Planning for Return on Investment for CMMI™ Process Improvement

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Agenda

- Definitions
- Context for ROI
- Objective
- Scope for ROI Measurement
- Hypotheses
- Plan for ROI
- Improvement Data
- Estimates for Improvement & ROI
- Manage ROI
- Key Points
Definitions

- Return on Investment (ROI) – benefit per investment
- Process improvement efficiency – effort and time to institutionalize an improvement
- Process element – subprocess; component of a development process applied to a specific work product, e.g. peer review of a design
- Productivity – size divided by staff month
- Quality – product defects per size of work product by phase
- Defect – anomaly from a review or test activity of a work product
- Benefit (direct) – increase in productivity, decrease in effort, increase in quality; converted to dollars
- Benefit (indirect) – qualitative benefits, e.g. less stressful work environment
Context cont.
Objective

- Use ROI measure to improve the efficiency of Program and Division Process Improvement (PI); support decisions in planning and executing PI
- Understand and quantify the benefits of PI
  - Project and Program
  - Division
Scope for ROI Measurement

- **Organization level:** IPT
- **Life cycle:** Requirements development to System Test
- **Process:** Process element
- **Products:** System product deliverables
- **Performance:** Productivity & Quality
- **Time:** Process period or milestone, e.g. completing integration, reaching a process level
- **Engineering:** Software & Systems
Hypotheses

- Investment in CMMI process improvement will
  - increase product quality by X%
  - Increase productivity by Y%

- Return on Investment will be initially ~1 for the first year and increase W% per year
Plan for ROI

- Collaborate with SEI
- Integrate this ROI study with program/project Measurement & Analysis Process
- Use ROI to guide program PI
  - Approach: ‘CMMI’ generic pattern, i.e. generic practices; control systems paradigm
  - Responsibility: Project process leads
  - Resources: Division CMMI Process Initiative
  - Preparation: Informal – SEI & literature
  - Reporting: Senior management review
Plan cont.

- **CMMI Level 3 Activity**
  - Baseline for ROI
  - CMMI Readiness Appraisal
  - CMMI Appraisal
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  - CMMI Appraisal

- **Timeline**
  - 6 months
  - 6 months
  - 6 months
  - 6 months

- **Improvement & ROI estimation point**
Improvement Data

- 8 to 12% per year industry improvement in productivity, cost, and quality (Reifer)
- CMM PI productivity gain of 9 to 67%; quality gain of 10 – 94%; ‘ROI’ of 4 - 8 (SEI)
- Product quality increases with CMM level by a factor of 1 - 2; cycle time decreases by a factor of .1 - .2; effort decreases by a factor of .1 (Harter, Krishnan, Slaughter)
- Division goals of 12% productivity improvement and quality improvement of 15% per year (based on division history)
- CMMI implementation equals ROI average of 7 (Solinger)
- Other (Project Historical Data)
Goals for Improvement and ROI

- Process Improvement estimates
  - Product quality increase: 15%
  - Productivity increase: 12%

- ROI estimates
  - 1 - 2 for process elements
Manage ROI

- ROI at the project IPT level can be aggregated to obtain project and program ROI
- Costs for ROI include support of division PI which may benefit other programs only
- ROI is calculated over a set of process enactments over a period, typically a phase, or at appraisal events; these measures can be aggregated for a fixed period, e.g. a year
- PI improvements are dependent on life cycle phases and work products
- ROI for the program will differ from the division
- ROI will differ among engineering disciplines (IPT’s)
Manage ROI cont.

Improvement & ROI Estimates

PI activity → Process activity

Benefits
- productivity gain
- effort decrease
- cycle time decrease
- rework decrease
- quality gain

ROI actuals

Costs
- CMMI planning
- Process Development
- Training
- Division reviews
- Deployment
- Appraisals
- Execution
Key Points

- Manage ROI in the same way as other measures
  - Establish ROI goal
  - Track ROI measure during development and take corrective action
- Use ROI to manage PI
- Process element is the appropriate level for ROI calculation
- Need to reconcile program and division ROI