



## **CMMI® for Executives**

**NDIA Systems Engineering Division**

in partnership with:

**Software Engineering Institute  
Carnegie Mellon University**

**October 2009**

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# Topics

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## *Do You Need CMMI?*

What Is CMMI?

How Can CMMI Benefit You?

Who Is Using CMMI?

How Can You Get Best Value from CMMI?



# Do You Need CMMI?

## Recognize these symptoms?

- **Missed commitments**
  - Late delivery
  - Last minute crunches
  - Spiraling costs
- **Inadequate management visibility**
  - Too many surprises
- **Quality problems**
  - Too much rework
  - Functions not working correctly
  - Customer complaints
- **Poor morale**
  - Crisis atmosphere
  - High turnover
  - Low productivity

## Does the following occur?

- **Poor planning**
  - Plans not realistic or followed
  - Work is not tracked against the plan; plans are not adjusted.
- **Baselines not controlled**
  - Inconsistent requirements
  - Changes not managed
- **Ineffective organizational structure**
  - Functions not well integrated
  - Designs not producible
- **Unable to repeat successes**
  - Staff skills and knowledge not available when needed
  - Dependent on heroic individuals

# CMMI Features Help Address Common Issues

| <b>CMMI Feature</b>                       | <b>Description and Examples</b>   |
|---|---|
| <b>Results Oriented</b>                   | <ul style="list-style-type: none"><li>• Industry best practices for project planning and execution</li><li>• Performance-driven measures for consistent outcomes</li></ul>                      |
| <b>Priorities Based on Business Value</b> | <ul style="list-style-type: none"><li>• Investments and maturity prioritized to align with business goals</li><li>• Appraisals relative to model to set direction (“map and compass”)</li></ul> |
| <b>Customer Focus</b>                     | <ul style="list-style-type: none"><li>• Validation of customer needs across the project life cycle</li><li>• Manage product/service quality (verification, validation, reviews)</li></ul>       |
| <b>Proactive Management</b>               | <ul style="list-style-type: none"><li>• Forward-looking measurement, monitoring, risks, corrective action</li><li>• Management decisions based on plans, data, alternatives</li></ul>           |
| <b>Flexibility</b>                        | <ul style="list-style-type: none"><li>• Adaptable to a variety of businesses (domain, size, products)</li><li>• Non-prescriptive (required, expected, informative components)</li></ul>         |
| <b>Business Process Integration</b>       | <ul style="list-style-type: none"><li>• Cross-functional stakeholder involvement</li><li>• Coordinate various improvement strategies and methods (Lean, Six Sigma, ISO, Agile, etc.)</li></ul>  |
| <b>Continuous Learning</b>                | <ul style="list-style-type: none"><li>• Standardized assets tailored for project characteristics</li><li>• Leverage experience and history across projects</li></ul>                            |

# Why Focus on Process?

**The quality of a system is highly influenced by the quality of the process used to acquire, develop, and maintain it.**

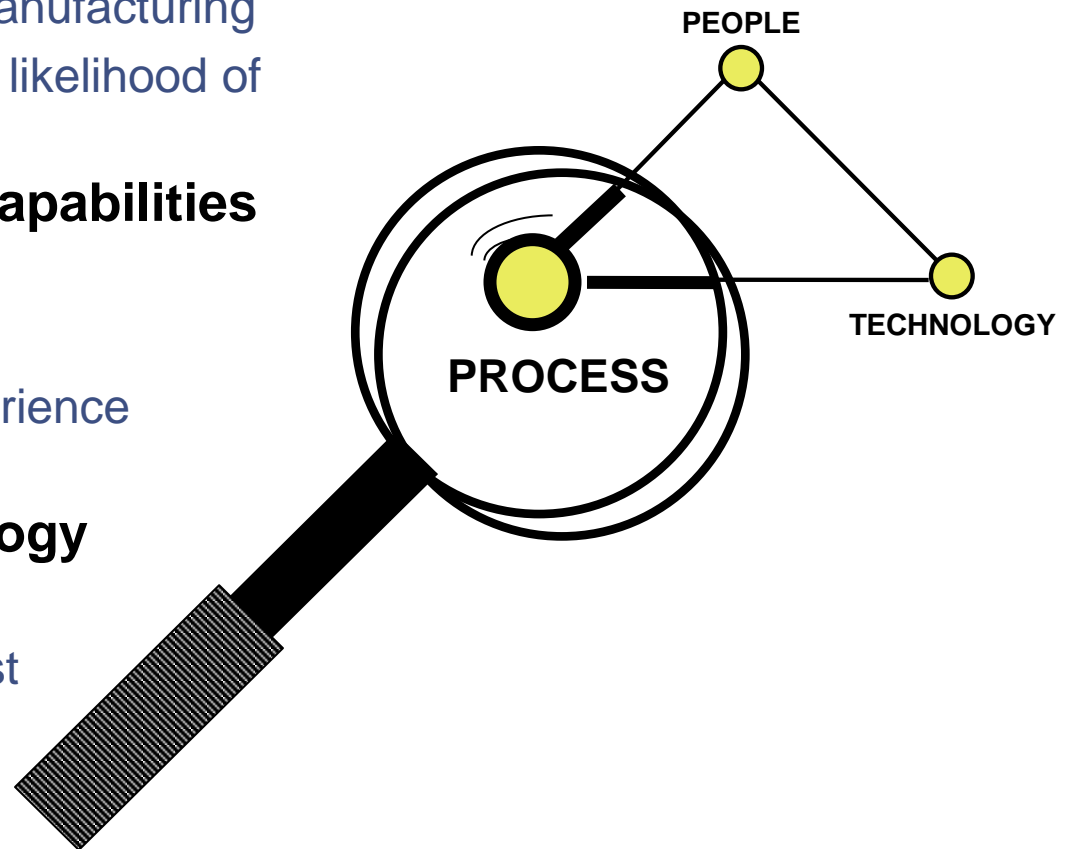
- A long-standing premise in manufacturing
- Good processes increase the likelihood of successful projects

**Process can enhance the capabilities of your workforce**

- Work smarter, not just harder
- Leverage organizational experience and best practices

**Process integrates technology with resources**

- Technology, by itself, will most likely not be used effectively



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## **What Is CMMI?**

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# What Is CMMI?

**CMMI is a model representing a collection of best practices proven effective in industry**

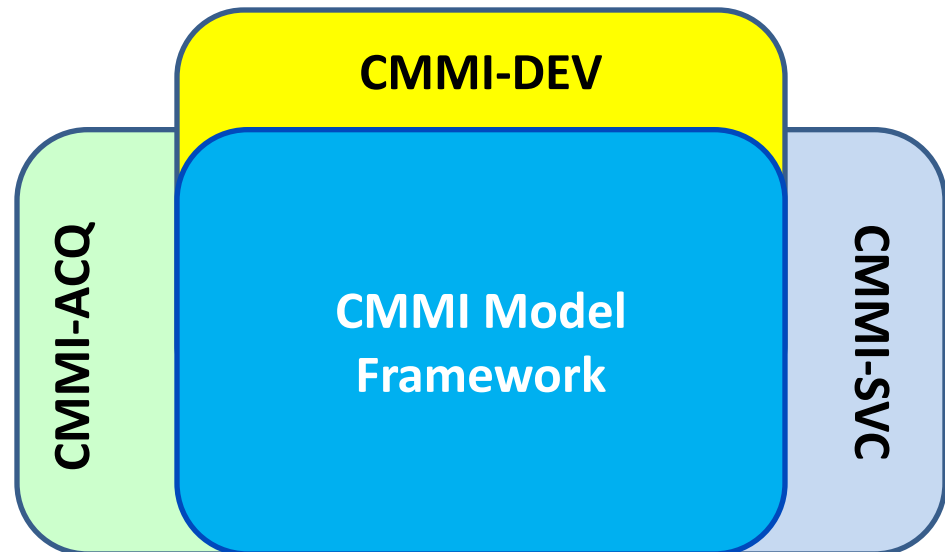
- A framework for developing, improving, and sustaining business performance
- Provides a process focus on work activities
- Developed by industry (commercial and defense), government, academia

**CMMI targets three primary environments:**

- Development -  
*Engineering a product or service*
- Services –  
*Providing services*
- Acquisition –  
*Acquiring products and services*

**The CMMI product suite consists of:**

- Models and primers
- Appraisal methods
- Training courses



Capability Maturity Model Integration (CMMI®)

# What CMMI Can Add to Your Organization

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- Integration of business processes across functions based on industry best practices
- Visible project and organizational measures aligned with achievement of business objectives
- Commonly accepted process framework for inter-company coordination and competitor benchmarking
- Repeat project successes through standardization, tailoring, and capture of organizational process assets
- Avoid project performance issues through process discipline, proactive management, and early stakeholder engagement
- Predictable project performance, with fewer surprises



# CMMI Model Overview

|                          |  |
|--------------------------|--|
| <b>Process Areas</b>     | <b>Clusters of related practices, in several categories</b> <ul style="list-style-type: none"><li>• <b>Project Management</b> – planning, monitoring, suppliers, risk, ...</li><li>• <b>Support</b> – CM, QA, measurement, decision analysis, ...</li><li>• <b>Process Management</b> – organizational processes, training, ...</li><li>• <b>Engineering</b> – requirements, development, integration, ...</li><li>• <b>Services</b> – development, delivery, transition, ...</li><li>• <b>Acquisition</b> – requirements, solicitation, agreements, ...</li></ul> |
| <b>Generic Practices</b> | <b>Enable process management, deployment and improvement</b> <ul style="list-style-type: none"><li>• Plans, monitoring, CM, stakeholders, objective evaluation, ...</li></ul>  |
| <b>Goals</b>             | <b>Describes characteristics for implemented processes</b>   |
| <b>Capability Levels</b> | <b>Achievement of process improvement within an individual process area</b>  |
| <b>Maturity Levels</b>   | <b>Achievement of process improvement across a predefined set of process areas (stages)</b>  |

# CMMI Appraisals

Appraisals compare organization and project processes against CMMI models to determine improvement priorities

Senior management's role in appraisals:

- Provide sponsorship and resources
- Set appraisal scope and objectives
- Ensure follow-through on appraisal findings and prioritized improvement actions

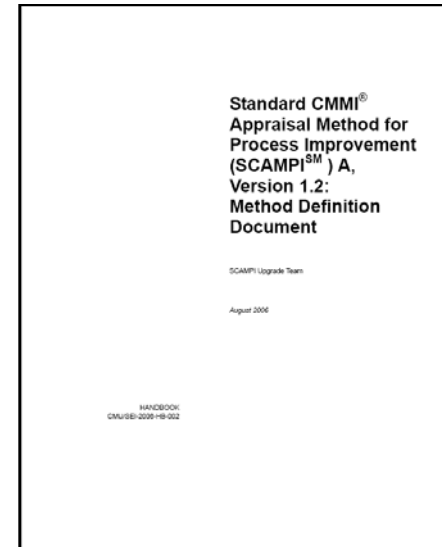
CMMI provides a family of appraisal methods, with varying intent, confidence levels, data collection, resources needed

- Flexible focus: approach, deployment, institutionalization
- Rigorous benchmark rating method (for maturity levels)
- “Quick look” diagnosis of process weaknesses

Licensed SEI partners deliver SCAMPI<sup>SM</sup> appraisal services

- <http://www.sei.cmu.edu/collaborating/partners/cmmiv1.2/>

Note that for internal process improvement, company-developed and other methods can be effective



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# Reasons You Should Adopt CMMI

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## 1. Increase customer satisfaction

- Deliver products and services that satisfy user needs
- Deliver products and services on time and within budget

## 2. Increase probability of capturing new and repeat business

- Improved ability to meet commitments
- Reduces customer-perceived risk of award to your organization
- Can be a discriminator relative to your competition

## 3. Increase profit through improved quality and less rework

- Better predict actual costs through repeatable processes
- Better visibility into projects due to established measures and analysis techniques
- Significantly reduce the probability of problem programs
- Reduce costs by capitalizing on organizational infrastructure, processes, training, tools and early/often stakeholder involvement

## 4. Increase productivity

- More efficiency through implementation of common processes, tools and training
- Improved productivity by implementing process improvement that are directly aligned key organizational goals and objectives.
- Higher employee morale and less turnover

# Benefits of CMMI-Based Process Improvement

## Many companies cite performance benefits from CMMI

- Published in conferences, articles, papers, studies, surveys, reports

## SEI collects quantitative measures of CMMI performance improvement

- Technical reports, including:
  - “Performance Results of CMMI-Based Process Improvement” (<http://www.sei.cmu.edu/pub/documents/06.reports/pdf/06tr004.pdf>)

| Performance Category                                | Median Improvement |
|---|--------------------|
| Cost  | 34%                |
| Schedule  | 50%                |
| Productivity  | 61%                |
| Quality   | 48%                |
| Customer Satisfaction                               | 14%                |
| ROI   | 4.0 : 1            |
| CMU/SEI-2006-TR-004.<br>Data from 35 organizations. |                    |

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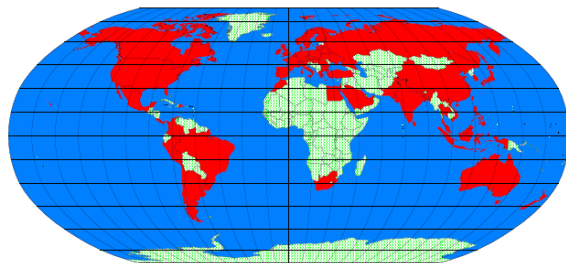
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How Can You Get Best Value from CMMI?



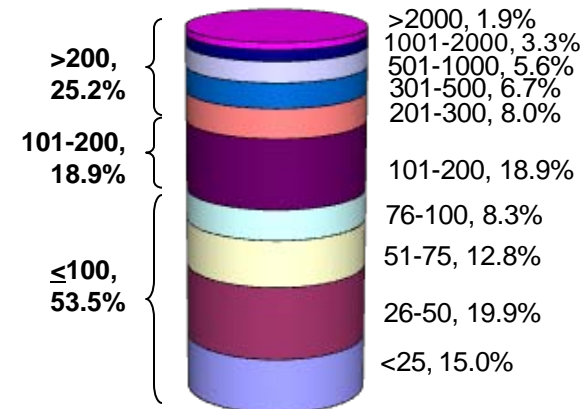
# CMMI Adoption

CMMI appraisals are conducted worldwide...



|                                    | USA  |        | Non-USA |        |
|------------------------------------|------|--------|---------|--------|
|                                    | Qty  | %      | Qty     | %      |
| Commercial In-House                | 354  | 33.6%  | 2566    | 91.3%  |
| Contractor for Military/Government | 586  | 55.7%  | 183     | 6.5%   |
| Military/Government Agency         | 113  | 10.7%  | 63      | 2.2%   |
|                                    | 1053 | 100.0% | 2812    | 100.0% |

...in small and large organizations and projects



Organization Size (Employees)  
(3863 organizations reporting)

...in a wide range of businesses

## Services (70.1%)

- Business Services
- Engineering and Management Services
- Health Services
- Other Services

## Manufacturing (16.8%)

- Electronic and Electric Equipmt
- Transportation Equipment
- Instruments & Related Products
- Industrial Machinery
- Other Mfg Industries

## Other (13.1%)

- Finance, Insurance, Real Estate
- Public Administration/Defense
- Transportation, Communication, Utilities

...at all levels of process maturity

|                              | 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)                 |

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

Based on primary Standard Industrial Classification (SIC) codes reported in CMMI-based appraisals.

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# Getting Value from CMMI

## Your Role as an Executive

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### **Set the vision and direction for CMMI-based improvement**

- Establish measurable objectives
- Be a visible sponsor – set expectations for involvement
- Manage process improvement like a project

### **Provide resources and support**

- Funding, staffing, tools
- Choose the best people to lead - respected opinion leaders

### **Keep it real**

- Maintain relentless focus on business value and program performance
- Involve projects and practitioners for the best ideas
- Hold people accountable
- Track and communicate progress
- Recognize and reward achievement

## 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/Pages/CMMI\\_Working\\_Group.aspx](http://www.ndia.org/Divisions/Divisions/SystemsEngineering/Pages/CMMI_Working_Group.aspx)

# Want to Learn More about CMMI?

## SEI CMMI web pages:

What is CMMI?

Conferences

FAQs

Models

Performance Results

Background Information

Adoption

Appraisals

Contacts



## CMMI focus topics, guidance, technical reports:

CMMI and Agile

CMMI in Small Settings

Earned Value Management

CMMI and Six Sigma

CMMI in Acquisition

SW-Only Organizations

Product Line Practices

Interpretive Guidance

Operations Organizations

## Training:

Process Improvement

CMMI Level 2-3 for Practitioners

Introduction to CMMI

Understanding High Maturity

Intermediate Concepts of CMMI

SCAMPI Appraiser training

## User Networks

SEI Partner Network

Consultants

Newsgroups, Blogs, Wikis

Conferences

Books, Periodicals, Articles

Asset Repositories

## Questions? Comments?

**Web:** <http://www.sei.cmu.edu/cmmi>

**Email:** [cmmi-comments@sei.cmu.edu](mailto:cmmi-comments@sei.cmu.edu)

**SEI Customer Relations:** (412) 268-5800, [customer-relations@sei.cmu.edu](mailto:customer-relations@sei.cmu.edu)