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Measuring and Managing the CMMI® Journey Using GQM

- ➢ **Why change initiatives fail?**

- ➢ **Metrics driven initiative management**

- ➢ **GQM: Big picture**

- ➢ **GQM for CMMI® Program**

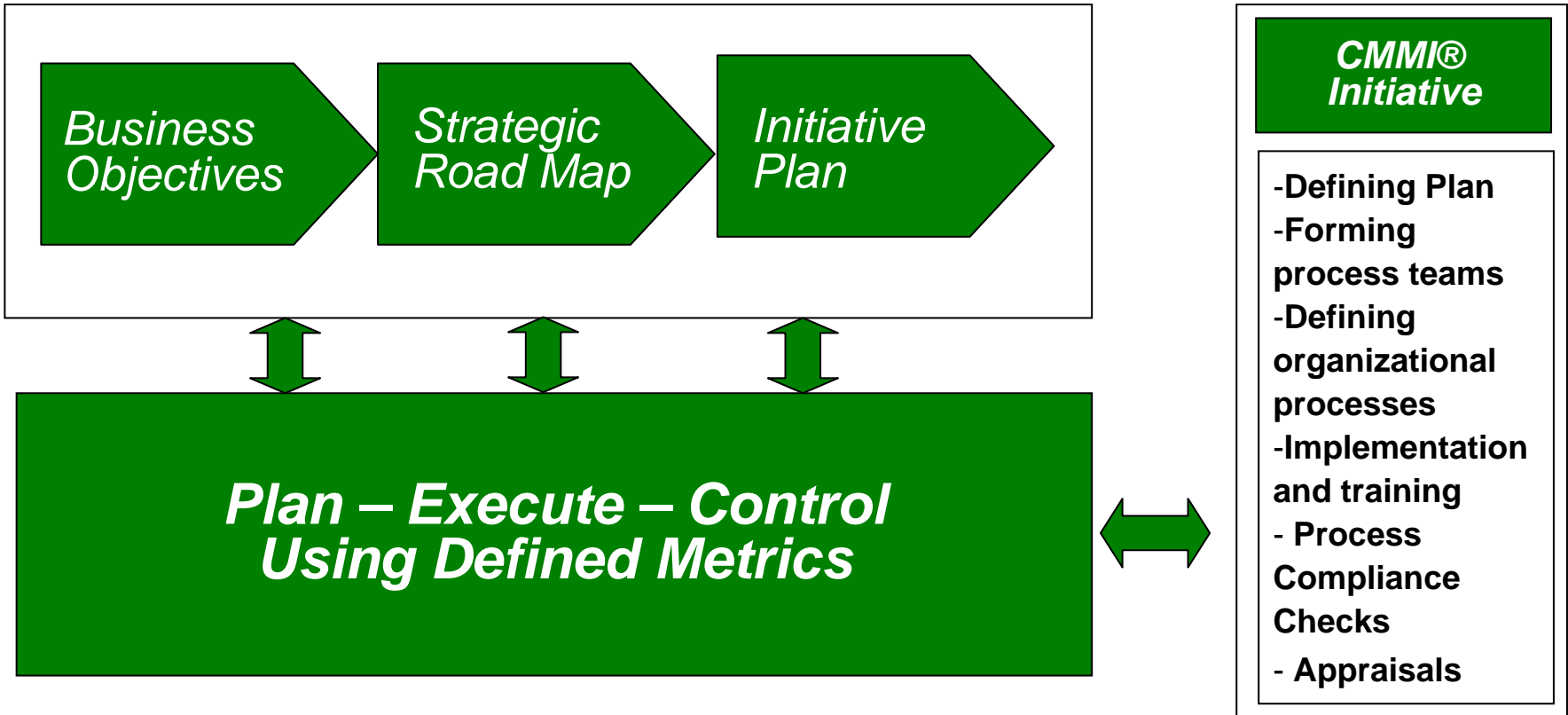- ➢ **References**

Why change initiatives fail?

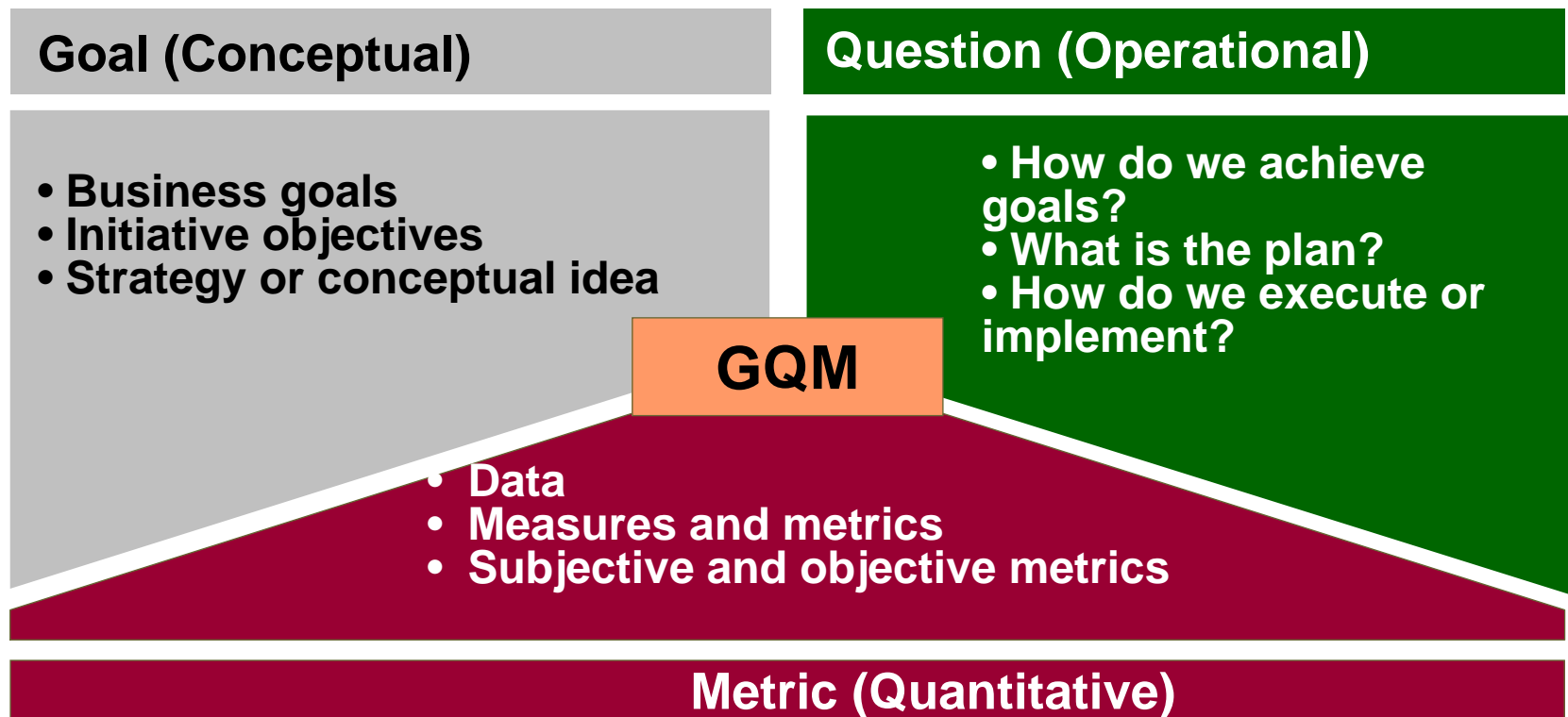**Two out of every three change initiatives fail.**

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 ?*

Note: The questions listed here are only a representative sample

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?*

Note: The questions listed here are only a representative sample

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?*

Phase wise effort Variation	Estimation Model Confidence Index	Earned Value Metrics	Effort Performance Index

➤ *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 ?*

Defect Removal Efficiency	Phase wise Review efficiency	% of Cost of Quality	Testing activities efficiency

Note: The metrics listed here are only a representative sample

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Translating Questions to Metrics

➢ *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?*

| *% PM effort for a given project size* | *Compliance to PM processes* | *PM skill Training effort* | *Schedule Variance* |

➢ *Goal 4: Obtain institutionalization of processes*

? *G4Q1: How do we reduce process non-compliances (NC)?*
? *G4Q2: What are the current challenges in implementing PPQA?*
? *G4Q3: How do we build buy-in into the processes?*

| *NC count per PPQA effort spent* | *Generic Practices NC Score* | *Average Age of Unresolved NC* | *Compliance to PPQA/SEPG Staffing* |

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

Select Metrics Set →	**Define Performance Targets** →	**Compute Performance** →	**Aggregate Program Performance**
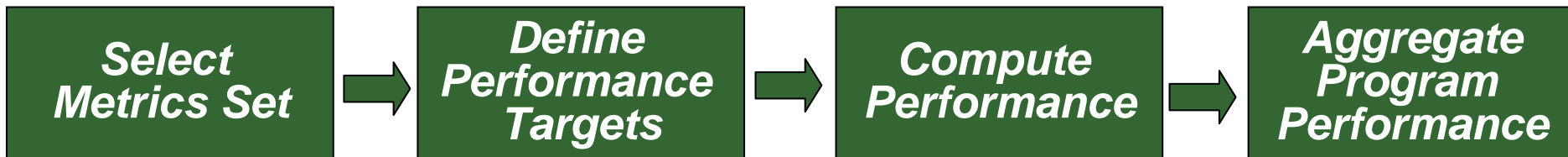
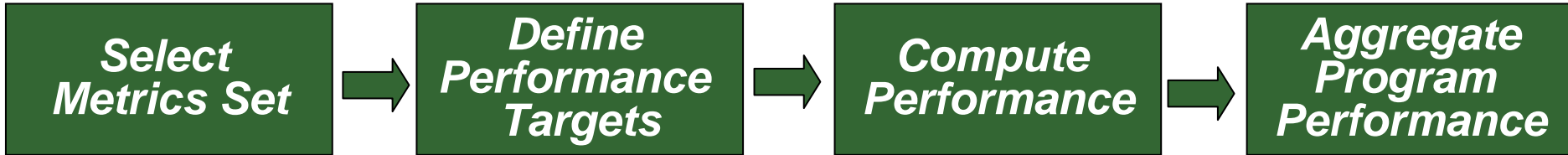| **Plan** |
|---|
| •**Data collection and validation**
•**Management review mechanism**
•**Identifying corrective actions**
•**Stakeholders communication** |

Example :

Select Metrics Set	→	Define Performance Targets	→	Compute Performance	→	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:

Metric	Month 1	Month 2	Month 3
G1Q1			
G1Q2			
G2Q1			
G2Q3			
G3Q4			
G4Q1			
G4Q2			
BGQ1			
BGQ3			

Sample

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

1. <u>Experiences in implementing measurement programs, Wolfhart Goethert, Will Hayes, Nov 2001, CMU/SEI-TN-026</u>

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

3. The Software Engineering Laboratory Web site: http://sel.gsfc.nasa.gov/website/exp-factory/gqm.htm

4. http://www.sei.cmu.edu/cmmi/

5. The hard side of change management, by Harold L Sirkin, Perry Keenan and Alan Jackson , Harvard Business Review, October 2005

Thank You
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