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# The Readiness & Fit Analysis: Is Your Organization Ready for Agile?

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## OVERVIEW OF THE READINESS & FIT ANALYSIS

All software engineering and management practices are based on cultural and social assumptions. When adopting new practices, leaders often find mismatches between those assumptions and the realities within their organizations. The SEI has an analysis method called Readiness & Fit Analysis (RFA) that allows the profiling of a set of practices to understand their cultural assumptions and then to use the profile to support an organization in understanding its fit with the practices' cultural assumptions. RFA has been used for multiple technologies and sets of practices, most notably for adoption of Capability Maturity Model Integration<sup>®</sup> (CMMI<sup>®</sup>) practices.

The method for using RFA and the profile that supports CMMI for Development adoption is found in Chapter 12 of the *CMMI Survival Guide: Just Enough Process Improvement* (Addison-Wesley, 2006). Adopting new practices like those found in the CMMI models involves adoption risk, as do many other technologies. I first used RFA in the 1990s to identify adoption risks for software process tools. Since that time, I have used RFA to profile various technologies, including CMMI. This paper summarizes the principles of RFA and describes the SEI's work in extending RFA to support profiling and adoption risk identification for the Department of Defense (DoD) and other highly regulated organizations that are considering or are in the middle of adopting agile methods.

A fundamental principle of technology adoption is that of *mutual adaptation*. This principle asserts that a successful technology adoption by an organization usually requires adaptation of both the technology and the organization. The technology may adapt, for example, by being configurable—allowing switching on or off of different features—or by allowing localization to a different native language. The organization may adapt by changing some of its business workflows so they are more compatible with the technology or by changing the roles of the people involved in different processes that are affected by the technology.

When an organization adopts a new set of practices, it sees many of the same issues associated with adopting a new hardware or software technology. The SEI has observed that when adopting new practices—as when adopting new technologies—the principle of mutual adaptation applies. One of our observations has

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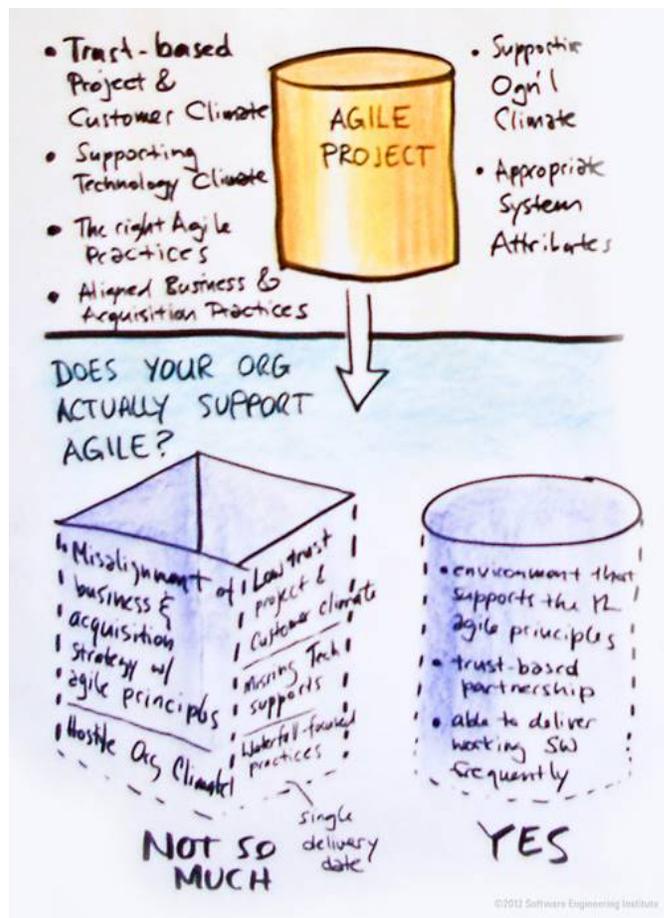
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## mutual adaptation

A successful technology adoption by an organization usually requires adaptation of both the technology and the organization.

been that the closer the organization's culture is to the implied cultural assumptions of a set of practices, the easier it is for that organization to adopt those practices.

The adoption of new practices, such as agile methods, is a task that is best undertaken with both eyes open. There are often disconnects between the adopting organization's current practices and culture and the new practices being adopted. The RFA is a model and method for understanding risks when contemplating or embarking on the adoption of new practices, in this case agile methods. The RFA method helps organizations understand the barriers and enablers to successful adoption that are present when an analysis is performed.



In our work with the DoD and other government agencies such as the U.S. Department of Veterans Affairs and the U.S. Department of the Treasury, we often encounter organizations that have been asked by their government program of-fice to adopt agile methods. These organizations have traditionally used a “wa-

terfall” lifecycle model (as epitomized by the engineering “V” charts) and are accustomed to being managed via a series of document-centric technical reviews, which focus on the evolution of documents that describe the requirements and design of the system rather than on its evolving implementation, as is more common with agile methods. After the program office and contractor are trained, they realize that there is more to an agile approach than frequent, small iterations and daily standup meetings. As a result, they struggle to adopt agile practices.

For example, contractor personnel often aren’t accustomed to working shoulder-to-shoulder with government counterparts, and the transparency of daily task management is uncomfortable. After a short time, programs often revert back to a more traditional approach, even though end users gave positive feedback about what was produced during the time frame that agile methods were used. On the other hand, acquisition staff often wonder how to fit agile measurement practices into their progress tracking systems. They also find it hard to prepare for technical reviews that don’t account for both implementation artifacts and the availability of requirements and design artifacts. These common scenarios highlight disconnects in business strategy, values, and management style that often occur in organizations trying to adopt new practices. These aren’t the only disconnects, but they are representative of what we often see when working with DoD or other regulated organizations trying to adopt agile methods.

You can apply the **Readiness and Fit Analysis** at any phase of your journey to adopt agile methods.

### **Determining Readiness & Fit**

From the title of this method—Readiness & Fit—it would be easy to assume that the only time you could productively use this method is in the early stages of adoption, when you’re trying to decide if you’re *ready* to adopt and if the practices you’re considering are a *fit* for your organization. In practice, however, we have used models like this at multiple points in the adoption of a new technology or method.

Certainty regarding readiness for agile adoption changes from early use of the RFA method (before initial pilots) to later use (after two or three releases using the newly adopted agile method). Certainty also changes with respect to the importance of a specific factor to organizational success.

At the beginning of an agile adoption project, organizations are often uncertain about their current state in terms of adoption factors or the importance of individual factors (such as alignment of oversight practices with agile practices) to adoption success. Later in the adoption process, performing an RFA highlights adoption risk areas that were overlooked during early phases of adoption. The

## Six Categories to Profile for an RFA

1. Business and acquisition
2. Organizational climate
3. Project and customer environment
4. System attributes
5. Technology environment
6. Practices

RFA also identifies areas where we now have more data to help guide us in developing adoption risk-mitigation strategies.

For example, we may not initially understand that our approach to cost estimation in a larger organization doesn't easily accommodate certain agile practices, such as relative estimation. After one or two pilots, however, we are more likely to understand the effect of relative estimation on our results, and we can develop strategies to help connect the agile estimation practices to those of the larger program. This may no longer be an area of adoption risk, and we can move on to dealing with other issues. The key point is to be prepared to apply RFA principles and techniques at multiple points in your adoption journey.

### Categories to Profile for Readiness & Fit

For the last several years, the SEI has researched the adoption of agile methods in U.S. DoD and government agency settings. We found that applying only the commercial profile didn't highlight enough of the issues that we were seeing in our interviews and observations of practice. As a result, SEI researchers have adapted the RFA profiling technique to accommodate typical factors related to adopting agile methods for any setting. We have also focused on other factors more uniquely associated with adopting agile methods in the highly regulated government acquisition environment.

In this paper, we present the categories and factors that we have identified so far, with the help of our interviewees and our SEI Agile Collaboration Group. This latter group consists of over a hundred DoD and other federal government acquisition practitioners, plus several DoD contractor organization representatives who are all actively adopting various relevant agile methods in their organizations. We have characterized the following six categories to profile for readiness and fit:

- **Business and Acquisition** – adoption factors related to business strategy, acquisition strategy, and contracting mechanisms
- **Organizational Climate** – adoption factors related to sponsorship, leadership, reward systems, values, and similar “soft” issues
- **Project and Customer Environment** – adoption factors related to project management norms, team dynamics and support structures, and customer relationships and expectations
- **System Attributes** – adoption factors related to the actual characteristics of the system(s) being developed
- **Technology Environment** – adoption factors related to the technologies that are in place or planned to support the selected agile methods

- **Practices** – a taxonomy of agile practices that is used to understand which practices an organization plans to adopt so that other factors can be calibrated around those expectations

For each category, we include a list of related factors. Each factor has a tag (a short title that summarizes the statement) and a statement that provides a condition or behavior that would be expected in an organization successfully using engineering and management methods consistent with agile principles as published in the Agile Manifesto. When applying an RFA, first look at the statement, and then consider the “fit” of that statement to your organization’s behaviors or attitudes.

The categories and factors continue to evolve as we pilot the analysis in client settings, but these six are the ones we’re currently using.

If an organization has used RFA in other settings, the factors that were found in the original RFA are scattered among the Business and Acquisition, Organizational Climate, and Project and Customer Environment categories. Thus, this paper focuses on describing key factors in the first three categories.

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## THE BUSINESS AND ACQUISITION CATEGORY

Each category of the RFA has a set of attributes that can be characterized by a statement representing your expectation if you were observing a successful agile project or organization operating in relation to that attribute. For example, an attribute of business and acquisition is stated as

*Oversight mechanisms are aligned with agile principles.*

Oversight is an aspect of acquisition that can either support or disable an agile project. Alignment of oversight with agile principles thus reduces the risk that oversight will be counterproductive. If you were evaluating your organization’s “fit” with this attribute, you would think about how oversight occurs currently in comparison to the 12 agile principles found with the Agile Manifesto.

### Applying the RFA to Business and Acquisition

This category covers issues related to an organization’s business strategy or mission and some specific factors related to acquisition and contracting. Business strategy is an important fit element because many organization values and principles are tied to the strategy. If the strategy changes, the organization’s values may change, creating either a better or worse fit environment for a particular set

of practices. Similarly, in DoD settings, certain contracting approaches are more aligned with particular sets of values and practices, and changing the way that a contract is formulated can have a significant impact on the values and practices necessary to execute that contract.

- **Clear program goals.** *Business or program goals are clear and reflect stakeholder concerns.*

From an agile methods perspective, the organization's mission or business goals are one of the touch points for decision making. If they are not clear—or if they do not adequately reflect the concerns of the organization's stakeholders—then lower level decision making runs the risk of being misaligned with the organization's focus.

- **Defined success strategies.** *Success strategies (e.g., roadmaps, product portfolios) are defined and clearly communicated.*

From an agile methods perspective, being clear about the roadmaps, portfolios, and other strategies that an organization uses to define its productivity and successful completions is key to understanding how an individual project fits into the broader organizational mission.

- **Project funding secured.** *Funding for the project has been secured.*

This factor is a success criterion for any project. Of particular importance when applying agile methods to DoD organizations, however, is that there are multiple ways to fund and contract for information technology products and services. Some steps in the formulation of a program can be executed prior to official funding, but there are many tasks that cannot be initiated until the funding allocation process has completed.

- **Close stakeholder/developer collaboration enabled.** *Mechanisms are in place in the contract and acquisition strategy to allow close collaboration between developers and other stakeholders (e.g., certification and accreditation personnel, end users, and others).*

The fourth principle derived from the Agile Manifesto states, “Business people and developers must work together daily throughout the project.” In a commercial environment, business people includes managers of the project and end users of the product being developed. In the DoD, these roles may be in different organizations, and there are multiple business-related stakeholder roles to account for program office personnel, information assurance, independent verification and validation agents, end users, logisticians, trainers, and others. If the acquisition strategy and associated contract vehicles create barriers to collaboration among these roles and the developer, it will be hard to achieve the performance of shoulder-to-shoulder agile implementations.

- **Interim delivery enabled.** *Mechanisms are in place in the contract and acquisition strategy that allow for interim demonstration and delivery be-*

If your organization is successfully using agile engineering and management methods, it will also have these attributes.

*tween official releases.*

The first principle derived from the Agile Manifesto states, “Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.” DoD contracts can specify the cadence of delivery in the Statement of Work (SOW) and in the way they apply different standards and define line items in their Contract Data Requirements List. If a contract specifies a single delivery of the software, other mechanisms may be in place to prevent productive early demonstration and re-orienting of priorities or focus.

- **Oversight-supported agile principles.** *Contract oversight mechanisms are aligned with agile principles.*

As with delivery enablement, the contract is the mechanism wherein program office technical and management oversight is specified. Contracts for large acquisition programs typically mandate document-centric capstone reviews, such as Preliminary Design Reviews (PDRs) and Critical Design Reviews (CDRs). These reviews analyze requirement, preliminary design (PDR), and detailed design (CDR) documentation; software coding does not typically begin until after all these documents have been approved following the CDR. This linear lifecycle model is not as productive an oversight strategy for contracts employing agile methods, where contracting language enables incremental, more frequent (and less formal) progress reviews. Beyond the contract language itself, the expectations of reviewers and oversight personnel must also be set appropriately.

- **Clear alignment of software goals and program goals.** *The alignment of software-related goals with program-level goals is clear.*

This factor is also important in non-agile settings, but its urgency in agile settings comes from the fact that software will be available earlier to test and interact with the other parts of the system. For systems engineers unaccustomed to this early access, provisioning test beds consisting of hardware emulators and simulation environments may not get the attention needed to ensure that the software part of the program can take advantage of incremental deliveries.

- **Appropriate contract type.** *Contract type accounts for use of agile or lean methods in the program.*

This factor may seem obvious, but it’s actually quite a challenge for DoD program offices. Almost any contract type (firm fixed price, indefinite delivery/indefinite quality, time and materials, level of effort, cost plus incentive fee, etc.) can be used to effectively support development using agile methods. For each contract type, however, the way the agreement is framed determines how effective it will be. The contract type and the acquisition strategy must therefore be aligned to support agile methods implementation.

- Appropriate lifecycle activities.** *Lifecycle activities that are planned in the acquisition strategy are compatible with agile methods.*

It's not enough that the contract vehicle be written correctly. It's also important that the lifecycle activities are specified in a way that can leverage the iterative and incremental nature of agile software development. For example, building test support equipment and test suites early in the lifecycle is essential if test-driven development is an agile method being applied.
- Agile at-scale enabled.** *The acquisition strategy takes into account the use of agile methods at the scale needed for the program.*

The most prevalent use to date for agile methods has been on smaller projects, but even in the DoD there have been successful projects with dozens of developers. To appropriately express the agile principles, stakeholders must consider communication mechanisms, architectural patterns, and layered management approaches. If these factors are not taken into account in the acquisition strategy, larger agile implementations may not be resourced effectively.

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## THE ORGANIZATIONAL CLIMATE CATEGORY

The RFA category Organizational Climate is one of the longer categories in the set, because misfits in organizational climate—including culture, values, and working principles—are particularly troublesome areas for many organizations pursuing agile adoption. This category covers the internal operations and culture of an organization, which are extremely important in determining its readiness for agile adoption. An attribute from the Organizational Climate category of the RFA can be stated as follows:

*Adherence to agile or lean principles is supported by external policies.*

The alignment of the organization's inherent operations to agile concepts and principles will help determine the ease or difficulty of the transition. If you were evaluating your organization's "fit" with this attribute, you would think about how external policies currently align in comparison to the 12 agile principles found in the Agile Manifesto.

### Applying the RFA to Organizational Climate

Organizational culture is one of most difficult RFA categories to assess when considering agile adoption readiness. *Culture* encompasses assumptions about appropriate or inappropriate behavior and values ingrained in the members of an organization. For instance, in DoD organizations the culture is typically plan-driven and hierarchical, with strict command-and-control structures for commu-

**Is your organization ready for agile?**  
Assess whether your organization climate can mitigate agile adoption risks before a threat to your schedule or budget occurs.

nication and leadership. Organizations that are “fit” to adopt agile methods generally need to be empirical, collaborative, self-organizing, and cross-functional.



The following list specifies the factors within the Organizational Climate category that should be considered when an organization performs an RFA. Factors include leadership, sponsorship, incentives, user and customer focus, organizational-change practices, and an agile-supportive environment. These factors can either be aligned to an agile perspective or misaligned, which is often a source of behaviors that may appear as resistance to the new practices. Understanding misaligned factors is important in addressing their symptoms proactively.

- **Senior support for Agile.** *Senior stakeholders openly and explicitly support the use of agile or lean methods in the program.*

Successful agile implementations have consistently had a champion. The champion may or may not be a senior stakeholder, but it is someone who has the respect of adopters and the support of senior leadership in the organization. This status will help protect fledgling agile projects from being derailed by those who do not understand the new methods or are uncomfortable with change. Open and explicit support by the senior stakeholders also means that

old behaviors are no longer rewarded. This factor is often one of the hardest for senior stakeholders to consistently practice when sponsoring change.

- **Sponsors understand Agile.** *Sponsors understand and support the difference in roles and business rhythm when using agile approaches.*

The roles and responsibilities in a traditional acquisition are well documented in DoD policies, regulations, and training documents; in an agile environment they are different and not as easily understood. Sponsors must understand the four tenets of the Agile Manifesto and the 12 underlying principles to enable the necessary business rhythm for an agile development effort. They also must understand the chosen agile practices well enough to understand the role and responsibility implications of the particular practices that have been selected.

- **Cascading sponsorship.** *Sponsor support for the use of agile or lean methods is explicit and cascading. In particular, sponsorship doesn't just emanate from the program manager; it cascades throughout the acquisition chain.*

In most organizations, a move to agile methods involves new behaviors and different values. This paradigm is a major change in how an organization operates, and it will affect the overall climate. For DoD organizations, the entire acquisition ecosystem includes not just the program but also outside organizations, such as Certification and Accreditation and Operational Test & Evaluation. Due to policies and regulations, it can be hard to include these parts of the acquisition chain when adopting agile or lean methods. Cascading sponsorship helps alleviate these problems by having sponsors in multiple places within the organization who can model the new values and behaviors, instilling confidence in the people who are actively trying to adopt the new practices.

- **External policy support.** *Adherence to agile or lean principles is supported by external policies.*

For example, the National Defense Authorization Act (NDAA) Section 804 promotes an iterative, incremental style of acquiring information systems that includes software-intensive systems. This legislation aids in the adoption of agile and lean methods and provides guidance in policy and regulation. In addition, Section 933 provides a strategy for acquisition and oversight of DoD cyber-warfare capabilities, which also points back to Section 804 of the 2010 NDAA. These are high-level examples of policy support of agile principles. Within a particular organization, however, there may be an opportunity for guidance that can push individuals and groups into adopting

### Organizational climate factors include

- leadership
- sponsorship
- incentives
- user and customer focus
- organizational-change practices
- agile-supportive environment

agile methods. For example, the CIO of a particular agency may mandate adoption of agile principles for their organizations.

**Caution:** Using a policy or mandate to force adherence to agile principles is not productive for healthy adoption of new practices. Putting policies in place too early, before the appropriate transition mechanisms are in place, often leads to malicious compliance. *Malicious compliance* occurs when individuals adhere to the letter of the law so rigidly that the practices can be adopted in an unproductive way.

- **Aligned incentives.** *Incentives among stakeholders are aligned to reflect agile principles.*

The fifth agile principle related to the Agile Manifesto states, “Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.” Part of this environment and support is the incentive to work in an agile environment. Most traditional organizations have incentives aligned to individuals but not many incentives for teams. For agile or lean environments, the incentives must be aligned to enable the team to succeed, not to make an individual hero.

- **Agile-supportive reward system.** *The organizational reward system supports the team-based reward focus of agile methods.*

The reward system is closely related to the incentives used on a program. As stated above, agile and lean organizations focus their rewards on team behavior, whereas traditional organizations reward individual behavior. Within the DoD environment, the reward system (via the performance-management system) is structured and not easily changed. This structure may actually interfere with the support and reinforcement of a more agile environment. There are ancillary reward system mechanisms, however, such as public praise, high evaluations, access to training, and certificate programs that may supplement individual-focused performance rewards. One of the key aspects of a successful reward system is understanding the kinds of rewards that individuals actually value (many teams would value an extra day off more than a gift certificate, for example).

- **User and customer focus.** *Organization supports early and frequent delivery of potentially shippable software to customers.*

The first principle associated with the Agile Manifesto states, “Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.” Most traditional government programs deliver software at the end of the development lifecycle (i.e., the “big bang” approach to system integration). The government organizational structure and culture are

“Welcome changing requirements, even late in development. Agile processes harness change for the customer’s competitive advantage.”

—Agile Manifesto

conducive to this one-time delivery. Structural changes will be required to support the iterative nature of agile and lean development, which requires more frequent user interaction. The changes may impact the organization, staffing, and interactions with organizations such as Information Assurance and Operational Test. Above all, the projects’ structures and support mechanisms must account for the user interaction needed to frequently deliver potentially shippable software; it should also account for the internal oversight mechanisms needed to support frequent, evolving deliveries.

- **Positive change history.** *Organization’s change history for introducing new engineering and management approaches is recently positive.*

Change is hard. Some organizations are better suited to make operational changes than others. Organizations that have successfully implemented a new expense reporting system, or adopted new analysis practices, will more likely succeed in their initial attempts at implementing agile or lean methods. These organizations will have well-established mechanisms for supporting new practices. In cases where recent change experiences have been negative, the adoption strategy can be changed to provide small, positive experiences prior to the larger changes as a way of overcoming the negative history and its effects.

- **Environment that embraces requirements changes.** *Organization provides mechanisms that support accommodation of inevitably changing requirements.*

The second principle of the Agile Manifesto states, “Welcome changing requirements, even late in development. Agile processes harness change for the customer’s competitive advantage.” In the DoD environment, the Joint Capabilities Integration Development System process requires that top-level requirements be fully specified and locked down early in the acquisition process, which makes these requirements extremely hard to change. The agile concept of welcoming change is antithetical to this process. The adoption and full realization of the benefits from the agile methods will therefore be hard to achieve if accommodations are not explicitly made within the project’s acquisition environment to allow for changing requirements. A typical solution to this dilemma is to ensure that the early requirements are at a high-enough level that the customer organization can make needed changes at the detailed level as understanding of the specific requirements matures.

- **Agile-supportive environment.** *Physical and social environments needed for agile team success are provided by the organization.*

The fifth principle of the Agile Manifesto emphasizes building projects around individuals and supporting their work. The sixth principle states,

“The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.” Agile environments typically house cross-functional teams in common areas where the teams can work together and have regular face-to-face conversations. Even if the teams are physically separated, modern communications and social media methods (such as video-teleconferences, instant messaging chats, and Skype) are used to promote continuous discussion and sharing of information. Designating a “team space” for physically co-located teams to work with appropriate network and IT environment access can be as simple as dedicating a conference room to the team for the duration of the project. We have seen some distributed teams establish a continuously “open” chat room where team members can talk about their work.

- **Trusting environment.** *Organization supports a climate of trust between acquirers and developers.*

Agile environments are created around 12 core principles. These principles focus on fostering trust within agile teams and between teams and their customers and users. The DoD acquisition environment is built on oversight and “trust but verify.” In many instances, we have seen adversarial relationships between the acquirers and the developers in traditional acquisitions. A climate of trust enables agile methods to achieve their fullest potential. Trust is usually built via shared experiences in which all parties feel respected and accepted. A joint workshop or event that focuses on the work, but provides opportunities for working together across organizational boundaries, is often a first step in that journey.

- **Fail/learn fast.** *A “fail early, fail fast, and learn” philosophy is supported by the organization in which development occurs.*

The 10th principle of the Agile Manifesto states, “Simplicity—the art of maximizing the amount of work not done—is essential.” This principle helps teams avoid unnecessary, nonproductive work. Simplicity is the art of employing just enough documentation, process, oversight, and work to evolve the needed product. DoD acquisition processes—while tailorable—do not innately support the idea of “just enough,” which is a skill and a mindset that must be fostered, encouraged, and adopted across the lifecycle. In addition, agile teams deliver software frequently; frequent delivery helps them learn what works and what doesn’t, and adjust accordingly.

As you can see, the list of factors in the Organizational Climate category is lengthy, but these factors often need the most attention in determining readiness and fitness for agile adoption and promoting a success in using agile methods and principles. Each category in the RFA offers insight into the risks that an or-

ganization will face when adopting agile methods. Identifying these risks is an important first step toward planning and executing mitigation strategies to address them. RFA has been used for multiple technologies and sets of practices (most notably CMMI) to help organizations in the DoD and other regulated environments mitigate agile adoption risks.

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## THE PROJECT AND CUSTOMER ENVIRONMENT CATEGORY

The Project and Customer Environment category deals with interactions among development team members and interactions between the development team and its customer, users, and management. This category of readiness and fit has a set of attributes that can be characterized by a statement representing your expectation if you were observing a successful agile project or organization operating in relation to that attribute. For example, an attribute from the project and customer environment category of the RFA is stated as follows:

*The rhythm of review and oversight activities is compatible with the agile or lean methods that are planned for or are already in use.*

Milestone technical reviews are an aspect of acquisition that can either support or disable an agile project. So having a rhythm of reviews in the larger program that are compatible with the iterative evolution of products that is typical with agile methods reduces the risk of review and other oversight activities being counterproductive. If you were evaluating your organization's "fit" with this attribute, you would think about the timing and entry criteria for using different technical and management reviews in your current environment in comparison to the rhythm of reviews (such as iteration demonstrations and release demonstrations) that are typical in agile settings.

### Applying the RFA to Project and Customer Environment

This category covers characteristics and aspects related to project and customer environments, many of which relate specifically to the 12 agile principles in the Agile Manifesto. These principles are the cornerstone and building blocks of Agile. If some of these building blocks are not present or are weak, then successful adoption and institutionalization of agile development may take longer to accomplish. A missing building block could even cause agile efforts to provide fewer than expected benefits, or, at worst, the adoption could fail.

To adopt agile methods successfully,

- the entire team
- the program
- the contractors
- the customer

should understand how agile methods differ from traditional methods.

Here are the factors within the Project and Customer Environment category that we consider when performing an RFA:

**Appropriately trained staff.** *All members of teams performing agile/lean methods or using work products of agile/lean methods are appropriately trained or experienced.*

The fifth principle of the Agile Manifesto states, “Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.” Techniques used within agile methods are different than those used on traditional projects. Teams need to be trained in the specific agile method that they will be using to reap the maximum benefit.

**Co-located teams.** *Teams performing agile or lean methods are co-located (physically or virtually).*

The sixth principle of the Agile Manifesto states, “The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.” Distributed teams, which are common today, can also function successfully with modern communications tools. While face-to-face interaction is preferred and incorporated into team plans on regular intervals, tools such as video teleconferences and instant messenger have the ability to augment periodic face-to-face interactions.

Teams that can be physically co-located, however, will likely need to transform portions of their facilities into team rooms with no walls or cubicles, to allow space for the team to work together. One small physical space change we have seen that was quite productive was to use “whiteboard paint” in team spaces on the walls so that teams had easy access to space to informally design and problem-solve together.

**Agile/lean-competent staff.** *Teams performing agile/lean methods possess the competencies (skills, knowledge, process abilities) needed to perform their roles.*

Not only do agile teams (or any team for that matter) need training to perform their jobs, they also need skills, knowledge, and abilities, which are often different than those used in the traditional software development environment. Those performing the RFA must assess whether the team has them. If the team is in transition, a learning curve will impact the project until the team learns new skills. It’s also important to note that the entire team—not just developers—must have some understanding of Agile.

**Rhythm of oversight compatible with Agile.** *The rhythm of review and oversight activities is compatible with the agile or lean methods that are planned for or are already in use.*

Within the DoD, most programs follow the typical acquisition lifecycle, which includes major milestones and major periodic reviews. This practice runs counter to the normal rhythm of agile development: short iterations (2–4 weeks), test-driven development, and continuous integration. The difference is more than schedule, however; while it is true that an agile lifecycle uses the same building blocks as traditional lifecycles (analyze, design, build, test, and deploy), it does so for all the blocks of each iteration. Traditional lifecycles handle each block in isolation. Thus, when a traditional program is ready for a preliminary design review, an agile program will already have working code in place. On the other hand, it may not have the same level of detail in its requirements as the traditional program that has not been focused on producing working software.



**Review goals aligned with Agile.** *Oversight review goals and activities are aligned with the agile or lean products and processes in use.*

Traditional programs include major periodic reviews. They also use documents to accomplish oversight, among other purposes. Agile is not void of documentation. The first principle of the Agile Manifesto—which states, “Our highest priority is to satisfy the customer through early and continuous delivery of valuable

software”—prioritizes continuous delivery of valuable code. Agile emphasizes just-enough documentation. Yet the primary measure of progress is working software (seventh principle of the Agile Manifesto). These two styles are anti-theoretical and will cause issues if the appropriate tailoring of traditional reviews is not accomplished for agile programs.

**Requirements incompleteness acknowledged.** *Program requirements-management processes allow for the reality of incomplete requirements throughout product evolution.*

The second principle of the Agile Manifesto states, “Welcome changing requirements, even late in development. Agile processes harness change for the customer’s competitive advantage.” In DoD settings, the customer may be the operational staff and not the acquisition customer. Traditional DoD programs determine all requirements up front, lock them down, and impose heavy processes (and often high costs) on late changes. DoD programs will need to adopt a more flexible view of requirements gathering to reap the full benefits of Agile. SEI researchers are at work on a technical note that deals explicitly with Agile and requirements.

**Positive perception of Agile by team.** *Performers of agile or lean methods and users of their work products have a positive perception of the methods they are using or going to use.*

If the team performing the work does not view the process in a positive light, then their efforts will not be optimal. All stakeholders are members of the “team” for this purpose. This is true for any set of practices that an organization adopts. Positive perception of the practices being adopted is even more important for practices like Agile or lean that are not mainstream in the DoD setting, because you are likely to need “top cover” from management to be able to perform agile or lean methods in an effective manner.

**Appropriate use of cost-size factors.** *Program size and cost are considered factors to collect data about rather than to create a “desired state” statement from.*

Agile practitioners use terms like *story points*, *velocity*, *burndown charts*, and *burnup charts* when they discuss cost, size, and remaining work. These terms are not readily translated to more traditional views expressed as earned value. Agile estimation for cost and size uses a relative approach versus the absolute approach used by traditional projects. The differences between the two approaches need to be understood and accommodated when assessing program status. The SEI has published a technical note addressing progress measurement in agile programs in general, including discussion of earned value. In 2011, the SEI published the

Project and Customer Environment factors include

- trained, co-located teams
- new oversight and review goals
- appropriate requirements and cost-size
- coaching and trust

Pay attention to the factors that influence these categories when considering your readiness and fitness for Agile adoption.

You can realize more successful pilots and implementations.

technical note *Agile Methods: Selected DoD Management and Acquisition Concerns*, which also addresses estimation issues in agile settings in DoD.

**Management as coaching function.** *Management is a coaching function (as opposed to traditional command and control) that helps to eliminate barriers to progress.*

Agile managers take on a coaching function. In doing so, they facilitate, mentor, and champion their teams. The team is self-organizing and their work during an individual iteration is not directed by the manager but rather coached and mentored. This new role is sometimes foreign to managers steeped in the traditional command-and-control style of management. Self-organized teams empower Agile, so managers that adapt to and adopt the role of coach are usually more successful in managing agile projects.

**High trust between management and teams.** *Teams are made up of task-mature individuals operating in high-trust groups.*

As mentioned above, the fifth principle of the Agile Manifesto states, “Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.” Agile promotes the creation of teams and trusts the individuals to complete the job. The managers coach the team, which is self-organized and has tools and competencies needed to accomplish the work. In many ways, this trust environment is contrary to the culture of “trust but verify” one often finds in the DoD development environment. Where we have seen this environment of trust in DoD agile settings, the project has typically been very successful.

**Sustainable development pace.** *Management emphasizes a consistently sustainable pace of development.*

The eighth principle of the Agile Manifesto states, “Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.” For this to happen, the management needs to encourage and promote this paradigm as opposed to waiting for integration to discover that a death march will be needed to integrate and complete the software and its testing on time.

### Looking Ahead

Many other factors influence readiness in the categories of Business and Acquisition, Organizational Climate, and Project and Customer Environment. The ones discussed in this paper, however, most closely reflect actual practices in the field. By paying attention to them when considering your readiness and fitness for agile adoption, you can realize more successful pilots and implementations.

Each category in the RFA offers insight into the risks that an organization will face when adopting agile methods. Identifying these risks is an important first step in planning and executing mitigation strategies to address them.

This white paper has summarized the initial blog posts related to the Readiness & Fit Analysis Method as applied to agile settings. Future blog posts will elaborate the other categories in the model.

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## ADDITIONAL RESOURCES

For more about the RFA method, please visit [www.sei.cmu.edu/sos/consulting/sos/readinessandfit.cfm](http://www.sei.cmu.edu/sos/consulting/sos/readinessandfit.cfm)

The Agile Manifesto and 12 Principles for Agile Software can be found at <http://agilemanifesto.org>

For more information on management and acquisition considerations in using agile methods in DoD environment, please see our first two technical notes in the Agile Acquisition series:

*An Acquisition Perspective on Product Evaluation*

<http://resources.sei.cmu.edu/library/asset-view.cfm?assetID=9821>

*Agile Methods: Selected DoD Management and Acquisition Concerns*

<http://resources.sei.cmu.edu/library/asset-view.cfm?assetID=9769>

Some of the issues related to project and customer environment challenges are also detailed in the October 2013 SEI technical note *Parallel Worlds: Agile and Waterfall Differences and Similarities*, which can be downloaded at <http://resources.sei.cmu.edu/library/asset-view.cfm?assetID=62901>

For more information about the method for using the RFA and the profile that supports CMMI for development, see the *CMMI Survival Guide: Just Enough Process Improvement*, Addison-Wesley Professional, 2006.

I am recording a series of podcasts with Mary Ann Lapham exploring the real-world application of Agile principles in the DoD. To view the series or download episodes, please visit <http://www.sei.cmu.edu/podcasts/index.cfm?getCat=43&wtGeneralCat=AcquisitionSupport>

For “one-stop” access to our Agile Adoption in Regulated Settings research, please go to [www.sei.cmu.edu/acquisition/research](http://www.sei.cmu.edu/acquisition/research).

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