Measuring and Managing the CMMI® Journey Using GQM
Agenda

- Why change initiatives fail?
- Metrics driven initiative management
- GQM: Big picture
- GQM for CMMI® Program
- References
Two out of every three change initiatives fail.  

Why:  
- Lack of initiative alignment to business needs  
- No convincing evidence to leadership team on initiative progress  
- Initiative team size is too small  
- History of unsuccessful change initiatives  
- Inadequate indication of implementation status or progress  
- Lack of quantitative program management rigor

Measure and Manage While You Drive Change
Metrics Driven Initiative Management

Business Objectives ➔ Strategic Road Map ➔ Initiative Plan

Plan – Execute – Control Using Defined Metrics

CMMI® Initiative
- Defining Plan
- Forming process teams
- Defining organizational processes
- Implementation and training
- Process Compliance Checks
- Appraisals

Creating Initiative Memory using Metrics
GQM: Big Picture

Goal (Conceptual)
- Business goals
- Initiative objectives
- Strategy or conceptual idea

Question (Operational)
- How do we achieve goals?
- What is the plan?
- How do we execute or implement?

GQM
- Data
- Measures and metrics
- Subjective and objective metrics

Metric (Quantitative)
Typical Goals for a CMMI® program:

- Better control on IT/Software Development budget spend
- High Quality Software Delivery
- Better control over project management
- Obtain institutionalization of processes

Achieve Target Maturity Level
Translating Goals to Questions

Goal 1: Better control on budget spend

- G1Q1: How to reduce budget overrun or budget variations?
- G1Q2: What is the current effort estimation process confidence level?
- G1Q3: What are the existing budget review methods?

Goal 2: High Quality Software Delivery

- G2Q1: How to reduce # of errors reported after Implementation?
- G2Q2: What is the peer review process effectiveness?
- G2Q3: Is there a plan to reduce re-work effort?
- G2Q4: How do we improve test efficiency?
Translating Goals to Questions

- **Goal 3: Better control over project management**
  - G3Q1: What is the project management effort?
  - G3Q2: What is the compliance to project management processes?
  - G3Q3: How do we improve project management competency?

- **Goal 4: Obtain institutionalization of processes**
  - G4Q1: How do we reduce process non-compliances?
  - G4Q2: What are the current challenges in implementing PPQA?
  - G4Q3: How do we build buy-in into the processes?
Translating Questions to Metrics

Goal 1: Better control on budget spend

- G1Q1: How to reduce budget overrun or budget variations?
- G1Q2: What is the current effort estimation process confidence level?
- G1Q3: What are the existing budget review methods?

Goal 2: High Quality Software Delivery

- G2Q1: How to reduce # of errors reported after implementation?
- G2Q2: What is the peer review process effectiveness?
- G2Q3: Is there a plan to reduce cost of quality effort?
- G2Q4: How do we improve test efficiency?

Note: The metrics listed here are only a representative sample
### Translating Questions to Metrics

#### Goal 3: Better control over project management

<table>
<thead>
<tr>
<th>Question</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3Q1: What is the project management effort?</td>
<td>% PM effort for a given project size</td>
</tr>
<tr>
<td>G3Q2: What is the compliance to project management processes?</td>
<td>Compliance to PM processes</td>
</tr>
<tr>
<td>G3Q3: How do we improve project management competency?</td>
<td>PM skill Training effort</td>
</tr>
</tbody>
</table>

#### Goal 4: Obtain institutionalization of processes

<table>
<thead>
<tr>
<th>Question</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4Q1: How do we reduce process non-compliances (NC)?</td>
<td>NC count per PPQA effort spent</td>
</tr>
<tr>
<td>G4Q2: What are the current challenges in implementing PPQA?</td>
<td>Generic Practices NC Score</td>
</tr>
<tr>
<td>G4Q3: How do we build buy-in into the processes?</td>
<td>Average Age of Unresolved NC</td>
</tr>
</tbody>
</table>

**Note:** The metrics listed here are only a representative sample.
Translating Questions to Metrics

Big Goal: Achieve Target Maturity Level

BGQ1: What is the CMMI® program plan for targeted maturity level?
BGQ2: Is the performance of the initiative on track?
BGQ3: What is the health of implementation for all Process Areas?

% Schedule variance as per defined plan
Process Area wise Compliance Score to SPs
Compliance to CMMI® Program Staffing Needs

Selected Goal 1 metrics performance
Selected Goal 2 metrics performance
Selected Goal 3 metrics performance
Selected Goal 4 metrics performance

Note: The metrics listed here are only a representative sample
Process to arrive at health of CMMI® Program

Plan
- Data collection and validation
- Management review mechanism
- Identifying corrective actions
- Stakeholders communication
Example:

1. Select Metrics Set
2. Define Performance Targets
3. Compute Performance
4. Aggregate Program Performance

**OPF Process Area (PA)**
- Compliance Score for SPs

**5 – Max Compliance**
- 1 – Min Compliance
- 6 – SPs in OPF
- Max Score = 30
- Min Score = 6
- Month 1: Target > 70
- Month 2: Target > 80
- Month 3: Target > 90

**In first month:**
- Actual score = 22%
- % = 100 * 22/30
- % = 73%

**Metric Performance is GREEN**

*Note: The targets defined are only sample values*
### Sample Program Dashboard:

<table>
<thead>
<tr>
<th>Metric</th>
<th>Month 1</th>
<th>Month 2</th>
<th>Month 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1Q1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G1Q2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G2Q1</td>
<td></td>
<td></td>
<td>Sample</td>
</tr>
<tr>
<td>G2Q3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G3Q4</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>G4Q1</td>
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<tr>
<td>G4Q2</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>BGQ1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>BGQ3</td>
<td></td>
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</tbody>
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### Benefits:
- Metric driven initiative management
- Visibility into early warning signals
- Initiative alignment to business goals
- Better stakeholders communication
- Readiness indicator for appraisals
- Strengthens metrics program

*Metrics Driven CMMI® Initiative Management*

2. CMMI®: Guidelines for Process Integration and Product Improvement Mary Beth Chrissis, Mike Konrad and Sandy Shrum; Addison-Wesley Professional


Thank You

e-mail: Rajendra.T.Prasad@accenture.com