Concepts of Return on Investment for Process Improvement

Presentation for PSM Conference

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Typical Concerns

- How can I maximize my process improvement efforts?
- Which process improvement technologies are the most cost effective?
- How can I measure the return on investment (ROI) for process improvement initiatives?

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A Survey

- What kind of organizations and projects are represented?
- How is process improvement currently measured and justified?
  - What indicators?
  - Which initiatives?
- How are benefits measured?
- How are costs measured?

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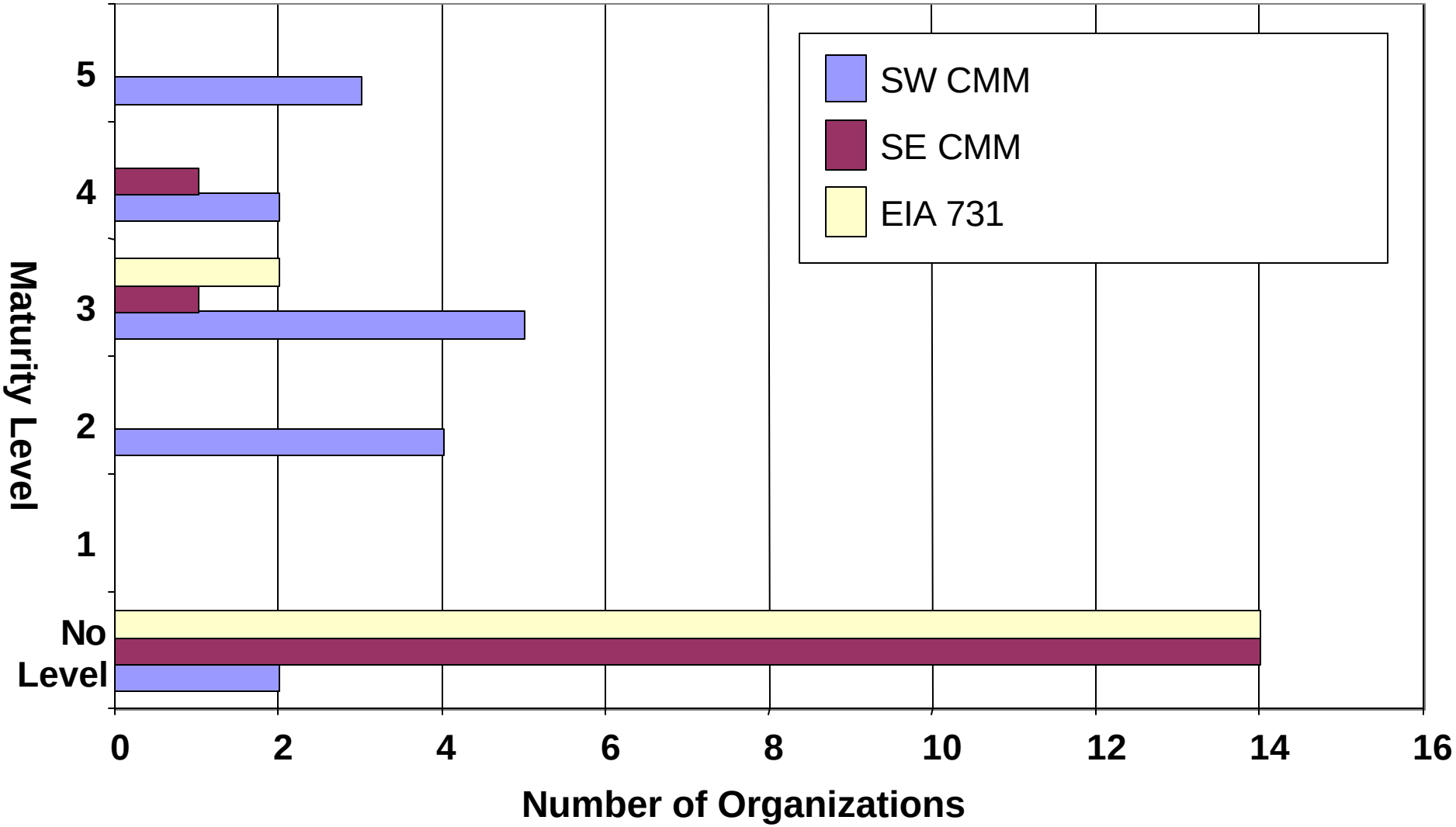
Maturity Levels of Respondents



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Survey
General Findings

- Survey size was small, but relevant
- Respondents were evenly distributed across CMM Levels
- Little consistency in the definition of measures used among organizations
- Most of the organizations track SPI using a growth or improvement factor, rather than financially
- Very few organizations are tracking the true cost or benefit of their SPI initiatives
- No definitive patterns associated with CMM Maturity, or Government vs. Commercial Marketplace

  (Exception was Earned Value)

Survey
Key Findings (cont.)

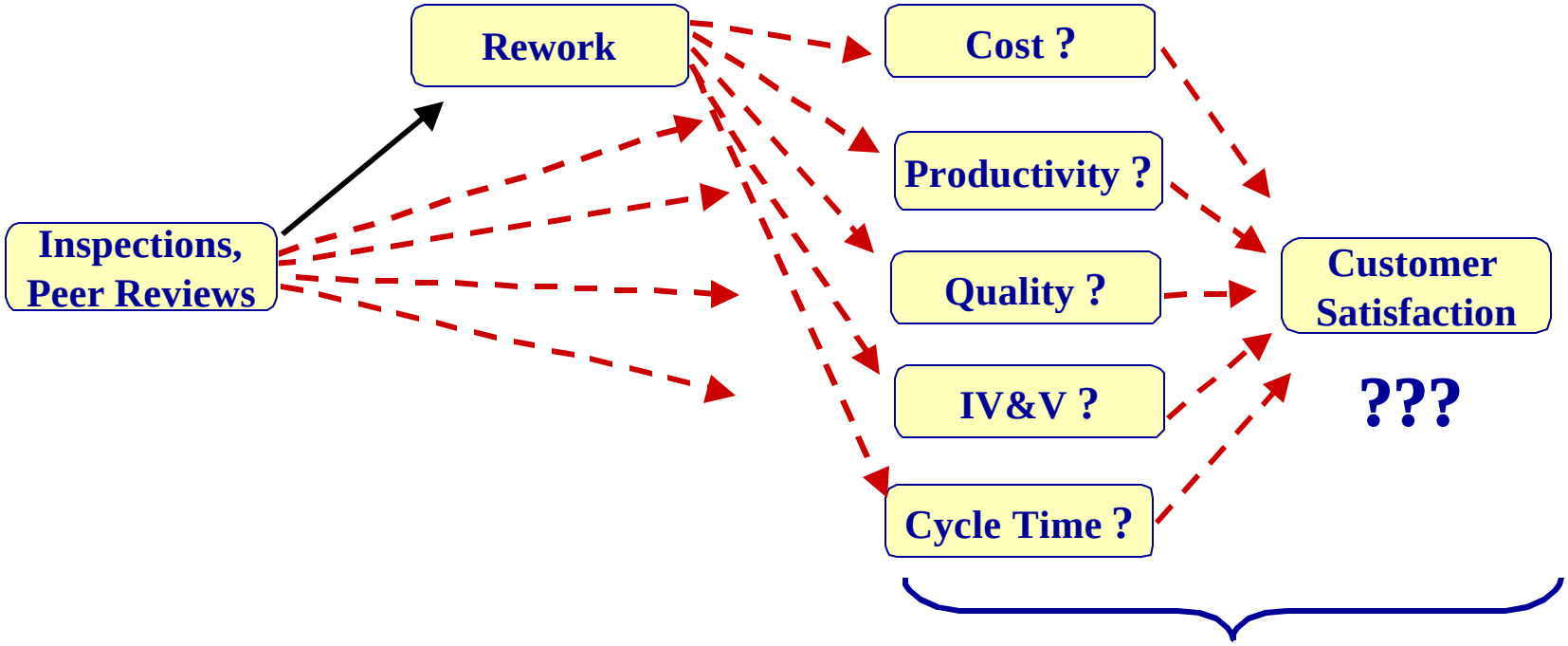
- 38% of respondents tracked the cost of SPI initiatives
  - Formal inspections tracked financially by just over half of those who perform them
- 30% track financial benefits of indicators
  - Financial benefit of quality, productivity, or cycle time tracked by less than 20% of responding organizations
- 38% of the respondents track rework above the project level
  - One organization tracks the cost of rework for all or most projects
- 12% track the Cost of Quality at organizational and enterprise level

Survey Conclusions

- Responses reflect a strong engineering focus with a relatively low level focus on cost/benefit of SPI
- Respondents generally are not well positioned to calculate financial ROI of their SPI program
- Lack of standard measurement definitions and ROI process models inhibit progress in justifying SPI from a financial perspective

The Problem With ROI

Multiple Relationships Make it Difficult to Assign the Benefits



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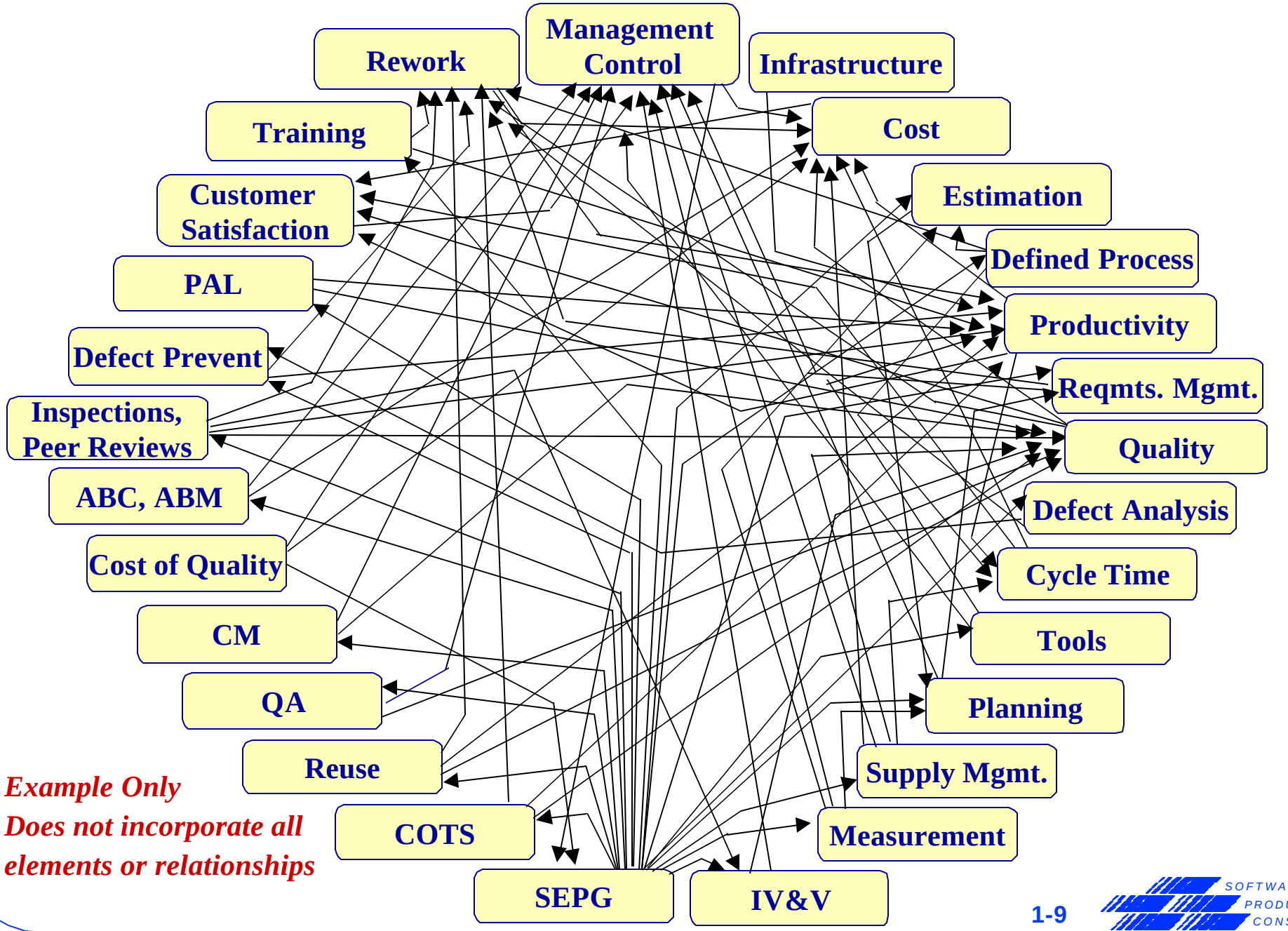
ROI Conundrum



Example Only
Does not incorporate all elements or relationships

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Key Indicators

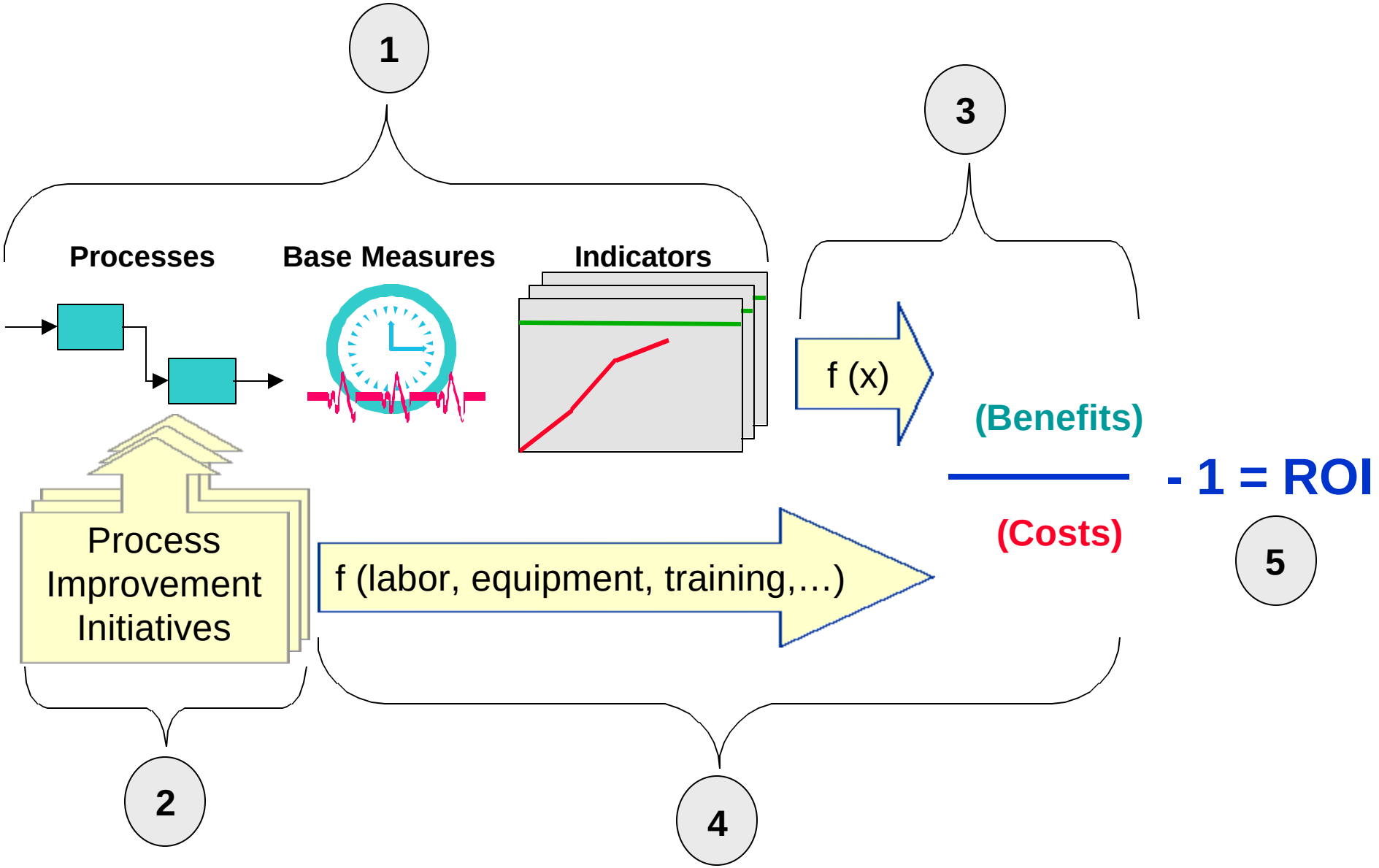
Primary Indicators

- ✓ Quality
- ✓ Productivity
- ✓ Cycle Time
- ✓ Cost
- ✓ Customer Satisfaction

Other Important Indicators

- ✓ Cost of Quality
- ✓ Cost of Rework

Conceptual ROI Model



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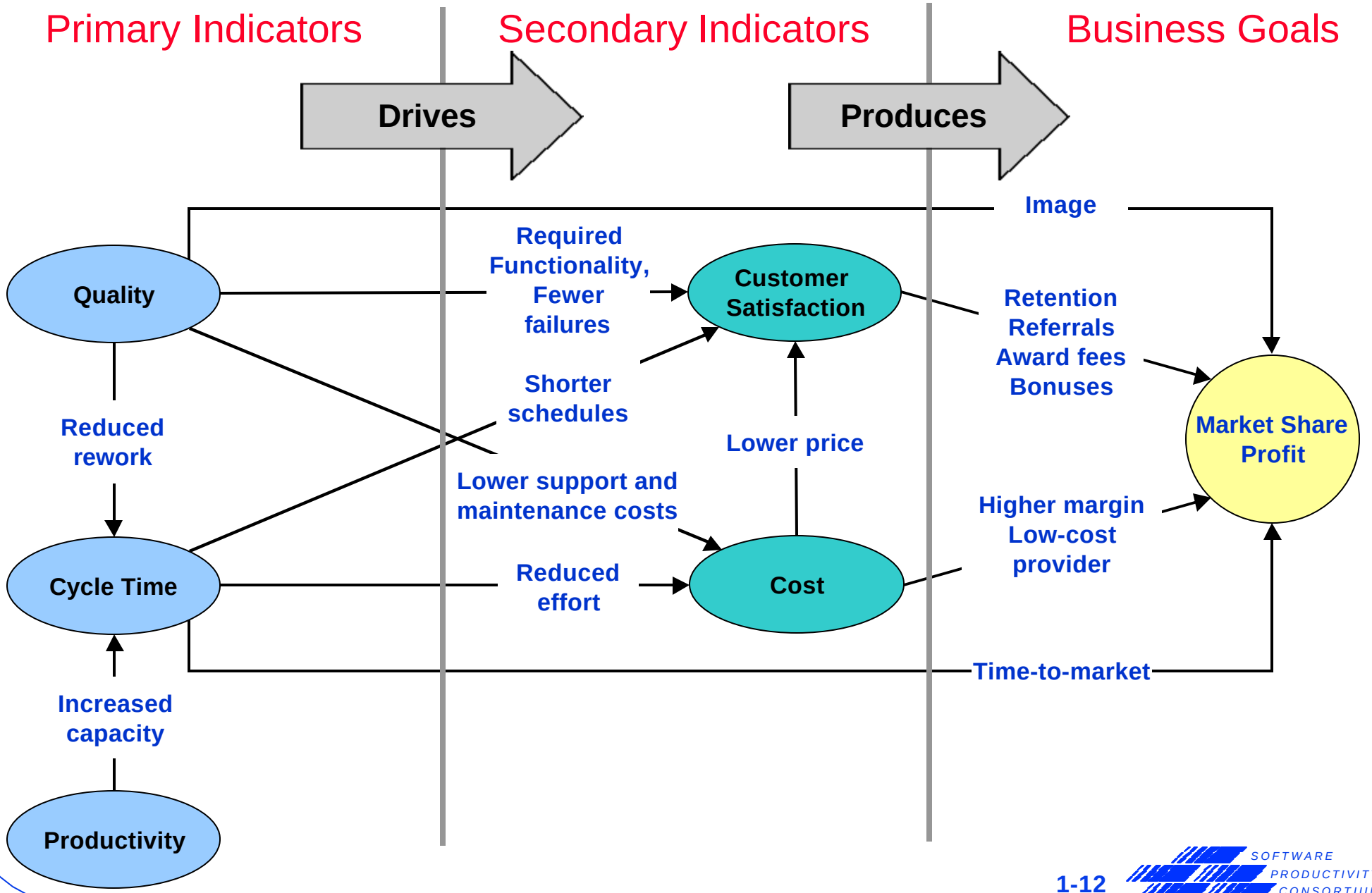
Indicator Relationships



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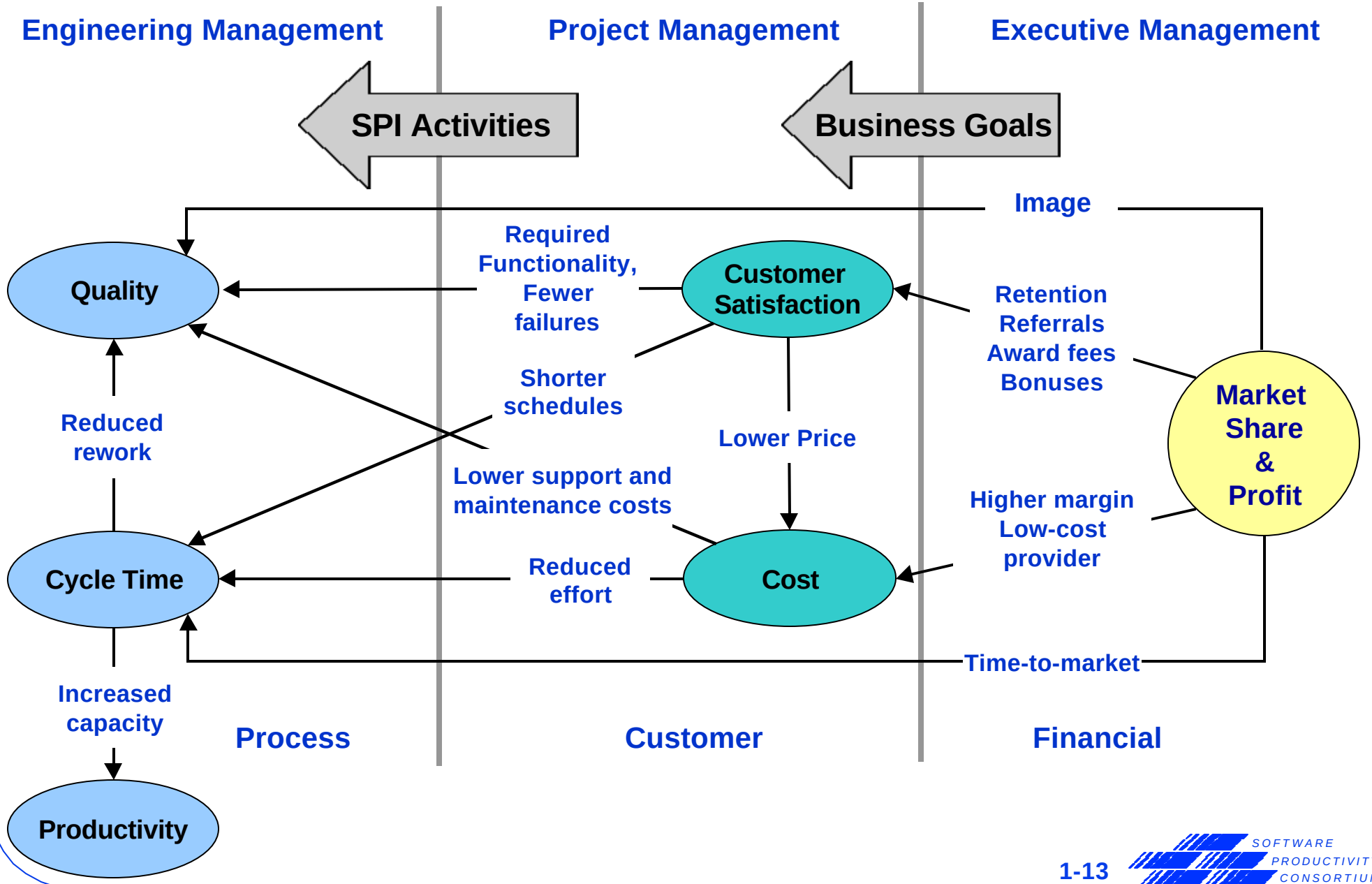
Focusing ROI on the Business



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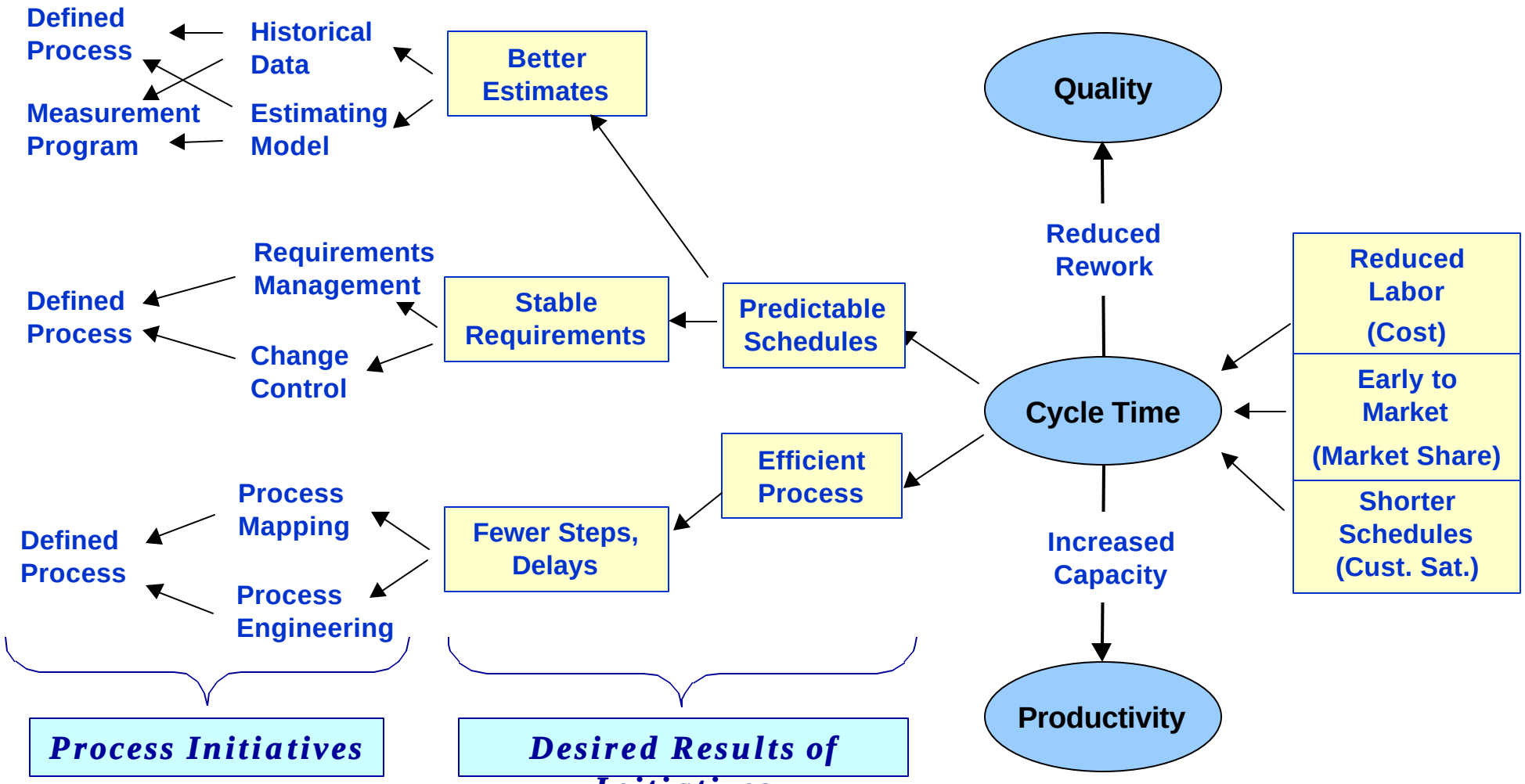
Mapping Indicators to Initiatives
(Cycle Time Example)



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Cost of Quality (COQ)

- What is the cost of poor quality?
- What are the key drivers?
- What is the cost of achieving higher quality?
- Which should be the highest priorities?
- How successful are the efforts designed to drive the COQ downward?

Elements of COQ

Cost of Poor Quality (Non-conformance)

Cost of Internal Failure — **Defects Discovered Prior to Shipment**

Cost of External Failure — **Defects Discovered After Shipment**

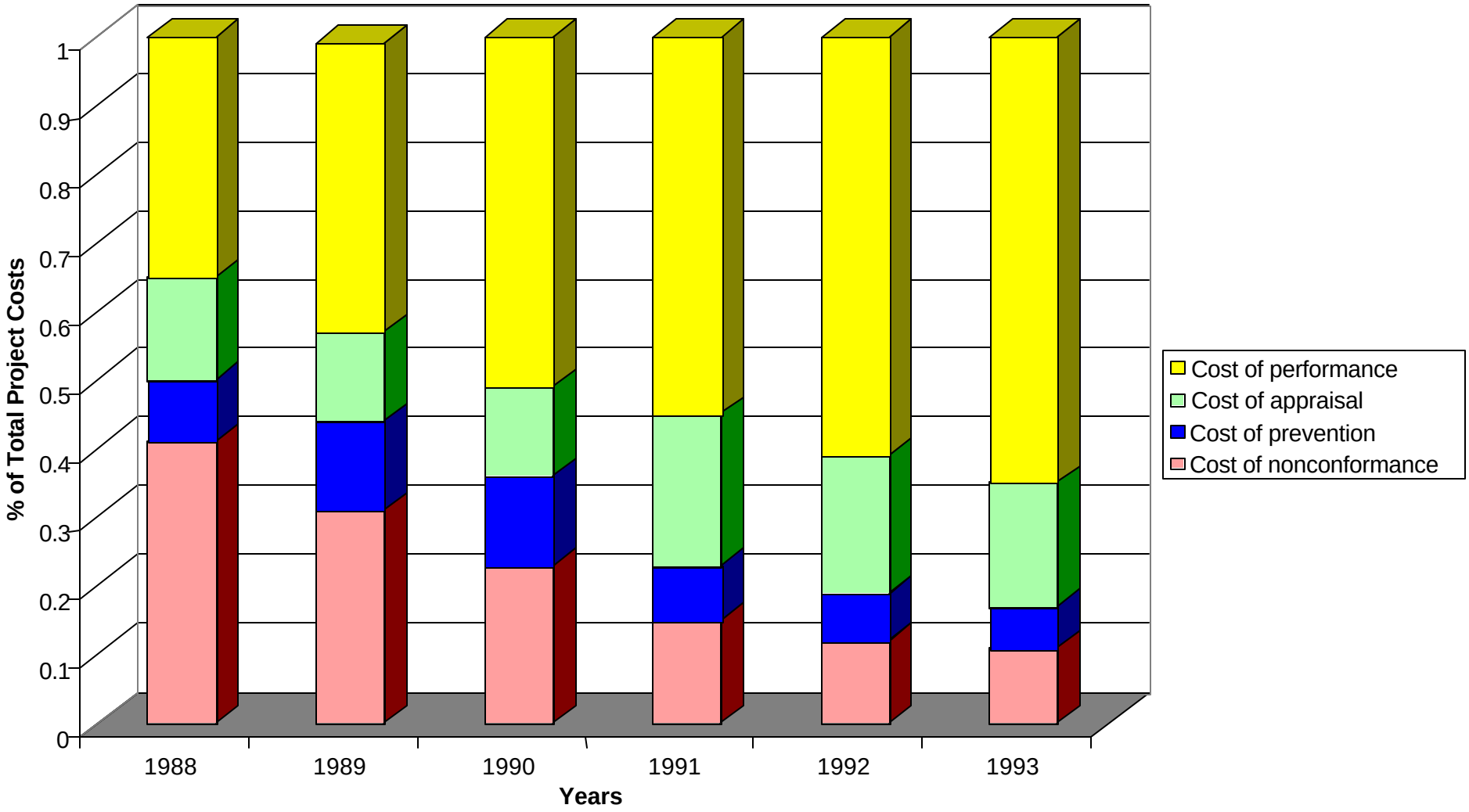
+

Cost of Achieving Higher Quality

Appraisal Costs — **Testing, Inspections, Quality Audits, Assessments**

Prevention Costs — **SEPG, SQA, CM, Reqmts. Management, Defect Prevention, Training, Risk Mgmt.**

Reducing the Cost of Quality



Adapted from: Dion, R., *Process Improvement and the Corporate Balance Sheet*, IEEE Software, July 1993

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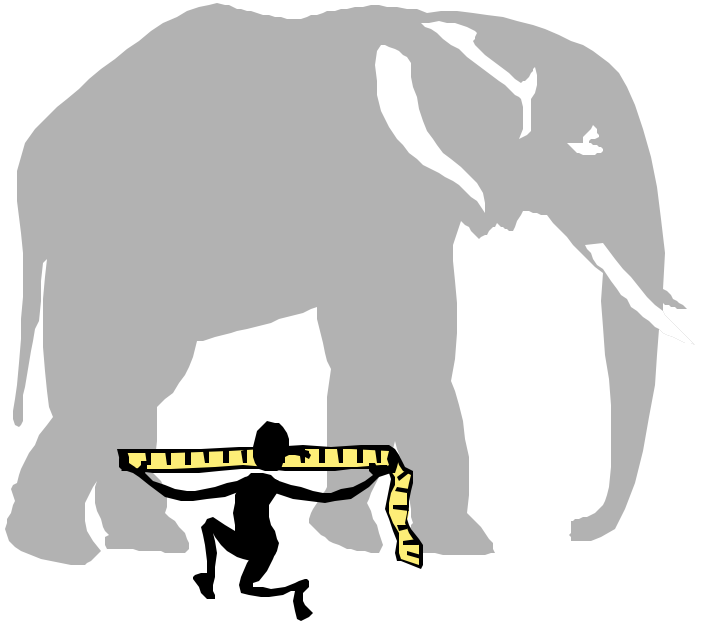
Cost of Rework

- Typically 30% to 50% (or more) of project cost for lower maturity organizations
- Only one respondent (of 16) tracks Cost of Rework on all or most projects
- True Cost of Rework is not well known in most organizations



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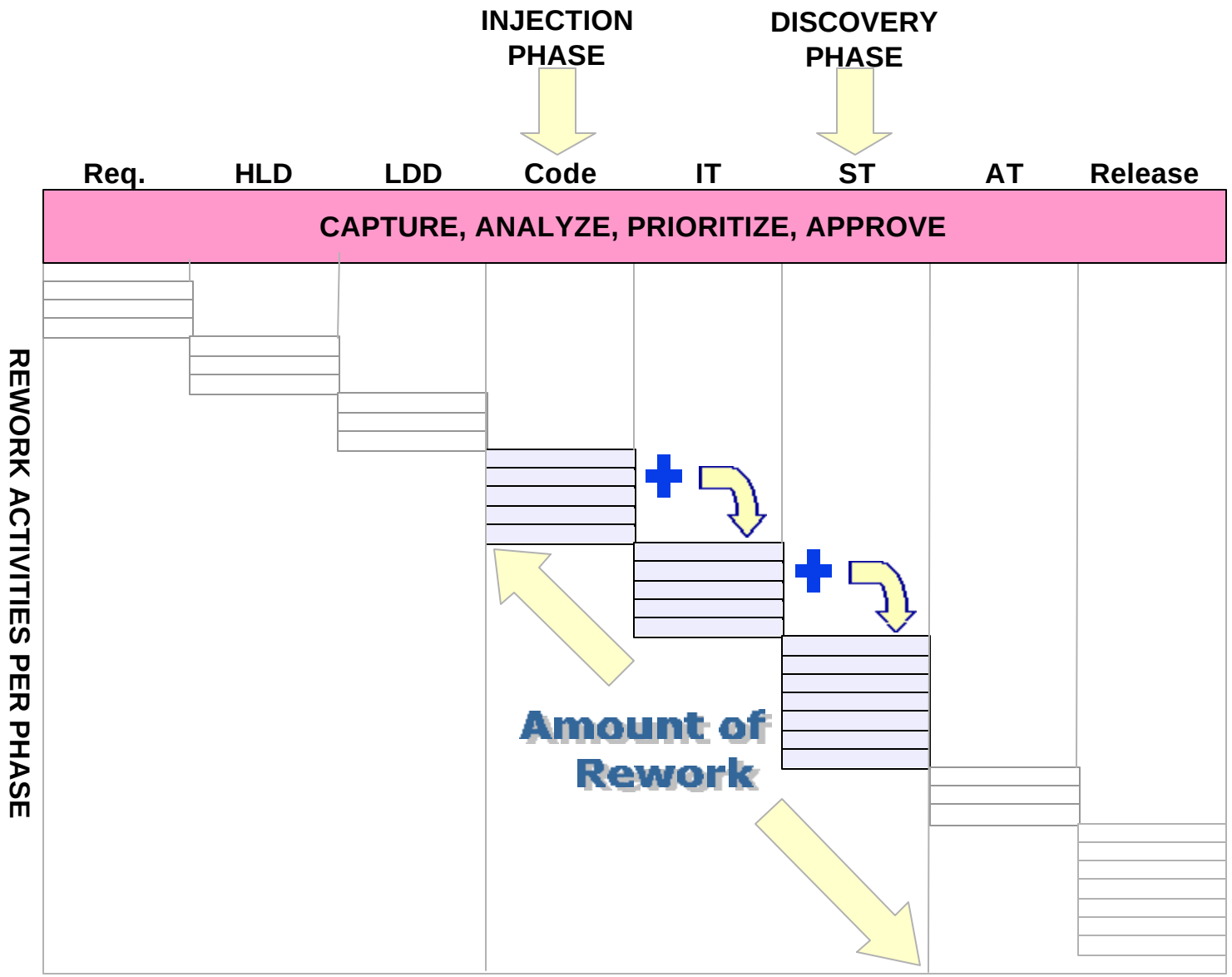
Cost of Rework

Coding Defects Found in System Test



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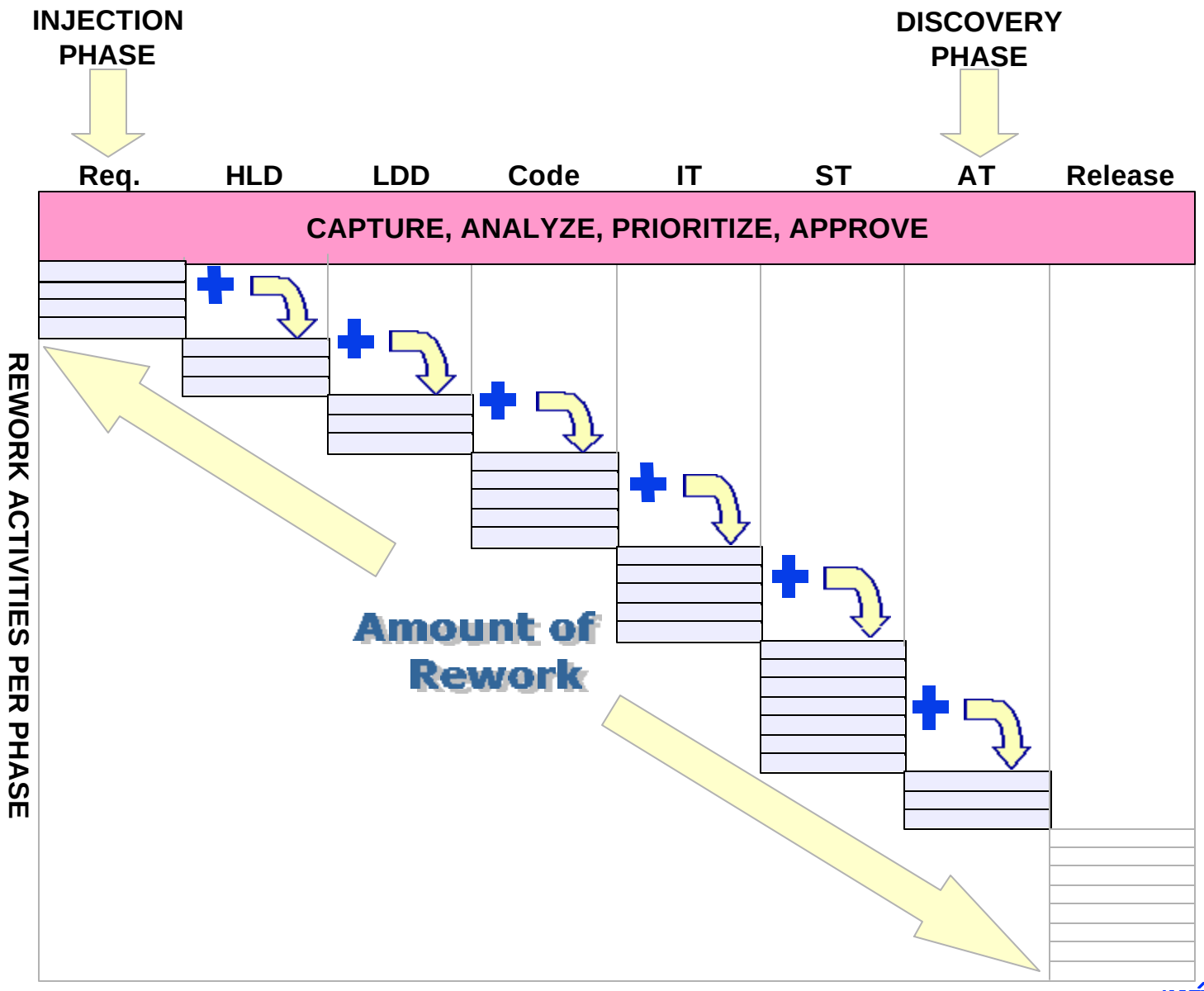
Cost of Rework

Requirements Defects Found in Acceptance Test



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Summary

- Measurement programs are typically focused on engineering effectiveness rather than business case
- Organizations generally are not well positioned to calculate financial ROI of their SPI program
- ROI Conundrum can be resolved by focusing on costs and benefits separately
- A focus on Cost of Quality and Cost of Rework can provide significant results
- Data indicate ROI is a ‘growth area’
  - Provides a means for focusing SPI investments on business goals and priorities
  - Helps in establishing effective measurement programs/habits