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Making the CMMI® Relevant

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Who am I

- Chief Engineer, ITSS
- SCAMPI Lead Appraiser
- (Lean) Six Sigma Black Belt
- Member, NDIA Systems Engr Steering Committee
- Member, NDIA CMMI Working Group
- Member, CMMI-SVC Advisory Group
- Visiting Scientist, SEI

Top 6 CMMI Challenges ("to dos")

1. Insufficient linkage between process capability and project performance
2. Immaturity of acquirers use of the CMMI to differentiate among suppliers
3. Lack of process interfaces and integration across teams
4. Insufficient framework for project process/ performance growth
5. Scarcity of high-value improvement approaches and strategies
6. Velocity of change is an order of magnitude too low

Linkage between Process Capability and Project Performance (1 of 2)

What's the beef?

If implementation of the CMMI does not demonstrably result in consistently and predictably improved performance at the project level - it's dead and doesn't know it.

- Positive factors:
  - Correlation between the Maturity Levels of systems development organizations and the performance of systems engineering projects has been shown (NDIA Systems Engineering Effectiveness survey – 2004 – 2007)
  - Process-performance at the project level is well supported at Maturity Levels 4 and 5
- So what's the problem?
  - Project performance is almost invisible in the CMMI at MLs 2 and 3
  - An organizational Maturity Levels 4 or 5 do not "naturally" equate to a prediction of improved project process performance – or even project process capability
  - ARC (Appraisal Requirements for CMMI) and SCAMPI methods are overly focused on organizational process-performance

Linkage between Process Capability and Project Performance (2 of 2)

- Organizations can:
  - Instill performance goals as focusing agents at ML 1, 2, and 3
  - ML4/5: Focus on standard processes for process/performance-based invocation of projects
    - Growth and measurement of process-performance at project level
    - Correlation and causal analysis of project process capability to project performance
  - Define appraisal method for efficient/fast appraisals of project process capability
- The CMMI could be evolved to:
  - Instill the importance of focus on performance/quality goals as a focusing agent at MLs or CLs 2 and 3
  - Support evolution of the ARC and SCAMPI methods to support the efficient estimation and benchmarking of process-performance at the project level

CMMI Differentiation Among Suppliers (1 of 2)

What's the beef?

Suppliers do not often take full advantage of organizational process capability in differentiating among suppliers.

- Positive factors:
  - The guidebook titled "Understanding and Leveraging a Supplier's CMMI® Efforts: A Guidebook for Acquirers" (March 2006) provides a valuable starting point
  - At Maturity Levels 4 and 5, organizations are urged to implement mechanisms to enable the prediction of project process-performance
- So what's the problem?
  - Maturity Levels 2 and 3 do not necessarily support prediction of project level performance
  - Acquirers rarely take advantage of ML 4 and 5 to ask the right questions

CMMI Differentiation Among Suppliers (2 of 2)

- Acquirers can:
  - Accomplish program risk analyses prior to source selection
  - Ask offerers to respond to critical program risks with:
    - Defined processes that are tailored from the organization's standard processes
    - Definition and measurements of meaningful project performance
    - A plan for project process-performance maturation across the life cycle of the project
    - A plan for appraising and ensuring the achievement of the project level process-performance profile
  - Ask offerers for historical proof of responding to program risks (as above)
- The Guidebook could be updated to include this approach

Process Interfaces and Integration Across Teams (1 of 2)

What's the beef?

Acquiring organizations have not adopted the CMMI-ACQ in large numbers, nor tend to improve/ mature their processes by other means/models.

- Positive factors:
  - There is a CMMI for Acquisition
  - There is a Lean Program Office approach for implementing the CMMI-ACQ
- So what's the problem?
  - Process Capability mismatches often confound the acquirer/ supplier relationship
    - Mature/capable processes on supplier side are constrained by direction, contract mechanisms, and lack of responsiveness from acquirer
    - Process interfaces across the INTEGRATED TEAM are not defined
    - Processes across the INTEGRATED TEAM are not integrated

Process Interfaces and Integration Across Teams (2 of 2)

- Acquirers could:
  - Adopt the CMMI for Acquisition at program start-up
  - Consider “Lean Program Office” implementation (see author)
  - Use the SEI published guidebook titled “Understanding and Leveraging a Supplier’s CMMI® Efforts: A Guidebook for Acquirers”
- Suppliers could:
  - Include (lack of) process interface/integration in proposal risk analysis
  - Suggest process interfaces/integration in technical and management proposals

Framework for Project Process/Performance Growth (1 of 2)

What's the beef?

The concept of a framework for maturation of project level process-performance is under-defined in the CMMI.

- Positive factors:
- OPF SP 3.2: "Deploy the organization's set of standard processes to projects at their startup and deploy changes to them as appropriate throughout the life of each project."
- OPP, QPM process areas provide foundation
- So what's the problem?
  - Too little focus in CMMI (SPs or informative components) on idea of project process-performance maturation
  - Failure of acquirers to ask for project maturation data and predictions during source selections
  - SCAMPI method is not easily applied as a monitoring mechanism of process-performance growth at the project level

Framework for Project Process/Performance Growth (2 of 2)

- Suppliers can:
  - Provide focus on project level process-performance baselines at ML/CL 4 and 5
  - Support derivation of meaningful project performance measures (that are specific to business domains)
  - Manage project instantiation and maturation IAW high maturity processes
- The CMMI could be evolved to:
  - Provide better defined focus on project maturation
    - (Primarily OPF, OPP, QPM)
  - Evolve SCAMPI methods to more clearly support estimation and benchmarking of project process-performance
    - Cost efficiency
    - Speed

Improvement Approaches and Strategies (1 of 2)

What's the beef?

Strategies and approaches to improvement are under-defined in the CMMI suite.

- Positive factors:
  - The IDEAL model IS provided
  - Other approaches already exist
- So what's the problem?
  - CMMI guidance is insufficient in asserting the importance of a viable improvement method
  - A "single source" of comparison for various improvement approaches and strategies does not exist

Improvement Approaches and Strategies (2 of 2)

- Organizations can:
  - Research and adopt modern/high value improvement approaches that already exist
    - Lean Value Stream Mapping
      - Applicable at CL1 and ML2 and up
      - Highly focused on customer value and elimination of waste
      - Supports visibility into process cadence and synchronization
      - Virtually solves “buy-in” problems
      - Supports “high velocity” improvement
    - 6 Sigma DMAIC (Define, Measure, Analyze, Improve, Control)
      - Best applied to stable processes (ML/CL 3 and above)
      - Excellent set of mechanisms to implement ML/CL 4 and 5 improvements
    - Theory of Constraints
      - Series of sub-optimal improvements
      - Releases “next bottlenecks’
      - Excellent for processes where throughput is a key performance factor
- The CMMI could be evolved to:
  - Better address the importance of a viable and effective improvement approach (beyond the Shewart or IDEAL models)

Velocity of Change (1 of 2)

What's the beef?

It appears that *time* is not the primary factor in institutionalization of process capability or performance

- Positive factors:
  - None noted.
- So what's the problem?
  - Technology cycles may be 1 – 3 years
  - Timeline for response to marketplace and changing customer needs may be 1 month to 1 year
  - The attributes of success for a process/performance improvement program are emergent and not consistently articulated in the CMMI
  - Time is unnecessarily used as an "antidote" to this lack of clarity

Velocity of Change (2 of 2)

- Organizations can:
  - Understand and embrace real world drivers to the pace of process/performance improvement
    - Lean approaches solve buy-in issues and rapid knowledge assimilation
    - Culture of continuous improvement accepts rapid, business-based change
    - Proactive change leadership
    - Focus on performance/quality goals to energy and provide context to improvement efforts
- The CMMI could be evolved to:
  - Tone down the emphasis on time as a driving variable for process institutionalization
  - Better articulate the importance of organizational attributes in process institutionalization
    - Existing organizational culture
    - Focus on performance and quality goals
    - Degree of Leadership involvement
    - Improvement strategy/approach

Summary

- At a 10,000 foot level, we have articulated and offered solutions to the following challenges:
    1. Insufficient linkage between process capability and project performance
    2. Immaturity of acquirers use of the CMMI to differentiate among suppliers
    3. Lack of process interfaces and integration across teams
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Questions?

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