

The Economics of CMMI®

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

NDIA Systems Engineering Conference

October 28, 2009

® CMMI is registered in the U.S. Patent and Trademark Office by Carnegie Mellon University.

The Economics of CMMI

CMMI is an investment

- Are you obtaining the returns you should?
- Is performance improving?
- Do benefits outweigh the costs?
- Or just an added cost of doing business?

Value often stems from business choices

- Organizational objectives
- Performance goals
- Implementation strategies

These choices are under an organization's control

- Utilize effective strategies and mechanisms to achieve improved business performance and cost efficiencies



The Effective Use of CMMI®

- NDIA Position Paper



Summary of NDIA industry position statements for obtaining best value from CMMI investments:

- 1. Good processes increase the likelihood of achieving successful project performance**
- 2. CMMI is a model, not a standard – adapt CMMI to your business environment, resources, and objectives**
- 3. Focus on business improvement objectives – a primary emphasis on achieving levels may not achieve significant benefits and may increase rather than decrease costs**
- 4. High maturity is a business case – justify the investment; many organizations find business value in improving processes even at lower CMMI maturity levels**
- 5. Maturity level ratings are not alone a predictor of project performance – many other factors can be significant contributors**
- 6. Don't specify maturity levels in acquisitions – use CMMI to probe supplier capability and process execution risks**
- 7. Greatest benefits of appraisals are from improvements, not evidence or ratings - disproportionate effort on appraisal preparation risk can diminish business returns**

•“The Effective Use of CMMI®”, NDIA Systems Engineering Division, June 2009.

http://www.ndia.org/Divisions/Divisions/SystemsEngineering/Documents/CMMI%20Working%20Group/CMMI%20NDIA%20position%20statement_final_.pdf

The Economics of CMMI

Overview:

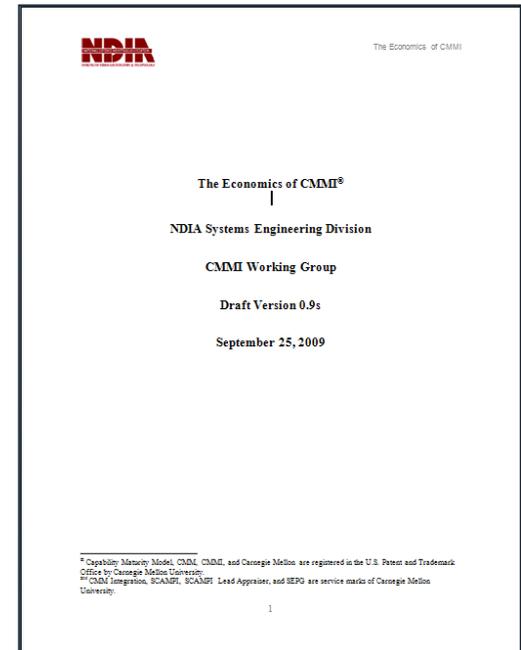
- Developed by NDIA CMMI Working Group
- Guidance by industry, and for industry, on achieving business value through CMMI
- Suggested CMMI strategies and mechanisms, intended to be tailored much like the model itself

Content:

1. Guidance on achieving business performance improvement through economical use of CMMI
2. Guidance on effective CMMI implementations to address common business issues

Objectives:

- Provoke thoughtful dialog on the effective use of CMMI
- Influence the mindset of CMMI business value – focus on improvement
- Help raise expectations across industry for results achieved through CMMI



The Economics of CMMI – *Targeting CMMI Decision-Makers*

Section	Topics
Economical Business Application of CMMI <i>(Executives)</i>	<ul style="list-style-type: none">• Support of Business Goals and Strategy• Organizational Leadership• Improvement Velocity• Making Performance Improvement Intrinsic to the Job
Economical Implementation of CMMI <i>(Implementers)</i>	<ul style="list-style-type: none">• 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

Economical Business Application of CMMI (Part 1)

CMMI business value depends on a foundation of underlying principles:

First Principles of CMMI Adoption	Potential Impact When Not Adopted
CMMI-based improvement efforts must align with and support <u>defined business goals</u> .	CMMI investments do not affect business performance; process improvements which are not really improvements have detrimental effects.
<u>Organizational leadership must be actively involved and visibly committed</u> to the improvement effort.	Improvements are not substantial or lasting, due to lack of organizational commitment and resources. Missed opportunities to improve the business.
<u>Manage process improvement velocity</u> . The rate at which processes are improved must respond to the needs of the business.	Massive simultaneous change overwhelms an organization and results in loss of focus on high priority improvement targets. Improvements are not realized in a reasonable time frame, which reduces the return on investment.
Continuous performance improvement must be an intrinsic <u>part of the job</u> - not secondary to it.	Workforce not engaged in improvement initiatives. Waste due to inefficiencies and organizational resistance to change. Premature abandonment based upon failures leaving a worsened condition in the aftermath.

CMMI is for improvement with a purpose

- Fit CMMI to the business objectives, not vice versa
 - Improving cycle time, productivity, quality, cost efficiency, customer satisfaction, etc.
- CMMI is a means to an end – not the objective itself

Prioritize improvements where business performance needs are greatest

- What business issues are being faced?
- How can CMMI help address them?

Pursue business value and improved performance

- Disproportionate emphasis on maturity levels can lead to a compliance-focused approach with burdensome processes at increased cost



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

Organizational Leadership

Prominent executive sponsorship of CMMI

- Management commitment is crucial
- Set and communicate the strategic vision
- Provide adequate resources (staff, funding, tools)
- Model and reinforce desired behaviors

Hold people accountable for improvement progress

- Set objectives
- Get the organization involved
- Recognize and reward achievements

Understand and communicate CMMI commitment

- Set the tone on why CMMI is important
- The workforce will follow cues from management



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

Improvement Velocity

Manage process changes at the rate needed to support the business

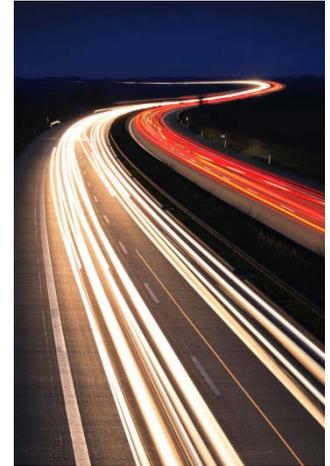
- What changes are needed, in what timeframe?

Plan for change at the organizational level

- Factors influencing the ability to absorb change
 - Relationships of processes with performance
 - Current state of processes and leadership
 - Project profiles (size, complexity, domain, etc.)
 - Improvement strategies and methods
- Prioritize improvements where most needed

Manage process improvement like a project

- Apply the same rigor as for any key project
- Led by a capable project manager
- Org charts, with defined roles and responsibilities
- Budget, schedule milestones, project reviews
- Engage the appropriate stakeholders



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

Making Performance Improvement Intrinsic to the Job

Process improvement is everyone's responsibility

- “Quality is not an act, it is a habit” (Deming)
- Set expectations for organization-wide involvement
 - Managers at all levels
 - Process groups
 - Practitioners and support groups
- Establish mechanisms for a learning organization
 - Improvement suggestions, lessons learned, process assets



Engage practitioners

- The most useful processes are often developed by those doing the work – not “ivory tower” process groups
- Ensure connection to the real issues faced by projects

Involve respected experts and opinion leaders

- Ensure process relevance, ownership, buy-in

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

Economical Implementation of CMMI (Part 2)

Section	Topics
Economical Implementation of CMMI <i>(Implementers)</i>	<ul style="list-style-type: none">• 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

Practical guidance for implementing CMMI economically

- Helps ensure investments yield returns in business performance
- Recommendations for effective implementations to avoid common pitfalls
- Non-exhaustive, perhaps subject to debate - intended to be interpreted, tailored and applied in business context

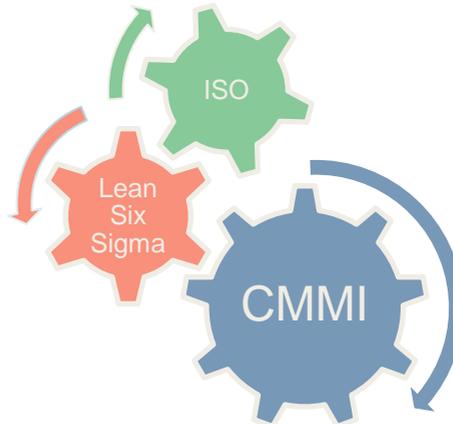
Intent is to help maintain CMMI emphasis where it belongs

- Improvement in business results and project performance, achieved economically

Use CMMI as an Integrating Framework

Common Issues	Recommendations
<ul style="list-style-type: none">• Multiple parallel improvement strategies (e.g., CMMI, ISO, Lean, Six Sigma) not well coordinated at the organizational level.• Not all functions engage in integrated process improvement, resulting in sub-optimized processes or disjoint initiatives.	<ul style="list-style-type: none">• <u>Create one set of organizational process standards</u> supporting multiple improvement strategies. Use CMMI to create a process architecture and framework supporting multiple process guidance sources.• <u>Integrate stakeholders and cross-functional processes</u> using CMMI to identify issues early in the product life cycle.

CMMI can be used to integrate processes, stakeholders and improvement initiatives



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

Develop and Deploy Processes Effectively

Common Issues	Recommendations
<ul style="list-style-type: none">• Processes too closely aligned with CMMI model don't fit the organization• Processes developed in isolation from projects aren't realistic or accepted• Too much change at once overwhelms the organization• Process descriptions are too verbose, disorganized, or overly dependent on manual effort to be useful to projects	<ul style="list-style-type: none">• <u>Integrate CMMI with current practices.</u> Design processes around work actually performed.• <u>Involve practitioners</u> to help develop and deploy processes that are practical and useful.• <u>Manage the improvement initiatives.</u> Consider improvement lifecycles. Pilot for effectiveness.• <u>Maintain perspective</u> - remember who processes are for, and why. Keep end users in mind as the primary target for useful, concise process descriptions ready to be followed

Design processes so they are effective and most useful to those that must follow them



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

Tailor the CMMI Implementation Appropriately

Common Issues	Recommendations
<ul style="list-style-type: none">• Organizations adapting to CMMI, instead of adapting CMMI to their business• Forcing a “one size fits all” CMMI implementation on the diverse projects in the organization	<ul style="list-style-type: none">• <u>Tailor CMMI model implementation to the business context.</u> Adapt CMMI implementations to meet the needs of the business.• <u>Recognize the needs of different types of projects.</u> Allow and encourage project tailoring of the organization’s process.

CMMI is a model, not a process – adapt it to fit the characteristics and constraints of the business context



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

Implement the CMMI in a Practical Way

Common Issues	Recommendations
<ul style="list-style-type: none">• Size of the CMMI model can be overwhelming for newcomers.• Confusion about generic practices causes process rework.• Inability to estimate process improvement effort causes cost and schedule problems.	<ul style="list-style-type: none">• <u>Start simply and bite off manageable chunks.</u> Identify areas where needs are greatest. Understand model dependencies.• <u>Interpret and apply CMMI generic practices with good judgment.</u> Find practical solutions for implementation/appraisal that support the work.• <u>Learn from experience.</u> Collect measures for improvement cost and effort. Use training and other resources to minimize misunderstandings that can cause rework.

Use good judgment on CMMI implementation strategies to manage complexity and maximize business leverage



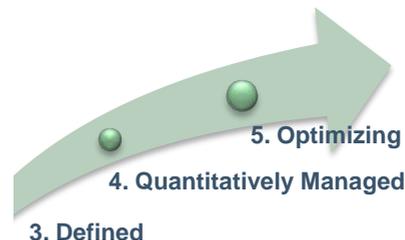
Economical Business Application
Support Business Goals/Strategy
Organizational Leadership
Improvement Velocity
Make Improvement Intrinsic to the Job

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

Make an Informed Decision on High Maturity

Common Issues	Recommendations
<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • <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



<p>Economical Business Application</p> <ul style="list-style-type: none"> Support Business Goals/Strategy Organizational Leadership Improvement Velocity Make Improvement Intrinsic to the Job
<p>Economical Implementation of CMMI</p> <ul style="list-style-type: none"> 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

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

Summary – The Economics of CMMI

Business returns on CMMI investments are dependent largely on underlying principles

- **Objectives** – *alignment with business goals*
- **Sponsorship** – *leadership, commitment, resources*
- **Action** – *improvement velocity for business needs*
- **Engagement** – *participation, project focused*
- **Value** – *performance results to justify investments*
- **Motivation** – *performance improvement vs. ratings*



These factors are under an organization's control

- The Economics of CMMI is a balance sheet for obtaining best value from CMMI
- Implementation strategies govern whether CMMI investments translate into improved business performance, or simply added costs of doing business

Focus on business value to provoke thoughtful dialog and raised expectations for the effective use of CMMI

For More Information....



NDIA CMMI Working Group

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

Jim Armstrong
Stevens Institute

Dan Blazer
SAIC

Michael Campo
Raytheon Company

Geoff Draper
Harris Corporation

Jeffrey L. Dutton
Jacobs Technology

Nancy Fleischer
Raytheon Company

Ray Kile
Lockheed Martin

Renee Linehan
The Boeing Company

Wendell Mullison
*General Dynamics,
Land Systems*

Randy Walters
Northrop Grumman