CMMI® Economics 501: High Maturity

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

CMMI Technology Conference

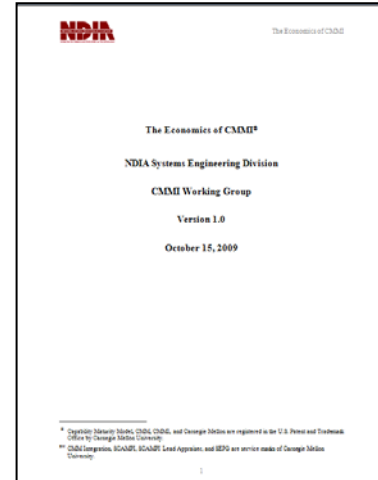**November 18, 2009**

The Economics of CMMI

Overview:

- Developed by NDIA CMMI Working Group
- Guidance by industry, and for industry, on achieving business value through CMMI
- Suggested CMMI strategies and mechanisms, intended to be tailored much like the model itself

Section	Topics
Economical Implementation of CMMI *(Implementers)*	• Use CMMI as an Integrating Framework • Develop and Deploy Processes Effectively • Tailor CMMI Implementation Appropriately • Implement CMMI in a Practical Way • **Make an Informed Decision on High Maturity** • Conduct Appraisals Economically

Introduction

CMMI maturity levels 4 and 5 are directly targeted at predictably improving performance to meet business objectives.
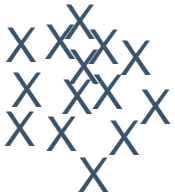
Level 1	Level 2	Level 3	Level 4	Level 5

ML4-ML5 are where process investments can pay off the most on business value.

Value is under an organization's control and depends on business objectives, and the commitment to achieve them.

* Although this presentation uses Maturity Levels 4 and 5 as the High Maturity context, the same issues and recommendations may be applied when considering Capability Levels 4 and 5 in individual process areas.

What is CMMI High Maturity?

Best practices in CMMI process areas at maturity levels 4 and 5

Level 4
Quantitative Project Management
Organizational Process Performance

Level 5
Causal Analysis and Resolution
Organizational Innovation and Deployment

- Quantified business objectives flowed down to projects
- Selection of processes directly influencing the objectives
- Measured capability of these processes to meet target performance
- Establishing process performance baselines/models from past use
- Using statistical and quantitative methods to manage performance
- Understanding process variation (special causes, common causes)
- Causal analysis to identify the causes of defects and other problems, and prevent their recurrence
- Measurably improving performance to meet business objectives

A high maturity organization understands the measurable effects of processes on the performance and capability of the organization and its projects, and strives to continuously improve.

CMMI High Maturity Profile
- What are the Facts?
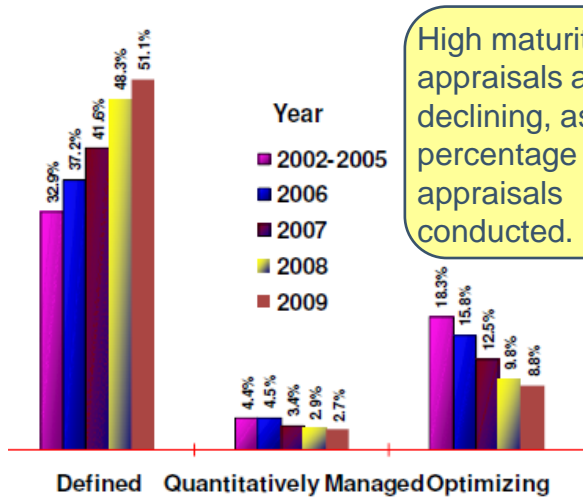
High maturity appraisals are declining, as a percentage of appraisals conducted.

ML5 orgs are all sizes, but predominantly large organizations.

Source: SEI Process Maturity Profile, Sept 2009.
http://www.sei.cmu.edu/appraisal-program/profile/

Organization Size (# of employees)	% of ML5 Appraisals Conducted
25 or fewer	0.3%
25-50	1.4%
51-75	4.5%
76-100	7.2%
101-200	9.4%
201-300	11.4%
301-500	17.7%
501-1000	27.8%
1001-2000	32.8%
2000+	34.7%

CMMI adoption (and qty of ML5's) is greatest in commercial industry.

	Commercial In-House	Contractor for Military/ Government	Military/ Government Agency
No Rating Given	5.7%	8.5%	22.7%
Initial (ML1)	0.8%	1.6%	1.7%
Managed (ML2)	28.0%	31.7%	44.3%
Defined (ML3)	53.6%	46.7%	26.7%
Quantitatively Managed (ML4)	3.1%	1.4%	1.1%
Optimizing (ML5)	8.7%	10.1%	3.4%
	(2920 orgs)	(769 orgs)	(176 orgs)

80% of ML4-ML5 appraisals are outside the U.S.

Maturity Level	U.S.	Non-U.S.
ML1	14	25
ML2	392	753
ML3	423	1577
ML4	9	96
ML5	82	258

The Business Case for CMMI High Maturity

Businesses must be as efficient as possible
- To achieve high margin
- To be competitive

Consistent efficiency is realized through continuous process improvement
- Real efficiency happens by optimizing your methods

Optimization can only happen by measuring performance and emphasizing results
- All process improvement approaches are based upon measuring process performance before and after an improvement
  - Lean, Six Sigma, Statistical Process Control, CMMI, …

Investments should be recouped in improved business performance – at any level
- Higher efficiency, less rework, greater predictability
- High maturity is *designed* to improve performance

Make an Informed Decision on CMMI High Maturity

Common Issues	Recommendations
• Misunderstanding high maturity leads to folklore on burdensome processes. • Focus on high maturity level ratings over actual improvement value. • Concern that high maturity requires excessive rework of processes. • Un-measurable quality and process performance objectives. • Settling for ML3, losing opportunities for greater business leverage.	• <u>Separate fact from fiction</u>. Take training to understand high maturity and find opportunities. • <u>Focus on process improvement, not maturity levels</u>. • <u>Anticipate process evolution</u>. Plan for natural progression of improvement, at any level. • <u>Derive measurable quality and process performance objectives</u> from business needs. • <u>Make an informed decision on high maturity</u>. Seek first to understand , then determine where it makes sense for the business.

Greatest business benefit can be obtained by implementing the appropriate level of process maturity based on business objectives

5. Optimizing

4. Quantitatively Managed

3. Defined

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

Separate Fact from Fiction

Common Issues	Recommendations
• Misunderstanding high maturity leads to folklore on burdensome processes.	• <u>Separate fact from fiction</u>. Take training to understand what high maturity is and is not. Couple examples from training with organizational opportunities to improve performance.

"CMMI Level 5 increases costs."

"Level 5 does not improve project performance."

"Level 5 criteria aren't clear and consistent."

"Maturity level ratings being revoked is evidence that CMMI doesn't work."

"Statistical process control is required for all ML5 processes."

"Criteria for Level 5 is defined by the SEI UCHMP training course."

**Seek first to understand.
Do the research.
Attend training.
Learn from others.
See where it makes sense.
Look for value.
Think for yourself.
Do a business case.**

"Results of Level 5 companies cannot be directly compared."

"CMMI lets companies pick which processes to use for Level 5."

"Informative material does not have to be considered for ML5."

"ML5 can be achieved using organizational data only."

"Companies can set their own quality and process performance objectives."

"Level 5 means rework to your Level 3 processes."

"Projects in Level 5 companies can still fail."

Focus on Process Improvement, not Maturity Levels

Common Issues	Recommendations
• Focus on high maturity level ratings over actual improvement undermines successful implementation.	• Focus on process improvement, not maturity levels.

A disproportionate emphasis on ratings over performance can diminish value
- May result in "minimal compliance" road without substantial business impact
- Results don't meet customer expectations
- Costs not recouped in improved performance

CMMI high maturity is directly targeted at performance and business objectives
- Cost, schedule, quality, rework, productivity
- Optimizing processes for efficiency, results
- Using statistical and quantitative techniques to achieve performance targets and ROI

"People care about who finishes first – not which car has the best stickers."
- Phil Couey

Anticipate Process Evolution

Common Issues	Recommendations
• Concern that implementing high maturity requires excessive rework of maturity level 2 and 3 processes.	• Anticipate process evolution. Recognize that process improvement to higher maturity is a natural progression. Evolution requires change. Anticipating high maturity futures when establishing early maturity level processes can reduce rework.

CMMI provides a framework for optimizing processes

- Level 4-5 behaviors evolve naturally from maturity level 3, stemming from desires to become more efficient
- Improvement (at any level) involves change of existing behaviors
    - Measures: operational definitions, repository, tools
    - Culture and management practices
    - Refinement of business goals and strategies

Recognize that the processes used at all maturity levels will evolve

- Thinking ahead can minimize rework as business processes mature
- Change is inevitable – so plan for it

# Derive Measurement Objectives from Business Objectives

Common Issues	Recommendations
• Un-measurable quality and process performance objectives.	• Derive measurable quality and process performance objectives from high level business objectives.

Establish quality and process performance objectives for process capability
- Derive quantitative performance objectives from business goals
  - Cost, schedule, quality, or other measures

Prioritize improvement initiatives on critical processes with greatest business impact
- Analyze and manage process outcomes quantitatively
- Return on high maturity investments should be recovered by process efficiencies
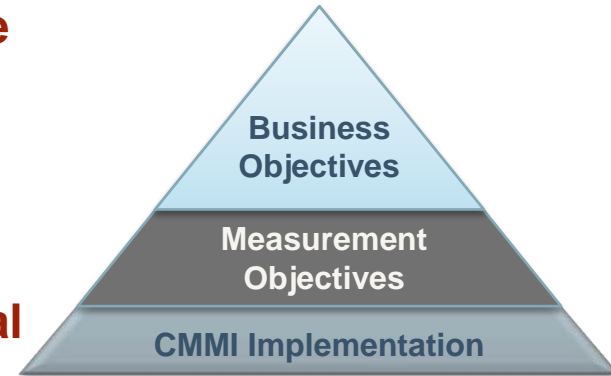
Shift the focus from standardization to effectiveness and results

Business Objectives

Measurement Objectives

CMMI Implementation

Make an Informed Decision

Common Issues	Recommendations
• Settling for maturity level 3 and losing opportunities for greater business leverage.	• Make an informed decision. Seek first to understand high maturity, and then determine if it makes sense for the business.

Consider if high maturity is right your business

- Some organizations find sufficient benefits from standardization at ML3
- …but may overlook the benefits of efficiency and predictability that high maturity can provide
- Balance today's needs against tomorrow's growth

Research return on investment in the context of your organization

- Leverage other existing initiatives (e.g., Lean, Six Sigma)

Summary –
The Economics of CMMI High Maturity

The value of CMMI High Maturity goes well beyond ratings
- Measurable improvement in performance results that matter
- ROI aligned with business objectives

Ensure your investments in CMMI ML4-ML5 translate into business returns
- Don't just <u>get</u> a Level 5 – <u>be</u> a Level 5
- Investment without improvement drives up the cost of business – at any level
  - Be vigilant in demanding results toward objectives
  - Achieving ratings with processes that still perform poorly can have a negative overall effect
- Lower costs through improved performance and reduced rework

Make decisions based on facts and data
- Learn where CMMI ML4-ML5 can fit your business

For More Information….

NDIA CMMI Working Group

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

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