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DEFINING THE FUTURE

Does CMMI Benefit the Customer?

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**Rick Hefner, Ph.D.
Director, Process Initiatives
Northrop Grumman Corporation**

Background

- **Many published results show improved cost and schedule performance from adopting CMMI**
 - Is there a price to be paid for these benefits?
 - Do CMMI-compliant processes cost more?
 - What are the true benefits to the customer?
- **This presentation will examine the fundamental principles behind the model, from a customer perspective**
 - Costs and benefits
 - Techniques for working with a CMMI-compliant supplier, and ensuring the promised benefits are received

Agenda

- **Underlying CMMI principles**
- **CMMI relationship to productivity, predictability and speed**
- **Cost of implementing CMMI-compliant processes**
- **Timelines for impacting program performance**
- **Practical tips and techniques for realizing the benefits**

*SM SCAMPI, SCAMPI Lead Appraiser, and SEI are service marks of Carnegie Mellon University.
® Capability Maturity Model Integration and CMMI are registered in the U.S. Patent & Trademark Office.*

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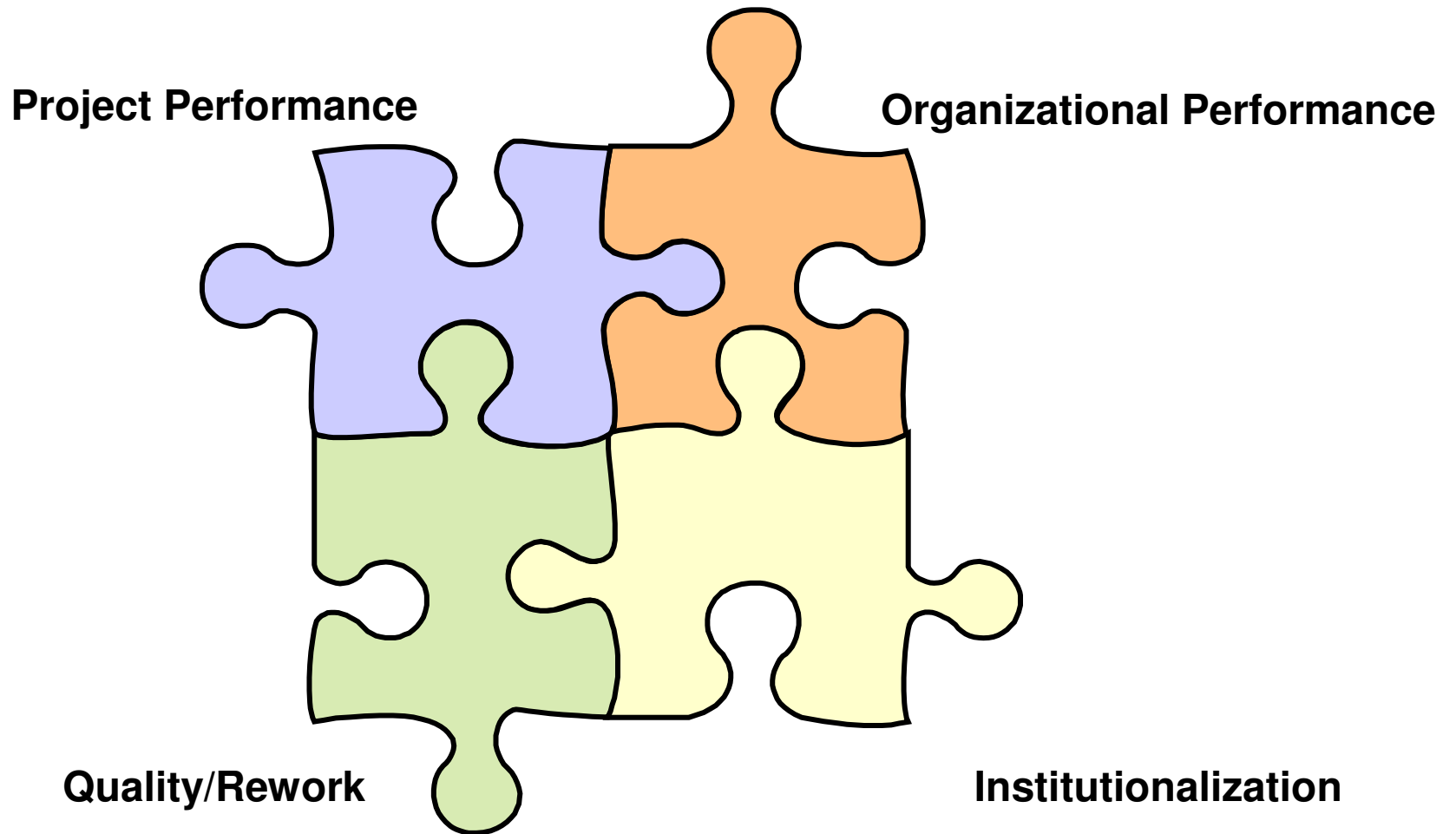
What Is the CMMI Trying to Achieve?

A model is a simplified representation of the world. Capability Maturity Models (CMMs) contain the essential elements of effective processes for one or more bodies of knowledge. These elements are based on the concepts developed by Crosby, Deming, Juran, and Humphrey.

-Introduction, CMMI

- **CMMI provides a model of industry best practices**
- **Following these practices has shown to produce software and systems faster, better, and cheaper, when properly applied**
- **The main benefits cited by CMMI users are:**
 - More predictable adherence to budgets and schedules
 - Reduced re-work (which can reduce cost and schedule)
 - Reduced risk

CMMI Provides Several Related Benefits

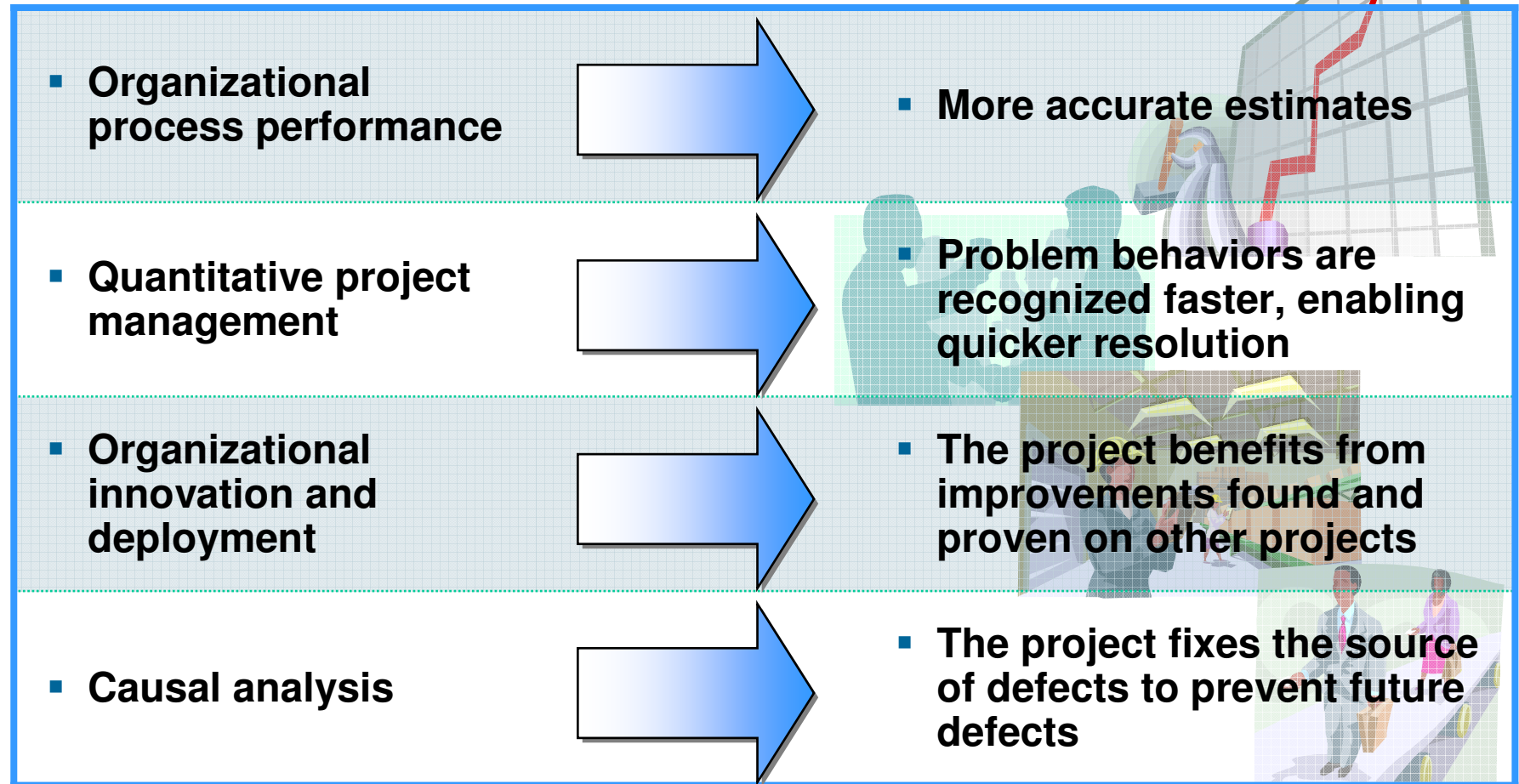


Rick Hefner, "Achieving the Promised Benefits of CMMI," CMMI Technology Conference & User Group, Denver, CO, 14-17 Nov 2005

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How Does Level 4 & 5 Benefit the Customer?



Better Products and Services Produced Faster And Cheaper

Rick Hefner, "How Does High Maturity Benefit the Customer?," Systems & Software Technology Conference, 18-22 April 2005

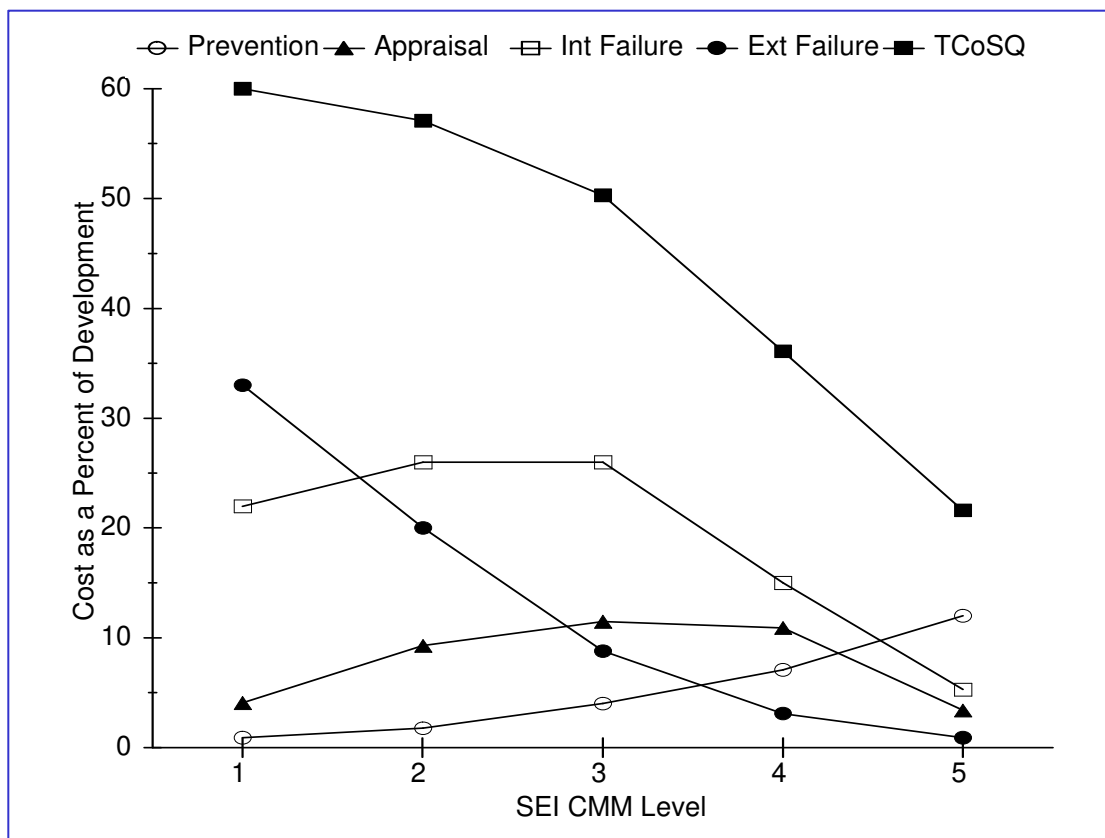
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Cost vs. Benefit

- Both theoretical models and industry data suggests that CMMI-compliant projects achieve a cost reduction of 10% per level, i.e., Level 3 is 20% cheaper than Level 1
 - The key is reducing rework

Knox Model – Theoretical Benefits



COCOMO predicts similar benefits based on current industry data

When Good Organizations Go Bad

- **Some organizations are driven to achieve a maturity level only for it's marketing value**

Improvement goals are not set realistically (“Level 5 in '05”)

Focus on passing the appraisal, not understanding and deciding among possible interpretations

Only some of the projects participate in the improvement effort

Practitioners/customers perceive CMMI as more expensive

Only some of the projects get appraised

The remaining projects don't implement

Insufficient resources (e.g., training, QA, metrics, consultants)

People don't learn or become proficient in the new behaviors

Management doesn't enforce using processes on new programs

Benefits are not realized because projects do not start up effectively

*Rick Hefner, “CMMI Horror Stories: When Good Projects Go Bad,”
Software Engineering Process Group Conference , 6-9 March 2006*

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What Does a CMMI Level Guarantee?

Decisions made on the basis of maturity level ratings are only valid if the ratings are based on known criteria.

- SCAMPI A Method Description Document

- **A CMMI appraisal indicates the organization's capacity to perform the next project, but cannot guarantee that each new project will perform in that way**
- **The CMMI methodology assumes the organization will propagating their processes to every new project**
 - An organization that gets appraised solely to demonstrate a maturity level might not have that intent
 - Organizations may not have developed the skills to roll out their processes effectively
- **A CMMI appraisal judges the maturity of the organization's processes – based upon the projects sampled**
 - New projects must embrace the new processes

Where Could Problems Arise?

- **The appraisal results may not be an accurate reflection of the organization's capability**
 - Sampling bias
 - Appraisal inaccuracies
 - Organization's inability to immediately apply their appraised processes
- **The projects within the organization may not live up to their capability**
 - Start-up problems, especially planning, subcontractors, and infrastructure
 - Problems with staffing, either as the prime or with subcontractors
 - Differences in domain experience
 - Back-sliding
- **The customer may prevent (or fail to demand) the supplier's use of their proven processes**

Appraisal Inaccuracies

- **Methodology**
 - SCAMPI A appraisals provide highly accurate appraisal results
 - SCAMPI B, C, and other appraisal methods may be useful, but they are not designed to provide the same accuracy
- **Appraiser skill**
 - There is wide variation in appraiser skill, experience and insight
 - Although appraisal experience is a crucial contributor to accuracy, the appraisal methods do little to ensure sufficient experience – method, type of organization
 - There is wide variation in how the model is interpreted, even among experienced lead appraisers
- **Appraiser independence**
 - Appraiser independence is needed to ensure unbiased results
 - It is difficult to establish a completely independent situation

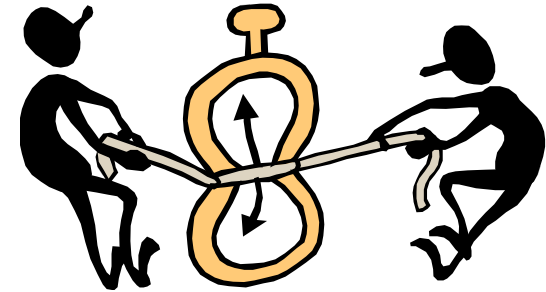
Rick Hefner, "How Does High Maturity Benefit the Customer?," Systems & Software Technology Conference, 18-22 April 2005

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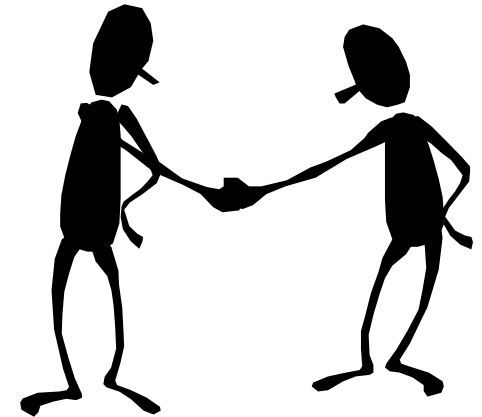
The First Three Months: Essential Project Start-Up Activities

- **Many process-related problems arise in the first few months of a project**
 - New relationships
 - Personnel changes and shortfalls
 - Pressure to produce quickly
 - Gaps between the planned processes and what was bid
- **If a project is going to live up to the organization's process capability, it is essential to fully implement the processes from the beginning**
 - Processes should be defined during the proposal, by tailoring the organization's standard process
 - Estimates should be based on historical data from the organization's measurement repository
 - Process assets (e.g., templates) should support detailed planning to ensure consistency with the organization's best practices
 - Evidence reviews should be used early to ensure CMMI compliance



Getting the Promised Benefits from a CMMI-Compliant Supplier

- **Choose the supplier wisely**
- **Let (demand) the supplier implement CMMI-compliant processes**
 - Recognize your personal experience with the processes may have been negative
 - However, the model (based on hundreds of people's/organizations' opinions and data) suggests these processes are essential
 - Ask the supplier to explain how their implementation of these processes provides value
- **Ensure the supplier uses the processes, at program start and throughout the program**
 - Ask how program start-up is controlled to ensure CMMI compliance
 - Demand an independent appraisal 3 months into the program
 - Demand continuous appraisals, at least annually



Northrop Grumman Mission Systems

Sampling bias

- ✓ Appraisals are done at the business unit level (typically 5-6 projects)
- ✓ All projects participate in SCAMPI A appraisals

Appraisal inaccuracies

- ✓ 60+ SCAMPI A's performed to date
- ✓ Six Sigma projects conducted to optimize appraisal cost and accuracy
- ✓ External lead appraisers used to reduce bias

Start-up problems

- ✓ Planning templates capture mature practices
- ✓ Review plans for compliance
- ✓ All project perform appraisals 90 days after start and annually after that

Summary

- **CMMI benefits can be achieved for all the projects within an organization if the focus is on true improvement and institutionalization**
- **The organization must ensure:**
 - Project start-up takes full advantage of the organization's capability
 - Appraisal accuracy is maintained
- **Acquirers must work with suppliers to ensure the promised benefits of CMMI are realized**