture change starts to take place when the initial assessment starts.

Staff members begin to realize that they need to think differently from the ways they thought in the past. In many cases, individuals already know that change is necessary. They're just not sure in what direction change should occur. The interviews performed during an assessment give some indication of that direction to staff members, and they do so in a way that is more engaging to employees because the interviews encourage reflection and self-motivated change, rather than seeking to impose change by fiat.

Another good avenue for starting cultural change is the communication of a vision. The act of performing an assessment tells staff members that leadership has a vision of improved performance in which they all have roles to play.

The results of the assessment reveal a clear path and tangible actions that can be implemented for the company to

move forward. This information can be communicated across the company in an easily understood fashion to start people thinking in new directions. By using the assessment data (based on information provided by all levels of employees), staff members become a part of the plan to promote change or at least feel they have an understanding of where the future of the company lies. This is one starting point to generate interest and enthusiasm to improve project management and foster employee engagement.

Baselining Capability for Performance Measurement

Performing maturity assessments also communicates that your organization is serious about improving processes and fostering efficiency and effectiveness. An initially high score can be good news to share; but so can a score that improves over time.

However, measuring improvements in process capability is difficult unless you have a baseline for comparison. An initial assessment can serve as the baseline that allows an organization to show the value of future investments in process improvement objectively.

Project Management Office Implementation

The assessment can help answer another important question: What is the appropriate level of the organization at which to implement a project or program management office (PMO)? A PMO, by definition, provides an organizational home for project management. Less clear is the level of the organization at which this structure should exist and the level depends on the degree of maturity that exists within the rest of the organization.

More mature organizations typically have PMOs at higher levels of the organization than those that are just starting the project management progression. Normally, what we see is that organizations that have fairly well-established processes for project management already have competently functioning
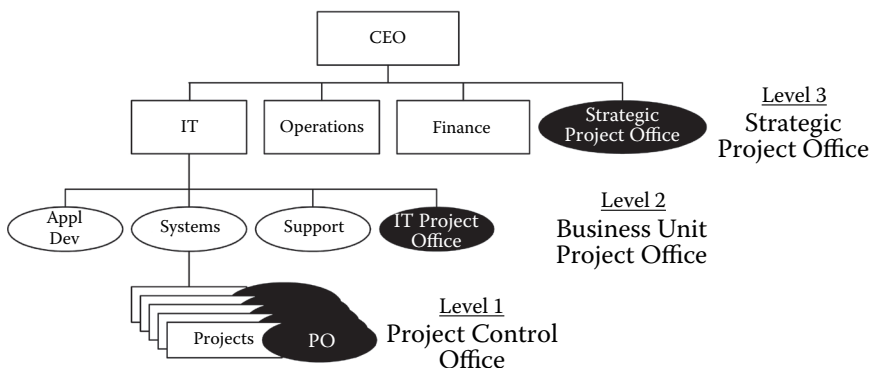
Figure 13.2 Types of project management offices.

Level 1 (Project Control) PMOs (Figure 13.2) and are working on implementing Level 2 (Business Unit) PMOs. Organizations that are very mature will likely be working on enterprise-level PMOs. In all cases, an assessment will reveal the actions necessary to ensure success in the next step of PMO implementation.

Repeated Use as Progress and Effectiveness Tool

We find many of our clients periodically ask themselves: Are we advancing project management capability overall and in the right areas?" Repeat assessments can be used to track progress against the project management deployment plan that should be developed as a result of the initial assessment, thus validating that improvements are taking root and reinforcing the adoption of new ways.

Recurring use of an assessment can show the progress that the PMO is making toward helping the organization reach its goals. Reassessment can become a component of the metrics used to measure success of a PMO on a recurring basis. If the PMO owns the project management capability improvement action, the results of the assessment can be attributed to the actions taken by the PMO to improve project management capability. It is possible to use these measures as the bases of incentive rewards.

Another value of the short-term reassessment is that it provides a tool to communicate successes and milestone achievements to executives and management. Leadership sometimes has a fairly short-range memory, and commitment to change initiative budgets can waiver over time. Providing leadership with objective evidence of results periodically is a wise strategy for keeping commitments from both executives and employees from wavering. We recommend that assessments be performed on an annual basis.

Target Six-Month Improvement Goals

We often find that organizations want to use assessments as tools to identify specific areas for improvement that in turn become goals for the next incremental period. They then tackle one area, one level at a time. This allows organizations to show improvements over a six- to twelve-month period so that the improvement sponsors see a solid return on investment (ROI). Small victories provide an opportunity to cheer for successes and reevaluate specific directions while reenergizing staff members. These are important "peg points" that allow organizations to see how much they've learned, plan for what they didn't know in the first planning session, and adapt or adjust directions for the next short-term (six-month) initiative.

Setting Maturity Goals

A Level 5 maturity goal may not be appropriate for every organization. Each organization needs to determine the minimum level of maturity at which the desired value, whether measured by ROI in terms of dollars, by improvements in customer satisfaction, or by some other measure important to the organization, can be achieved. The next step is to determine the value associated with achieving the next higher level. It is important to realize that these levels are evolutionary steps. Establishing an incremental improvement program with

specific focus and measurable goals allows an organization to realize some benefits within a short time.

There is a great difference between each of the five levels; organizations should strive to fill in the pockets that are weak while advancing those that will provide benefit. Striving to increase the maturity level just for the sake of having a higher level is an unwise use of the tool. We recommend that an organization attempt to maintain a close relationship of levels across the various knowledge areas. It has been our experience that the benefits associated with achieving a Level 5 maturity in one knowledge area may be erased if all other knowledge areas are at Level 2 maturity.

We have also found it beneficial to maintain project management maturity in sync with other corporate process maturity areas, including financial management, organizational improvement, software engineering, human capital development, and others. For instance, implementing mature project management processes such as earned value tracking is meaningless if the organization has not implemented time reporting processes. Experience shows that advancing project management practices far ahead of other corporate processes can cause turmoil and mistrust. Here are a few tips to consider when advancing project management maturity:

- Think of it as an ongoing process, not a rapid transformation. Project management maturity will not happen overnight, but rewarding benefits will be noticed in as little as six months along the way toward optimal maturity.
- Set the maturity goal at an appropriate level in the PMMM^{SM}. Not every organization needs to reach Level 5 maturity in the PMMM to reap important benefits. The maturity assessment helps to determine the level that is most appropriate for each organization.
- Focus on continuous improvement. Project management maturity emphasizes continuous improvement. There is always room for improvement and growth, even after

an organization reaches its highest target maturity level. Organizations should revisit their project management practices, strategies, processes, and goals every six to twelve months.

■ Get outside help. Like any cultural change within an organization, maturity advancement often means carefully navigating the political climate of the organization to get progress in motion. Leveraging neutral, third-party consultants (like PM Solutions) that specialize in effective approaches to assessing project management maturity and mapping realistic plans for advancement can help ensure progress more quickly than going it alone, especially if internal resources are constrained.

■ Remember that maturity is not an end in itself. Improved maturity pays off in increased value delivered to the organization's business goals.

■ Keep in mind that the results of an assessment can be misused. An assessment should be aimed at providing a path forward for the organization by improving its project management capabilities—not serve as a "final grade" on the value (or lack thereof) of the project management function. Typically, organizations start with a baseline assessment of their current situations. From there, a periodic, abbreviated assessment can indicate where progress is being made. A baseline assessment enables an organization to identify where immediate actions will yield the greatest return on investment.

Advancing organizational project management maturity is a key success factor in improving organizational performance. After all, an organization executes its strategy through projects, and optimizing its project management capability results in directly increasing the probability of strategic success.

Appendix A: Self-Assessment Survey

This self-assessment survey is designed to help perform a simple, informal self-assessment of an organization's project management maturity. More detailed information about assessments and how to use them is found in Chapters 1 and 13.

Follow the directions below to perform the organizational self-assessment. Remember that the primary purpose of a project management maturity assessment is to provide a path for your organization to move forward by improving its project management capabilities.

To Assess Your Organization's Project Management Maturity

- Review the description for each component in each of the ten knowledge areas (see Chapters 2 through 12) and assess the organization's level of maturity. Check the appropriate boxes in the survey in Figure A.1.
- Achievement of a given maturity level by an organization is cumulative—that is, for each succeeding PMMM level, the assumption is that all criteria for the preceding levels for that component are being (or have been) fulfilled. To assess an organization at Level 3 in scope definition,

	Project Management Maturity Level				
	1	2	3	4	5
Project Scope Management					
Scope Management Planning	☐	✔	☐	☐	☐
Requirements Collection	☐	☐	✔	☐	☐
Scope Definition	☐	☐	✔	☐	☐
Work Breakdown Structure	☐	☐	✔	☐	☐
Scope Validation	☐	☐	✔	☐	☐

Figure A.1   Sample self-assessment for project scope management. This organization is at Level 2 maturity in scope management.

for example, it must have in place all the processes described in Levels 1, 2, and 3 of scope definition. The organization may have some of the processes in place in Level 4, but if it does not have all of those processes in place, it is at Level 3.

■ After completing the assessment of the knowledge area components, determine the maturity level in each knowledge area. To do that, review the assessments of the knowledge area components and pick the lowest level at which you've assessed maturity in that knowledge area. For example, if the component self-assessment is as shown in Figure A.1, then the maturity level in project scope management is Level 2 (because you are at Level 2 maturity in scope management planning). In other words, the overall maturity level for the component cannot be higher than the lowest individual component score.

■ To assess the overall organizational maturity level, follow a similar method. Review the maturity assessment results for each of the ten knowledge areas. The lowest level assessed is the organizational maturity level. For example, if the knowledge area self-assessment is as shown in Figure A.2, the overall organizational maturity is at Level 1 because it scores at Level 1 in risk management.

	Project Management Maturity Level				
	1	2	3	4	5
Knowledge Area Maturity Level					
Project Integration Management	☐	✔	☐	☐	☐
Project Scope Management	☐	✔	☐	☐	☐
Project Quality Management	☐	☐	✔	☐	☐
Project RiskManagement	✔	☐	☐	☐	☐

Figure A.2   Sample overall maturity score. This organization is at Level 1 maturity because it is at Level 1 in risk management.

PMMM Self-Assessment Survey Checklist	*Project Management Maturity Levels*				
	1	*2*	*3*	*4*	*5*
Project Integration Management					
Project Charter Development	☐	☐	☐	☐	☐
Project Management Plan Development	☐	☐	☐	☐	☐
Project Execution	☐	☐	☐	☐	☐
Monitoring and Controlling Project Work	☐	☐	☐	☐	☐
Integrated Change Control	☐	☐	☐	☐	☐
Project or Phase Closure	☐	☐	☐	☐	☐
Project Management Office (PMO)	☐	☐	☐	☐	☐
Project Scope Management					
Scope Management Planning	☐	☐	☐	☐	☐
Requirements Collection	☐	☐	☐	☐	☐
Scope Definition	☐	☐	☐	☐	☐
Work Breakdown Structure	☐	☐	☐	☐	☐
Scope Validation	☐	☐	☐	☐	☐
Scope Change Control	☐	☐	☐	☐	☐

Continued

PMMM Self-Assessment Survey Checklist (*Continued*)	Project Management Maturity Levels				
	1	2	3	4	5
Project Time Management					
Time Management Planning	☐	☐	☐	☐	☐
Activity Definition	☐	☐	☐	☐	☐
Activity Sequencing	☐	☐	☐	☐	☐
Activity Resource Estimating	☐	☐	☐	☐	☐
Activity Duration Estimating	☐	☐	☐	☐	☐
Schedule Development	☐	☐	☐	☐	☐
Schedule Control	☐	☐	☐	☐	☐
Schedule Integration	☐	☐	☐	☐	☐
Project Cost Management					
Cost Management Planning	☐	☐	☐	☐	☐
Cost Estimating	☐	☐	☐	☐	☐
Budget Determination	☐	☐	☐	☐	☐
Cost Control	☐	☐	☐	☐	☐
Project Quality Management					
Quality Management Planning	☐	☐	☐	☐	☐
Quality Assurance	☐	☐	☐	☐	☐
Quality Control	☐	☐	☐	☐	☐
Management Oversight	☐	☐	☐	☐	☐
Human Resources Planning					
Human Resources Management Planning	☐	☐	☐	☐	☐
Project Team Acquisition	☐	☐	☐	☐	☐
Project Team Development	☐	☐	☐	☐	☐
Project Team Management	☐	☐	☐	☐	☐
Professional Development Management	☐	☐	☐	☐	☐

PMMM Self-Assessment Survey Checklist (*Continued*)					
	Project Management Maturity Levels				
	1	*2*	*3*	*4*	*5*
Project Communications Management					
Communications Management Planning	☐	☐	☐	☐	☐
Communications Management (Information Distribution)	☐	☐	☐	☐	☐
Communications Control	☐	☐	☐	☐	☐
Issues Tracking and Management	☐	☐	☐	☐	☐
Project Risk Management					
Risk Management Planning	☐	☐	☐	☐	☐
Risk Identification	☐	☐	☐	☐	☐
Qualitative Risk Analysis	☐	☐	☐	☐	☐
Quantitative Risk Analysis	☐	☐	☐	☐	☐
Risk Response Planning	☐	☐	☐	☐	☐
Risk Control	☐	☐	☐	☐	☐
Risk Documentation	☐	☐	☐	☐	☐
Project Procurement and Vendor Management					
Procurement Management Planning	☐	☐	☐	☐	☐
Procurements Requisition and Solicitation	☐	☐	☐	☐	☐
Procurement Control and Vendor Management	☐	☐	☐	☐	☐
Procurement Closure	☐	☐	☐	☐	☐
Project Stakeholder Management					
Stakeholder Identification	☐	☐	☐	☐	☐
Stakeholder Management Planning	☐	☐	☐	☐	☐
Managing Stakeholder Engagement	☐	☐	☐	☐	☐
Controlling Stakeholder Engagement	☐	☐	☐	☐	☐

Continued

PMMM Self-Assessment Survey Checklist (*Continued*)					
	Project Management Maturity Levels				
	1	*2*	*3*	*4*	*5*
Knowledge Area Maturity Level					
Project Integration Management	☐	☐	☐	☐	☐
Project Scope Management	☐	☐	☐	☐	☐
Project Time Management	☐	☐	☐	☐	☐
Project Cost Management	☐	☐	☐	☐	☐
Project Quality Management	☐	☐	☐	☐	☐
Project Human Resources Management	☐	☐	☐	☐	☐
Project Communications Management	☐	☐	☐	☐	☐
Project Risk Management	☐	☐	☐	☐	☐
Project Procurement and Vendor Management	☐	☐	☐	☐	☐
Project Stakeholder Management	☐	☐	☐	☐	☐
Organizational Maturity Level	☐	☐	☐	☐	☐

Appendix B:
PPM Maturity Model

Enhancing an organization's portfolio management capabilities is an important piece of its overall project management maturity. PM Solutions' Project Portfolio Management (PPM) Maturity Model is built around eight essential components of portfolio management. The model is also patterned after the Software Engineering Institute's Capability Maturity Models. The PPM Maturity Model has five distinct levels of maturity and examines an organization's implementation across the eight project portfolio management components. The five levels of PPM maturity are described below for each level of the model.

Eight PPM Components

We identified eight components essential to developing an effective organizational portfolio management environment. These components are shown in Figure B.1. The descriptions below break these components down into their relevant subcomponents.

1. Portfolio Governance

Portfolio governance addresses the organizational and decision-making processes used to manage and review a

Project Portfolio Management Maturity Model

	LEVEL 1 Initial Process	LEVEL 2 Structured Process and Standards	LEVEL 3 Organizational Standards and Institutionalized Process	LEVEL 4 Managed Process	LEVEL 5 Optimizing Process
Portfolio Governance					
Project Opportunity Assessment and Initiation					
Project Prioritization and Selection					
Portfolio & Project Communications Management					
Portfolio Resource Management					
Portfolio Risk Management					
Portfolio Management Organizational Structure					
Portfolio Performance Management					

Maturity Levels

PPM Maturity Components

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Figure B.1   Eight components of Project Portfolio Management Maturity Model.

portfolio of projects. It includes establishing and maintaining the structure and procedures, conducting the ongoing assessments, and pursuing improvement of the portfolio. The portfolio governance component ensures that the projects undertaken by the organization are aligned with its vision, strategy, and objectives. The portfolio governance subcomponents are

Portfolio Governance Process

Governance processes ensure that procedures exist to charter portfolio review boards at different levels within an organization. Additionally, board procedures are analyzed and improved when possible to optimize board members' decision-making actions.

Alignment to Organization Strategy and Objectives

Strategic criteria are developed to ensure that projects within the portfolio are aligned with standardized objectives to maximize the efficiency of invested capital. For the mature organization, the criteria should be measured against industry standards to ensure the competitiveness of the business.

Roles and Responsibilities

Clear roles and responsibilities must be established to perform project proposal identification and assessment duties and defined for determining the business value of any proposal.

Portfolio Review Board

Portfolio review boards are established at each governance level to oversee the vetting of project opportunities, the execution of funded projects, and the determination of the optimal composition of portfolios. Processes exist to create, charter, and populate review boards. Review board operations and decision-making criteria are set by the organization-wide review board.

2. Project Opportunity Assessment and Initiation

Project opportunity assessment focuses on the processes for identifying business needs that may be satisfied through the development of a solution or solutions achieved by a project or projects. Assessment includes processes and procedures for understanding and defining high-level business needs, crafting potential solution concepts, and harnessing organizational resources to articulate these concepts as suggested projects. The opportunity assessment and initiation subcomponents are

Project Opportunity Assessment and Initiation Processes

Project opportunity assessment and initiation processes exist to ensure that all project ideas and proposals receive due consideration for inclusion in the enterprise and business unit portfolios.

Business Value Determination

Business value determination ensures that projects across the organization use standard documents with standard business value algorithms to facilitate optimal selection and prioritization processes across the enterprise.

3. Project Prioritization and Selection

Project prioritization and selection processes help organizations review potential projects, prioritize candidates based on sound decision-making criteria, and select those that will provide optimum value to the organization within its given resource constraints. Prioritization and selection link project selection to organizational strategies and establish a framework for systematically evaluating the business values of all projects and the project portfolio in total. Subcomponents include

Project Prioritization Process

Prioritization involves ranking all project proposals across the organization for potential investment. A standardized prioritization model is used to ensure objective evaluations of all projects under consideration.

Prioritization Scheme

The prioritization scheme is designed to differentiate projects on the basis of alignment with enterprise strategy and the project benefits to be derived. Schemes are updated as the business environment changes.

Selection and Funding Process

Selection is the final portfolio step prior to launching a project initiative. Selection processes allow senior management to use a vetted and prioritized list of project proposals and hone a realistic and achievable investment plan.

4. Portfolio and Project Communications Management

Portfolio and project communications management deals with the collection and sharing of information about each project in the portfolio. Summarizing this information enables an organization to make strategic portfolio decisions. When properly executed, portfolio and project communications management helps organizations make rational and unbiased decisions, with full knowledge of each project's value to their portfolios. The subcomponents are

Categorization of Projects

Project categorizations are created to provide segmented views of a portfolio. Organizations use categorizations to

ensure balanced investment schemes that meet their strategic goals and objectives.

Portfolio Information Defined

Portfolio information fields are structured to provide aggregated project information that allows varied portfolio views that are then employed in an organization's investment decision-making process.

List of Approved Projects

Portfolio repositories used in conjunction with project communication management processes to capture project data are required to produce consolidated views of all details of existing and potential project investments.

Processes for Sharing Information

Processes for aggregating project data are instituted to provide a consolidated view of an organization's portfolio of projects. The portfolio information is targeted for different groups of stakeholders across the organization.

Project Communication Management Processes

Project communication management processes exist to allow the capture of project information at the portfolio level. Aggregation of project data is used to make decisions about portfolio investments.

5. Portfolio Resource Management

Portfolio resource management includes the processes that allow an organization to assign the appropriate resources and quantities (skilled labor, non-labor services and materials) effectively to execute the projects in its portfolio successfully.

Resource management helps to ensure that the organization's resources are allocated properly to meet business needs and provides management with information for forecasting future resource requirements. Subcomponents are

Resource Assignment Process

Resource assignment processes optimize the matching of needs to capacity to obtain the highest value by assigning the most appropriate resources.

Skills Identification and Asset Inventory

Skills and asset inventories are necessary to optimize resource allocation. Correct categorization of skills and assets is necessary for accurate depiction of the qualities and capabilities of meeting resource needs. Understanding skill and asset inventories promotes more effective learning and career development opportunities for human resources.

Portfolio Resource Planning

Portfolio resource planning includes reviewing current and planned activities and projecting the needs for both human and other resources and developing plans to fill projected gaps. Human resources planning includes identifying the numbers of people and associated skill sets required to complete the planned activities. Other resource planning steps include making provisions to obtain resources such as equipment, hardware, software licenses, and specialty teams (to handle testing and other functions) needed for the planned activities.

6. Portfolio Risk Management

Portfolio risk management allows an organization to monitor threats to its portfolio of projects and respond when necessary. Threats may impact schedules, costs, values, and the quality of a portfolio. Management must have the tools necessary to

retain the optimized value of the portfolio as the risk landscape changes. Risk measures and metrics are set at the organizational level to serve as threat warnings to portfolio managers. Aggregated portfolio risk tolerances are set to account for individual project performance variations. Subcomponents include

Risk Management Processes

Risk management processes identify, analyze, track, mitigate, and respond to threats posed to schedules, costs, values, and qualities of portfolios. Risk management plans detail the use of the processes within portfolio settings. Consistent refinement of processes guards against degradation of risk responses and possible project and portfolio losses.

Risk Measures and Metrics

Risk measures act as signposts and alarms in portfolio management to alert governance bodies to impending schedule, cost, value, or quality problems. When these indicators exceed defined tolerances, response plans should be invoked.

7. Portfolio Management Organizational Structure

Portfolio management organizational structure serves as a formalized approach for reviewing proposed and ongoing work. Increases in the level of maturity are demonstrated by a standardized and enforced approach. After uniform processes are in place, reviews identify areas for improvement. Processes are compared against external best practices and targeted for continuous improvements. Subcomponents are

Governance Organizational Structure

Governance organizational structure measures management organizations necessary for the development of mature and consistent practices that are accepted and executed throughout

the organization. A more formal organizational structure is usually centralized and is designed to allow everyone to work collaboratively toward common business goals.

Portfolio Administrative Functions

Project portfolio administrative functions are useful in the performance or management of business operations. A common set of administrative functions facilitates the fulfillment of organizational goals.

8. Portfolio Performance Management

Portfolio performance management allows an organization to evaluate the performance and relative value of the projects in its portfolio. It allows management to analyze various portfolio scenarios and modify plans resulting from changes in strategies or budgets. This includes evaluating the business value actually realized from each project, program, or initiative and using that information for repositioning the organization's portfolio. Subcomponents are

Portfolio Performance Management Processes

Portfolio performance management should ensure that projects meet post-investment goals. Should projects within a portfolio vary from performance targets, a portfolio review board is charged with ensuring that corrective action is undertaken. Performance metrics are reviewed for effectiveness in managing portfolios.

Portfolio Information Sharing

Processes are implemented to disseminate critical portfolio performance information to targeted decision makers. The information is used to support decisions to rebalance portfolios and help projects remain on course.

PPM Model

Level 1: Initial Process

Project portfolio management processes may exist but they are inconsistent and undocumented. No single group has decision-making authority for portfolio selection and funding. Projects are funded despite the absence of critical information for demonstrating expected and achieved improvements in program, business, or mission performance.

Portfolio Governance

Informal governance processes and portfolio review boards may exist but procedures are not documented or consistent. Projects and portfolios are funded without prioritization or strategic alignment criteria. Documented governance roles and responsibilities are lacking at all levels.

Portfolio Governance Process—Portfolio governance processes may exist but are neither standardized nor documented.

Alignment to Organization Strategy and Objectives—The evaluation, prioritization, and selection of projects do not consider alignment with the organization's vision, strategy, or objectives.

Roles and Responsibilities—Roles and responsibilities for portfolio governance at each organizational level are not defined or the roles and responsibilities are inconsistent throughout the organization. No documentation detailing roles and responsibilities exists.

Portfolio Review Board—No review board exists or board operations are inconsistent and not documented. Project opportunities, projects, and portfolios are usually governed by the funding entity only.

Project Opportunity Assessment and Initiation

Informal assessment processes may exist, but are not documented or consistent. No formal process for determining business value has been established. No single group is responsible for project assessment and value determination. No organized list of project proposals exists.

Project Opportunity Assessment and Initiation Process—Ad hoc or no standard process exists for identifying project opportunities or initiating projects. Roles and responsibilities are not aligned with identifying and managing project opportunities. No list of project opportunities is available or maintained.

Business Value Determination—Ad hoc or no processes are used for establishing the business value of projects. Business case documentation is not required and is informal if it exists.

Project Prioritization and Selection

Prioritization and selection processes may exist, but are not documented or consistent. Projects are funded even if critical business value information is absent. Prioritization schemes are missing and selection criteria used by review boards are not standardized. No one group is responsible for project proposal selection and funding. No organized list of funded projects is available to stakeholders.

Project Prioritization Process—Ad hoc or no processes are used for prioritizing potential and active work. Project prioritization is performed by the funding entity without written procedures. Prioritized project lists may or may not be communicated to interested stakeholders.

Prioritization Scheme—No formal prioritization scheme exists. Projects are prioritized without reference to critical business information (defined business values, strategic alignment, business benefits, risks, and resource or funding requirement

data). No person or group is responsible for the creation and maintenance of prioritization schemes.

Selection and Funding Process—Ad hoc or no processes are used to prioritize, select, and fund project initiatives. Projects are funded despite the lack of critical information that would reveal expected and achieved improvements in program, business, or mission performance. Project selection is performed by the funding entity.

Portfolio and Project Communications Management

Communication processes may exist, but are not documented or consistent. The categorization of projects is random and does encompass an organization view. The organization compiles simple lists of projects that contain no detailed information. Aggregation of portfolio information does not exist.

Categorization of Projects—Project categorization does not exist or is not standard across the organization. No person or group is responsible for the creation, documentation, maintenance, or dissemination of categories.

Portfolio Information Defined—Portfolio-based information is not defined.

List of Approved Projects—No organization-wide list of current project work exists.

Processes for Sharing Information—Portfolio information is not readily available and/or not communicated across the organization. No processes exist for aggregating project data for distribution.

Project Communication Management Processes—Processes for project communication management may exist, but are inconsistent and not documented.

Portfolio Resource Management

Resources are assigned to projects via ad hoc processes. There are no inventories of resource skills or assets to use in

assignment processes. No documentation of resource management processes exists.

Resource Assignment Process—Resources are assigned to projects on an availability basis using ad hoc processes. Documentation of the processes may or may not exist. Delays in securing resources to staff projects are common. Reliance on limited highly skilled labor resources that are over-allocated across multiple concurrent projects is common.

Skills Identification and Asset Inventory—No skills inventory or asset inventory exists to depict the organization's resource capabilities. Resource skills and availability data are not documented or readily available for assessing resource requirements for potential, pending, or active projects.

Portfolio Resource Planning—Nonexistent or rudimentary processes exist to plan resource requirements to meet near-term or future portfolio needs.

Portfolio Risk Management

Risk is managed using ad hoc or non-standard processes. No portfolio risk management plan exists and risk measures are defined randomly. No documentation of portfolio risk management exists.

Risk Management Processes—Ad hoc or no standardized processes exist to identify, analyze, or monitor risks at the portfolio level. Documentation of the processes may or may not exist. No portfolio risk management plan exists.

Risk Measures and Metrics—No defined portfolio risk measures have been established.

Portfolio Management Organizational Structure

No formal governance structure is responsible for project assessment, selection, or funding. If a project management office (PMO) exists, it lacks clear direction and authority for administering the portfolio of projects.

Governance Organizational Structure—No organizational bodies are responsible for establishing portfolio management or quantitative portfolio measures to be used in portfolio management processes. No organizational bodies are responsible for the funding and composition of the portfolio of projects and non-project work.

Portfolio Administrative Functions—Portfolio administrative functions may be performed by an individual or designated body such as a PMO, but the individual or body does not have administrative authority to manage the organization's portfolio of projects. No individual or designated body has the administrative authority to ensure compliance with the decisions of the organization's review boards.

Portfolio Performance Management

Performance management processes are ad hoc or not standardized. Documentation of performance management processes is lacking. Management controls are inconsistent and consequently management rarely reviews portfolio performance.

Portfolio Performance Management Processes—Ad hoc or no standard process exists for managing the current portfolio of projects. Ad hoc or no standard processes are used for reviewing the portfolio with the sponsor organization. No reviews of high risk and/or high value projects are conducted.

Portfolio Information Sharing—Portfolio management controls are unstructured, ill timed, and inconsistent. Management rarely reviews project performance data. The organization rarely has an up-to-date and complete inventory of assets available. It rarely evaluates project outcomes or identifies lessons learned.

Level 2: Structured Process and Standards

Project portfolio management exists within the business unit and the unit defines processes. Documentation describes these basic

processes, but adherence to the processes may not be enforced. Business value and prioritization are reviewed at the business unit level and portfolio decision-making resides there. Strategic criteria for use in making portfolio decisions may come from the enterprise but compliance is not required. Cross-unit initiatives are managed by temporary cross-unit governance structures. Portfolio communication is internal to the business unit.

Portfolio Governance

Basic portfolio governance processes are documented and used. Portfolio review boards exist at the business unit level. Strategic alignment may be considered in review board decisions, but no universal strategic criteria have been established. Governance roles and responsibilities are defined and documented.

Portfolio Governance Process—Basic processes exist for the governance unit and are documented. Cross-unit governance processes may or may not exist. Adherence to processes is not enforced vigorously.

Alignment to Organization Strategy and Objectives—Strategic alignment may be considered in the evaluation of projects, but no strategic criteria have been formally developed.

Roles and Responsibilities—Roles and responsibilities are defined at the governance unit level, but may not exist for cross-unit governance. Despite documentation, roles and responsibilities are not enforced.

Portfolio Review Board—Review boards are established at the governance unit level to oversee project opportunities, projects, and portfolios.

Project Opportunity Assessment and Initiation

Opportunity assessment, initiation, and value determination processes are documented and used at the business unit level. Communications are not formalized. Simple lists of project initiatives are maintained.

Project Opportunity Assessment and Initiation Process—Basic documented processes for identifying project opportunities exist but adherence is not enforced. A project request form, project charter, or equivalent document is used to identify and initiate projects. Different documents may be used by different governance groups. Roles and responsibilities for identifying project opportunities and initiating them are defined. Key stakeholders and near-term business needs are designated for each project. Project managers communicate regularly with all stakeholders through standard reports. A list of project opportunities is compiled for the governance group.

Business Value Determination—Basic documented processes exist for determining business value, but the process varies and adherence is not enforced. Business case documentation is required when submitting project proposals, but the documentation is not standardized from project to project or group to group.

Project Prioritization and Selection

Prioritization and selection processes are documented and in use at the business unit level. Prioritization schemes are simple and selection criteria vary across the business units. Review boards have the authority to kill projects within a business unit. Simple lists of project funding decisions are maintained.

Project Prioritization Process—Basic documented project prioritization processes are in use at the governance level. Adherence to the prioritization processes is not enforced strictly. A governance-level portfolio review board prioritizes its portfolio of project investments using group-level criteria. Prioritized project recommendations are communicated to stakeholders by the project manager or other designated personnel.

Prioritization Scheme—Potential and active projects are prioritized using a simple prioritization scheme (1, 2, 3, etc.). Prioritization may also be applied to the different project

categories. The prioritization scheme is based on high-level factors that may include strategic alignment and business benefits. The governance-level review board creates, documents, and maintains the prioritization scheme. Business value and prioritization levels are reviewed by management, sponsor, and other stakeholders. The communication of a prioritization scheme to stakeholders is the responsibility of the governance-level review board.

Selection and Funding Process—A governance-level process exists for defining business value and includes the development of a business case (or equivalent document) whose detail may be proportionate to the level of investment. Documented processes cover funding decisions, but different selection criteria may be employed by different governance units. Adherence to selection and funding procedures may not be enforced. Each governance review board has the authority to kill projects within its portfolio of investments.

Portfolio and Project Communications Management

Processes exist for reporting project information and for aggregating project information into a portfolio view, but the processes are not standardized. Projects are categorized at the business unit level, and portfolio views are created for business units. Communications are managed at the business unit level.

Categorization of Projects—Each project is categorized by a governance-level portfolio review board to ensure that investments are balanced to meet the goals and objectives of the organization. Categories (such as program, functional area, strategic versus tactical, etc.) may vary across governance groups. The review board creates and maintains a list of categories and is responsible for documenting and communicating the lexicon to appropriate stakeholders.

Portfolio Information Defined—Basic project portfolio data indicates descriptive information, owners and sponsors, timing and estimated resources, and high-level status or importance.

List of Approved Projects—A list of active and pending projects is maintained for each governance group and updated periodically. Portfolio project lists are distributed to targeted stakeholders.

Processes for Sharing Information—A basic process exists for aggregating project data to build a portfolio "snapshot" for the governance group. Portfolio information is communicated across and down the organization through meetings and other communication processes.

Project Communication Management Processes—A documented communication management process is used to review and update information for each project within a governance group. Communication management of cross-organization projects is the job of the governance group that has leadership responsibility for a project.

Portfolio Resource Management

Resource management processes are documented and executed at the business unit level. Resource inventories including skills and competencies and inventories of non-human resources are captured and used by the business unit to staff and execute initiatives. Guidelines govern the cross-unit initiatives.

Resource Assignment Process—Project prioritization is established at the governance unit level, but there are no guidelines for managing project priorities with limited resources in a cross-unit and collaborative fashion. Documentation for all processes exists at the governance unit level.

Skills Identification and Asset Inventory—Each governance unit captures the skill sets of its resources and manages their availabilities and assignments in a collaborative fashion for project matrix management. Resources are identified according to their skill sets and availabilities. The inventory and availability data for non-human resources (equipment, hardware, software licenses, and specialized

teams to perform testing and other technical tasks) is maintained at the governance unit level.

Portfolio Resource Planning—Some processes exist to provide high-level plans and forecast future resource needs at the portfolio level of each governance unit.

Portfolio Risk Management

Risk management processes are documented and executed at the business unit level. However, the use of the processes and preparation of a portfolio risk management plan are not mandatory. Risk measures and metrics are defined at the business unit level.

Risk Management Processes—Risk management processes exist and are documented at the governance unit level. These processes may or may not be enforced and a portfolio risk management plan may or may not exist. Assessment of portfolio risks may be considered in the governance processes of project evaluation, selection, prioritization, authorization and portfolio balancing. Risk processes include identification, analysis, tracking, ownership, mitigation planning, escalation, and response planning at the portfolio and project levels.

Risk Measures and Metrics—Basic risk measures and metrics are defined and documented at the governance unit level, but are not required for use in portfolio management.

Portfolio Management Organizational Structure

Business units establish processes to manage their portfolios. A business unit has funding decision authority over project initiatives. Cross-unit initiatives are managed through committees. A business unit PMO exists to facilitate business unit portfolio reviews and administer the business unit portfolio.

Governance Organizational Structure—Business units are responsible for establishing their portfolio management processes, for defining and maintaining portfolio measures and

metrics, and for enforcing adherence to business unit portfolio processes. Business units have decision-making authority regarding the funding and composition of portfolios of projects and non-project work. Cross-unit initiatives are managed by ad hoc committees of impacted stakeholders. Portfolio reporting is limited within the business unit. There may or may not be business unit reports to the enterprise level.

Portfolio Administrative Functions—These functions are performed by a designated business unit body such as a PMO that has responsibility to administer portfolio communications, facilitate business unit portfolio review boards, and ensure adherence to portfolio processes and procedures designated by the business unit portfolio review board.

Portfolio Performance Management

Performance management processes are documented and executed at the business unit level. The business unit portfolio review board oversees the performance of each project by comparing cost and schedule actuals to estimates. If a project is exhibiting sub-par performance, the portfolio review board will ensure corrective actions are initiated.

Portfolio Performance Management Processes—A project oversight process established a governance unit to monitor cost and schedule expectations for all projects. Using established criteria, a governance portfolio review board (PRB) periodically oversees each project's performance by comparing actual cost and schedule data to expectations. The PRB directs special reviews of projects that have not met predetermined performance standards and ensures that corrective actions are developed and tracked. Portfolio information is reviewed periodically with the sponsor organization. High risk and high value projects are identified and typically subjected to reviews to apprise executive management of current issues.

Portfolio Information Sharing—A defined process is used to analyze and report portfolio status and includes

graphs, charts, and presentations. The process involves multiple levels within the organization, including senior management, steering committees, PMO, and other stakeholders. Each project's up-to-date cost and schedule data are provided to the appropriate portfolio review board (PRB).

Level 3: Organizational Standards and Institutionalized Process

Standardized, documented, and enforced processes, including selection and prioritization techniques, are in place and communicated across the enterprise The enterprise review board oversees all portfolio decisions that are aligned to enterprise strategy and based on value to the organization. Organizational metrics are used to analyze performance. Resources are managed across the enterprise. An enterprise-wide portfolio risk management plan is in place. Business unit portfolios are rolled into a single enterprise portfolio.

Portfolio Governance

Standardized, documented, and enforced portfolio governance processes are instituted. An enterprise portfolio review board oversees all business unit review boards. The enterprise review board sets portfolio decision-making criteria that align with enterprise strategic goals and objectives.

Portfolio Governance Process—Standardized, documented governance processes are implemented throughout the organization and include cross-unit governance. Adherence is enforced. Portfolio processes include both project and non-project work competing for the same budget and resources.

Alignment to Organization Strategy and Objectives— Specific strategic criteria such as alignment with business strategy, customer satisfaction, and competitive advantage have

been developed and projects are evaluated against them to establish their acceptance in the portfolio.

Roles and Responsibilities—Standardized, documented roles and responsibilities are clearly defined for each level of governance, including organization-wide portfolio governance. Filling the roles and executing the responsibilities are mandatory activities.

Portfolio Review Board—An organization-wide portfolio review board is established to oversee the documented operations of the various governance unit review boards. This board has final decision authority over all projects and portfolios.

Project Opportunity Assessment and Initiation

Opportunity assessment and initiation processes are standardized and enforced across the enterprise. Controlled documentation describes all processes. Project value formulas are defined and maintained at the enterprise level. Communications are formal and include the establishment of an enterprise-wide portfolio data repository.

Project Opportunity Assessment and Initiation Process—A documented, organization-wide process is used to identify and track project opportunities. Adherence to the process is enforced. A formal project initiation process is used and maintained and includes formal approval processes. Adherence to the process is enforced. A standardized, organization-wide project request form, project charter, or equivalent document is used to identify and initiate projects. Formal communication is provided to each requester, identifying the current status of a project opportunity or initiated project. Project opportunities are captured and maintained in an organization-wide portfolio repository.

Business Value Determination—An organization-wide process and documents are used to define the business value of a project. The process includes a standard business case that is integrated with PM processes, financial and accounting practices, and other business processes. Roles and responsibilities

are clearly defined for establishing business value. Standardized business case documentation is institutionalized for use in project value determination. There is a process for examining the fundamental cost, benefit, schedule, and risk characteristics of a project before it is funded and combined with other projects into a portfolio. Each portfolio review board ensures that cost, benefit, schedule, risk, and other required data are validated for each project within its span of control.

Project Prioritization and Selection

Standardized and documented processes exist for portfolio prioritization and project selection across the enterprise. Prioritization schemes and selection criteria are defined at the enterprise level. Business unit portfolios are consolidated into a single, funded enterprise portfolio. Communication with stakeholders is formal and includes the use of an enterprise-wide project repository.

Project Prioritization Process—Comprehensive, standardized, and documented project prioritization processes are used. Adherence to the prioritization processes is enforced across the organization. Executives analyze and prioritize new project proposals according to standardized criteria. An organization-wide portfolio review board prioritizes its portfolio of project investments using the criteria. An organization-wide consolidated listing of prioritized projects is distributed to a predetermined stakeholder list. Responsibility for distribution of the prioritization list to all stakeholders belongs to a single governance unit.

Prioritization Scheme—A flexible prioritization scheme exists for ranking the portfolio of work based on agreed-upon criteria established by an organization-wide portfolio review board. The prioritization scheme is documented and is used by all governance levels. Adherence to the prioritization scheme is enforced by the organization-wide portfolio review board. The prioritization scheme supports the alignment of projects

with the organization strategy and goals. Prioritization data is captured, updated, communicated, and stored, and the information is readily available to all stakeholders. The prioritization criteria may include quantitative, qualitative, statistical, specific strategic, business benefit, financial, and resource goals.

Selection and Funding Process—Standardized, documented procedures are employed to make selection and funding decisions for new project proposals. Adherence to the procedures is enforced. An organization-wide board has the right and responsibility to kill projects within the consolidated portfolio of investments. There is a process for comparing worthwhile projects and combining selected projects into a funded organization-wide portfolio. Decision makers follow a procedure to communicate to the organization the criteria used to select and fund projects. A repository of portfolio development information is established, updated, and maintained.

Portfolio and Project Communications Management

Communication processes are standardized and executed at the project and portfolio levels. Information is disseminated across the enterprise to targeted stakeholder groups.

Categorization of projects is determined by the enterprise and the portfolio repository facilitates enterprise-level investment decision-making.

Categorization of Projects—Project categorization is standardized and documented across the organization to provide ordered, differentiated views of project load. The categories support the alignment of projects with the organization's strategies and goals. Categories are captured, updated, communicated, and stored, and the information is readily available to all stakeholders.

Portfolio Information Defined—Detailed information is tracked for each project. Information should cover descriptive and performance details, resource estimates for high-level projects, business value data, status, project categorization,

and cost and schedule statistics. Risk information may also be tracked for each project or work opportunity.

List of Approved Projects—A project list or database is maintained to describe new projects, completed projects, and changes to the organization-wide project portfolio.

Processes for Sharing Information—A process exists for aggregating portfolio-level information to the organizational level for review and evaluation of impacts to investment balances. Detailed information for each project is available in a project status report and is distributed to pertinent stakeholders. Aggregated portfolio information such as value, resource usage, project status, costs, and schedule variances are compiled into a portfolio summary report and distributed to targeted audiences. Communication processes involve multiple organization levels, including senior management, steering committees, PMO, and other stakeholders.

Project Communication Management Processes—Standardized, documented project communication management processes are used to maintain information for all project initiatives.

Portfolio Resource Management

Resource management processes are standardized, documented, and utilized across the enterprise. The enterprise portfolio review board establishes project prioritization. Business unit leaders are expected to optimize resource staffing of selected projects. Asset inventories of non-human resources are maintained and include availability information.

Resource Assignment Process—Project priorities are established by an organization-wide portfolio review board. Unit leaders are expected to assign resources optimally based on resource skills, prioritization, and established project priorities. Standard, documented procedures for resource assignment exist and their use is enforced.

Skills Identification and Asset Inventory—A resource pool management process captures skills sets, availabilities, and knowledge management across the organization. Resources other than people are also described in the pool. Equipment, hardware, software licenses, specialty teams (such as those performing testing) are included to ensure that all constraints are tracked. Resource cost data is captured, stored, and readily available to portfolio managers across the organization.

Portfolio Resource Planning—Resource forecasting data is used by portfolio managers and the governing body for future portfolio decision analysis. Processes exist to provide forecasts of future human resources needs and other tangible resources, including physical assets and shared services required to staff project needs at the enterprise portfolio level.

Portfolio Risk Management

Standardized and documented processes administer risk management at the enterprise level. The enterprise portfolio review board uses enterprise-wide risk measures and metrics to analyze threats to the portfolio. Portfolios that exceed risk tolerance levels invoke actions that are documented in the required portfolio risk management plan.

Risk Management Processes—Standardized, documented portfolio risk management processes are integrated into portfolio management processes across the organization. Adherence to risk management processes is enforced. A risk management plan is created and executed. Risks are prioritized and categorized within each portfolio and risk owners are identified. Portfolio risks are considered in the governance processes of project evaluation, project selection, project prioritization, project authorization and portfolio balancing.

Risk Measures and Metrics—Standardized, documented risk measures and metrics are defined, implemented, and used in risk management processes organization-wide.

Portfolio Management Organizational Structure

The enterprise portfolio review board standardizes all enterprise-wide portfolio management processes. The board has ultimate authority in funding decisions. All business unit portfolios are rolled into a single enterprise portfolio. An enterprise project management office (EPMO) is responsible for facilitating the actions of the enterprise portfolio review board and managing the enterprise portfolio.

Governance Organizational Structure—An enterprise-level portfolio review board is responsible for establishing portfolio management processes for use across the enterprise, defining and maintaining portfolio measures and metrics to be employed across the enterprise, and enforcing adherence to the enterprise portfolio processes. All business unit portfolios are rolled into a single enterprise portfolio. The enterprise portfolio review board has the ultimate decision-making authority regarding funding and the composition of the enterprise portfolio of projects, and non-project work. Cross-business unit initiatives are managed by formal committees established by the enterprise portfolio review board. Inclusive enterprise portfolio reporting is established by aggregating all business unit reports into a single enterprise report and dashboard.

Portfolio Administrative Functions—These functions are performed by a designated enterprise body such as an EPMO that ensures that business unit PMOs administer their portfolios under the guidelines set by the enterprise portfolio review board. The EPMO is responsible for facilitating the consolidation of business unit portfolios and cross-unit initiatives into a single enterprise portfolio. It is also responsible for facilitating operations of the enterprise portfolio review board.

Portfolio Performance Management

Standardized and documented performance management processes apply across the enterprise. The enterprise portfolio review board uses organization-wide metrics to analyze the

performance of the enterprise portfolio. Projects that perform outside acceptable control limits are required to propose and execute corrective actions.

Portfolio Performance Management Processes— Organizational standards and institutionalized processes exist for analyzing and reporting on the enterprise portfolio. (Roll-up includes business units, functional units, project categories, etc.) Organizational standards involve the use of consistent data fields, common definitions, and standard business rules. The portfolio is analyzed actively using varied views and is used to make balanced investments. An existing process builds upon the project oversight process by adding the elements of benefit and risk management to control process activities. Using established criteria, the PRB identifies projects that have not met predetermined cost, benefit, schedule, and risk performance expectations. The PRB ensures that project managers develop action plans to apply identified corrective actions. All projects are subject to reviews to apprise management of current issues.

Portfolio Information Sharing—All projects are reviewed and management is apprised of current issues.

Level 4: Managed Process

Portfolio management is integrated with other business processes. Procedures identify, evaluate, select, and prioritize new opportunities along with work-in-progress. Portfolios include project and non-project work, and processes are integrated with other enterprise business processes. Strategic changes are reviewed for effects on the portfolio. Performance is reviewed on an ongoing basis and lessons learned are used to improve capabilities. Portfolio information is available on demand for decision makers and other stakeholders. Communication processes provide summary portfolio status reports. Enterprise performance metrics are used to improve processes. Resource needs are defined across the organization. Risks are managed and tracked across the enterprise portfolio.

Portfolio Governance

Portfolio governance is integrated with other business unit and enterprise business processes. Portfolios include both project and non-project work. Changes to goals and objectives are reviewed for effects on portfolios. Lessons learned are used to improve decision-making capabilities.

Portfolio Governance Process—Portfolio governance is integrated with other business processes to ensure successful coordination prior to project execution.

Alignment to Organization Strategy and Objectives—Portfolio alignment criteria are integrated with operational and financial data to optimize the portfolio. Portfolio considerations include both project and non-project work.

Roles and Responsibilities—Roles and responsibilities for identifying and assessing project opportunities and determining their comparative values among all projects and against all other work are integrated. Roles and responsibilities for portfolio project work are integrated with roles and responsibilities for portfolio non-project work.

Portfolio Review Board—The organization-wide portfolio review board examines the fits of all projects, combinations of projects, and non-project work when approving project proposals for selection and prioritization. An organization-wide portfolio review board approves the core project portfolio selection criteria, including cost, benefit, schedule, and risk criteria based on the organization's mission, goals, strategies, and priorities. Changes to the organization strategy will result in necessary changes to the decision criteria. The organization-wide review board integrates lessons learned and portfolio status into current and future decision making.

Project Opportunity Assessment and Initiation

Opportunity assessment and initiation are integrated with other business unit and enterprise processes. Processes are in

place to identify new opportunities. Value determination formulas are scrutinized for reliability. Lessons learned are used to improve decision-making capabilities. All pertinent stakeholders have access to and undergo training on the enterprise portfolio repository.

Project Opportunity Assessment and Initiation Process—A process governs conduct of post-implementation reviews to learn from past projects and initiatives by comparing actual results to estimates. Quantitative and qualitative project data are collected, evaluated for reliability, and analyzed during such reviews. Lessons learned and improvement recommendations related to the process and individual investments are captured in a written product or knowledge base and distributed to decision makers. Project opportunity information is available by searching an enterprise portfolio repository.

Business Value Determination—The process of determining business value is integrated with other project management processes, financial and accounting practices, and other relevant business processes. A process exists to compare individual project benefit results against pre-launch business value estimates. These metrics then reveal a trend measure of the accuracy of the business value formula. The organization-wide portfolio review board implements changes to the business value formula when advantageous. When comparing project benefits against value estimates, it is assumed that project execution is within acceptable time and cost parameters and will not affect benefit realization.

Project Prioritization and Selection

Prioritization and selection are integrated with other business unit and enterprise processes. Prioritization schemes and selection criteria are updated in response to changes in organization strategy and objectives. Lessons learned are used to improve decision-making capabilities. All pertinent

stakeholders have access to and have attended training on the enterprise-wide project repository.

Project Prioritization Process—Prioritization processes are integrated with other business processes to ensure successful coordination before project execution. Standard models and business prioritization processes are validated by analyzing historical benefit and cost information and revising as required. Internal benchmarks are captured and used to assess current project prioritization processes. Lessons learned are captured, reviewed, analyzed, and leveraged as part of the prioritization process.

Prioritization Scheme—An organization-wide portfolio review board approves the core project portfolio prioritization criteria. The criteria are based on the organization's mission, goals, strategies, and priorities. Changes in strategy will lead to changes in the prioritization criteria. Portfolio alignment criteria are integrated with operational and financial data for optimization purposes. Portfolio considerations include both project and non-project work. Metrics are defined to show that prioritization schemes are effective for adding business value. A process exists for periodic updates of prioritization scores and business values of work portfolios.

Selection and Funding Process—An organization-wide portfolio review board approves the core project portfolio selection criteria, including cost, benefit, schedule, and risk criteria based on the organization's mission, goals, strategies, and priorities. The project portfolio selection criteria are reviewed using cumulative experience and event-driven data and modified as appropriate. The portfolio review board approves or modifies the annual cost, benefit, schedule, and risk expectations for all selected project investments throughout the lives of projects.

Portfolio and Project Communications Management

Project and portfolio communication processes are integrated to provide summary portfolio status reports. Project information and portfolio lists are audited to validate data. Portfolio

information is available on demand for decision makers and other stakeholders.

Categorization of Projects—Categories have been established and are maintained by an organization-wide portfolio review board. Changes to the organization strategy may result in changes to the project categories.

Portfolio Information Defined—Project portfolio information is audited by an internal auditing team to validate the data.

List of Approved Projects—Project lists are audited by an internal auditing team to validate the data. The organization's asset inventory is developed and maintained according to a written procedure and change procedures are described. Historical asset inventory records are maintained for future selections and assessments.

Processes for Sharing Information—Project investment information is available on demand to decision makers and other affected parties.

Project Communication Management Processes—These processes are integrated with portfolio communication management processes to provide summary and detail views of portfolio information.

Portfolio Resource Management

The enterprise portfolio review board is responsible for defining the resource categories required to meet resource needs, review their use, and modify processes based on the results of performance reviews and lessons learned.

Resource Assignment Process—Scheduled organization-wide resource analysis and reporting ensures that an organization maximizes its potential productivity and effectiveness in realizing the objectives of the projects and financial drivers of its portfolio. The organization-wide review uses performance metrics and lessons learned to improve resource assignment processes.

Skills Identification and Asset Inventory—The organization-wide portfolio review board is responsible for establishing and reviewing portfolio performance. The results of the review include defined skill and asset categories that are used to define the resource population and identify areas for improvements.

Portfolio Resource Planning—Resource management baseline metrics and data are collected, stored, and available for process improvement. A process requires that management lessons learned are captured and evaluated.

Portfolio Risk Management

Risk tolerances are tracked and analyzed against portfolio performance as a risk management activity. Internal audits are performed, and lessons learned are gathered as aids in risk process improvement procedures. The enterprise portfolio review board defines and maintains portfolio risk measures and metrics.

Risk Management Processes—Defined risk tolerances of all portfolios are tracked, analyzed, and evaluated regularly as a step in risk management of the portfolio. Internal audit teams review risk management performance and reports for possible process changes. Risk-related lessons learned are captured, reviewed, analyzed, and leveraged as part of the process of improving risk management.

Risk Measures and Metrics—The organization-wide portfolio review board is responsible for defining and maintaining risk measures and metrics to be used by all portfolios.

Portfolio Management Organizational Structure

Portfolio management governance structures are integrated into other business management structures. The EPMO will use lessons learned and gathered metrics to ascertain the effectiveness of the portfolio governance structures.

The EPMO advises the enterprise portfolio review board of performance results.

Governance Organizational Structure—Portfolio management organizational structures are integrated with other enterprise and business unit structures to ensure the coordination of portfolio management with business management operations. Lessons learned are incorporated into the review and maintenance of the lines of governance.

Portfolio Administrative Functions—The EPMO gathers and reviews baseline data related to administrative functions and gathers lessons learned for use in analyzing the effectiveness of the organization's governance structure in returning portfolio value and throughput. The EPMO will assist, lead, or perform all data gathering and data analysis efforts as they pertain to the effectiveness of portfolio management processes, portfolio decision criteria, or portfolio metrics.

Portfolio Performance Management

Portfolio performance metrics are captured and used to improve current management processes. The enterprise portfolio review board implements procedures to analyze and manage investment succession for assets and programs. The enterprise portfolio review board will end funding for initiatives that fail to reach expected results.

Portfolio Performance Management Processes—The organization maintains a process for evaluating portfolio performance to improve both current and future project portfolio management processes and performance. Comprehensive project portfolio performance measurement data are defined and collected using agreed-upon methods. A process defines methods for analyzing and managing the succession of identified project investments and assets to their higher-value successors. The PRB develops criteria for identifying project investments that may meet succession status. The organization-wide portfolio review board will rebalance the portfolio based upon individual

project or program performance; this includes ending funding for initiatives that will not reach expected results.

Portfolio Information Sharing—Common objectives and metrics are defined for the project portfolio and reviewed periodically with management to maintain and balance the portfolio.

Level 5: Optimizing Process

Internal baselines and external benchmarks are used to review and evaluate the effectiveness of portfolio management processes and promote continuous improvement. Criteria for performance are benchmarked against industry standards and trends. Information sharing and communications are reviewed continuously for effective delivery of critical information to decision makers. Improvements are made when advantageous. External auditing of processes is used to validate management decision making. Risk is managed and includes external measures and best practices. Organizational structures are benchmarked against industry standards. Operations are compared to industry best practices to identify changes that may be advantageous.

Portfolio Governance

Management processes are reviewed for continuous improvement using both internal baselines and externally benchmarked best practices. Strategic criteria are benchmarked against industry standards and trends.

Portfolio Governance Process—A process is used to exploit management decision making to improve the value of governance management processes.

Alignment to Organization Strategy and Objectives— Strategic criteria and objectives are benchmarked against standards and industry trends. Changes to criteria are implemented when improvements will be realized.

Roles and Responsibilities—Baseline data is collected for the performance of the organization's portfolio management roles and is used as a benchmark for future role definition. Changes to roles, responsibilities, and benchmarks are made when needed.

Portfolio Review Board—Baseline performance data is collected for the organization's portfolio review boards. The effectiveness of board operations is reviewed periodically to search for potential improvements. External best practices are compared against internal processes to identify potential operational improvements. Changes are made when appropriate.

Project Opportunity Assessment and Initiation

External benchmarks and internal baselines are used to evaluate the effectiveness of assessment and initiation procedures. Business value determination algorithms are compared against external formulations. The enterprise portfolio review board will institute changes to processes and valuation determination when necessary.

Project Opportunity Assessment and Initiation Process—There is a process used to exploit management decision making to improve project assessment and initiation. External comparable processes are identified and benchmarked, and improvements are made when needed.

Business Value Determination—Business value formulas are compared against external valuation algorithms for differences. Changes to the business value formula are made when advantageous.

Project Prioritization and Selection

External benchmarks and internal baselines are used to evaluate the precision of prioritization and selection procedures. Improvements are made when advantageous. External auditing

of selection schemes and processes is employed to validate management decision making.

Project Prioritization Process—There is a process used to exploit management decision making to improve project prioritization. Baseline data is collected for the portfolio project prioritization processes. External comparable processes are identified and benchmarked, and improvements are made when needed.

Prioritization Scheme—Internal prioritization schemes are compared against external prioritization formulations. Changes are made when they appear beneficial. The organization conducts periodic reviews of prioritization procedures by engaging external management consultants.

Selection and Funding Process—Baseline data is collected to enable the organization to analyze the performance of selection criteria. This data is used as the benchmark for future selection formulas. Changes to selection criteria and benchmarks are made when needed. The organization e conducts external audits of portfolio performance to validate the performance of criteria and processes for funding projects.

Portfolio and Project Communications Management

Portfolio data and project categorizations are examined for relevancy to portfolio performance. Portfolio and project communication management processes are reviewed for effectiveness in supporting all portfolio management processes.

Categorization of Projects—Project and portfolio categorization guidelines are reviewed for suitability in supporting all portfolio and project management processes.

Portfolio Information Defined—Portfolio metrics are captured and reviewed periodically to confirm the relevancy of the data structures in the portfolio. After analysis, improvements to the set of portfolio information collected will be implemented.

List of Approved Projects—Data archive and retrieval procedures are reviewed for suitability in supporting all port-

folio and project management processes. Changes are made when found to be advantageous.

Processes for Sharing Information—Data distribution procedures are reviewed for suitability in supporting all portfolio and project management processes.

Project Communication Management Process— Project communication management processes are compared to best practice processes from the project management discipline. Changes are made to processes when advantageous to the organization.

Portfolio Resource Management

Resource management processes are compared to external best practices to maximize effectiveness. Skills and asset inventories are used to determine future resource needs of the organization.

Resource Assignment Process—Portfolio resource management processes are compared to best practice processes external to the organization. Changes are made to processes when advantageous.

Skills Identification and Asset Inventory—Skill and asset inventories are compared against others and used in conjunction with other information to find ways to improve the resource mix used to meet the needs of the organization.

Portfolio Resource Planning—Internal and external benchmarks are captured and used to assess current resource management processes.

Portfolio Risk Management

Risk management processes are analyzed for resulting risk variation. Changes to the processes are made as necessary. Risk measures and metrics are benchmarked against external measures and best practices to reveal weaknesses of internal risk controls.

Risk Management Process—Portfolio risk management causes of variation are identified; risk management measurement

data is captured. When necessary, portfolio risk management processes are targeted for improvement.

Risk Measures and Metrics—External risk measures are compared against internal established measures and best practices are implemented when advantageous.

Portfolio Management Organizational Structure

Governance organizational structures are benchmarked against industry standards to uncover possible improvements. The EPMO reviews its operations against best practices to identify changes that will be advantageous.

Governance Organizational Structure—Internal organizational structures are benchmarked against external management structures found in industry analyses. Organizational changes are made as management structures within the industry evolve.

Portfolio Administrative Functions—Internal EPMO practices are compared against external best practices. Changes to EPMO processes are implemented when advantageous.

Portfolio Performance Management

Internal reports reveal portfolio performance trends and prompt improvements in portfolio management. Information-sharing procedures are reviewed for effectiveness in delivering critical portfolio performance data to decision makers.

Portfolio Performance Management Process—Reports are developed on trends at all levels of the organization's portfolio. Aggregate performance data trends are analyzed. Portfolio process and improvement recommendations are developed and implemented.

Portfolio Information Sharing—Portfolio performance reporting procedures are reviewed for suitability in supporting all portfolio management processes. Changes are made when needed.

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Following in the tradition of its bestselling predecessors, **Project Management Maturity Model, Third Edition** provides a roadmap for improving project success and boosting organizational performance. This edition presents new and revised material based on the Project Management Institute's (PMI's) *A Guide to the Project Management Body of Knowledge, Fifth Edition* (*PMBOK® Guide*). Chapters are based on the 10 knowledge areas specified in PMI's standard.

A cornerstone of the author's organization, PM Solutions, has been the Project Management Maturity Model (PMMM^{SM}). This book fully describes the model to provide you with a comprehensive tool to improve your organization's project management practices. The book covers the areas critical to organizational improvement, including the project management office, management oversight, and professional development. After reading this book, you will understand how to:

- Determine the maturity of your organization's project management processes and use that information to address business needs
- Map a logical path to organization-wide process improvement
- Set priorities for short-term process improvement
- Assess the need for a project management office
- Track progress against your project management improvement plan
- Build and sustain a culture of project management excellence

The book provides you with a conceptual framework to optimize specific project management processes and boost the capabilities of your organization. It presents best practices for determining portfolio maturity, setting short-term priorities, improving portfolio management processes, and tracking progress. It also includes a checklist for assessing your organization's project management maturity as well as an updated version of PM Solutions' Project Portfolio Management Maturity Model.