

Capability Maturity Model Integration Guidebook Utility in Government: An Interview

PERSPECTIVE #GI208102
Jenny V. Whitmer

GOVERNMENT INSIGHTS OPINION

Shown to enable process improvement, capability maturity models have emerged as a widely used tool for many organizations. Spreading implementation of capability maturity models has led to the use of maturity-level ratings as an indicator of quality to assess suppliers. Although considering ratings is reasonable, they must be interpreted with care. Some organizations, instead of being committed to maturity, pursue ratings as a stamp of approval. Capability maturity model sponsors are acting to raise awareness of rating misuse. The U.S. Department of Defense and the Software Engineering Institute (SEI), steward of Capability Maturity Model Integration (CMMI), recently released *Understanding and Leveraging a Supplier's CMMI Efforts: A Guidebook for Acquirers* to arm government contracting personnel and program managers with the knowledge to appropriately interpret suppliers' CMMI for Development (CMMI-DEV) ratings. Government Insights recommends:

- **Be aware of ratings pitfalls and familiarize yourself with the guidebook.** CMMI and other supplier ratings do not ensure success. Knowing pitfalls and the resources the guidebook offers will inform your evaluation and potentially help you avoid duplicative efforts. The guidebook can be downloaded for free from the SEI Web site.
- **Make use of CMMI feedback mechanisms.** CMMI-DEV is a collaborative effort. The SEI offers multiple channels for stakeholders to give feedback regarding their work. Acquirers can also contact the SEI with concerns about the quality of appraisals, which helps hold appraisers and suppliers accountable. As with any collaboration, increased community involvement will improve CMMI-DEV.
- **Incorporate CMMI into your organization.** CMMI-DEV offers methods for improvement in software and systems development and acquisition. The model is updated periodically and offers good sources for best practices. Applied appropriately and with commitment, CMMI can aid organizational process improvement.

IN THIS PERSPECTIVE

This Government Insights Perspective discusses the use of capability maturity model ratings in procurement and summarizes a discussion with Mark Schaeffer and Kristen Baldwin of the U.S. Office of the Under Secretary of Defense (OUSD) regarding the recent release of the Software Engineering Institute's *Understanding and Leveraging a Supplier's CMMI Efforts: A Guidebook for Acquirers*. The guidebook provides acquisition office personnel insight into CMMI, including interpretation of CMMI-DEV ratings and how best to use ratings to inform acquisition.

Schaeffer has provided Department of Defense (DoD) sponsorship of CMMI, teaming with the National Defense Industrial Association, which provides industry sponsorship. Baldwin sits on the CMMI Steering Group that oversees CMMI and directly contributed to the release of the guidebook. Schaeffer is the director of systems and software engineering at OUSD for Acquisition, Technology, and Logistics. Baldwin is deputy director for software engineering and system assurance. The interview took place on March 22, 2007.

Note: "Capability Maturity Model Integration," "CMMI," and "SW-CMM" are trademarks of the Software Engineering Institute.

SITUATION OVERVIEW

Business Need

In November 1986, the Software Engineering Institute, with assistance from MITRE, a federally funded research and development center (FFRDC), began developing a process maturity framework that would assist organizations in improving their software process. This effort was initiated in response to a request to provide the federal government with a method for assessing the capability of their software contractors. Too often, software projects were over budget or late or the delivered products did not meet the original needs of the project. In September 1987, the SEI released a brief description of the process maturity framework and a maturity questionnaire, which eventually led to the formal release of the Capability Maturity Model for Software (SW-CMM) in 1991. In 2000, the SEI — in coordination with the CMMI Steering Group, a team of government, industry, and SEI experts — released Capability Maturity Model Integration, which incorporates software and systems engineering. The most recent CMMI v1.2 Product Suite — which includes CMMI for Development — was released in August 2006.

CMMI-DEV enjoys wide, global implementation in the public and private sectors. CMMI practitioners include General Motors, the U.S. DoD, and IBM, to name just a few. Experience shows that

organizations achieve process improvement when applying the model appropriately and with commitment. While results vary, median change of quality performance over time for 20 sample CMMI-DEV implementations is 50%, according to data gathered by the SEI.

These successes attach an implied quality to organizations with high CMMI-DEV ratings. (CMMI-DEV ratings, appraised by an SEI-authorized third party, range from 1 to 5. A rating of 1 indicates a low level of software development process maturity, and a rating of 5 indicates a level at which software development processes are being optimized for organizational performance. A CMMI level 3 is considered appropriate for many systems and software engineering and development efforts, since the benchmarked development best practices are captured at that level.) Organizations pursue high CMMI ratings in an effort to differentiate themselves from competitors. Likewise, public and private acquirers use CMMI ratings to inform decisions regarding suppliers, giving organizations with high ratings an edge and discounting those with no rating. Although not a practice endorsed by DoD, some government requests for proposal (RFPs) require proof of CMMI level, turning the rating into table stakes to compete for certain contracts.

Management Challenges

Two issues challenge the original intent of developing a model to improve software development processes. First, acquirers use CMMI-DEV ratings to assess suppliers but do not fully understand what the ratings mean. Schaeffer notes, "There is a good understanding of CMMI within the systems and software community, but it became clear that nuances were not understood outside that group of people." This misunderstanding of CMMI leads to a second issue, which involves suppliers chasing CMMI ratings as a stamp of approval, instead of being committed to process improvement — the original intent of CMMI.

The DoD and the SEI produced *Understanding and Leveraging a Supplier's CMMI Efforts: A Guidebook for Acquirers* to mitigate these challenges. Says Schaeffer, "We wanted to demystify the model, provide clarification, and help prevent further misuse and misunderstanding." The guidebook, written for acquisition personnel, is designed to help acquisition professionals understand CMMI terminology, ratings, and pitfalls.

The Best Practices

The guidebook, true to its intention, contains a wealth of information about CMMI-DEV. Readers may find terms such as *SCAMPI* less mysterious and begin to understand the differences between staged and continuous model representations. "The guidebook reviews different CMMI processes and recommends that PMs focus on those that are

needed, based upon their program risks," says Baldwin. "We tried to explain what the acquirer will need to pay attention to when dealing with a CMMI-DEV appraised organization."

The guidebook begins with an introduction to CMMI-DEV. Key in this section is the discussion of misperceptions surrounding CMMI ratings. In plain language, the text warns of pitfalls in maturity-level interpretation. For example, the guidebook states, "Organizations may sample only a few exemplar programs and declare that all programs are being executed at that CMMI rating." The introductory section also provides information on CMMI fundamentals such as the maturity-level ratings and different classes of appraisals.

Guidebook collaborators then focus on informing acquirers about key strategies when working with suppliers appraised for CMMI-DEV. Best practices are discussed around identifying critical program process areas, leveraging supplier process capabilities, and monitoring supplier process performance post-award. The appendices contain tools and checklists that aid in carrying out these strategies.

FUTURE OUTLOOK

Changing perceptions and increasing understanding of ratings will take time. Efforts such as the guidebook are necessary to increase awareness of the original intent of capability maturity models — to improve processes. In the short term, Government Insights believes pressures facing government procurement are likely to continue to support the use of maturity ratings as a criterion for supplier assessment. The acquisition workforce is overburdened, and pending retirements are likely to worsen the situation. Personnel limitations will maintain the use of accepted indicators of quality to shave off time while assessing suppliers. Increasing oversight, signaled by congressional efforts such as the proposed Accountability in Contracting Act, will also sustain the checking off of certifications as a way to demonstrate due diligence.

Government Insights anticipates that growing small business priorities and large, multiple-vendor contracts will increase attention on CMMI and similar ratings as both government and private sectors seek partners. Small business will have to demonstrate the capability to manage teams of contractors and respond to task orders quickly. "It's an IDIQ world," says Annie Eissler of Synchris, a software maker specializing in bid and task order management. "There's a move by small businesses toward CMMI and ISO certifications to show their ability to manage processes and make themselves more attractive partners." To help government agencies and government contractors fulfill their missions, Government Insights has compiled comprehensive profiles of 70 small, government vendors with CMMI appraisals, of which 24 also have ISO 9001:2000 certifications.

As organizations continue to pursue level ratings and certifications, capability maturity model sponsors will act to preserve model and appraisal integrity. DoD, a sponsor of CMMI, stated, "DoD does not place significant emphasis on capability level or maturity ratings, but rather promotes CMMI as a tool for internal process improvement" (*Defense AT&L*, July–August 2007, "Improving the Integrity of the CMMI Product Suite").

Sponsors will also work to increase awareness of misuse and misinterpretation while updating the models to address issues. Improvement of the models and appraisal processes will potentially limit the "stamp of approval" uses of capability maturity model ratings and support truly improvement-focused implementations. For example, CMMI-DEV ratings previously continued for an indefinite period but now expire after three years, thereby compelling ongoing adherence to model best practices. Efforts to continuously update capability maturity models will ensure that the dynamics of implementations keep changing. In addition, ongoing efforts such as the guidebook are needed to clarify interpretation of CMMI-DEV ratings. It is important for acquirers to understand maturity-level rating terminology, criteria, and pitfalls.

ESSENTIAL GUIDANCE

Actions to Consider

- **Be aware of ratings pitfalls and familiarize yourself with the guidebook.** CMMI and other supplier ratings do not ensure success. Knowing pitfalls and the resources the guidebook offers will inform your evaluation and potentially help you avoid duplicative efforts. The guidebook can be downloaded for free from the SEI Web site.
- **Make use of CMMI feedback mechanisms.** CMMI-DEV is a collaborative effort. The SEI offers multiple channels for stakeholders to give feedback regarding their work. Acquirers can also contact the SEI with concerns about the quality of appraisals, which helps hold appraisers and suppliers accountable. As with any collaboration, increased community involvement will improve CMMI-DEV.
- **Incorporate CMMI into your organization.** CMMI-DEV offers methods for improvement in software and systems development and acquisition. The model is updated regularly and offers good sources for best practices. Applied appropriately and with commitment, CMMI can aid organizational process improvement.

LEARN MORE

Related Research

Government Insights:

- *Procurement Panel: Averting Crisis and Winning Business* (Government Insights #GI206276, April 2007)
- *Government Oversight and the IT Project Manager* (Government Insights #GI205937, March 2007)
- *Enterprise Architecture: Overcoming Challenges to Achieve Transformation* (Government Insights #GI205709, February 2007)
- *Information Technology Infrastructure Library (ITIL) Gaining Traction in Canadian Government* (Government Insights #CA12GV6, January 2007)
- *Government IT Project Management Standards Get Attention* (Government Insights #GI204412, November 2006)
- *SAP Strives to Define Public ROI* (Government Insights #GI204092, October 2006)

Other:

- *Understanding and Leveraging a Supplier's CMMI Efforts: A Guidebook for Acquirers* (Software Engineering Institute, www.sei.cmu.edu/publications/documents/07.reports/07tr004.html)

Copyright Notice

Copyright 2007 Government Insights, an IDC company. Reproduction without written permission is completely forbidden. External Publication of Government Insights Information and Data: Any Government Insights information that is to be used in advertising, press releases, or promotional materials requires prior written approval from the appropriate Government Insights Vice President. A draft of the proposed document should accompany any such request. Government Insights reserves the right to deny approval of external usage for any reason.