

CMMI[®] Economics 202: Appraisals

**NDIA CMMI[®] Working Group
NDIA Systems Engineering Division**

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There are generally two primary objectives for appraisals:

1. Identify improvement opportunities (strengths, weaknesses)
2. Determine capability/maturity level as a measure of progress

Appraisal costs can consume large portions of an organization's process improvement resources

- Cost, schedule, staff – tangible and intangible (opportunity costs)

Are the real returns from appraisals substantial enough to justify the investment?

- May depend on the motivation and actions taken as a result
- Ineffective strategies and implementation choices can drive costs and limit the benefits
- Over-emphasis on PIID generation and ratings risk may lead to missed opportunities for appraisal efficiency

What do you think?

- Are appraisals too costly?
- Is your organization getting sufficient business improvement value from your investment in appraisals, beyond ratings?
- Are SCAMPI appraisals more effective than prior methods? (e.g., greater accuracy, higher confidence, more efficient)
- Are verification-based appraisals more effective and efficient than prior discovery-based approaches?
- Does your organization routinely use PIIDs (or equivalent) as part of its improvement strategy beyond appraisals (i.e., residual value?)
- Does your organization find that collecting indirect artifacts provides greater value to the confidence of the appraisal and business value to the organization?

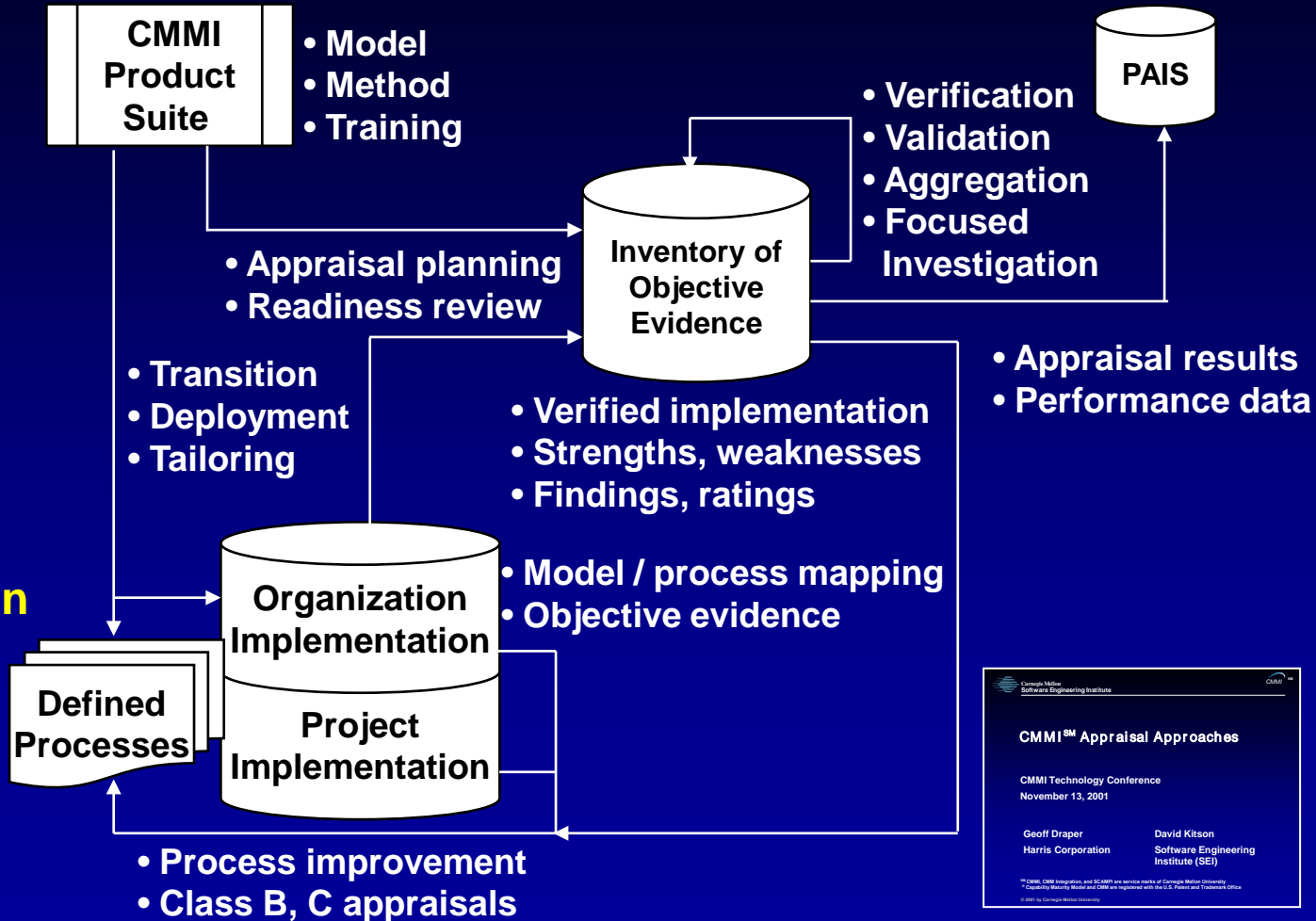


Appraisal Concept of Operations

CMMI Steward

Appraisal Team

Organization



Primary objective for SCAMPI v1.1 method:

appraisal efficiency

1. **Verification-based appraisals** of **existing** OU implementation evidence used as initial OE
2. **Focused investigation** (“trriage”) of appraisal OE (prioritize time on the gaps)

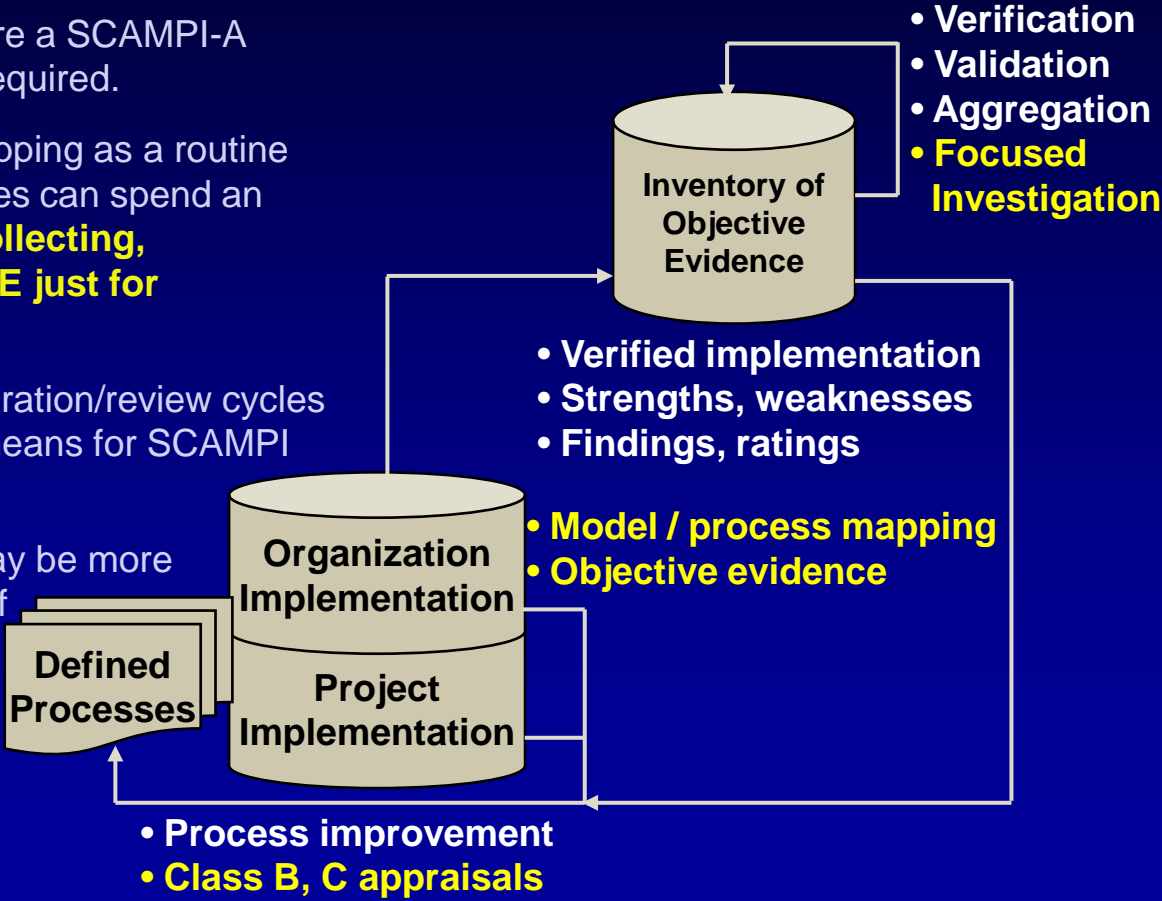
Verification-mode appraisals are a SCAMPI-A implementation **option** – not required.

Organizations without this mapping as a routine part of their business processes can spend an **inordinate amount of time collecting, organizing, and perfecting OE just for appraisals.**

A recurring series of PIID generation/review cycles weakens both of the primary means for SCAMPI appraisal efficiency.

- For some organizations, it may be more cost-effective to use a hybrid of **discovery-based appraisals** – even at the expense of increasing the appraisal on-site time.

Appraisal Concept of Operations

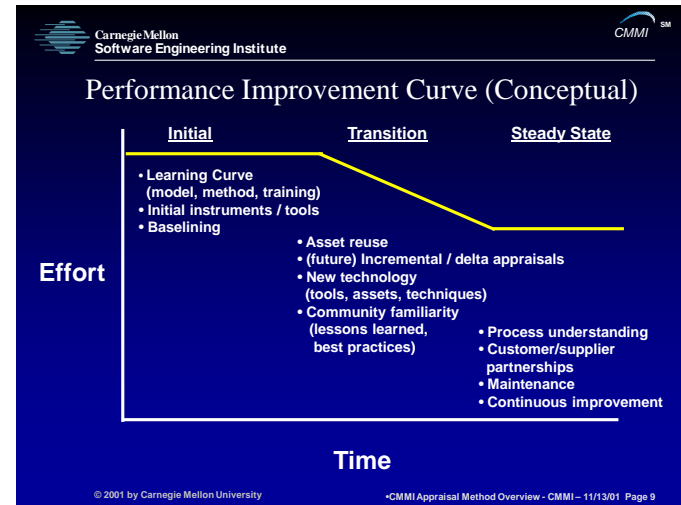


Have the Expected SCAMPI Performance Improvements Been Realized?

Appraisal efficiency remains a primary objective for CMMI v1.3

Lots of potential sources for cost inefficiency or lost value:

- Motivation: ratings vs. improvement, “pass the audit”, don’t act on weaknesses
- PIIDs: limited reuse of existing assets, extensive effort creating PIIDs from scratch with little residual value
- Pre-onsite: optimizing on-site appraisal time at expense of pre-onsite prep
- Corroboration: insisting on full set of indirect artifacts beyond MDD requirements
- Risk aversion: eliminating all ratings risk by series of evidence reviews



While the SCAMPI method can be improved, many appraisal cost issues stem from ineffective implementation choices and not taking full advantage of existing method features.

Conduct Appraisals Economically

Common Issues	Recommendations
<ul style="list-style-type: none"> Behaviors based on fear of failing ratings drives disproportionate effort on appraisal preparation and dry runs. Focusing on appraisal ratings and not acting upon improvements. Expensive appraisals, preparation and evidence collection can burden CMMI adoption. Appraisals of supplier processes can be cost-prohibitive in acquisition. 	<ul style="list-style-type: none"> <u>Utilize the entire family of appraisal methods (Class A, B, C) appropriately</u> – right tool for the right purpose. Design an appraisal strategy. <u>Use appraisals as process improvement opportunities and as a measure of progress.</u> <u>Conduct efficient appraisals.</u> Minimize creation of evidence repositories and artifacts intended just for appraisals. <u>Use targeted appraisals to determine supplier processes risks most relevant to a planned acquisition.</u> Look beyond ratings for suitability.

Establish cost-effective strategies for appraisals that align with business needs and measure improvement progress



Economical Business Application
 Support Business Goals/Strategy
 Organizational Leadership
 Improvement Velocity
 Make Improvement Intrinsic to the Job

Economical Implementation of CMMI
 CMMI as an Integrating Framework
 Develop/Deploy Effective Processes
 Tailor CMMI Appropriately
 Implement CMMI in a Practical Way
 Informed Decisions on High Maturity
 ➤ Conduct Appraisals Economically

Utilize the Family of Appraisal Methods

Common Issues	Recommendations
<ul style="list-style-type: none">Behaviors based on fear of failing ratings instead of motivation to identify weaknesses can drive organizations to put disproportionate effort on appraisal preparation and dry runs.	<ul style="list-style-type: none"><u>Utilize the entire family of appraisal methods (Class A, B, C) appropriately</u> – the right tool for the right purpose. Design an appraisal scheduling strategy to meet the organization’s business needs.

Use the right tool for the right purpose

- Less rigorous (Class C) appraisals may best fit objectives

Don't be afraid to fail – keep the end in mind

- Series of appraisals to eliminate all risk can drive costs
- Balance the costs against risks and improvement actions
- Don't do multiple appraisals when a single one will do
- Scope appraisal to higher maturity level than expect to achieve



Weigh the real (not only perceived) benefits to justify appraisal costs

Use Appraisals as Process Improvement Opportunities and Measures of Progress

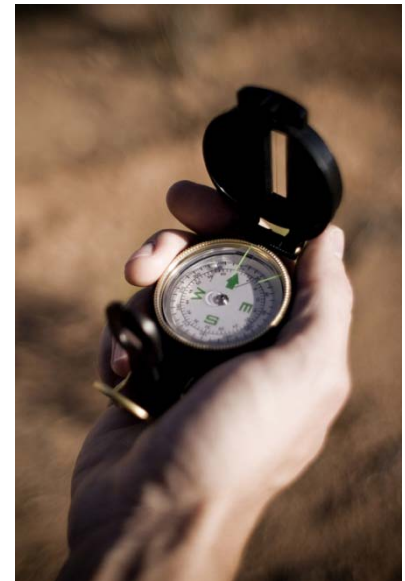
Common Issues	Recommendations
<ul style="list-style-type: none">• Focusing on appraisal ratings and not acting upon appraisal improvement recommendations undermines focus on process improvement.	<ul style="list-style-type: none">• <u>Use appraisals as process improvement opportunities and as a measure of progress.</u>

Focus on strengths, weaknesses, improvements

- More likely than benchmark ratings to provide substantial and lasting benefits to business results
- Regularly gauge progress (map and compass)
- Prioritize the strategic allocation of resources

Disproportionate emphasis on ratings can be to the detriment of improvements

- Weaknesses aren't acknowledged or addressed, and may continue to hinder performance
- Achieved ratings alone have little impact on improved business results (and may increase costs)



Conduct Efficient Appraisals

Common Issues	Recommendations
<ul style="list-style-type: none">Appraisals are expensive and may be seen as a burden to CMMI adoption. Many organizations invest huge costs in appraisal preparation and evidence collection.	<ul style="list-style-type: none"><u>Conduct efficient appraisals.</u> Minimize the creation of evidence repositories and artifacts intended just for appraisals. Use external consulting resources wisely.

Appraisal costs can be exorbitant if not managed

- Pre-appraisal prep (evidence collection, PIID generation)
- Use internal resources and consultants wisely

Integrate data collection with natural work flows

- Standard program directory structures, automated tools

Trade off appraisal strategies vs. cost/benefit factors

- Confidence level; acceptable risk; verification vs. discovery
- PIIDs: how much? For appraisals only, or residual value?
- Method tailoring: scoping, indirect artifacts, interviews, ...

Think of appraisals as cost-effective investments to identify priorities for improvement actions

- Use Lean principles, resist non-value added activities that don't benefit the business



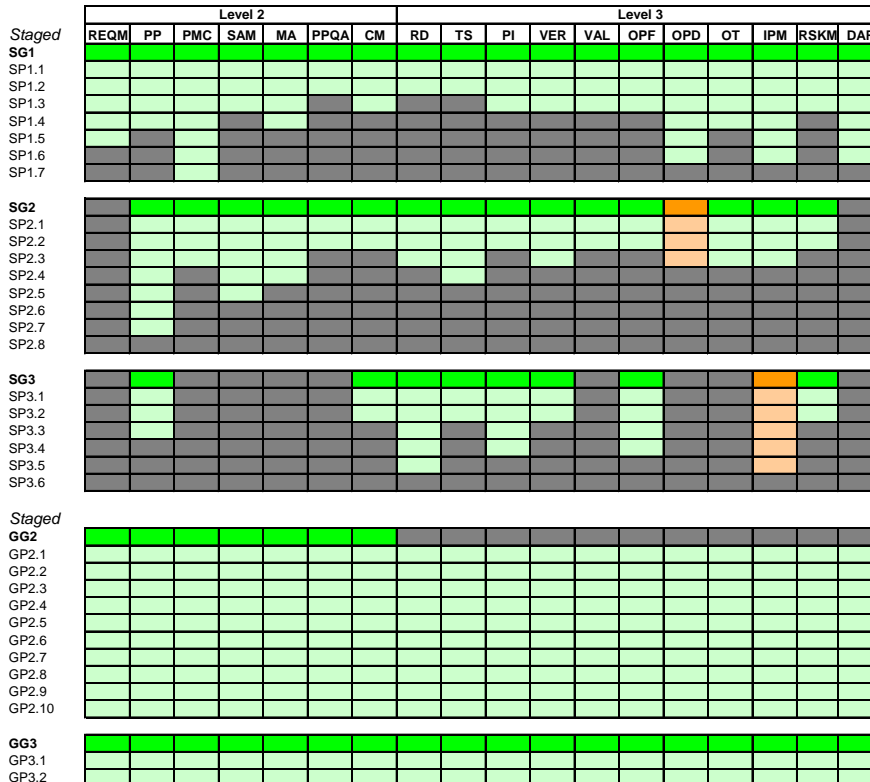
Quantifying Appraisal Effort

Evidence needed for GPs exceeds SPs by >50%

Example scope:

- CMMI-DEV (staged)
- ML3 model scope
- 4 projects

	Projects (4)	Org Unit (1)	Total
PAs	15	3 OPF,OPD,OT	18
SPs	118	22	140
GPs	180	36	216
PII Direct Artifacts	SP: 472 GP: 720	SP: 22 GP: 36	SP: 494 GP: 756
PII Indirect /Affirmation	SP: 472 GP: 720	SP: 22 GP: 36	SP: 494 GP: 756
Total PII's (min.)	SP: 944 GP: 1,440 = 2,384	SP: 44 GP: 72 = 110	SP: 988 GP: 1,512 = 2,500



LEGEND

- Green square: Goal (SG,GG) [CMMI-DEV]
- Light green square: Practice (SP,GP) [CMMI-DEV]
- Orange square: Goal (SG,GG) (+IPPD)
- Light orange square: Practice (SP,GP) (+IPPD)

*SCAMPI requirements for Practice Implementation Indicators (PIIs):

- direct artifact for each specific and generic practice, for each instance (project or OU level)
- corroborated by an indirect artifact or affirmation

Source: "Applying CMMI Generic Practices with Good Judgment", Rick Hefner and Geoff Draper. Tutorial, 2008 CMMI Technology Conference.

Target Appraisals at Supplier Risks Most Relevant to a Planned Acquisition

Common Issues	Recommendations
<ul style="list-style-type: none">Supplier maturity level ratings may or may not be relevant to the targeted work scope for a planned acquisition. It can be cost-prohibitive to conduct appraisals of multiple potential suppliers to determine process risks.	<ul style="list-style-type: none"><u>Use targeted appraisals to determine supplier process risks most relevant to a planned acquisition.</u> Look beyond ratings to determine suitability of suppliers for the work context.

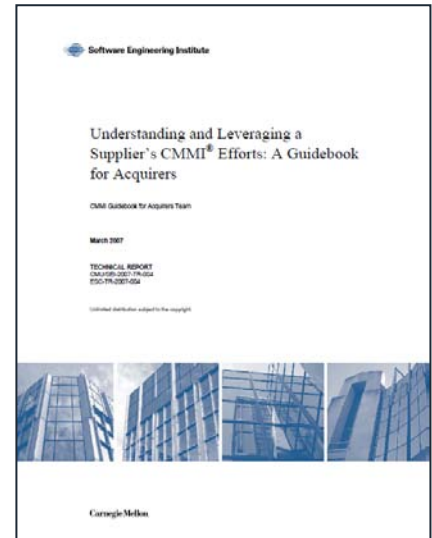
Look beyond maturity level ratings when considering supplier qualifications

- Process risks, capability, historical performance in domain
- Are high maturity processes applicable and suitable?

Consider a CMMI-based appraisal (Class A, B, or C) for critical procurements

- Evaluate processes most relevant to the planned acquisition
- Leverage model relationships and dependencies to obtain greatest model coverage with minimum effort

Consult guidance for the use of CMMI in acquisition



Summary – The Economics of CMMI Appraisals

Appraisals can consume huge investments in costs and resources if not well managed

- Set appraisal strategies based on objectives
- Appropriate use of Class A, B, C methods - right tool for the right purpose
- PIIDs aligned with natural business workflows – not just collecting/perfecting artifacts to “pass audits”



Look for long-term business benefits beyond ratings

- Performance improvements addressing identified weaknesses are most likely to have substantial and lasting impact

Leverage SCAMPI method features and innovative tailoring

- Lean appraisals that are efficient and effective – be wary of exceeding method requirements
- Consider trade off factors (risk, confidence, OE, corroboration, mode, ...)
- Balance organizational vs. appraisal team effort (verification vs. discovery)
- Keep costs, benefits and residual business value in mind

For More Information....



NDIA CMMI Working Group

http://www.ndia.org/Divisions/Divisions/SystemsEngineering/Pages/CMMI_Working_Group.aspx

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