B4 - STEP
Building a Bi-directional Bridge
Between Software ThEory and Practice

Rosetta Stone ROI Model

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- CMMI Level 2 (Staged) Benefit mapping
- How to achieve specific Benefits

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Where are we currently?

- A lot of studies available on benefits of CMM/CMMI
- Many benefits are high-level benefits e.g. increased productivity, increased ROI
  - What do they mean? Where do they come from?
  - How are benefits related to each other?
  - How do they translate to concrete benefits?
- Smaller companies tend to want to focus on specific benefits
- Companies already have some metrics available to them – can they re-use them?

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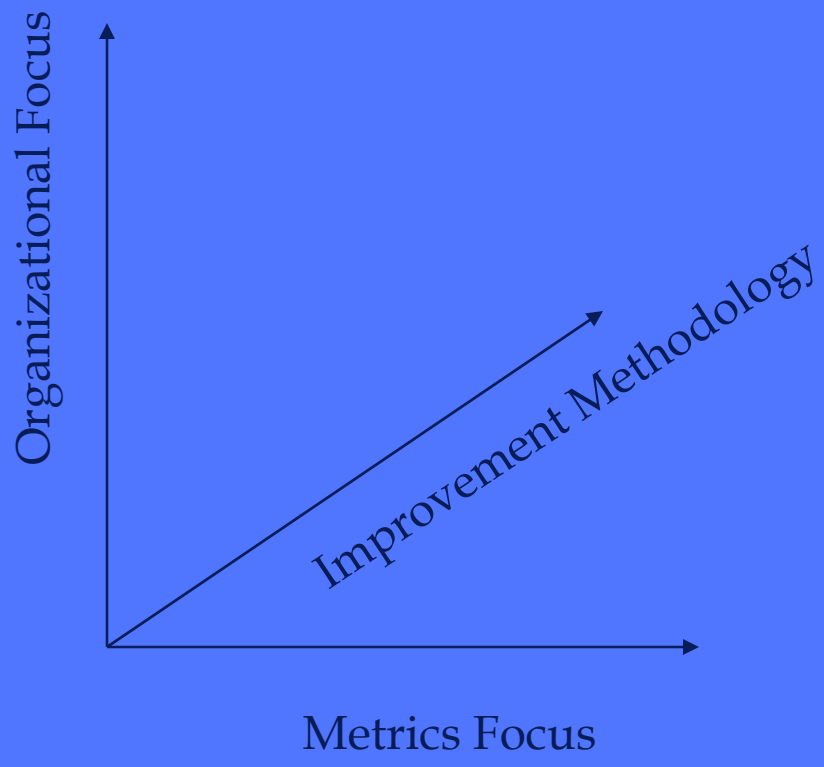
Where are we currently (cont.)



Many valuable studies of the benefits resulting from implementation of CMM/CMMI and Software Process Improvement (SPI) in general have been undertaken over the last several years. These studies may be viewed as having at least separate three axes

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Why use the Rosetta Stone ROI (RSROI) Model?

- Provides a flexible framework that can be modified if needed
- Hierarchy of Business Objectives or Benefits – how one benefit can impact others
- Benefits fine-grained
- Allows re-use of metrics where appropriate
- Allows targeting of specific benefits

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The Rosetta Stone

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- Wiki - http://en.wikipedia.org/wiki/Rosetta_Stone
- The **Rosetta Stone** is an ancient stele inscribed with the same passage of writing in two Egyptian language scripts and in classical Greek. It was created in 196 BC, discovered by the French in 1799, and translated in 1822. Comparative translation of the stone assisted in understanding many previously undecipherable examples of hieroglyphic writing.

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Rosetta Stone and the Rosetta Stone ROI Model

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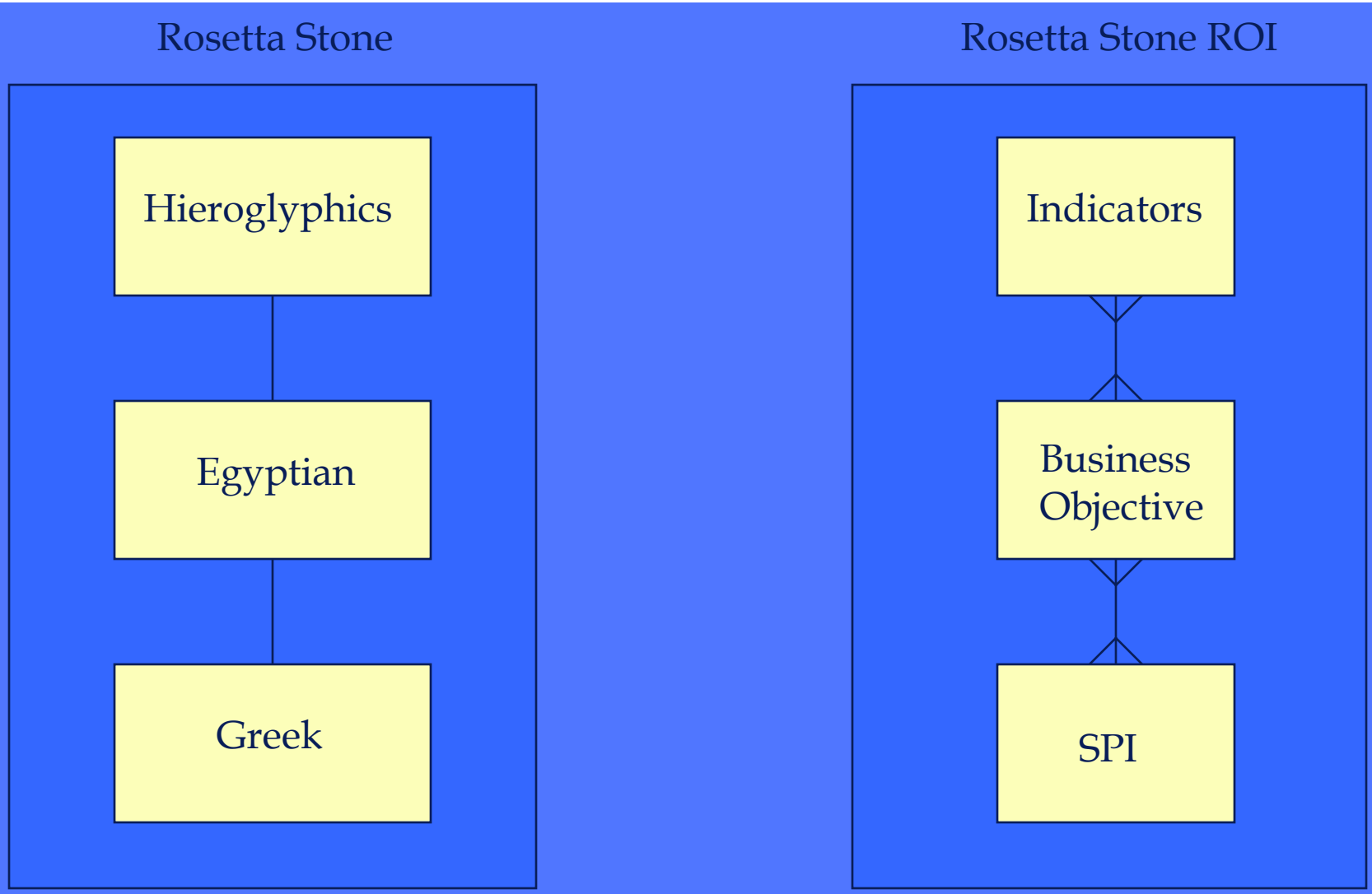

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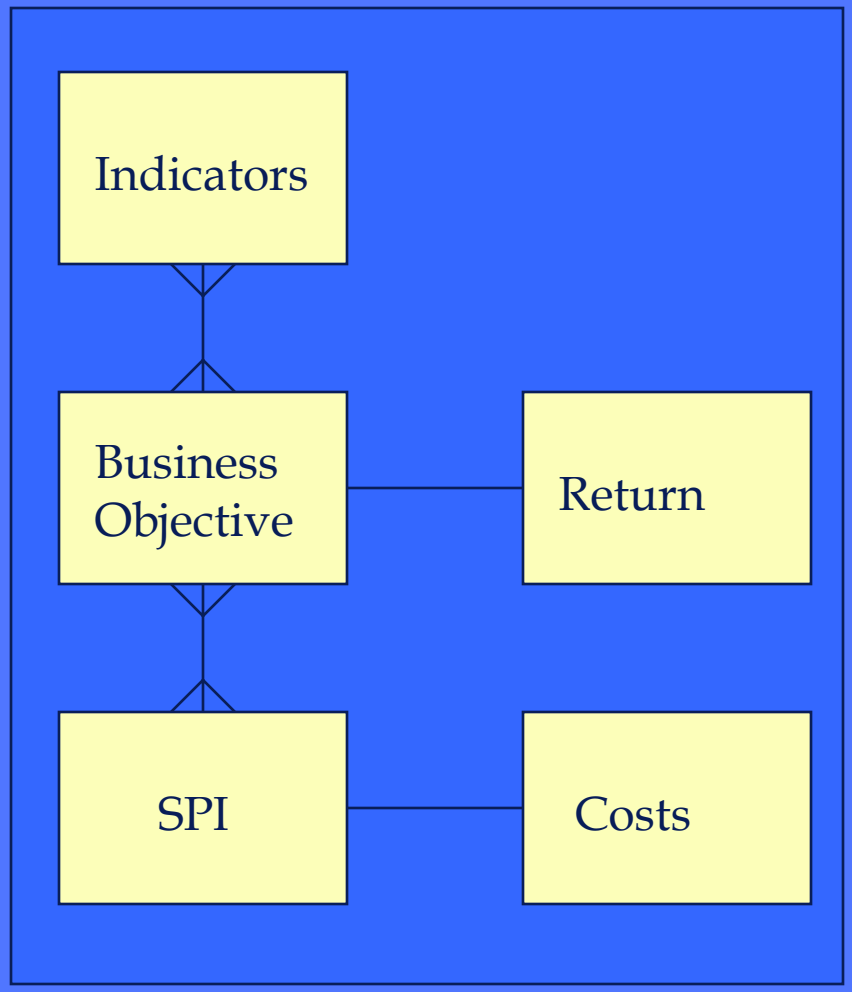
What is the Rosetta Stone ROI Model?



- a well-defined and extensible hierarchical set of Business Objectives associated with Software Process Improvement in general and CMMI in particular
- a mapping of those benefits by CMMI Process Areas
- an extensible set of performance measures and indicators. Users of the model are free to add any pre-existing, custom, or about-to-be-initiated performance measures that they may have, thus allowing them to re-use any existing work they have already undertaken or are about to undertake

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Benefits/Objectives

- Goyal et al. [1], as part of research undertaken on the benefits of SPI for IBM Global Services, India (IGSI), held two workshops that used consensus-based responses as inputs for an Interpretive Structural Modeling (ISM) methodology to develop a model of the needs and consequences of SPI
- This model is called the IGSI-ISM ROI Model and shows the relationships between the various benefits that can be derived from SPI. Using this model, there are 21 separate identifiable benefit areas.

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IGSI-ISM Benefit/Business Objectives Model

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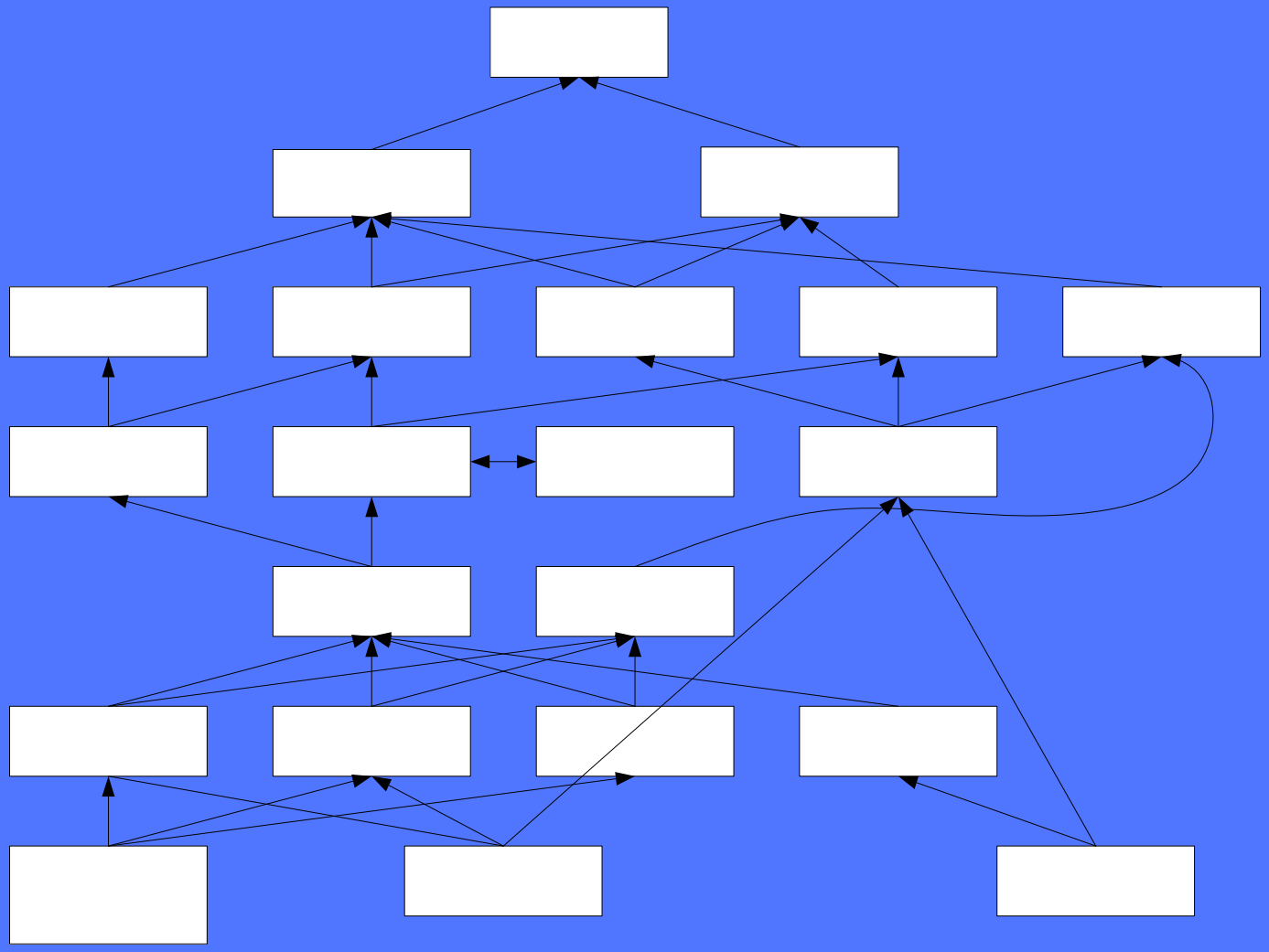

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Benefit Types

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- Primary
  - Brought about as a direct result of implementation of a PA/SPI where the cause and effect relationship between the Process Area implementation and the benefit is very strong
- Derived
  - IGSI-ISM model is a hierarchical graph. Benefits elements that are closer to the root of the tree automatically accrue from benefits that are farther down if there is a path/relationship between them – these are *derived*

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Indicators/Metrics and SPI

- Indicators/Metrics
  - Metrics or indicators that will allow us to measure increased (or decreased) success in achieving benefits. In effect, these metrics act as proxies for the general benefit area
- SPI
  - Applicable to any SPI. For the purposes of this presentation we are interested in CMMI

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Costs, Return & ROI

- Benefits should ultimately lead to a monetary impact on the organization
- Some benefit impact may be difficult to quantify – how much does increased morale save an organization?
- SPI costs effort/money

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ROI

- ROI is typically some ratio of benefit to cost
- There are several popular methods for evaluating projects [2-4]:
  - Net Present Value (NPV)
  - Internal Rate of Return (IRR)
  - Return on Investment (ROI)
  - Profitability Index (PI)

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How RSROI Applies to CMMI – Level 2 Staged

- Requirements Management
  - Benefits - Better Risk Management, Understanding customer needs, Lower time to market
- Project Planning
  - Benefits – Better quality product, Better risk management, Efficient resource management, Understanding customer needs, Setting right customer expectations, predictability, Competitive proposals

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How RSROI Applies to CMMI – Level 2 Staged (cont.)

- Project Monitoring & Control
  - Benefits - *Better quality product, Better risk management, Efficient resource management, Setting right customer expectations, Predictability*
- Supplier Agreement Management
  - Benefits - *Better quality product, Better risk Management, predictability, Lower time to market*
- *Measurement & Analysis*
  - *Benefits - Better quality product, Better risk Management, predictability, Lower time to market*

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How RSROI Applies to CMMI – Level 2 Staged (cont.)

- Process and Product Quality Assurance
  - Benefits - *Improved institutionalization of Tools / Process / Methods, Better quality product, Better risk Management, predictability, Lower time to market*
- **Configuration Management**
  - Benefits - *Better quality product, Better risk management, Teaming / Synergize*

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CMMI Level 2 to Benefit Map

PA Identifier	Staged Level	Process Area	Expected Primary IGSI ROI Benefits	Expected Derived IGSI ROI Benefits
2-1	2 - Managed	Requirements Management	4-2, 4-4, 5-2	5-1, 2-1, 4-3, 7-3, 3-4, 3-5, 2-1, 2-2, 1-1
2-2		Project Planning	4-1, 4-2, 3-4, 3-5, 3-3, 4-3, 4-4	3-2, 3-4, 2-2, 1-1, 3-1, 3-3, 3-5, 2-1, 1-1
2-3		Project Monitoring and Control	4-2, 4-1, 4-3, 3-4, 3-3	3-1, 3-2, 3-3, 3-4, 2-1, 2-2, 1-1
2-4		Supplier Agreement Management	4-2, 4-1, 3-4, 5-2	3-1, 3-2, 3-3, 3-4, 2-1, 2-2, 1-1
2-5		Measurement and Analysis	4-2, 4-1, 5-2, 3-4	3-1, 3-2, 3-3, 3-4, 2-1, 2-2, 1-1
2-6		Process and Product Quality Assurance	4-1, 4-2, 5-2, 7-1, 3-4	6-1, 6-2, 6-3, 5-1, 5-2, 4-3, 4-4, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
2-7		Configuration Management	6-3, 4-2, 4-1	5-1, 5-2, 4-3, 4-4, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1

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Meeting the Business Objectives of an Organization

- Approach/Process
  - Identify specific benefit you want to achieve/improve
  - Determine potential benefits for each PA
  - Determine relevant PAs
  - Identify indicators/metrics that can be used as proxies for benefits
  - Order implementations of PAs
  - Implement!
- Example - Lower Time to Market (5-2)

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Lower Time to Market

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- Lower Time to Market (5-2) depends on:

IGSI-ISM Id	Objective Name
6-1	Skill development Facilitation by Management
6-2	Effective Information Management
6-3	Teaming/Synergize
7-1	Improved Institutionalization of Tools/Process/Methods
7-2	Business Focus

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What Process Areas are linked to Business Objectives?

PA Identifier	Staged Level	Process Area	Expected Primary IGSI ROI Benefits	Expected Secondary IGSI ROI Benefits
2-1	2 - Managed	Requirements Management	4-2, 4-4, 5-2	5-1, 2-1, 4-3, 7-3, 3-4, 3-5, 2-1, 2-2, 1-1
2-4		Supplier Agreement Management	4-2, 4-1, 3-4, 5-2	3-1, 3-2, 3-3, 3-4, 2-1, 2-2, 1-1
2-5		Measurement and Analysis	4-2, 4-1, 5-2, 3-4	3-1, 3-2, 3-3, 3-4, 2-1, 2-2, 1-1
2-6		Process and Product Quality Assurance	4-1, 4-2, 5-2, 7-1, 3-4	6-1, 6-2, 6-3, 5-1, 5-2, 4-3, 4-4, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
2-7		Configuration Management	6-3, 4-2, 4-1	5-1, 5-2, 4-3, 4-4, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
3-1	3 - Defined	Requirements Development	5-2, 4-4, 4-2, 4-1	4-3, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
3-6		Organizational Process Focus	7-1, 7-2, 7-3	6-1, 6-2, 6-3, 6-4, 5-1, 5-2, 4-1, 4-2, 4-3, 4-4, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
3-7		Organizational Process Definition	6-2, 7-1	6-1, 6-3, 5-1, 5-2, 4-1, 4-2, 4-3, 4-4, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
3-8		Organizational Training	6-1, 6-3	5-1, 5-2, 4-1, 4-2, 4-3, 4-4, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
		Integrated Project Management	6-3, 4-1, 4-2, 4-3, 4-4	5-1, 5-2, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
3-9		Integrated Project Management for IPPD	6-3, 4-1, 4-2, 4-3, 4-4	5-1, 5-2, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
3-11		Integrated Teaming	6-3, 4-1, 4-3, 4-2, 4-4, 6-2	5-1, 5-2, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
3-12		Integrated Supplier Management	7-3, 6-3, 6-4, 4-1, 4-2, 7-2, 3-4, 5-2	5-1, 5-2, 4-3, 3-1, 3-2, 3-3, 3-5, 2-1, 2-2, 1-1
3-14		Organizational Environment for Integration	6-2, 6-3, 7-2, 5-2, 7-1	6-1, 6-2, 6-4, 5-1, 5-2, 4-1, 4-2, 4-3, 4-4, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
4-1	4 - Quantitatively Managed	Organizational Process Performance	7-1, 7-2, 7-3, 6-2	6-1, 6-3, 5-1, 5-2, 4-1, 4-2, 4-3, 4-4, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
4-2		Quantitative Project Management	4-1, 4-2, 4-3, 5-2	4-3, 4-4, 2-1, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
5-1	5 - Optimizing	Organizational Innovation and Deployment	7-1, 7-2, 7-3	6-1, 6-2, 6-3, 6-4, 5-1, 5-2, 4-1, 4-2, 4-3, 4-4, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 2-2, 1-1
5-2		Causal Analysis and Resolution	6-2, 5-2, 4-1, 4-2, 4-3, 7-1	6-1, 6-3, 5-1, 4-4, 3-1, 3-2, 3-3, 3-4, 3-5, 2-1, 3, 1-1

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Prioritization of Implementation

- Factors:
  - More consideration should be given to those PAs that **primarily** satisfy a particular objective. By this we mean that those PAs that satisfy an objective as a primary objective should be given higher ranking than those that do not.
  - More consideration should be given to those PAs that, in the Staged Model, are **lower** in the Stage phases.

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A *Recommended* Order of Implementation

PA Identifier	Process Area	Expected Primary IGSI ROI Benefits
2-1	Requirements Management	4-2, 4-4, 5-2
2-4	Supplier Agreement Management	4-2, 4-1, 3-4, 5-2
2-5	Measurement and Analysis	4-2, 4-1, 5-2, 3-4
2-6	Process and Product Quality Assurance	4-1, 4-2, 5-2, 7-1, 3-4
3-1	Requirements Development	5-2, 4-4, 4-2, 4-1
3-12	Integrated Supplier Management	7-3, 6-3, 6-4, 4-1, 4-2, 7-2, 3-4, 5-2
3-14	Organizational Environment for Integration	6-2, 6-3, 7-2, 5-2, 7-1
4-2	Quantitative Project Management	4-1, 4-2, 4-3, 5-2
5-2	Causal Analysis and Resolution	6-2, 5-2, 4-1, 4-2, 4-3, 7-1
2-7	Configuration Management	6-3, 4-2, 4-1
3-6	Organizational Process Focus	7-1, 7-2, 7-3
3-7	Organizational Process Definition	6-2, 7-1
3-8	Organizational Training	6-1, 6-3
3-9	Integrated Project Management for IPPD	6-3, 4-1, 4-2, 4-3, 4-4
3-11	Integrated Teaming	6-3, 4-1, 4-3, 4-2, 4-4, 6-2
4-1	Organizational Process Performance	7-1, 7-2, 7-3, 6-2
5-1	Organizational Innovation and Deployment	7-1, 7-2, 7-3

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- [1] A. Goyal, S. Kanungo, V. Muthu, and S. Jayadevan, "ROI for SPI: Lessons from Initiatives at IBM Global Services India," presented at SEPG 2001, 2001.
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Questions?

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