Integrating CMMI® and Agile Development

Case Studies and Proven Techniques for Faster Performance Improvement

Paul E. McMahon
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Foreword by Mike Phillips

As I write this, the CMMI Product Team is crafting our next release of CMMI models—CMMI V1.3. A critical element of the V1.3 release is to improve the models’ coverage of the unique elements that Agile methods have provided to accelerate software development in innovative ways. We on the product team believe that the synergies that Agile methods and CMMI models have when used together demands this expansion of model coverage. In our update of CMMI models for V1.3, we were directed by criteria that required that we minimize the models’ growth. (As of this writing, we have over 110,000 people trained in CMMI models, and over 4,000 organizations that have demonstrated their adoption of the practices using CMMI benchmark appraisals. Therefore, a large amount of change would require them to be retrained and reduce the overall benefit to users.) The product team has chosen to add supporting material to process areas that have the strongest correlation with Agile methods, and where Agile methods might be perceived as significantly different in approach from CMMI practices.

Release of this book precedes the release of Version 1.3 models. The book provides some of the key insights from Paul’s work with a number of organizations to show ways that CMMI and Agile methods can effectively be teamed for success. The collection of examples that Paul uses to illustrate effective process improvement confirms our conclusion that these two approaches are complementary and are not, in fact, competitors. Each can complement the other and add value to any organization’s development efforts.

Paul’s book allows you to gain many more hints, tips, and insights than we can ever include in a CMMI model. I particularly like the mixture of “myths,” “lessons,” “insights,” and straightforward “questions and answers” that he has sprinkled throughout the book. The lessons from real organizations that he has renamed to be RAVE, BOND, LACM, NANO, and GEAR, are part of Paul’s delightful way of sharing his consulting experiences with you. Each
of these lessons provides a potential “takeaway” for your process improvement journey—ideas that will make your application of Agile methods and CMMI better for having read them.

With this book, Paul is providing invaluable leadership that will fuel the move forward with various mixes of Agile methods and CMMI models. Your use of the tools and techniques captured within this work will enable you to join us in the effort to grow these ideas and improve your organization’s performance.

—Mike Phillips
CMMI Program Manager
Looking back at writing and discussions that brought CMMI and Agile concepts together, arguably, the conversation, at best, entered the mainstream between the years 2004 and 2006. As of the publication of this work, many people are still skeptical about whether CMMI and Agile can truly co-exist. (I suppose, when there are more than 20 years of history associated with a brand (e.g., SEI’s CMM), it might take a few more years for the broader market to catch on. Thanks to social media and the Internet, it will hopefully take less than two decades to drill the message into people’s minds.)

There are several things I like about Paul’s book, which make it worthwhile reading for people interested in this topic. His case studies are typical across many types of companies and many situations. As I reviewed an early version of the work, I found myself believing he was working with many of my own clients and former employers. Prior to reviewing the manuscript, I had never met Paul or collaborated with him. For us to have such similar experiences merely provides further evidence that Pareto was right: 80% of the problems can be explained by 20% of the issues. The cases Paul describes can be easily related and extrapolated to many organizations. Even if/when his case studies don’t match a reader’s experience precisely, that doesn’t mean they are not relevant or there aren’t lessons to be learned and applied.

Another attribute I like is that Paul seems to spend most of his efforts in these client cases on the basics that are common to CMMI and to Agile. In particular, he dutifully applies Lean principles and practices to empower Agile practices and facilitate CMMI practices. If I had to point to one “take away” from this book, it would be this.

I should point out that, like many of us, Paul’s been doing this for a while. His experience pre-dates the named “Agile” movement just as “Lean” is a progenitor of the Agile movement. An important meta-observation about Paul’s work, in general, is that it often takes an expert like Paul to effectively
(and objectively) bring “Lean” principles into a software development organization. There’s something about the manner in which software and “processes” have been brought together over the years that have established many challenges in this space. Paul demonstrates several techniques to create conditions that allow for both flexibility and disciplined improvement that are worth emulating—both as a consultant, in general, but with respect to Lean principles, in particular. Readers without a firm grounding in “Lean” principles and practices would be well advised to have a guide or coach to try them out the first few times.

The same things I like also carry precautions to the broader reader audience. One thing is clear about both the companies Paul included in his cases, and about Paul’s approach: improvement as a business driver is a key to success. Implementing CMMI for the ratings or “Agile” for bragging rights won’t work. It must be human nature that causes people to continue to seek “silver bullet” solutions to their business challenges. Were there such solutions, there would be no challenges. Paul’s techniques and approach were adapted from his experience addressing his clients’ needs. They were not prefabricated in Paul’s office and then installed in his clients’ conference rooms. Paul generated appropriate solutions in the context of his clients’ needs. The caution is this: experiment, inspect, and adapt. For either CMMI or Agile to benefit an organization or from each other, and, for either to truly take advantage of experimenting, inspecting, and adapting, there are several attributes an organization must embody: self-awareness, learning, brutal honesty, trust, and refusal to settle for mediocrity as a goal. Organizations who merely try to copy Paul’s work clearly don’t “get it.”

Enjoy the work and I hope you all achieve your state of “excellence.”

—Hillel Glazer, Principal and CEO, Entinex, Inc.
CMMI High Maturity Lead Appraiser
Preface

Why You Should Read This Book

This book explains why combining an Agile approach with the CMMI\(^1\) process improvement framework [1] is the best route to quickly achieve your business objectives\(^2\) and it gives you practical and proven techniques to do it. But the book’s greatest value might lie in its insights into how real performance improvement is achieved by focusing on “repeating specific weaknesses” that tend to be unique and closely related to culture in each organization. The book also provides

- Proven alternatives to traditional approaches to implement CMMI practices that can increase your agility
- Proven criteria to help make timely and effective decisions
- Proven techniques to extend Agile methods to Systems Engineering and Project Management
- Big picture insights, lessons, and cautions
- Specific “how-to” examples to quick-start a successful Agile and CMMI integration
- Common mistakes to avoid when implementing an Agile approach

First, to understand why more companies are not jumping at this great opportunity, you need to understand the problem.

\(^1\) The Capability Maturity Model Integration (CMMI) is a process improvement maturity model for the development of products and services developed by the Software Engineering Institute (SEI).

\(^2\) An organization’s “business objectives” might not include “process improvement.” Why it is important to start with business objectives is discussed in Chapter 2. Examples of business objectives are provided in Chapter 3.
The Problem

The mistaken belief persists that the Capability Maturity Model Integration (CMMI) and Agile approaches are at odds. In a Technical Note appearing on the Software Engineering Institute (SEI) Web site in November 2008 [2], a call to action is issued to both Agile and CMMI camps. CMMI experts are encouraged to engage the Agile community by including examples from multiple types of organizations. Agile experts are encouraged to learn about the CMMI and how its practices can complement Agile practices. The authors of the Technical Note universally agree that Agile methods and the CMMI “can not only coexist, but successfully integrate to bring substantial benefits to both Agile and traditional software development organizations.”

Why Conflicts Continue to Arise

One reason for many of the conflicts that arise when using the CMMI together with an Agile approach traces back to the origins of the CMMI found in the development of its precursor CMM model. As stated in the referenced technical note:

If we look at the genesis of the CMM, it predates the internet and nearly everything associated with internet technology. For that matter, CMM pre-dates many software development, deployment, and infrastructure technologies, languages, and methods...

...In today’s frequent discussions of increasing globalization and the important role played by trust in making effective collaboration happen across stakeholders, one might describe such a development context as exhibiting low trust. Users were typically not direct contributors to the evolution of the end product prior to field-testing. They instead had to depend on the contracting relationship, requirements, and standards to deliver the product they needed. These comments may be an over-generalization, but they are intended to summarize the DoD software acquisition environment that existed at the time. Further, these comments explain why the practices in the CMMI sometimes exhibit some of these same high ceremony and low trust characteristics found in the high-risk, government-contractor environment in which software failure could equal lives lost.

Another reason for many of the conflicts is the differing views on just what “Agile” is. Some view “Agile” simply as quick when making a decision or light when it comes to writing things down, but these popular misunderstandings of agility have led many organizations down unsuccessful paths.

Why I Wrote This Book

I wrote this book to help bridge the chasm described previously. Through this book, I explain where the heart of the conflict exists, and what you can do about it. A fundamental claim made through the case studies is that:

_Most of the conflicts that arise between the CMMI and Agile are based in either a historical view of what a “good practice” should look like when implemented—which may no longer be accurate given the world we live in today—or a misunderstanding of what “Agile practices” really are and how they should be executed._

It is my hope that CMMI experts, including lead appraisers, will consider this material and potentially re-think messages that might be being inadvertently shared related to what a “good CMMI-compliant” practice should look like when implemented. It is also my hope that organizations currently _misapplying Agile concepts_ will begin to understand where their practices are deficient and see how the CMMI could help them locate their right level of agility given their business situation.

Throughout this book, I share numerous examples of how the CMMI can help Agile, and how Agile can help the CMMI.

How CMMI Can Help Agile

One goal of the book is to expose characteristics of Agile misapplications common in growing “Agile-like” organizations and share how the CMMI can help these organizations by providing “reminders” of critical practices that frequently lose visibility as organizations grow and project pressures rise. I also share how the CMMI can help even successful growing organizations that are applying fundamental Agile practices as intended.

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4. When I use the phrase “Agile-like” or “wannabe Agile” in this book, I am referring to organizations that are trying to use an Agile approach but are missing key ingredients of true agility.
How Agile Can Help CMMI

In this book, I also provide numerous options to traditional “how-to” approaches to implement CMMI practices. Some of these options are not well known, and in one personal case study, I present some “out of the box” thinking with respect to the use of the CMMI to help an organization move beyond consistency to the kind of performance required to effectively and continually rise above the competition.

What This Book Is Not

This is not a book about the fundamentals of the CMMI, nor is it a book about Agile methods such as Scrum, Extreme Programming, and the Crystal Methodologies—although you will read about lessons learned from applying these software methods as well as many proven systems engineering and project management techniques that evolved consistent with these methods.

What This Book Assumes about the Reader

Some of the chapters in this book assume the reader is familiar with either traditional CMMI-based development and management approaches or Agile development approaches, and is interested in learning how the other could be used effectively to help an organization achieve its business objectives fast.

The book is intended for managers at all levels, systems engineers, software engineers, and process professionals in large and small organizations that currently employ traditional CMMI-based processes, Agile methods, or a mix of both. The book is also intended equally for both CMMI and Agile experts, as well as less experienced personnel, and those just starting out with new process improvement initiatives looking for the most effective implementation approach for their organization.

How This Book Is Structured

In this book, I share six major case studies, each with related lessons, insights, myths, and cautions. Lessons contain key fundamental information. Insights
contain key information that might require deeper reflection by the reader. **Myths** contain a belief about the CMMI model or an Agile approach that most people know is not true, but that organizations often treat as though it were. **Cautions** raise awareness of commonly observed pitfalls.

In Chapters 2 through 10, you will find 16 insights, 15 myths, 16 cautions, and 62 lessons. Lessons are numbered sequentially within each chapter. The book is structured into five major parts. Part I provides an introduction and a CMMI and Agile primer. Part II focuses on techniques to help CMMI process mature organizations increase their agility. Part III demonstrates how a successful Agile organization can increase its CMMI process maturity without compromising the agility that has brought it success. Part IV provides multiple examples demonstrating how the CMMI can help organizations that are trying to be agile but are missing key ingredients of true agility.

Part V focuses on the role of *repeating specific weaknesses* in achieving real performance improvements. Chapter 9 is intended to help you think a little “outside the box” by demonstrating the use of an Agile approach together with key CMMI practices to help solve a non-work-related challenge. Through this personal challenge, I draw some nontraditional conclusions—but conclusions backed up by case study data. This case study takes us beyond the fundamentals, examining how real “consistent high performance” is best achieved. This story brings us closer to the personal side of process improvement, and looks at how great organizations continually outperform the competition. In the concluding chapter, we step back, summarize what we have learned from these case studies, and provide an insight into real and consistent performance.

**How Different Audiences Can Use This Book**

This book can be used by different audiences in multiple ways. First, executives and senior managers looking for the big picture are encouraged to read the introductory material at the start of each of the five major parts of the book. Then scan the book, focusing on the **Scenarios** at the start of each chapter, the “What You Will Learn in This Chapter” paragraphs following the Scenarios, the highlighted **Insights**, **Lessons**, **Cautions**, and **Pause, Reflect, and Glance Forward** features throughout the chapters, and the summarizing tables at the end of each chapter entitled “How Agile Helps CMMI” and “How CMMI Helps Agile.” You can then go back and read more specific case
study information related to topics of greatest interest. You can also use the
Roadmap in the Part I Introduction to help locate specific key information.

Second, technical leaders and developers looking for a deeper understand-
ing can read the full case studies, which provide the rationale for approaches
taken and the thought process we went through in applying the CMMI
model to varying situations. This level of detailed information is necessary to
understand why the options were chosen within each of the specific organi-
zations. This information can in turn help you make better decisions given
your own situation.

Third, process professionals and those looking for more detailed “how-to”
information should first take the time to digest the case study information,
understanding both what was done and why. This will lead to “how-to”
questions. To help with the “how-to,” specific examples are provided in the
appendices. These “how-to” annotated examples are referenced from foot-
notes within the case study chapters and can help your process improvement
effort get started on the right track toward a successful Agile and CMMI inte-
gration.

Fourth, the novice (i.e., software engineer fresh out of college or college stu-
dent) or those looking for the fundamentals are encouraged to first read
Chapter 1, the introduction, and CMMI/Agile primers. Then, after reading
the Summary tables at the end of each chapter, read Chapters 4, 5, and 8 and
Part V. Chapters 4 and 5 provide a good foundation in fundamentals, while
Chapter 8 demonstrates some of the most common challenges observed in
traditional organizations when initially attempting an Agile approach,
along with practical and proven solutions.
Scenario: You are a small Agile organization that is successful and growing, but to date you have few documented processes and no formal training program for your people. To maintain your success as you grow you are going to need more process discipline. You would like to start a CMMI process improvement effort. However, you fear losing the Agile culture that has led to your current success. So what should you do? What options do you have?

4.1 What You Will Learn in This Chapter

- Five popular myths about processes in Agile organizations
- Common challenges faced initiating a CMMI process improvement effort within an Agile organization
- Successful techniques to guide a small growing Agile organization to CMMI level 3 while maintaining an Agile culture
• Answers to common questions related to developing Agile processes
• Practical techniques to structure an organizational repository supporting agility and CMMI compliancy

Section I
Key Case Study Points

4.2 BOND Case Study Background

In July 2007, I participated in a formal CMMI appraisal with the goal of achieving a full-staged (18 process areas) CMMI level 3 for a client I will refer to as BOND. I began helping this client years earlier when they had virtually no written processes, or training, and only 25 people. The company, which was started by two retired military men, had been rapidly growing at a rate of over 30 percent a year reaching over 150 people by the time of the 2007 appraisal.

The key challenge I was presented with at the onset was to help the organization add the needed process discipline the CMMI could bring to help them continue to manage their projects effectively as the organization grew. The owners also stressed the importance they placed on maintaining the successful Agile culture that they felt was an important component of their business success.

After I initially executed a gap analysis (I will explain what a gap analysis is shortly) against the CMM model for this organization in 2001, they attempted for a few years to move forward with their process initiative on their own, but were unsuccessful.

In 2003, I executed a second gap analysis (this time using the CMMI model). Subsequent to the presentation of my gap analysis findings to Senior Management, I was asked to become more involved in assisting the organization’s process improvement effort.

They asked—as many clients do—if I had CMMI-compliant processes that could expedite their CMMI goals. I replied that I could help them develop...
their own processes addressing the areas the CMMI expected, and that I could share what I referred to as “starting point CMMI-based process templates.” I also emphasized that we wouldn’t achieve the goal they were searching for if we tried to use these process templates without taking the next important step. Now, let me explain what the next important step is and how we executed it to help BOND achieve their CMMI level 3 goal.

4.3 What Is a Gap Analysis and Why Is It Crucial for Agile Organizations?

Whenever I am asked to help a small Agile organization improve its process maturity, I always recommend we start with a gap analysis against the CMMI model. The purpose of a gap analysis is to assess where an organization currently is from a process perspective and identify gaps based on the CMMI model. The result is a strengths and weaknesses report and an initial set of recommendations to help the organization achieve its current process goals.

When I present weaknesses I have observed based on the CMMI model practices, I always stress that these might or might not be actual weaknesses in the organization that require actions. Part of the follow-on plan always includes more analysis of these “potential weaknesses” to determine the proper course of action given the organization’s business situation and process needs.

Executing a gap analysis is important for any organization initiating a process improvement effort because it facilitates the most effective plan based on the correct priorities for that particular organization. I now want to share the key points on how I conduct a gap analysis for an Agile organization, and why the approach you use when doing a gap analysis is crucial when it comes to agility. This will lead to a discussion of additional techniques I use to help Agile organizations move forward with a successful CMMI process maturity effort.

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2. The discussion to follow on a gap analysis and running a process improvement effort like a project relates to the expected practices in the Organizational Process Focus (OPF) process area in the CMMI model. Examples of OPF and Organizational Process Definition (OPD) processes are provided in the appendices to this book.
4.4 Keys to Conducting a Gap Analysis for an Agile Organization

There are multiple approaches to conducting a gap analysis. You can focus on documentation including the products an organization produces, and documented processes employed in developing those products. You can also spend time interviewing people in the organization who use those processes. I have seen a gap analysis conducted using exclusively the documentation route, and at times, this can make sense. Most often, a traditional gap analysis focuses on the documentation, supplemented with a few interviews.

When I do a gap analysis for an Agile organization, I switch this traditional emphasis from the documentation to the discussions with the people. The way I conduct these interviews is crucial to the success of the approach.

I conduct my interviews individually, not in groups as is often done with more formal CMMI appraisals. I am particularly careful how I phrase my questions during these interviews. I keep the interviews informal with an emphasis on letting the people being interviewed just talk about how they do their job. I have found that by phrasing questions as simply as possible, most people tend to talk openly and with ease about their job. An interview question I often start with is:

*Can you tell me how you do your job?*

I spend most of my time taking notes, letting the employee speak. My follow-on questions flow naturally from responses that lead me to dig deeper. I don’t use any of the words from the CMMI model in asking the questions, but I do keep the model practices in mind. I am using those practices to trigger more detailed questions based on what I hear.

Late in the interview after I have learned how they view their responsibilities and carry out their activities to achieve those responsibilities, I ask:

*Do you follow a process when you do your job?*

Almost everyone in Agile organizations that have just begun a process improvement effort answers that question with:

*No.*

By the time I ask that question, I already know the answer, and most of the people have answered it incorrectly.
By this time, I have in my notes a great deal of the information that describes the process they actually do follow when doing their job. They, of course, when asked that question assume I mean a documented process.

I assess what they tell me they do against the CMMI model, and against whatever written processes exist. I look at examples of the products they produce to corroborate what they are telling me and what their documented processes say.

When I out-brief a client with strengths and weaknesses against each process area of the CMMI model, each point I make is backed up with objective evidence from what I heard in an interview and/or saw in documentation. What I hear in interviews and see through documentation—a long with my own experience based on patterns I have seen in similar organizations—is shared in my report and serves as the objective data that leads to my recommendations. I always stress in my report that any weaknesses identified against the CMMI model are “potential weaknesses” to the business.

My reports go much deeper with detailed examples than most traditional gap analysis reports. This approach is counter to what is usually done partly because of nonattribution concerns. It is important that I don’t attribute specific findings to individuals in order to maintain an atmosphere in which people are willing to talk openly about their jobs.

However, too often valuable findings are raised up to an abstract set of statements leading to ultimate findings that become almost useless in helping the organization focus on the specific priority improvements needed.

Furthermore, it has been my experience that when a gap analysis does not provide specific examples with details backing up conclusions, Senior Managers do not place much value in the report resulting in minimum value to follow-on improvement efforts. See Table 4-1 for pros and cons of different gap analysis approaches.

<table>
<thead>
<tr>
<th>Gap Analysis Approach</th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Documentation Focus</td>
<td>Learn “gaps” if you followed documented processes</td>
<td>Don’t gain insight into real processes followed by people</td>
<td>Behavior change is the most difficult process improvement</td>
</tr>
</tbody>
</table>

Continues
Table 4-1  Pros and Cons of Different Gap Analysis Approaches (Continued)

<table>
<thead>
<tr>
<th>Gap Analysis Approach</th>
<th>Advantage</th>
<th>Disadvantage</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agile Interview Focus</td>
<td>Learn the real process the people are following</td>
<td>Takes more effort requiring more analysis and digging</td>
<td>Leads to uncovering where the most valuable process improvements lie</td>
</tr>
</tbody>
</table>

Let me now give you a simple example of why I stress weaknesses identified in a gap analysis are “potential weaknesses” to the business and how we determine if these “potential weaknesses” require actions to resolve in the plan to move forward.

4.5 Example of “Potential Weakness” Against CMMI in an Agile Organization

Somewhere during every interview as we are talking about how the individual executes his or her job, we get to the products they produce as part of executing that job. Eventually, I ask:

Who else looks at these products you are producing?

This discussion leads to the question about whether they conduct peer reviews on their products. Often the answer I get in Agile organizations is:

We don’t do formal peer reviews on our products.

On the surface, this triggers a “potential weakness” against the CMMI model because peer reviews are a specific practice in the Verification Process Area of the CMMI model. We don’t have enough time to dig into each area I identify as a potential weakness during the one-hour interview. In most areas where I find potential weaknesses, I just make a note that those areas require more investigation and probably further discussion.

As an alternative, I could just list as part of my report all the areas my client must fix to “comply” with the CMMI model. I could tell them I heard you don’t do peer reviews and you need to do peer reviews because it is an expected practice within the CMMI. This is actually how I have observed the CMMI model used in many organizations. It is an example of using the model
in a prescriptive way. This is not the way the model was intended to be used by its authors, nor would this approach help achieve the goal my client is looking for.

If I were to use the prescriptive approach each time I found a potential weakness against the model, I would “impose” something extra for the organization to do, and therefore add work on top of what they already do without fully understanding the value of that added work.

This approach, in my view, would be a huge mistake particularly in a successful Agile organization that is relying on their existing proven “Agile culture” to continue to bring them the success they have achieved in the past.

This approach may appear to be the most direct way to prepare the organization for a formal appraisal. It would also be the easiest thing to do as a consultant because it requires the least amount of effort.

However, from experience I know it is also the fastest way to raise the risk of driving this organization away from its Agile culture, leading it to a less efficient process than it currently has. Each time I take this approach to a potential weakness, I raise the risk of making this organization less competitive in the future.

I have observed that many process improvement professionals take this approach, and I understand why. It is natural to assume that people who developed the CMMI model are probably smarter than most process people are and the likelihood is that most organizations should be complying with whatever expected practices exist within the model.

What is frequently missed in this line of reasoning is the following implied myth:

**MYTH** The CMMI developers understood when they came up with the model all the business situations where the model might be applied.

This myth rests at the core of why we so often hear that Agile approaches conflict with the CMMI. When the model is used this way we are inappropriately utilizing the model to dictate implementation, or “how to” issues the model was never meant to address.

I will explain further how to handle these apparent conflicts as they arise, and why the vast majority turns out to be no conflict at all. First, we need to discuss the recommended plan to move forward subsequent to the gap analysis.
4.6 Running Process Improvement like a Project

At BOND, part of the plan forward was to run the process improvement effort just like any other project in the company. I worked closely with the assigned Process Improvement Lead inside the company building a project plan with a schedule, tasks, and assigned resources. We used the Continuous Representation of the CMMI model and decided to prioritize process areas and attack them incrementally.

The Project Management process areas were identified as the highest priority and attacked first during the initial increment of work. To address each process area we used a tailored version of the Technical Working Groups (TWG) approach recommended by the SEI [21]. While the fundamental TWG approach is sound, there are lessons I have learned applying this approach to develop CMMI “compliant” processes that fit within an Agile culture.

4.7 TWG Approach for Agile Organizations

The purpose of a TWG is to use key subject matter experts (SMEs) in the organization to help develop, document, and deploy processes and related process support assets across an organization. In observing TWGs in the past in multiple organizations, I have found common patterns I like to avoid when implementing this approach in an Agile organization. Those patterns have led to a tailoring of the TWG approach for Agile organizations, which are described in the following paragraphs.

One of the responsibilities of a TWG is addressing any potential weaknesses against the CMMI model that might have been identified. Another is to ensure the people in the organization who must use the process and supporting process assets are trained in those processes.

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Pause, Reflect, and Glance Forward

If you are experienced with Agile approaches but are new to CMMI, you might be asking at this point: “If this organization is successful using an Agile approach, why go through all this effort?”

We will begin to answer this question in the next chapter where we discuss the added value the CMMI can bring to a successful Agile organization. This subject will also be addressed further in Part IV where we investigate common misapplications of agility.

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3. Refer to appendices for an example of a template for a Project Management Plan.
The primary goal is to help the organization become more successful, or maintain its current success. However, a secondary goal is to ensure that when the formal CMMI appraisal happens, the organization is prepared to demonstrate through both objective documented evidence and interviews that they have achieved the intent of the practices in the process area.

Training and process deployment are included under the responsibilities of a TWG because often in the past, these critical efforts have fallen through the cracks in many organizational process improvement efforts.

When a new process is first developed, those who were closest to its development are best equipped to provide the rationale for key decisions and share how the processes are intended to be used.

### LESSON 1

Hold those responsible for developing processes also responsible for training those processes at least during the pilot project and initial organizational rollout.

Some organizations operate as if the following myth is true:

### MYTH

If an organization is Agile, it requires less process training.

You need to communicate the rationale for your processes. There is no one better equipped to explain why things were placed in a process than those who developed them. Too often, this critical knowledge is lost after a process development working group is disbanded. It is the rationale that leads to the needed *buy-in*, which is critical to ensure the organization achieves the intended value and the people are not just “going through the motions” to comply.

When you bring CMMI process maturity to an Agile organization by maintaining the Agile culture within their documented processes, you also need more—not less—training. The reason for this is that the Agile documented processes we develop will not address every possible scenario that is likely to arise in the use of the process. These processes must be supported by *mentoring* and *on-the-job* assistance especially during the period of initial deployment.
4.8 Revisiting the Goal and Challenges on the Process Improvement Project

The goal at BOND on the process improvement project was multifold. First, it was to help the project leaders manage their projects effectively as the organization grew. Second, it was to move the organization forward toward the achievement of a formal CMMI level 3 as rapidly as possible, but without adding significant risk to their ongoing business. This meant the TWGs had to keep an eye on the CMMI model practices addressing potential weaknesses. We also had to be sensitive to the use of key people in the organization who were actively engaged, often working closely with customer counterparts on critical projects.

Third, we had been given the added challenge by Senior Management to maintain the Agile culture the owners felt was critical to the organization’s success to date. To accomplish this, I added a requirement for the TWGs. If we were to add activities to the existing processes in the organization, the TWG would have to provide the rationale during the training as to why this activity added value to the organization.

This led to some interesting discussions among TWG members. Some argued that we should be able to just tell those being trained that the CMMI required it and that was sufficient rationale. I objected to this line of reasoning.

I explained to each of the TWG members that the CMMI requires you to make conscious decisions related to certain practices based on your business needs. Any decision we made based on a CMMI practice should be explained during the training from a BOND business need perspective. While this approach led to more time being required by TWG members to discuss current processes and potential weaknesses it helped the organization reason about its own processes and determine what the right processes were given their current business and the anticipated potential growth.

Fundamental Rule: Always Ask the Intent Question, and Then Keep Digging

The first Fundamental Rule of our Agile TWG at BOND was based on something a lead CMMI appraiser once told me:

*Always ask the intent question.*
What she meant was, when assessing an organization against a practice in the CMMI model, ask yourself:

*What is the intent of this practice?*

Another phrase the lead appraiser often used was:

*You don’t want to create unnatural behavior in the organization.*

This approach leads to another question:

*Is the organization achieving the intent?*

If the answer is yes, but they don’t appear to be following the expected practice, the next question is:

*How are they achieving the intent?*

and:

*What activities are they following to achieve the intent?*

The approach of asking these questions fits with our goal to maintain the “Agile culture.” The Agile culture is a natural culture where people follow practices that have been proven to work in getting their job done successfully. BOND had a history of success, so whatever practices they were following were, for the most part, working. This was our starting point to extract and document the right processes for this organization.

### 4.9 Alternative Practices and Tailored Agile TWG

The approach described may lead to an *alternative practice*. An alternative practice is defined by the CMMI guidelines as, “A practice that is a substitute for one or more generic or specific practices contained in CMMI models that achieves an equivalent effect toward satisfying the generic or specific goal associated with model practices. Alternative practices are not necessarily one-for-one replacements for the generic or specific practices.” However, my experience when digging “looking-for-intent” or “equivalent effect” has been that most often, you don’t arrive at an alternative practice, but rather a different implementation of an expected practice.

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4. The informative material within the CMMI model is the best source to help in determining the intent. Caution should be used when supplying one’s own intention.
LESSON 2

Always keep in mind that the CMMI is primarily about “what you are expected to do,” not “how you do it.”

The “how you do it” should always be open for discussion. By keeping Lesson 2 in mind as the TWGs dig deeper in discussion, they are opening options they might not have previously understood existed in terms of “how” a given expected practice in the CMMI model can be legitimately achieved.

Another good question to ask yourself as you are digging is:

Is there a problem in the organization because this practice as we are reading it in the CMMI model does not appear to be followed?

INSIGHT  If there isn’t a problem in the organization related to a given expected practice, it is likely the intent of the practice is being achieved. Keep digging and you will uncover what that technique is and probably find something worth sharing with others in your organization.

One valuable side effect of “digging deeper” is that often these TWG discussions lead subject matter experts to uncover what I refer to as a “local” practice. A “local” practice is one that works very well to achieve a given CMMI expected practice, but the practice just grew up as part of the organization’s culture and wasn’t even viewed by most as part of any “process.”

These “local” practices are often found in organizations where culture is taken for granted. I have in fact discovered many such practices during a gap analysis and then reiterated them with TWGs afterward, reminding them of what they had told me during the interviews. This kind of memory jogger has been one of the main reasons I like to sit in on client TWGs at times to help facilitate the process and remind them of their own processes.

Other common examples of powerful processes in Agile organizations often taken for granted include brainstorming sessions on white boards, maintenance of informal team task lists, and early product demonstrations with customers. These are all examples of real processes that work, can be documented, and can be shared across the organization.

5. Examples of “local” practices discussed later in the book include the “Undocumented super-spreadsheet” resource management process, and “Doorway” risk management process.
Questioning and digging is the major difference in how the Agile TWG operates over traditional TWGs. The focus of the Agile TWG is digging to uncover the real activities that are being followed and used successfully in the organization—not to create new ones. Now let us return to the Peer Review example to learn more about how this TWG process works.

### 4.10 Returning to the Peer Review Example

What is the intent of the specific practices in the Verification Process Area related to performing peer reviews? The tips in the CMMI guidelines book give us good hints that can help us understand intent. In the Peer Review case, they tell us “peer reviews provide opportunities to learn and share information across the team,” and “many different types of reviews might be considered.” The text also tells us that the purpose of peer reviews is to:

*Identify defects for removal and recommend other changes that are needed.*

This information leads us to ask some different questions, which we did at BOND. When I asked:

> How do you identify defects for removal and get recommendations for other changes that are needed?

I heard:

> We demonstrate our products early and often to our customers.

and:

> We meet daily with our teammates and discuss openly the work we are doing. Our products are checked into a library every day where others can see them and are encouraged to provide feedback. And they do.

As I listened to the answers, I realized that when they said they didn’t do “formal peer reviews” they meant they didn’t have a single defined time when people went into a conference room to provide feedback on a product. However, they did achieve the intent of “peer reviews” by doing continual “less formal” peer reviews throughout the development. This is a common practice in many Agile organizations.

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6. See “Effective Techniques to Run an Agile TWG” later in this chapter, and the “Thread” Approach to Process Development and Deployment in Chapter 7, GEAR case study, for more information on running Agile TWGs.
This is an example of digging for the real process that is followed to achieve the intent of a given practice. At BOND after this discussion by the Verification Process Area TWG, it was decided that the process did need to be documented, but that it wasn’t an alternate practice at all like first thought.

They were just using different “how to” techniques to “share information across the team” and “peer review” products. While this had been a concern early in preparing for the formal appraisal, it turned out there were no issues raised during the formal appraisal about peer reviews at BOND.

“Convenient, but False Arguments”

While BOND was successful, no company is perfect. Therefore, as you ask the intent question and conduct related discussions, I recommend that multiple people participate, including Agile knowledgeable and CMMI knowledgeable people, and others that might be independent of the organization to ensure the group is not creating “convenient, but false arguments.” An example of a “convenient, but false argument” would be an organization that claims it does continuous team reviews on its products, and/or frequent and early product demonstrations with the customer, but doesn’t follow through in a disciplined way when conducting these activities.

<table>
<thead>
<tr>
<th>CAUTION</th>
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</thead>
<tbody>
<tr>
<td>Beware of “Convenient, but False Arguments”</td>
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</tbody>
</table>

This situation can usually be uncovered by asking questions to determine if there is a related problem in the organization.7

4.11 Tailored TWG Techniques and Lessons at BOND

Let us now discuss a few more key techniques used at BOND in conducting the TWGs to document and deploy Agile processes along with a few lessons we learned to help the TWGs run more effectively. Among these techniques and lessons you will see more examples of asking questions and digging leading to more typical Agile “how-tos” that often just needed to be documented.

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7. Another example of a “convenient, but false argument” is provided in the NANO case study in Chapter 6 related to the need for training (GP 2.5).
Some are examples where documentation and minor additional behavior changes were required.\textsuperscript{8}

\section*{4.12 Preparation Work for Running Agile TWGs}

When you are first preparing your organization to conduct Agile TWGs, you don’t need to involve all the subject matter experts who will eventually be needed to help define your processes. The first few tasks to complete before the TWGs get going revolve around establishing the structure of the organizational repository and the process assets. These are discussed in the following paragraphs.

\textbf{An Agile Organizational Repository Structure}

The CMMI does not prescribe a structure for the organizational repository.\textsuperscript{9} The Process Improvement Lead at BOND with my assistance established the organizational repository structure. Unless there is a good reason for a different structure (e.g., non-CMMI process requirements), I recommend establishing a repository structure that aligns with the process area categories in the CMMI model. For example, the structure could be partitioned by Engineering, Management, and Support. Process Management could have its own partition or be included under Management. This decision is ultimately up to each organization and should be made based on legacy process structure, ease of use, and organizational culture. It is recommended that the repository structure not be structured to align with a specific organizational structure since organizational structures tend to change.

\section*{4.13 Packaging of Processes}

Processes do not need to align one for one with CMMI PAs. Many organizations do this, but it is not necessary. This decision is best made based on how

\textsuperscript{8} More significant behavior issues that needed to be addressed to achieve the full CMMI level 3 are addressed in the next chapter.

\textsuperscript{9} The discussion to follow in this book on the organizational repository structure and packaging of process assets relates to the expected practices within the Organizational Process Definition (OPD) process area of the CMMI model.
you do real work in your organization. You don’t need to make the final decision for process packaging at the start of your process improvement effort. In fact, the brainstorming within TWGs may lead to the identification of processes that should be broken out separately, and processes that should be consolidated.

At BOND, the Technical Solution (TS) TWG broke out two distinct processes referred to as Design and Implementation. Verification and Validation were consolidated into one process, which is common in Agile organizations because the practices Agile organizations use for Verification and Validation tend to have significant overlap. This is because a common Agile technique is to develop complete slices of functionality in short increments, often leading to product demonstrations to the customer. As a result, Verification and Validation techniques tend to blend in such environments.

There was significant discussion over Project Planning (PP) and Project Monitor and Control (PMC) at BOND. The TWG ended up keeping these processes separate, although in other Agile organizations I have seen these consolidated. The factors to consider when making the decision to keep PP and PMC separate versus consolidating include the maturity of your organization’s planning and project management activities.

In organizations where the project planning, monitoring, and control activities are sound and institutionalized, it can be more efficient to consolidate and train these processes together. This is because the expected practices under PMC align closely with those under PP and therefore can naturally be packaged and trained together. PMC expected practices revolve around monitoring and taking appropriate action associated with each of the items in your project plan. However, if your organization is just learning how to develop a project plan, it might be more effective to maintain distinct processes so each gets its proper focus.

Risk Management (RSKM) is usually broken out into its own process area, although in implementation in most Agile organizations it is frequently integrated with project planning, monitoring, and control. For example, most Agile organizations do not have distinct risk management review boards. The risk management reporting is usually integrated with project monitor, control, and reporting to Senior Management. Refer to Table 4-2 for an example of an Agile organization’s eleven process descriptions and how they could provide coverage for all eighteen CMMI level 2 and 3 process areas.
4.14 An Agile Organizational Process Asset Structure

The subject of organizational process asset structure has received a great deal of attention. I have heard the following myth expressed by Agile proponents:

**MYTH** The CMMI requires a process “superstructure.”

“Superstructure” means multiple types and tiers of process assets. This myth continues to exist not because of anything the CMMI requires, but because of the way in which many large organizations have chosen to implement their process assets in the past.

As an example, it is not uncommon in many large high-tech companies to see four levels (or tiers) of process assets such as policies, processes/practices,
work instructions/procedures, and enablers/templates. Policies identify the organization’s expectations for establishing and maintaining the process. Processes or practices are often high-level process descriptions whereas work instructions/procedures provide more detailed steps related to the process. Enablers and templates can be any kind of process aid that helps carry out the process and can include tool guides, or templates to help build related documentation.

While the choice for a process asset structure is up to each organization, most Agile organizations I have helped have found that two tiers is sufficient. This is accomplished by consolidating a policy statement with the associated process description that encapsulates “what must be done” in carrying out the process. The second tier contains “how to” guidelines in carrying out the process and tailoring it. This level can be viewed as aids for tailoring the process, and usually includes supporting templates. I have found that in most Agile organizations, step-by-step procedures are replaced by tool guides and training/mentoring. It is worth noting here that a template, such as a Project Management Plan template, can serve as a process with the required process activities implied within the template. This is a common technique I have observed for developing effective Agile process descriptions. See Figure 4-1 for a comparison of a traditional and Agile organizational process asset structure.

**Key Recommendation for Agile Organizations in Support of Tailoring**

While decisions on process asset structure are up to each organization, there is one key related recommendation I make to Agile organizations. This recommendation was used successfully at BOND. I will state it in the form of a lesson:

**LESSON 3**

Keep your process “must dos” packaged separate from your process “guidelines.”

The reason for this recommendation relates to a major concern that management and independent appraisers often hold—the fear that an Agile approach will lead to loss of project control. This ties to a popular myth:

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10. Refer to the appendices for an example of a Project Management Plan (PMP) Template.
11. By “traditional,” I mean what I have commonly observed in many large high-tech organizations.
It has been my experience that organizations that understand and implement Agile practices appropriately tend to be more disciplined\textsuperscript{12} in their development and management practices than many traditional development organizations. This is because they believe in their practices and therefore gravitate to them in times of crisis rather than abandoning them, as many more traditional organizations who don’t really embrace their practices tend to do. The evidence of this often surfaces with the fervor that can

\footnotesize{12. Refer to \url{http://www.ddj.com/architect/201804241} for a supporting article by Scott Ambler titled “The Discipline of Agile.”}
be sensed during the interview process when conducting a gap analysis or a more formal appraisal inside an Agile organization. In organizations in which compliance is achieved more through a “policing” approach, I have often found this same fervor and belief in the process missing.

Regardless of this observation, Agile organizations must still deal with the common perception that they don’t follow sound practices, and to be honest, many organizations that claim to be Agile are in fact using the term as a smoke screen to not comply and thus add to this perception.\textsuperscript{13}

Following the recommendation in Lesson 3 prepares the organization to deal objectively with this perception by simplifying the tailoring process and making the “must dos” clear and visible to all. A fundamental implication of Lesson 3 is that no one tailors the “must do” practices. Everyone follows them. Hopefully, the reader is starting to appreciate the importance of establishing such rules early before the TWGs develop the processes. If you follow this recommended lesson, the TWGs must carefully consider what they agree to place in the process “must do” packages because this must make sense for all projects regardless of size or scale. Refer to Figure 4-2.

When you take this approach, which works well for organizations with Agile cultures, tailoring the process is integrated with project planning. Tailoring guidelines are used during project planning to make “how to” project specific decisions, such as decisions related to the use of certain tools. Since these guidelines are packaged separately from the process “must dos,” the process becomes very clear on what you are allowed to tailor and what must never be tailored.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure4-2.png}
\caption{Tailoring and Process Asset Structure}
\end{figure}

\textsuperscript{13} Refer to the NANO and GEAR case studies later in the book.
By following this guidance, the visibility of compliance to the process becomes more evident in an Agile organization, not less. Fuzzy tailoring guidelines are now removed. It is for this reason I often make the claim that if you follow my guidance in the tailoring area when moving an organization with an Agile culture forward toward increased CMMI process maturity, you will find you have an increase in control rather than the loss of control that many falsely believe occurs in Agile organizations.

4.15 Process Asset Guidelines Used at BOND

Following are key guidelines we provided to the TWGs at BOND.14

- Process “must dos” are packaged separately from guidelines (hard rule).15
- No process is more than two pages (goal, soft rule).
- Processes do not contain “how-to” information or tool information unless you have decided to mandate this across all projects regardless of size or scale.
- Separate guidelines contain tailoring/planning options, and “how-to” information.
- Processes don’t stand alone; they require mentoring and training.

4.16 Different Organizations with Different Process Asset Structures

LACM and BOND are different types of organizations in many ways. LACM is large and product-centric; BOND is small and service-centric. LACM has

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14. Refer to the appendices for example organizational process asset guidelines.
15. Refer to the example in the appendix of the Organizational Process Definition (OPD) Process description.
decided to mandate a number of tools and standards across their organization to support more effective product-centric development and reuse. BOND has decided it makes sense to mandate few standards and few tools because their business is software service oriented, and they need to be flexible in supporting whatever tools and standards are required based on the constraints of each project.

The resulting organizational repository structures in these two organizations are very different in size and structure based on their different business strategies, but both are “CMMI compliant” because they have been developed based on each organization’s business needs.

While their organizational repository structures are different, both organizations have achieved formal advanced CMMI levels using these different structures. Contrary to popular myths, the CMMI does not mandate an organizational repository “superstructure” as I have often heard Agile proponents claim.

The CMMI does require each organization to document its processes and maintain those processes at the organizational level where they can be shared and tailored to meet the needs of each project. How you execute your tailoring is up to each organization based on its business needs. The choice is yours as to the size, structure, and agility of your process assets. Nothing in the CMMI OPD expected practices is counter to an Agile approach.

### 4.17 Agile TWG Roles and Responsibilities

TWGs are composed of assigned personnel who take on two distinct roles: TWG lead and TWG members. The TWG lead is the “doer,” which means the lead is responsible for documenting the draft process assets according to the agreed-to process asset structure. This means the lead must clearly understand the process asset structure and guidelines. By minimizing the number of people who actually “write” the processes, we reduce the risk of extensive review cycles due to inconsistent process assets that don’t follow the agreed-to rules.

The TWG members are SMEs. Members are often some of the best people in the company and their time is valuable. This approach supports the most effective use of the members’ time by not requiring that they become experts.

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16. In this book, “CMMI compliant” means meeting the intent of the CMMI practices.
4.18 Effective Techniques to Run an Agile TWG

One of the most effective ways to run an Agile TWG is a variant on how I conduct a gap analysis interview. You can think of an Agile TWG as the next step in “extracting” the real “as-is” process from the organization that started during the gap analysis.

To help extract the “as-is” process from TWG members I like to stand at a whiteboard and ask the TWG members to throw out words that are either activities they do as part of this process or products they produce. I tell them not to worry about creating full sentences. When you ask people to describe the process they follow, often they get wrapped up in talking about all kinds of extraneous detail. I find that it is best to let them talk this way during a gap analysis interview because it puts them at ease, allowing them to communicate more effectively. I have also found that TWGs can easily become bogged down with a great deal of nonessential discussion. This simplified guideline I have found helps to keep the working group focused on the task at hand. This is an area where the TWG lead needs to sense the group dynamics. For a small working group that has trouble getting started, it might work best to just let them talk about how they do their jobs for a period of time. However, if the leader senses the group is getting too far off task he or she might move to my simplified recommendation.

4.19 Separating the TWG Work from the Lead Offline Work

The techniques of running an Agile TWG described in the last section are intended to help keep the group at the desired level of discussion. If the discussion stays too high, the lead should ask more direct questions such as:

*What aids do you use to get your job done such as guides, tools, templates?*

The working group members usually do not need to discuss the packaging of the process assets into “must dos” and “guides.” This is often more efficiently handled by the TWG lead after the group adjourns. It is important for the lead to take all notes such as drawings or words that were jotted down on
a whiteboard. It is also important to capture the terminology used by the group members.

I have seen TWG leads who decided on their own to “translate” the terminology the group members were using in a working session into “CMMI terminology,” thinking this was part of their responsibility. This is definitely a mistake and should be guarded against.

The reason for this lesson is really a variant of Lesson 2 in Chapter 2. The CMMI is not a set of dictated practices, and is not intended to dictate terminology. When we say it is a tool to help you reason about your processes, this means to reason about your terminology as well. It is therefore fine to discuss and raise potential issues about the right terminology in your organization. If a term is being used by some inappropriately, this should be discussed. Keep in mind our primary purpose is to “extract” the real process that is used first, and this includes extracting the real terminology used.

In the case when I observed a TWG lead “translating” the terms the group used, it caused a significant buy-in problem during the deployment stage of the project. This occurred because the TWG members felt the lead hadn’t listened to them, and members said they didn’t even recognize the process that resulted from the TWG effort as being the process they actually used and discussed in the working group. Don’t let this happen to your process improvement efforts. TWG leader’s responsibilities are primarily facilitation, listening, and documenting.17

4.20 What Do You Do When You Find a Gap?

A second gap analysis against the CMMI model is conducted offline by the TWG lead after the initial sorting out of the notes from the TWG session and creation of the initial draft Process and Guidelines documents.

When a gap is found, it usually becomes a topic for a follow-on TWG session where the group is also reviewing and commenting on the draft process and

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17. The subject of terminology is also discussed in the NANO case study in Chapter 6.
guideline artifacts. This is where the facilitator should be in the “discovery” and “digging” mode as discussed earlier. Questions to be asking during this session include:

*Is there a problem in the organization because this practice is not happening?*

Usually, through this digging process if there isn’t a problem in the organization, the group should be able to uncover what is being done to accomplish the intent of this practice. Once this is discovered it should be added to the process documentation so it can be shared with others in the organization during training as discussed earlier.

If the answer is “yes,” the next question should be:

*Do we all agree the organization should be “stretching” at this time to change its behavior to accomplish this practice?*

If the group agrees the answer is “yes,” they might decide to add the must-do to the process. However, each decision should be carefully considered because we are now creating some of the most difficult potential process improvement work—that is, behavior change in the organization. This will require documentation, and training with rationale as to why this new practice is needed to help the organization achieve its business goals.  

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**INSIGHT** The most difficult and costly process improvements are those that involve behavior change. Ensure all initiated changes are essential to achieving business objectives.

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**Section II**

**Answers to Common Questions**

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**4.21 Answers to Common Questions When Running an Agile TWG**

Following are answers to common questions that often arise when running an Agile Technical Working Group.

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18. In the next chapter, we talk more about the most significant gaps found at BOND and what we did to address them.
4.22 Do I Need a DAR Process?

At BOND, it was decided that a distinct Decision Analysis and Resolution (DAR) process and guidelines were not required by the organization. Following is the logic that was used to arrive at this decision, which caused no difficulty during the formal CMMI evaluation.

In the DAR TWG at BOND, the group first found itself asking the question:

What are the relevant formal decisions that arise in our organization, and how do we handle them today?

This discussion led to the recognition that formal decisions at BOND were made in two areas: Risks and Designs. The group also discussed what “formal” meant in their organization. The CMMI doesn’t tell you what “formal” means, so each organization can make this decision for itself based on its own business needs. Formality at BOND (which did most things informally) was taken to mean the need to involve someone in the decision at a higher level of management. From a risk perspective, formal decisions involved the need to raise a risk to higher-level management. From a design perspective, formal decisions involved evaluating alternative design decisions that affected other groups.

In the case of a risk, the criteria to consider when deciding to raise the risk to Senior Management were included in the Risk Management guidelines that were developed as part of the Risk Management TWG. In the case of design alternatives, the criteria to use in making decisions were included in the design guidelines that were developed as part of the Technical Solution TWG. Therefore, DAR was handled through existing processes and no additional process assets were required.

4.23 Do I Need to Verify Everything I Develop?

The CMMI model does not dictate the work products that must be verified. SP 1.1 of the Verification Process Area expects each project to select the work products to be verified. Once again, as in so many areas of the CMMI model, this decision is up to you.

Often this practice is overlooked especially in organizations that have been building products for many years. A number of my client organizations are product-centric. Specific Practice 1.1 of Verification is a very good example of
how the CMMI can help us reason about our processes. It helps us ask questions that can in turn help us manage our work more effectively. Often the questions that result from using the CMMI are ones we might not think to ask otherwise.

As an example, organizations that rely heavily on product reuse should also be relying heavily on reusing the end product such as the software code, and reusing requirements, test cases, and test results. In other words, if I am reusing a product that has already been verified, I should be able to reuse that verification to gain the benefits of that effort. I will still need certain levels of verification and validation in the new environment where I am reusing the product, but the potential exists to “skip” certain lower levels of verification. To help us reason about where in our processes it makes sense to allow one to “skip” certain verification steps, SP 1.3 reminds us that we should have verification criteria. This leads to the question:

What are the criteria we use to determine when a verification level can be skipped?

It should be apparent that the creation of criteria can be a powerful aid to help an organization and its processes become more agile in making dynamic work-related decisions. However, criteria can only help if they have been created and personnel are trained in their use.19

### 4.24 Do I Need to Make Sure the Steps in My Processes Are in the Right Order?

**MYTH** CMMI-compliant processes require a sequence of steps.

I have observed numerous Technical Working Groups wasting valuable time arguing about the steps in a process and the order in which those steps occur. First, the CMMI defines processes as “activities that can be recognized as implementations of practices in a CMMI model.” It doesn’t say the order in which those activities occur must be specified.

It has been my experience that when first developing process documentation, any order dependencies should be one of the last items we worry about. I have found that TWGs can spend incredible amounts of time discussing sequence

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19. The power of criteria in helping an organization make more rapid real-time decisions is discussed at greater length in the GEAR case study in Chapter 7.
topics that turn out to be noncritical. I am not saying order is unimportant, just that often areas where we think we have order dependencies turn out to be “soft” order dependencies at best. Any “hard” order dependencies can always be added later.

A good example of order dependencies I refer to as “soft” is project planning. When I teach planning, I talk about the “what,” “who,” “when,” “how,” and “how much.” There are certainly order dependencies here. I can’t fully define the “who” (resources I need on the project) until I know the skills I need, which depends on the “what” I need to produce. I can’t complete the “how much” it will cost until I have figured out all the other pieces to my plan because they all imply some level of cost. Nevertheless, I can provide a project plan template to be used as a great aid to help people plan without telling them which sections they must fill in before others. Such dependencies are best communicated through training, rather than captured through formal documented process descriptions.

4.25 Do I Need to Make Sure Process Descriptions Are Not Redundant?

Often I hear people in TWGs arguing over whether a certain activity should be included in some process document. For example, in the technical solution TWG there was considerable discussion related to whether the design process should refer to requirements development at the start of the process. I tell working groups that it is okay to include words about an activity that might be in another process if it adds to the understanding of this process. Many processes are closely connected, such as requirements and design. Because of the way most Agile teams work—iterating closely between requirement, design, implementation, and test—it makes sense to describe this process as it is executed in your organization. This is another reason why it is best not to get too hung up on order. The traditional order of requirements followed by design followed by implementation followed by test isn’t the way Agile teams work. While at a high level this view still might make sense, the activities Agile teams follow during a given day might appear to jumble this order.

The bottom line is that we want to capture the activities and products produced that relate to our processes. If it helps to describe closely related activities that are also included in another process document, it doesn’t hurt to say it again.
4.26 Can Requirements Be Captured in an Email or PowerPoint Slides?

This might sound like a strange question, but it is not uncommon to hear it in Agile organizations that are just starting out with a CMMI process effort. First, the CMMI does not dictate the format requirements must be captured in, so on the surface, nothing directly prohibits email or Microsoft PowerPoint slides from being used to document requirements. However, when you look more closely at related expected practices and start asking a few more questions the CMMI expected practices will raise, a different picture often results.

For example, Requirements Management PA, SP 1.3 states:

Manage changes to the requirements as they evolve…

and SP 1.4 states:

Maintain … traceability among the requirements and work products.

These expected practices lead to the following questions:

How do you manage changes to requirements as they evolve if your requirements are captured only in email or PowerPoint slides?

Are you going to update the PowerPoint presentation or email whenever changes are agreed to so the current set of accepted requirements is clear?

One of the reasons traceability is an expected practice is to ensure our testing addresses all requirements including any changes. For this reason I have always suggested to clients that, while you might not need a formal requirements management tool, you do need to have your requirements organized and managed in a way that supports the assignment of requirements identifiers to each requirement so that those identifiers can be used in a test document to ensure your testing is complete.

As you start to ask these questions that arise from using the CMMI to reason about your processes, most organizations, including those with an Agile culture, decide that email and presentation tools cannot adequately do this job. Some very small organizations, and organizations with products that have very stable requirements, might be able to survive with requirements communicated through these means, but most organizations quickly recognize the limitations of these mechanisms.
4.27  Do Requirements Need to Be Captured in Single “Shall Statements”?  

This question often arises in Agile organizations that do requirements using user stories or use cases. First, there is no expected practice in the CMMI with respect to “shall statements.” The same questions concerning the management of requirements through the life cycle, and traceability, need to be asked. In many Agile organizations, user stories or use cases are often found to help the developers initially understand the requirements and to develop the test cases. Once these test cases are established, the cases themselves often become the agreed-to requirements with the customers. If your customer agrees to this approach, this may suffice to achieve the intent of the requirements management specific practices related to requirements change management and traceability. This is an example where an organization needs to ask a number of “what if” questions related to future potential changes and possible consequences before making such decisions. Other good questions to ask at this time related to the way your organization currently operates include:

- Is there a problem in the organization with respect to Requirements Management?
- Do customers ever come back and challenge an earlier decision with respect to a requirement change?

Nothing in the CMMI says that a managed test document cannot meet the intent of managing requirements. Asking these types of questions that naturally result when using the CMMI model will often lead to very good discussions in your TWGs that help an organization understand its own processes better and where some process modifications could be of benefit.

4.28  Formalizing Informality

One of the greatest achievements with BOND was our close attention to their culture and maintaining it as they grew. As we added the necessary process formality to prepare them for both the organization’s continued growth and
their upcoming CMMI assessment, we monitored any changes closely to ensure we weren’t damaging the Agile culture that had gotten them their rapid growth and success so far.

Key to our success at BOND was a strategy I have referred to as “formalizing informality.”

If something is working well, you don’t have to change it for CMMI. However, you do have to document it so it can be taught and shared with others.

It might sound odd to say this, but you can formalize informality, and we did it at BOND successfully. What I mean is if you have a process that works such as a risk management process, but it is “informal” in certain ways, you can teach what you do just like you do it, and document it just like you do it. I have found there almost always seems to be a strong tendency by process professionals to assume when working a process improvement effort, what people currently are doing must be wrong if they have no formal documented processes. This view rests at the heart of why we often find in large supposedly process mature organizations a large disconnect from what the people actually do, and what their processes say they do.

An Example of Formalizing Informality: “Doorway” Risk Management

Let me give you an example of formalizing informality. At BOND, one of the reasons the company was so successful was because risk management was an ingrained way of working. People lived risk management daily. When they had a risk they were often in the doorway of a Senior Manager’s office strategizing the risk mitigation. They were doing it immediately, not waiting until a formal risk management meeting. Because of this informality, they were able to initiate risk mitigation almost instantly, thereby keeping potential risks from becoming real problems. Effective risk mitigation stood at the heart of why this organization was successful.

Rather than try to add unnecessary paperwork to this process that was already working effectively, we just described in the newly documented Risk Management Process exactly what the expectations were of how risks were identified, assessed, and categorized in the organization. We did add a small degree of documentation that wasn’t going on before by adding a risk slide to the periodic senior management briefs, but we emphasized in the Risk Management training the existing culture that was expected to continue to effectively manage risks. We actually taught this informal “doorway risk management” approach.
4.29 Summary

We have shared many examples in this chapter to help illustrate what is mandated with the CMMI and what is not. “How-to” approaches are not mandated. You do need “how-to” approaches and the CMMI expects that you have them—but it doesn’t mandate what they need to look like. They can look traditional or Agile. CMMI doesn’t give you the answers, but it does tell you what questions you need to ask and answer for your organization and your project teams.

The focus of this chapter has been on extracting the real “as-is” process and packaging the results. However, even in very successful Agile organizations, there are practices within the CMMI where the intent is not being achieved. In these cases, often adding activities might be needed. Understanding the rationale for these added practices and how they were handled at BOND is the focus of the next chapter.

4.30 Summary: How Agile Helps CMMI

The following table provides a summary of how Agile approaches discussed in this chapter help the CMMI.

<table>
<thead>
<tr>
<th>“How-to” Approach in Agile Environment</th>
<th>How It Helps CMMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Doorway” Risk Management</td>
<td>Helps us implement Risk Management effectively achieving its real intent and timely risk mitigation</td>
</tr>
<tr>
<td>Customer demos early, continuous informal reviews</td>
<td>Helps us implement the intent of the Verification PA by identifying defects early and opportunities for improvement</td>
</tr>
<tr>
<td>Tailored Agile TWG/Gap Analysis approach</td>
<td>Helps us develop processes that reflect practical and proven techniques that work, and what people really do</td>
</tr>
</tbody>
</table>
## Table 4-3  *How Agile Helps CMMI (Continued)*

<table>
<thead>
<tr>
<th>“How-To” Approach in Agile Environment</th>
<th>How It Helps CMMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agile process packaging separating “must dos” from “guidelines” Agile tailoring process integrated with project planning</td>
<td>Supports agility and control</td>
</tr>
<tr>
<td>Agile “digging” approach when finding a gap</td>
<td>Helps us locate the most valuable process improvement candidates</td>
</tr>
</tbody>
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