Overview of a Business Case for CMMI[SM]-Based Process Improvement

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Topics

- Why Perform a Business Case?
- Business Case Process
  - Key Considerations
  - Business Drivers/Inputs
  - Costs
  - Benefits
  - Outputs
- Business Case Lessons Learned
- Summary and Conclusions

Why Perform a Business Case?

- Do our process improvement goals make sense from a business perspective?
- What is the benefit of being “assessed at” a level vs. “operating at” a level?
- What is the benefit of moving from CMM/CMMI Level m to Level n?
- What is the relative return on the SW CMM vs. the CMMI?

The business case is a tool to validate our process improvement goals from a financial perspective.

Business Case Process

- Collaborative team effort to:
  - Identify business drivers and inputs
  - Define alternative scenarios
  - Identify costs of scenarios
  - Identify benefits of scenarios
  - Evaluate results
  - Prepare presentations
- Benefits structured around a Balanced Scorecard
- Organizational and industry data applied where appropriate and available
- Output is team consensus

Used the Software Productivity Consortium's (SPC's) "Business Case Workshop"

Key Considerations

- Just maintaining a CMM/CMMI level requires investment
- Benefits result from operating at an improved level of maturity, not from just getting there
- Some benefits may not be financial, but can still can be “valued”
- Weaknesses at lower levels of maturity increase risk and cost of achieving higher levels of maturity
- Attractiveness of alternatives depends on actions of current and potential competitors and customers

Business Drivers

- External Factors
  - Table Stakes
  - Marketplace Competitiveness
  - Industry Standards Superceded
    - ISO 9001:1994 to :2000 (Dec 2003)
    - SEI SW CMM to CMMI (Dec 2003)
  - Competition
  - Customer Expectations and Satisfaction
- Internal Factors
  - Enabler to Meet Company Financial Commitments
    - productivity
    - delivery/ performance
    - quality
  - Support Projected Growth Objectives
  - Company Integration
  - Internal Customer Satisfaction

Business Case Inputs

Each business unit answered the following questions:

1. What are the major business areas involving engineering?
2. What types of contract vehicles are used?
3. How much engineering development and support activity goes on?
4. How much new business opportunity depends on engineering?
5. What are the current levels of performance?
6. What is the current level of employee satisfaction?

Solid inputs are key to a successful business case.

Need to Determine Scenarios

- Candidates depend on where you are and where you want to go. Some options:
  - Do not invest -- agree to regress
  - Maintain existing CMM/CMMI levels
  - Advance to SW CMM Level n [operating at, assessed at]
  - Advance to CMMI Level n [operating at, assessed at]
  - Others? (e.g., ISO 9001:2000, 14000, 18000)
- Select scenarios carefully
  - Determines the magnitude of the business case task
  - Determines the presentable outputs

Select the minimum number of scenarios.

Cost Elements for the Business Case

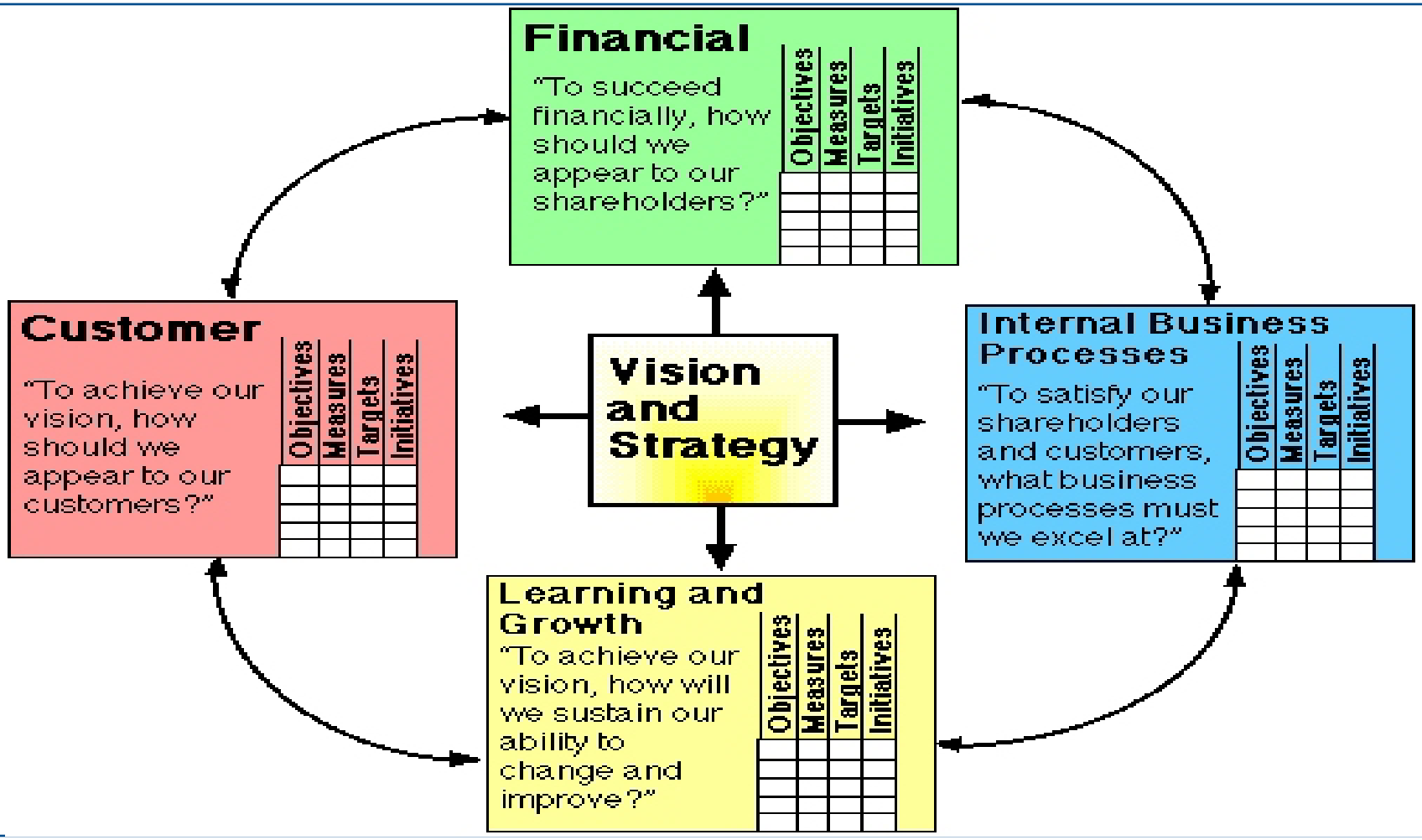
- Process improvement activities
  - SEPG, EPG, CMM, CMMI, etc.
- CMM/CMMI External Assessments
  - External assessment team (both fees & costs)
  - Internal assessment participants
- Training
  - Ongoing development, delivery, and maintenance
- Project Impact
  - Cost of adopting on projects
- Management Attention
  - Involvement and participation

Output → team consensus of costs by year for each scenario.

Typical SW CMM Costs
(Industry data, per the SPC)

Cost Element	Current State
SEPG	2 – 10% of software staff
External Assessment Team	$40,000 – 100,000 per event
Assessment Participants	400 hours per event
Training	4 – 8 hours per KPA per person

Benefits Organized Around a Balanced Scorecard Approach



Benefit Elements for the Business Case

- Financial performance
  - ↗ Profits →Adjust Current Margin
  - ↗ Sales/Market Share → Increased Probability of Win
- Customer
  - ↗ Cost/Schedule Performance → Increased Predictability
- Internal Business Processes
  - ↗ Productivity → Increased Productivity
  - ↗ Quality → Decreased Delivered Defects
  - ↗ Cycle Time → Decreased Elapsed Time
- Learning and growth
  - ↗ No credit taken

Typical SW CMM Benefits
(Multipliers by level change, per the SPC)

Benefit Element	How Estimated	L2	L3	L4	L5
Profits	Adjust Current Margin				
Sales/Market Share	Increased Probability of Win	1.05	1.05	1.05	1.05
Customer Satisfaction	Increased Predictability	1.1	1.1	1.2	1.3
Productivity	Lines per Hour	1.2	1.2	1.6	1.2
Quality	Defect Rate	0.4	0.46	0.5	0.61
Cycle Time	Elapsed Time	0.5	1.0	0.5	0.5
Learning & Growth	New Technology				

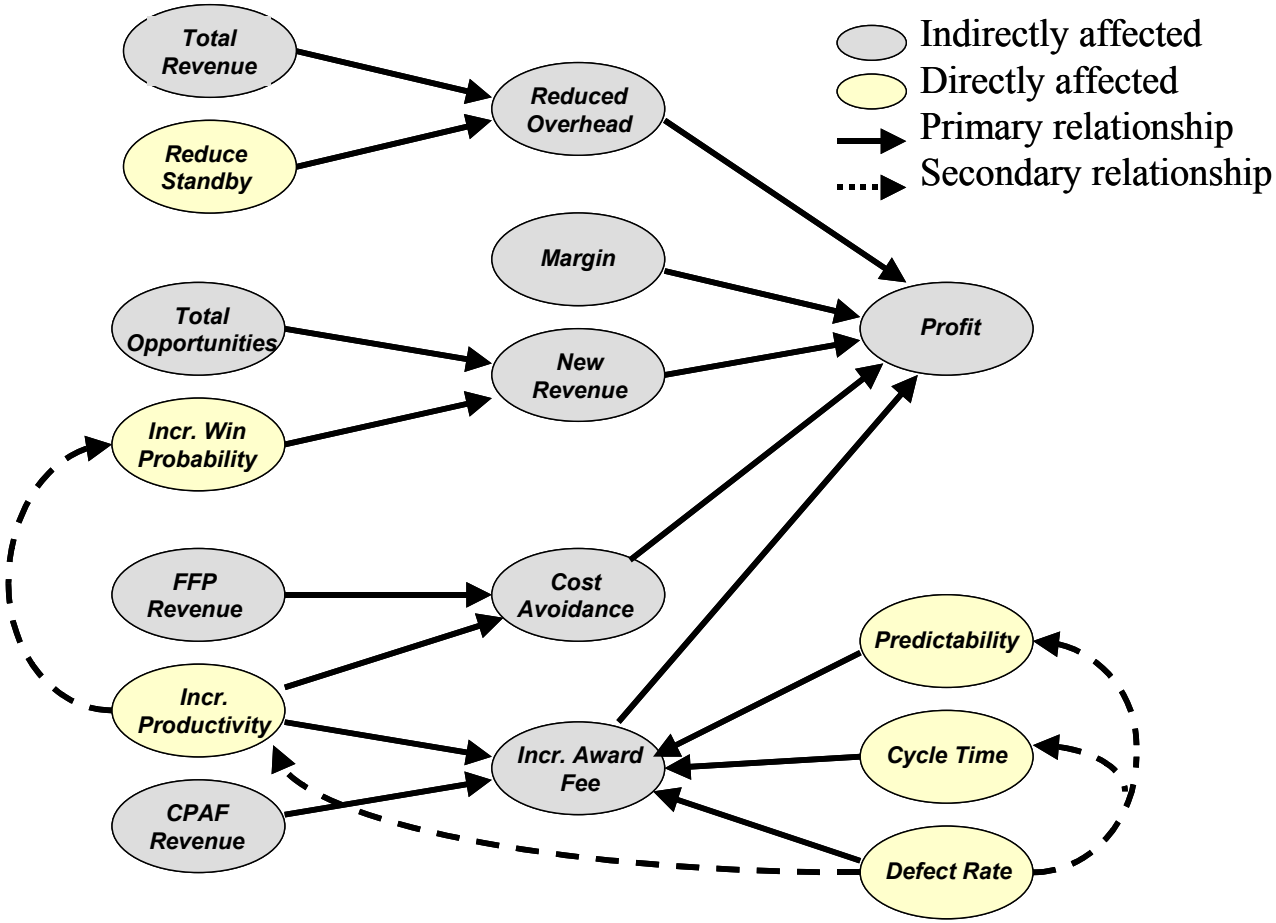
References: M. Diaz and J. Sligo, How Process Improvement Helped Motorola, ***IEEE Software***, September 1997; SEI website and reports (www.sei.cmu.edu); B. Clark, The Effect of SEI-CMM Maturity on Software Effort, ***IEEE Software***, November 2000; SPC Business Case Workshop

CMM/CMMI Benefits Multipliers Used

Benefit Element	How Estimated	CMM L2→L3	CMMI L2→L3	CMM L3→L5	CMMI L3→L5
Profits	*Value Network*				
Sales/Market Share	Increased Probability of Win	1.05	1.1	1.1	1.15
Customer Satisfaction	Increased Predictability	1.1	1.15	1.56	1.75
Productivity	Output per Hour	1.08	1.08	1.15	1.15
Quality	Defect Rate	0.46	0.4	0.3	0.25
Cycle Time	Elapsed Time	1.0	1.0	0.95	0.9
Learning & Growth	*No Credit Taken*	N/A	N/A	N/A	N/A

Notes: Values reached by team consensus. Some values adjusted for GDAIS environment or actual data.
CMMI multipliers assume some nominal (conservative) increase over SW CMM in some cases.

Benefits Value Network



Business Case Outputs

- Financial return based on costs and benefits converted into a series of annual cash flows
  - Annualized Return on Investment (ROI)
  - Net Present Value (NPV)
  - Internal Rate of Return (IRR)
- Calculated for each scenario of interest
  - Operating At
  - Assessed At
  - CMM vs CMMI

The scenarios showed a significant positive return.

Lessons Learned

- Business case process from the SPC was invaluable
- Take the time to provide solid inputs and cost estimates
  - Inputs from the LRSP and SBUs take time and effort
  - Industry expert from the SPC was key
  - Team consensus and organizational buy-in critical
- Use a conservative benefits model with a Balanced Scorecard approach
  - Leverage industry data for SW CMM, derate some factors
  - Estimate conservative CMMI improvements over SW CMM
  - Delete questionable benefits factors
  - Derate the realized benefits (e.g., 25%, 50%, 100% by year)
- Work with the intended audience in advance
  - Senior leadership
  - Don’t neglect Finance
  - Use concise presentation material, be flexible

Summary & Conclusions

- GDAIS used a business case to validate our process improvement goals from a business perspective
- GDAIS partnered with the SPC to produce the business case
- The business case was a success
  - Allowed all the key questions to be answered
  - Showed positive returns
  - Was accepted by the senior leadership team