

**What is the ROI of SPI?**

**Next question please ...**

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# Introduction



Thesis:

- If the costs of doing SPI are viewed as an investment, then the payoff must be expressed in a temporally-shifted, return-on-investment (ROI) model.

Question:

- Do you agree?

# Definition ROI



Traditional:

- *For a given use of money in an organization, the ROI (return on investment) is how much profit or cost saving is realized. An ROI calculation is sometimes used along with other approaches to develop a business case for a given proposal.*

Questions:

- Do you use an ROI-analysis for your SPI program?
- How often is it revisited, updated?

# Formulae



$$\begin{aligned} ROI &= \frac{\textit{net benefits}}{\textit{cost}} \times 100\% \\ &= \frac{\textit{benefits} - \textit{cost}}{\textit{cost}} \times 100\% \end{aligned}$$

# Definition SPI



Krasner (2001) defines SPI as:

- *The primary mechanism for achieving maturity and bottom line results in a specific organization is a focused, structured, and institutionalized program of continuous software process improvement (SPI). This requires the cyclic application of a model-based improvement method. In addition to a well defined set of improvement objectives, such a method may use one or more of several popular goal oriented models for guiding the improvement program.*

# Some Problems



- Benefit areas are often stated at project level (like delivery precision), not at business performance level (like increased market share)
- The correlations between cost and benefits are non-trivial, may cross calendar/fiscal years and may not apply in fixed revenue/budget situations
- Future projects may have very different characteristics than current and past projects, making comparisons difficult
- The observable payoff is normally delayed in time, due to the complexities of deployment, institutionalization and culture change as well as lead-time of projects
- Some of the biggest benefits of SPI cannot be expressed in monetary terms (better job satisfaction, increased ability to attract, retain and grow experts, company reputation, etc.)
- Although CMMI level X is not considered an appropriate objective, it seems the most commonly seen objective in reality
- Many organizations do not have reliable data regarding their current performance, making it hard to justify a process improvement investment

# By the way (1) ...



How financially-informed are your decisions?

- How did you buy your house?
- How did you select your partner?
- How did you accept your new job?
- What are the savings using a checklist for whatever purpose?

Conclusion:

- People and organizations agree to the usefulness of ROI-calculations as input to their decisions, but in reality
  - Identifying benefit and cost areas, and assigning values is non-trivial
  - Predicted benefits are often optimistic and not based on reliable data
  - Evaluations and updates of business cases are often ‘forgotten’

Question

- Do you recognize this?

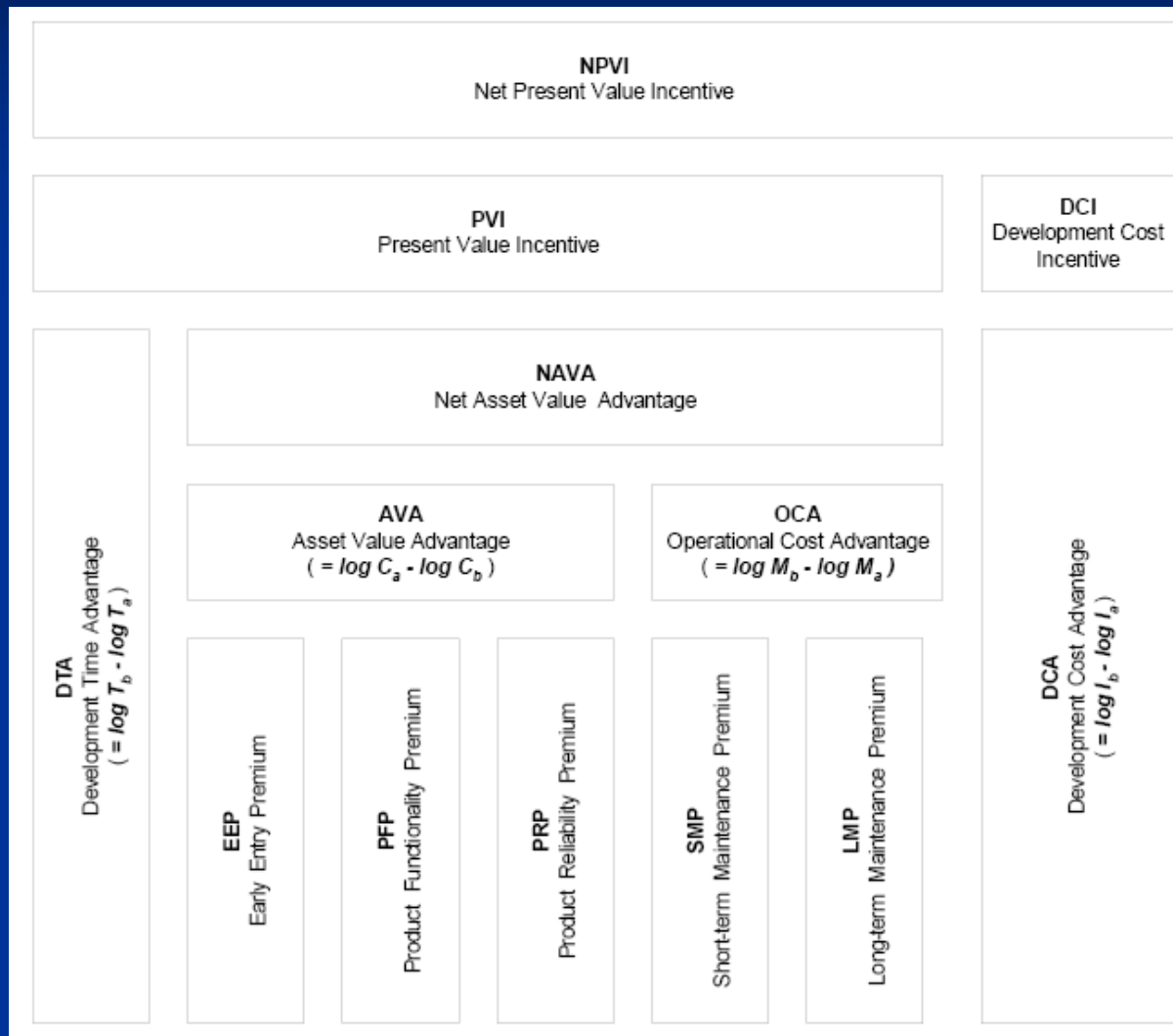
# By the way (2) ...



Suppose the calculated ROI is 'x'

- Is this an acceptable value to you?
- If yes, what are your decision criteria?
- If no, what is the threshold value?
- What is the calculation model used?
- How were estimates for input parameters obtained?
- How reliable are they?
- What is the standard deviation?
- ...

# By the way (3) ...



# Alternative Approach (1/2)



- Do not use the traditional definition of ROI only, which normally focusses on a cost of quality approach, trying to reduce or eliminate rework by preventing downstream defects
- In addition, define business strategy/objectives and determine what is needed to meet those objectives
- This is a pull-approach instead of a push-approach

# ROI redefined



*If an organization has immediate objectives of getting market revenue share, building infrastructure, positioning itself for sale, or other objectives, a return on investment might be measured in terms of meeting one or more of these objectives rather than in immediate profit or cost saving.*

# Alternative Approach (2/2)



- In addition, look at the business value of new opportunities created when reaching higher ‘maturity’
  - Increased access to ‘total addressable market’
  - More money available to do whatever felt feasible
- Include in your business strategy/objectives those opportunities and determine how ‘mature’ you have to be to meet those targets
- But what is ‘maturity’?

# What is Maturity?

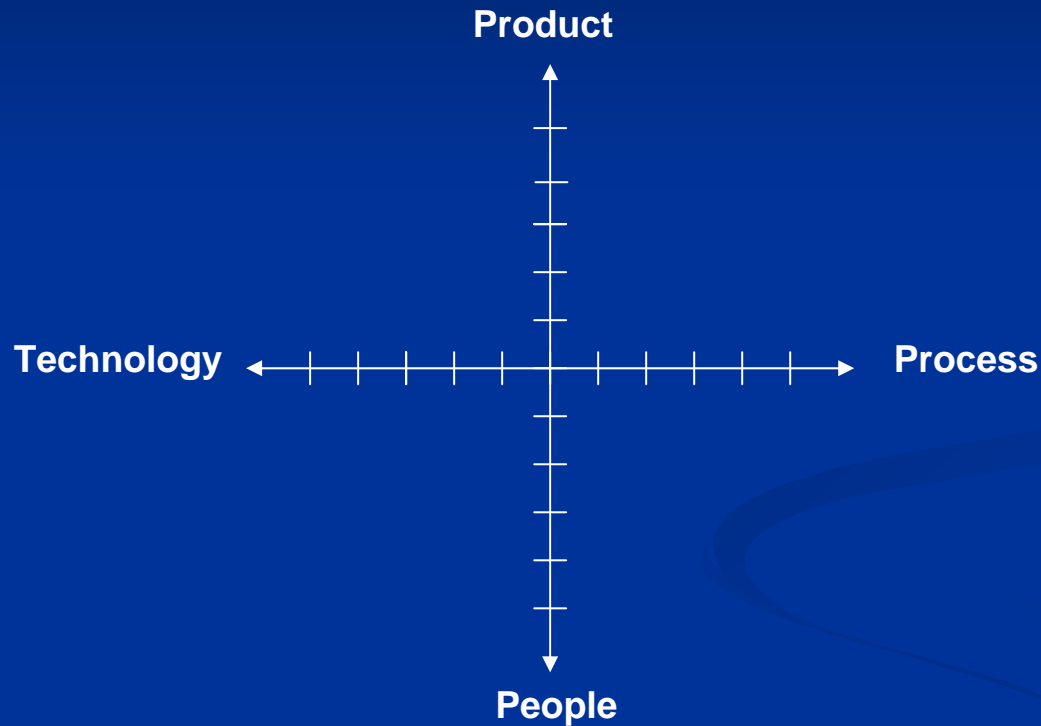


## Krasner (2001):

- Quality is defined and therefore predictable (*product*)
- Costs and schedules are predictable and normally met (*process*)
- Processes are defined and under statistical control (*process*)
- Roles and responsibilities are clear - interdisciplinary communications are good (*people*)
- Software measurement discipline is practiced (*process*)
- Success rides on organizational capability, and individual talent flourishes within that (*people*)
- Technology that supports the process is used effectively (*technology*)
- Staff development practices for software talent growth are established and effective (*people*)
- Management and staff are committed to total quality and continuous improvement, and results are obvious (*process*)

Note that these characteristics address different dimensions, not process only!

# Engineering Maturity



Question: how 'mature' must an organization be to meet its business strategy?

# Balanced Engineering Scorecard



## Theses

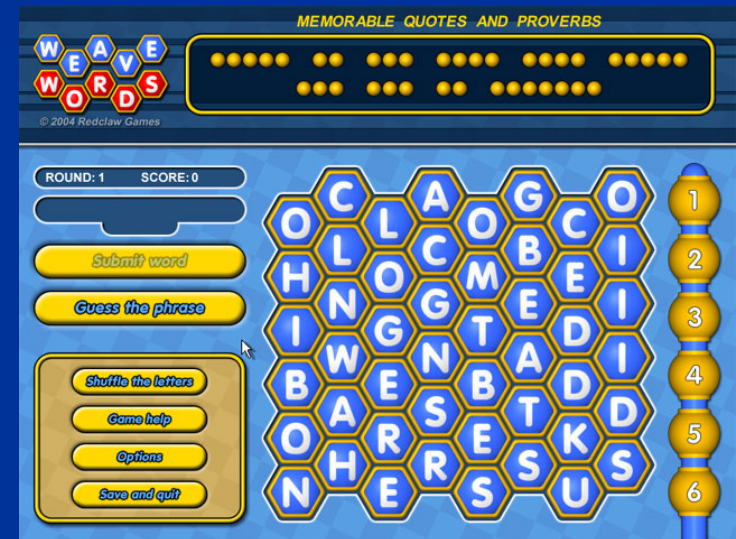
1. Desired maturity levels follow from business strategy
  - An optimum exists: level 5 for each dimension should not necessarily be the ultimate goal
2. Differences in desired maturity levels  $\leq 1$ 
  - Optimal maturity levels have to be balanced: a high-quality *product* requires a high maturity *process*, state-of-art *technology* and well-trained *people* and vice versa
3. Difference between current and desired situation demonstrates under- or overperformance
  - Non-performance means waste of time, money, resources, ...
  - A Level 5 process can still produce a Level 1 product and vice versa, but in those cases there is a high potential for efficiency (process) and effectiveness (product quality) improvements

# Level 5 versus Level 1-2



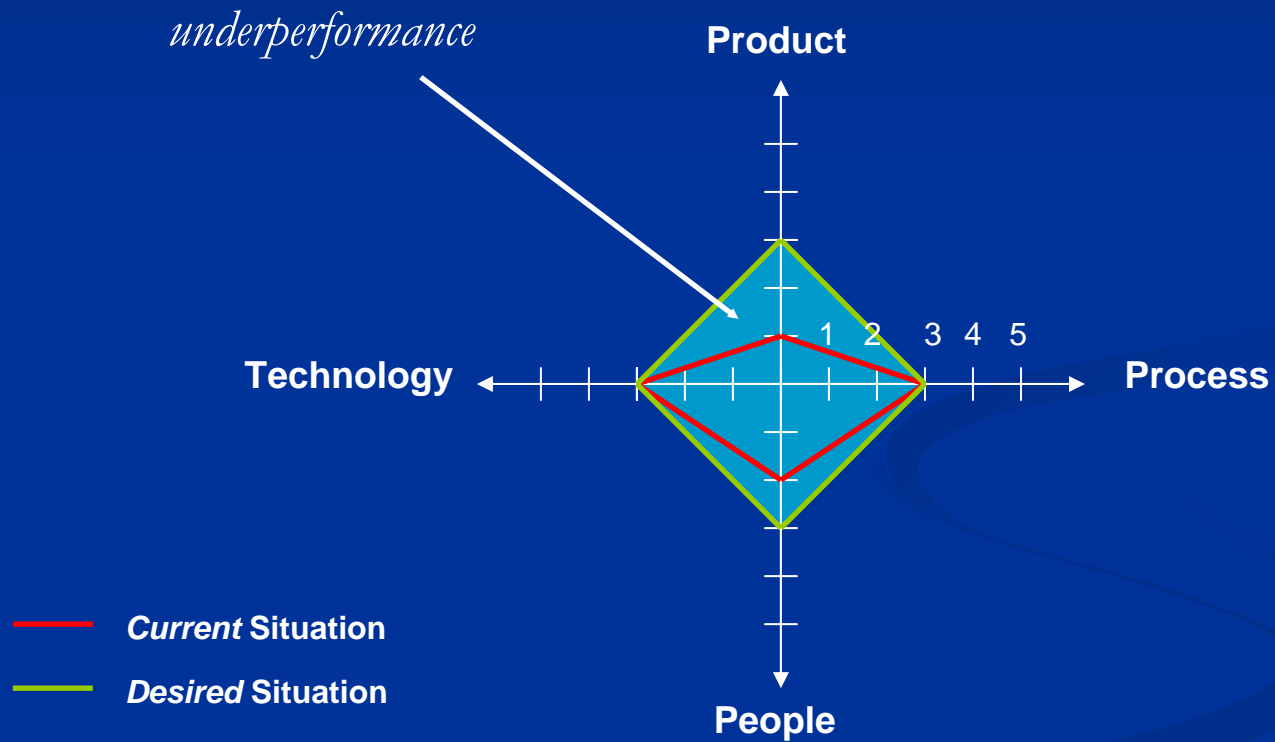
Challenger

## Hobby project

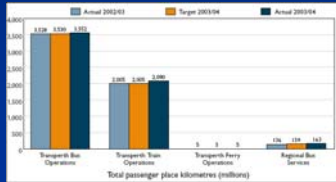


*Different product requirements -> different technologies, different processes, different people*

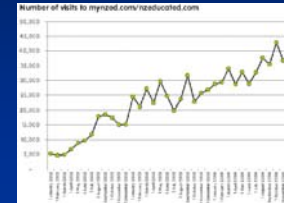
# Balanced Engineering Scorecard



# Balanced Engineering Cockpit



<u>Product</u>			
<i>goal</i>	<i>tgt</i>	<i>act</i>	<i>measure</i>



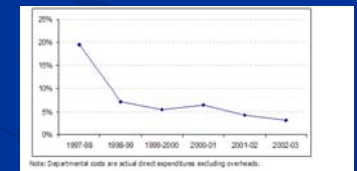
<u>Technology</u>			
<i>goal</i>	<i>tgt</i>	<i>act</i>	<i>measure</i>



<u>Process</u>			
<i>goal</i>	<i>tgt</i>	<i>act</i>	<i>measure</i>



<u>People</u>			
<i>goal</i>	<i>tgt</i>	<i>act</i>	<i>measure</i>



# What is the ROI of SPI?



It can be argued that it is the wrong question because

- It proves lack of awareness regarding current and desired organizational performance
- This uncertainty cannot be easily reduced/eliminated by inaccurate guesses

Instead:

- An organization should not ask for an SPI business case, but provide the money in the belief that it will be a necessary investment: “It is the right thing to do“
- This is what we call commitment and leadership and requires awareness
- This still requires an understanding of expected cost but less of expected financial benefits
- Business cases with ROI calculations (cost and benefits) are considered more useful when a selection has to be made between different implementation alternatives for which benefit and cost areas can be (more) easily derived
  - Smaller scope investments using for instance Six Sigma techniques
  - Example: tradeoff test automation versus increased inspections or code reviews



# Conclusions

- The question is not whether an investment in SPI is useful or not
- The question is how mature your organization needs to be in different dimensions to meet its business strategy/objectives
- This requires an understanding of current and desired performance
- This gap between current and desired performance needs to be closed without questioning (“it is the right thing to do“)
- Otherwise the business strategy is wrong
- The Balanced Engineering Scorecard/Cockpit can help to visualize your performance gap and monitor progress when closing it (target versus actual values for all identified goals in each dimension)

# Thank you for your attention!



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