

Successfully Transitioning Projects from S&T to Acquisition Programs

**U.S. Department of Defense (DoD)
R&D, Technology & Program Management**

**Infologic Webinar
May 25, 2011**

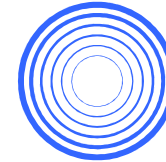
**Presented by:
Has Patel
Infologic, Inc.
has.patel@infologic.com
(888) 325 0500 Ext. 100**



INFOLOGIC
The logical approach to harness innovation

INFOLOGIC, INC.
1048 Irvine Avenue #624
Newport Beach, CA 92660
www.infologic.com

Profile: Infologic and Presenter



INFOLOGIC

The logical approach to harness innovation

Has Patel

- **President** - Infologic, Inc.
- **Editor** – Monthly Newsletter :
Art & Science of Innovation
Management for the Defense
Community.
- **Previous Experience:**
AT&T Bell Laboratories
GlaxoSmithKline Pharmaceuticals
BP Chemicals
- **Education: MS/BS**

- **Primary Mission:** To Provide S&T Management and related IT services, methodologies & training with specific concentration on the Innovation Management practices.
- **Secondary Mission:** Acquire, develop and integrate COTS/GOTS software tools
- **Contracts: Prime** (Army CE-LCMC , Navy Seaport);
Federal Subcontractor/team member: (Army S3/R2, DHS Eagle, GSA Alliant and DHS SEDI)
- **Memberships:** AFCEA and NDIA
- **SBA Certification:** Small Business

Agenda

ART to SCIENCE ?

I. Innovation Management: Innovation Agenda for Public and Private Organizations: Concerns, Needs and Strategies, Why Innovation Management Art?, Need to convert to Science. Define an Innovation Management Model.

II. Innovation Management: DoD R&D and Technology Management Process

Develop a framework which incorporates DoD Acquisition Management framework (e.g.: TRLs), DoD Business Transformation strategies (e.g.: Evolutionary Acquisition), GAO Recommendations (e.g.: Knowledge-based Acquisition), DoD Community concerns & suggestions (e.g.: Multi-Dimension Maturity Analysis, System of Systems integration), and Industry best practices (e.g: the Gate Process, CMMI, Technology Hype Cycle and Adoption Cycle.

III. Knowledge-Based Gate Process: An Art to Science process which may be employed by DoD R&D organizations and Program Managers to manage technologies through their life cycle. Introduce an Innovation Management methodology: TechIP (TechIP)

IV. Execution: Strategies to implement the Framework and Process.

Strategic Issues: Innovation Agenda

Challenges

■ Innovation Agenda?

- Developing breakthrough products, revamping processes, and introducing improved or new business models.
- Emerging Technology Insertion & Integration.
- Open Innovation (export and import Intellectual Property (IP) and technologies).

■ Why Innovation Agenda?

- Private Organizations: Challenges of a flattened, competitive and information rich global economies (New consumers, shifting demographics, Global R&D and Technology villages and External & Global Intellectual Property (IP) sources).
- Public Organizations (DoD): Meeting the Security challenges of the 21st Century (Imperatives – Strategic, Technology, Threat and Risk Mitigation)

■ What Are we doing to meet these challenges?

Strategic Issues: Meeting the Challenges

Innovation Management Needs Recognized

■ **Private Organizations:** Recent Gartner Group, Deloitte and IBM studies have said Innovation is the “top of the mind” for corporate and public CEOs. Recent IBM study, titled: “Expanding the Innovation Horizon” concluded that:

- Business Model Innovation Matters: Business process innovation
- External Collaboration is Indispensable: Collaboration beyond the walls
- Innovation requires Orchestration from the top: Strategic commitments, teams, rewards and technology/process integration

■ **Public Organizations (DoD):** DoD Force Transformation:

- Support the Joint Warfighting Capability of the DoD
- Enable Rapid Access to Information for Strategic Decisions
- Reduce the Cost of Defense Business Operations
- Improve Financial Stewardship to the American People

Strategic Issues: Innovation Management is Art

Call to Action: An Innovation Management model which incorporates rigor, metrics and discipline



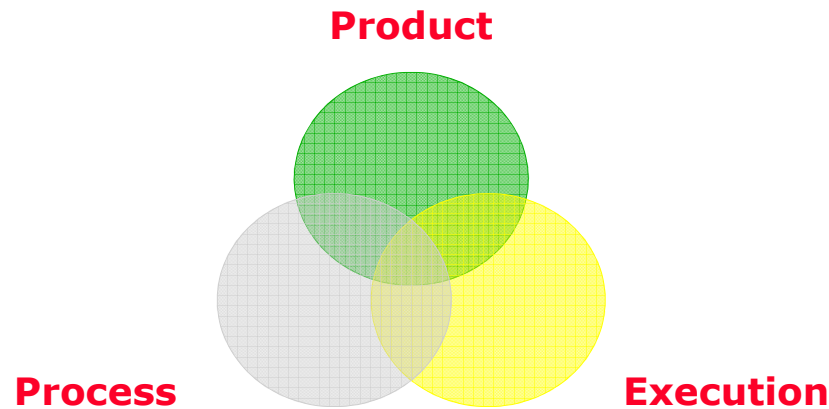
- Innovation should be held as same measurement rigor as other core functions.
- Innovation Opportunity Is About How the Process is Managed – Not Just Ideas and Creativity
- Improving Innovation is not Beyond Leaders' Control – It must be measured and controlled
- Key Innovation Mistakes: Not Emphasizing Speed, and Not Managing with Discipline and Aggressiveness



- Defense Transformation: Clear Leadership, Accountability, and Management Tools Are Needed to Enhance DOD's Efforts to Transform Military Capabilities [GAO-05-70](#)
- Best Practices: Stronger Practices Needed to Improve DOD Technology Transition Processes [GAO-06-883](#)

Innovation Management Model

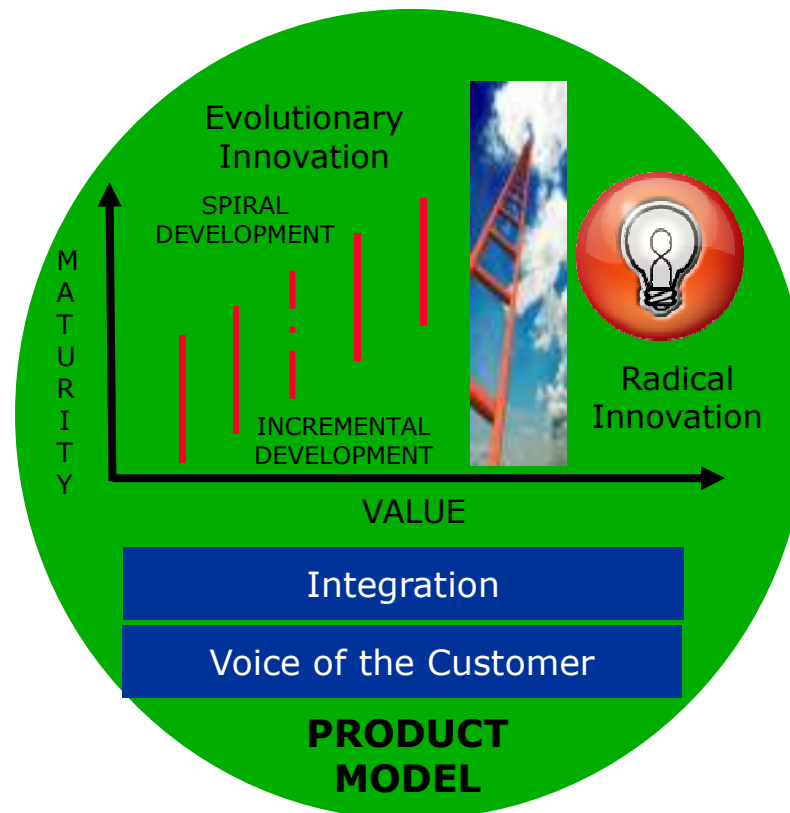
Innovation = f (Product, Process, Execution)



- **Product:** **HARD**(products that you touch, such as Missiles and iPod) and **SOFT** (products that you can experience, such as algorithms, methodologies, and services, such as Design and Starbucks System)
- **Process:** Any critical business process to ensure the success of product (e.g.: iTunes for iPod, Logistics to move weapons and supplies to the Theater.
- **Execution:** Management strategies to ensure that Innovation works!

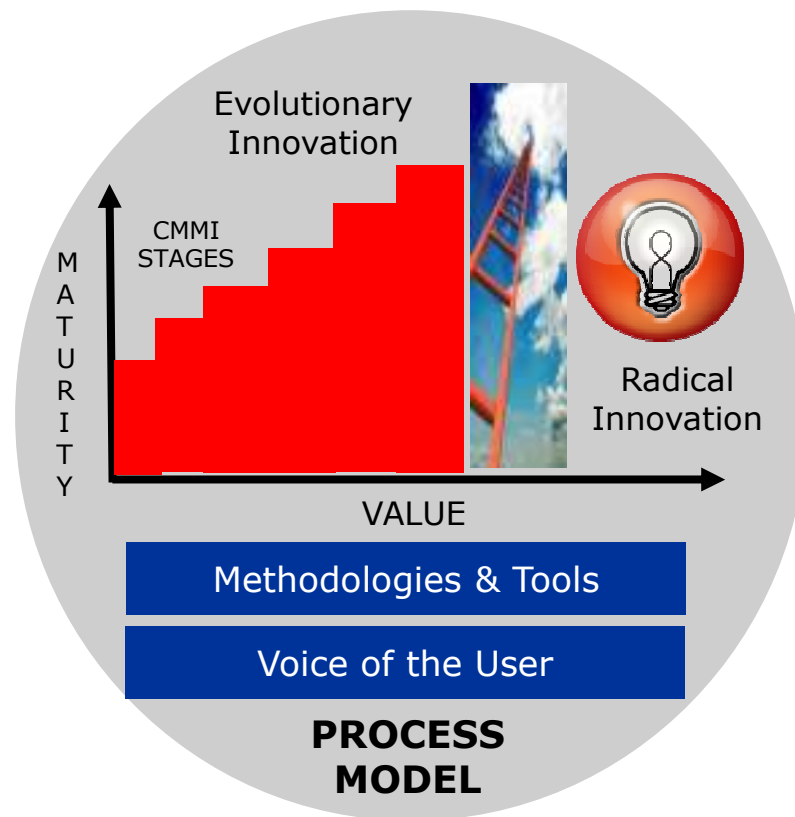
Model: Product Maturity

Spiral Development, Multi-Dimension Maturity Analysis, Integration and Voice of the Customer



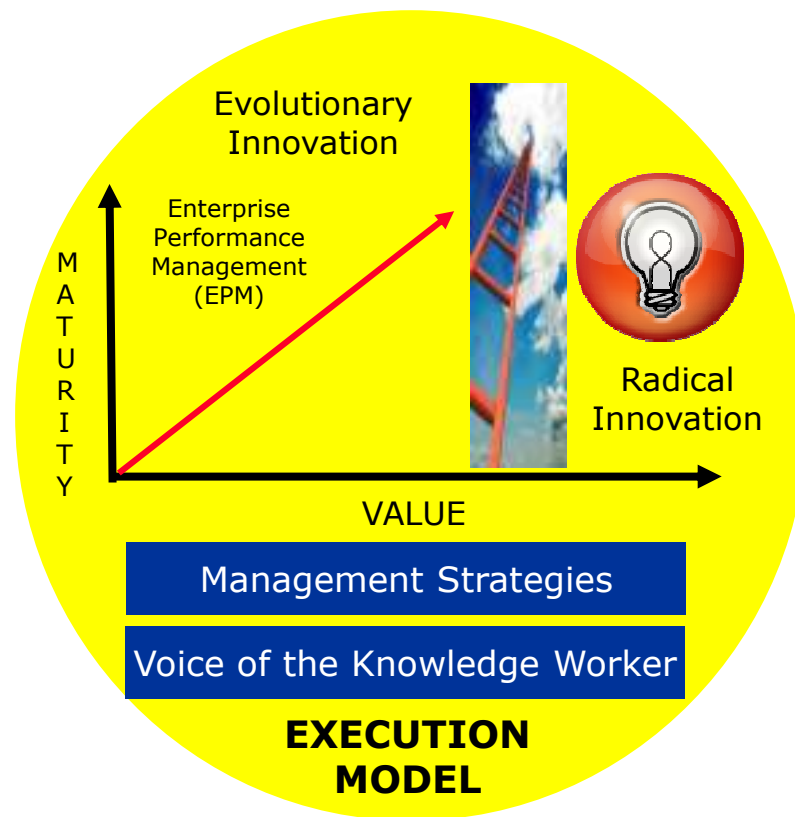
Model: Process Maturity

Model based on CMMI, Methodologies & Tools, and Voice of the User



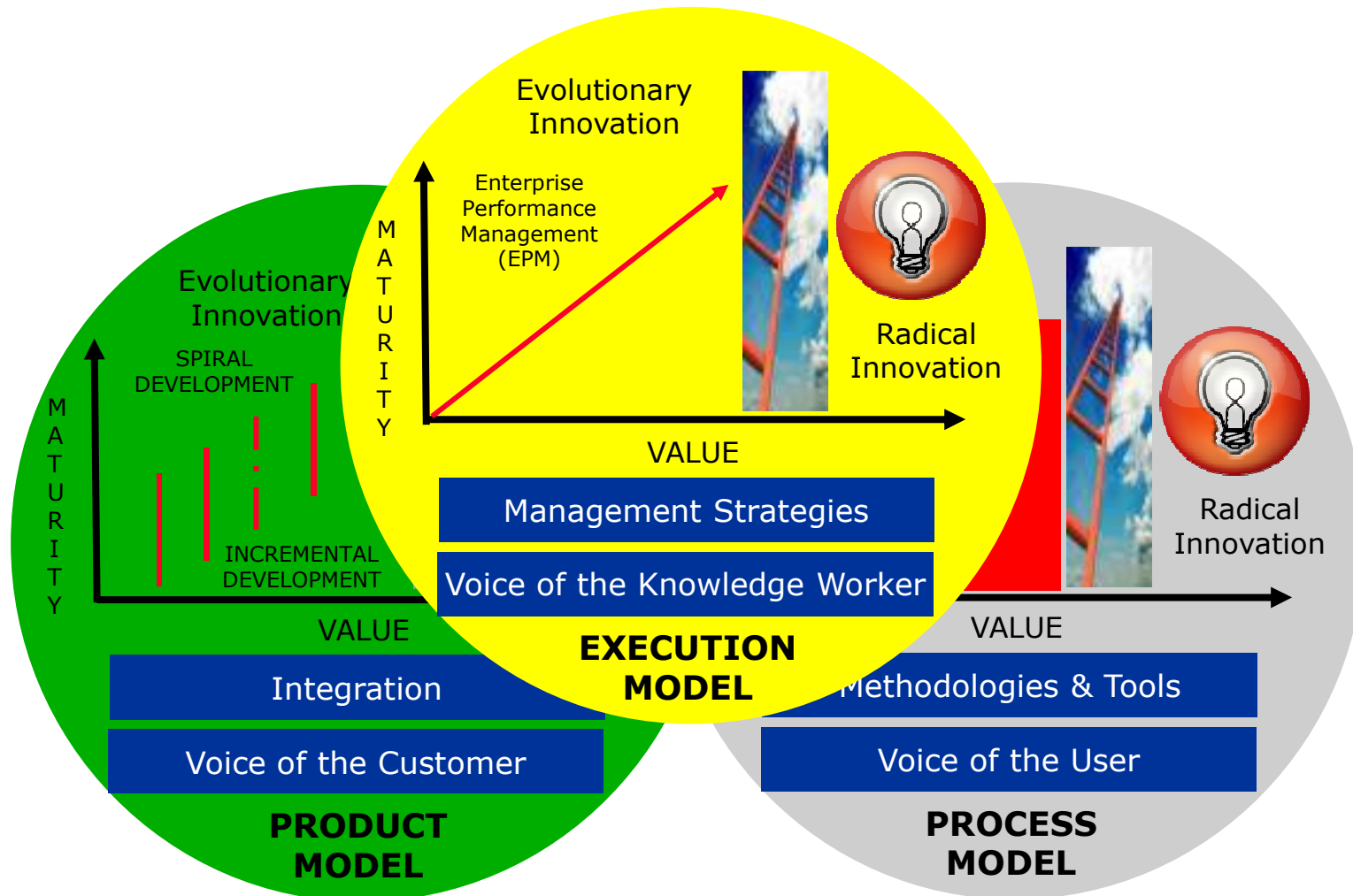
Model: Execution Maturity

Model based on EPM Matrices, Management Strategies, and Voice of the Knowledge Worker



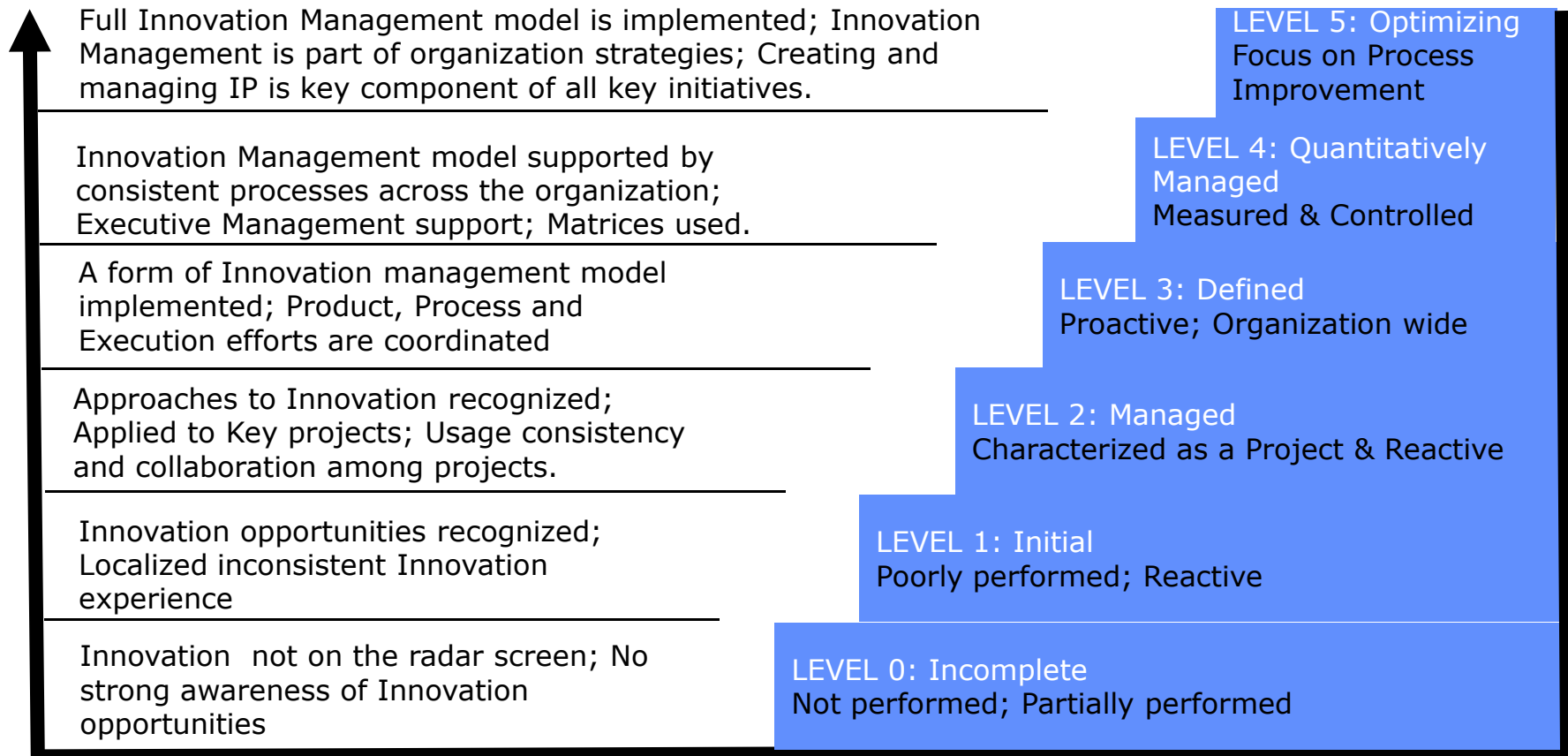
Innovation Management Model: Components

Innovation Maturity = f (Product, Process, Execution)



Innovation Management Model: Maturity

Innovation Management is a Process and should be matured using the CMMI methodology



Innovation Model: Implementation

An Innovation Model can be applied to varied functions of an Organization

■ Private Organizations

- Organization wide Innovation maturity – measure and control the whole organization's current level of maturity in adopting Innovation
- Product specific – measure and control Innovation in a given product (e.g: Idea to market for a given widget.)
- Process specific - measure and control Innovation in a given Process (e.g: Human Resource Management)

■ Public Organizations (DoD)

- Program Specific – measure the maturity of technologies and processes for a given Program through its life cycle (e.g: FCS)
- **Sector Specific – measure the Innovation maturity of an organization (e.g: R&D and Technology Management)**
- Initiative specific – measure the Innovation maturity for an Initiative (e.g: eGov)

Agenda (Recap)

ART to SCIENCE : A Framework

I. Innovation Management: Innovation Agenda for Public and Private Organizations: Concerns, Needs and Strategies, Why Innovation Management Art?, Need to convert to Science. Define an Innovation Management Model.

II. Innovation Management: DoD R&D and Technology Management Process

Develop a framework which incorporates DoD Acquisition Management framework (e.g: TRLs), Force Transformation strategies (e.g: Evolutionary Acquisition), GAO Recommendations (e.g: Knowledge-based Acquisition), DoD Community concerns & suggestions (e.g: Multi-Dimension Maturity Analysis), and Industry best practices (e.g: the Gate Process, CMMI, Technology Hype Cycle and Adoption Cycle).

III. Knowledge-Based Gate Process: An Art to Science process which may be employed by DoD R&D organizations and Program Managers to manage technologies through their life cycle. Introduce an Innovation Management methodology: TechIP (Techology Insertion Plan)

IV. Execution: Strategies to implement the Framework and Process.

Challenges & Issues: DoD R&D and Technology Management

Valley of Death Phenomena !!

■ DoD Report to the Congress on Technology Transition, July 2007

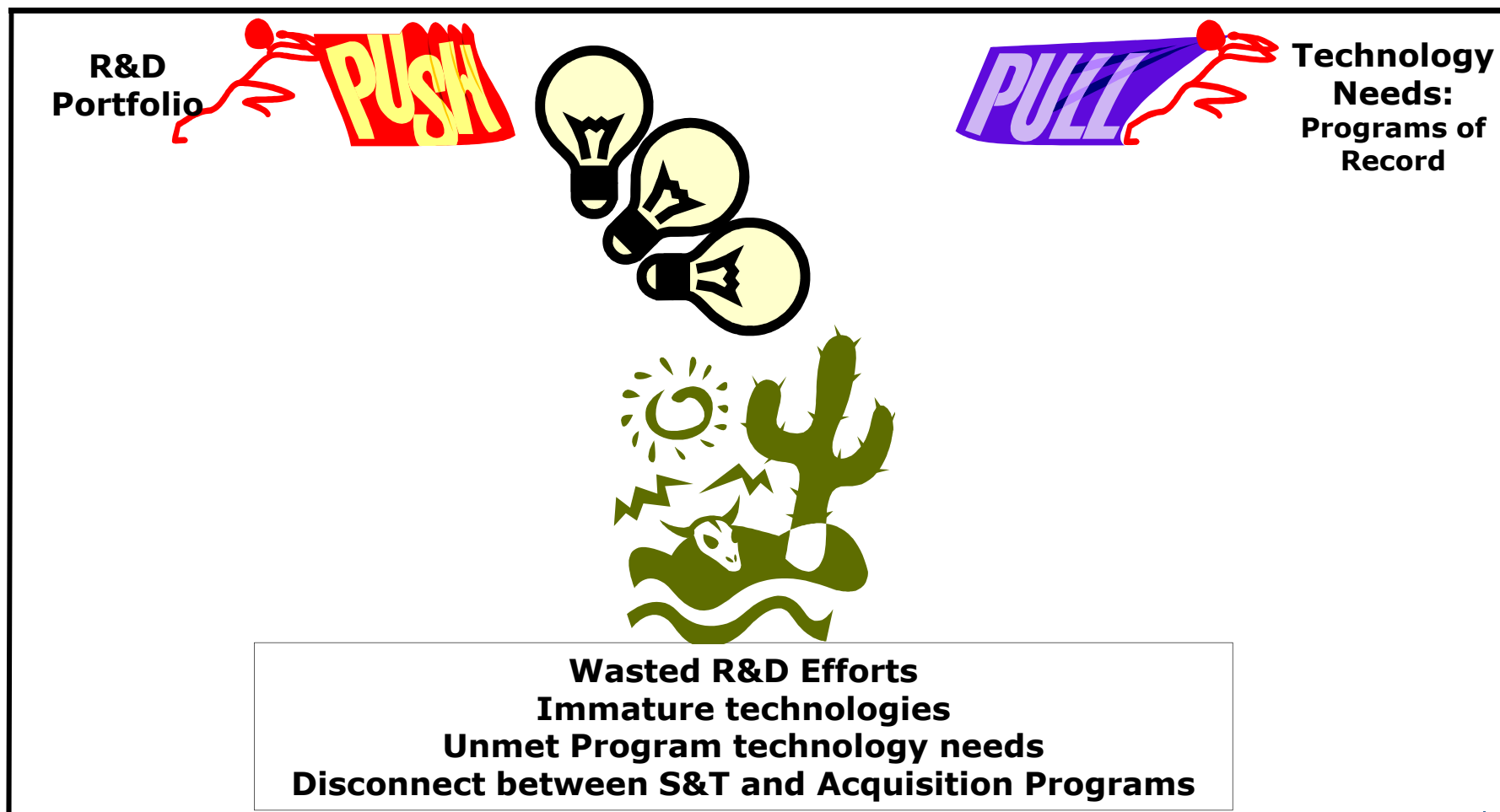
- **Author** - John J. Kubricky, Deputy Under Secretary of Defense, Advanced Systems & Concepts and Kathleen L. Harger, Assistant Deputy Under Secretary of Defense, Innovation & Technology Transition.
- **Conclusion** – Disconnect between S&T and Acquisition Programs
- **Recommendations** – (1) Improve Technology Push, (2) Improve Technology Pull, (3) Remove technical, cultural and business barriers to integrate new suppliers and technologies into defense system architectures, and (4) Focused governance and oversight at the Enterprise level

■ GAO Report on Assessments of Select Weapon Programs, March 2008

- **Author** - Gene L. Dodaro, Acting Comptroller General of the United States
- **Conclusion** – Immature technology causes cost and time escalation (other – software development difficulties, contractor usage, staff turnover)
- **Recommendations** – Employ Knowledge-based approach (Technology Maturity, Design Maturity and Production Maturity)

Valley of Death ?

Disconnect S&T and Acquisition Programs



Valley of Death: Why?

The Issues to be resolved and Best Practices to be implemented

R&D
Portfolio



Technology
Needs:
Programs of
Record

S&T and Program Management Issues

Enterprise Guidelines and Issues

Lack of Industry Best Practices



Process Pitfalls: DoD R&D and Technology Management

Need Process Re-engineering

■ Generic

- Lack of Common technology maturation and risk control matrices (a la financial ratios)
- Gap between R&D Portfolios and Program technology needs
- Use of ad-hoc software tools which do not address the product or technology life cycle
- Lack industry “best practices”- The Gate Process, Technology Hype & Adoption Cycles
- Disconnect between R&D and Program Management

■ R&D Organizations

- Do not address technology transfer, insertion and INTEGRATION requirements
- “too much reliance” on technologists who are “sold” on their work; creating “Hype”
- Manages internally developed R&D projects
- A number of research efforts are undirected, unfocused and unproductive.

■ Program Management Offices

- TRLs conducted “too late/too few”; S&T Community “Hype” and PM’s “under pressure”
- Does not provide links to related methodologies, such as Spiral Development (SD).
- Addresses only “hard” technologies (hardware, software, etc.), and not “soft” technologies (algorithms, formulas, models, methodologies, work flow, etc.)

Enterprise Issues: DoD R&D and Technology Management

Enterprise Guidelines

■ DoD Acquisition Management

- DoDi/FAR 5000.5 - TRLs are single dimension & partially conducted
- Defense Transformation – Business transformation; Cost reduction; Evolutionary Development
- DoD Community suggestions
 - Multi-Dimension Maturity needs by DoD Technology Maturity Conference
 - Manufacturing Readiness Level working Group of the Joint Defense Manufacturing Technology Panel (JDMTP)
- DoD Enterprise: DoD Report to the Congress on Technology Transition

■ GAO Recommendations

- Knowledge-based Gate Process
- Technology, Design and Production Maturity Knowledge Points

Industry Best Practices: R&D and Technology Management

Apply Industry Best Practices

■ Gate Process

- Over 75% major U.S. product developers use some kind of Gate Process

■ Hype Cycle

- Gartner developed;
- large private organizations use for technology planning

■ Adoption cycle

- Technology based organizations use to position their products

■ Innovation Cash Curve

- Developed at Harvard Business School

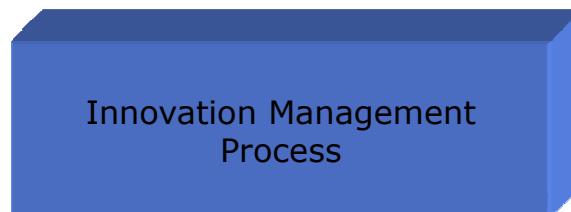
Valley of Death: A Solution

A Process which addresses Process pitfalls, Enterprise Guidelines and Industry Best Practices

**R&D
Portfolio**

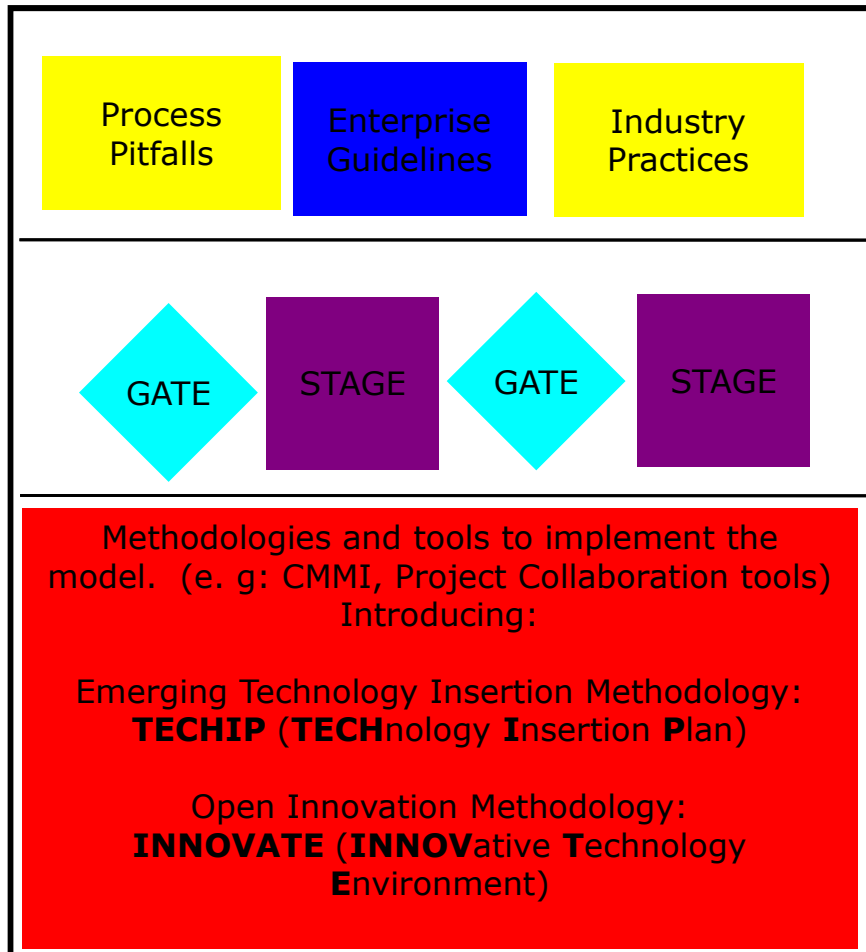


**Technology
Needs:
Programs of
Record**



A Proposed Solution: An Innovation Management Process

An Gate Process



■ **BUSINESS MODEL:** A R&D and Technology Management Gate process which addresses

- **Process Pitfalls**
- **Enterprise Guidelines**
- **Industry Best Practices**

■ **AGENDA:**

- Secure Sponsorship & develop plan
- Start with existing practices
- Migrate to a business model
- Communicate & Coordinate
- Track Progress

Agenda - Recap

ART to SCIENCE : A Methodology

I. Innovation Management: Innovation Agenda for Public and Private Organizations: Concerns, Needs and Strategies, Why Innovation Management Art?, Need to convert to Science. Define an Innovation Management Model.

II. Innovation Management: DoD R&D and Technology Management Process

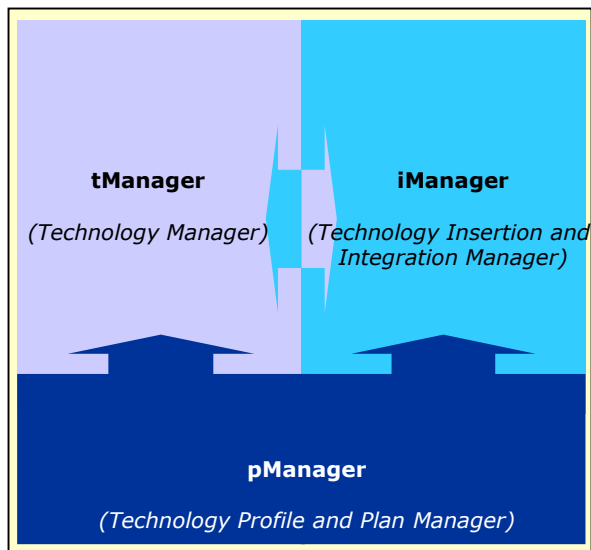
Develop a framework which incorporates DoD Acquisition Management framework (e.g: TRLs), Force Transformation strategies (e.g: Evolutionary Acquisition), GAO Recommendations (e.g: Knowledge-based Acquisition), DoD Community concerns & suggestions (e.g: Multi-Dimension Maturity Analysis), and Industry best practices (e.g: the Gate Process, CMMI, Technology Hype Cycle and Adoption Cycle).

III. Knowledge-Based Gate Process: An Art to Science process which may be employed by DoD R&D organizations and Program Managers to manage technologies through their life cycle. Introduce an Innovation Management methodology: TechIP (TechInPlan)

IV. Execution: Strategies to implement the Framework and Process.

TechIP Methodology: Introduction

TechIP Methodology consists of two models, tManager & iManager, and associated tools, called pManager



■ What is TechIP?

A knowledge-based Gate process and associated tools that can be used to identify critical research and technology elements, perform multi-dimension maturity analysis, risk assessment, technology insertion and integration activities for the full life cycle of a product.

■ Stages/Gates:

Consists of nine innovation gates and stages, named **iGate (Innovation Gate)** & **iStage (Innovation Stage)**

■ Components:

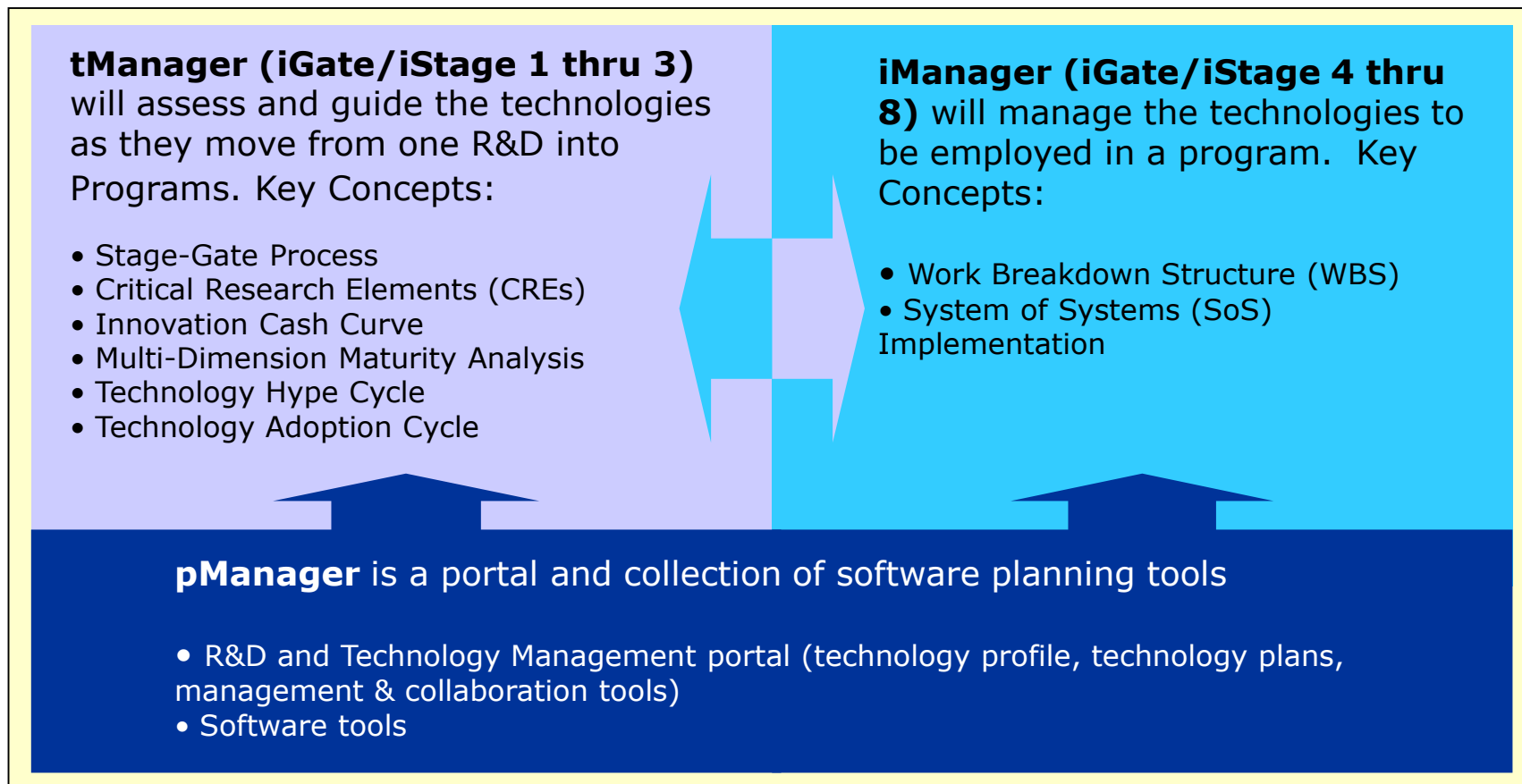
tManager (Technology Manager)

iManager (Insertion and Integration Manager)

pManager (Profile and Plan Manager)

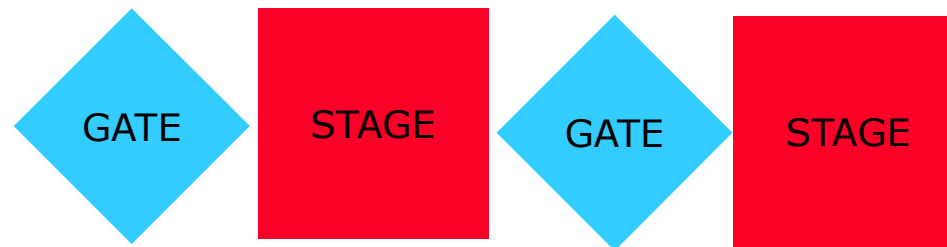
TechIP Methodology: Components

TechIP methodology provides a framework for the management of technology through its lifecycle.



TechIP : Stage Gate Process

The Gate process is a road map for moving a product from one STAGE to the next, using a GATE as a decision point.



BENEFITS:

Product/Service portfolio align with organization objectives
Portfolio has high value and balanced projects
Projects stay within budget & done on time
Spending reflects strategy

STAGES:

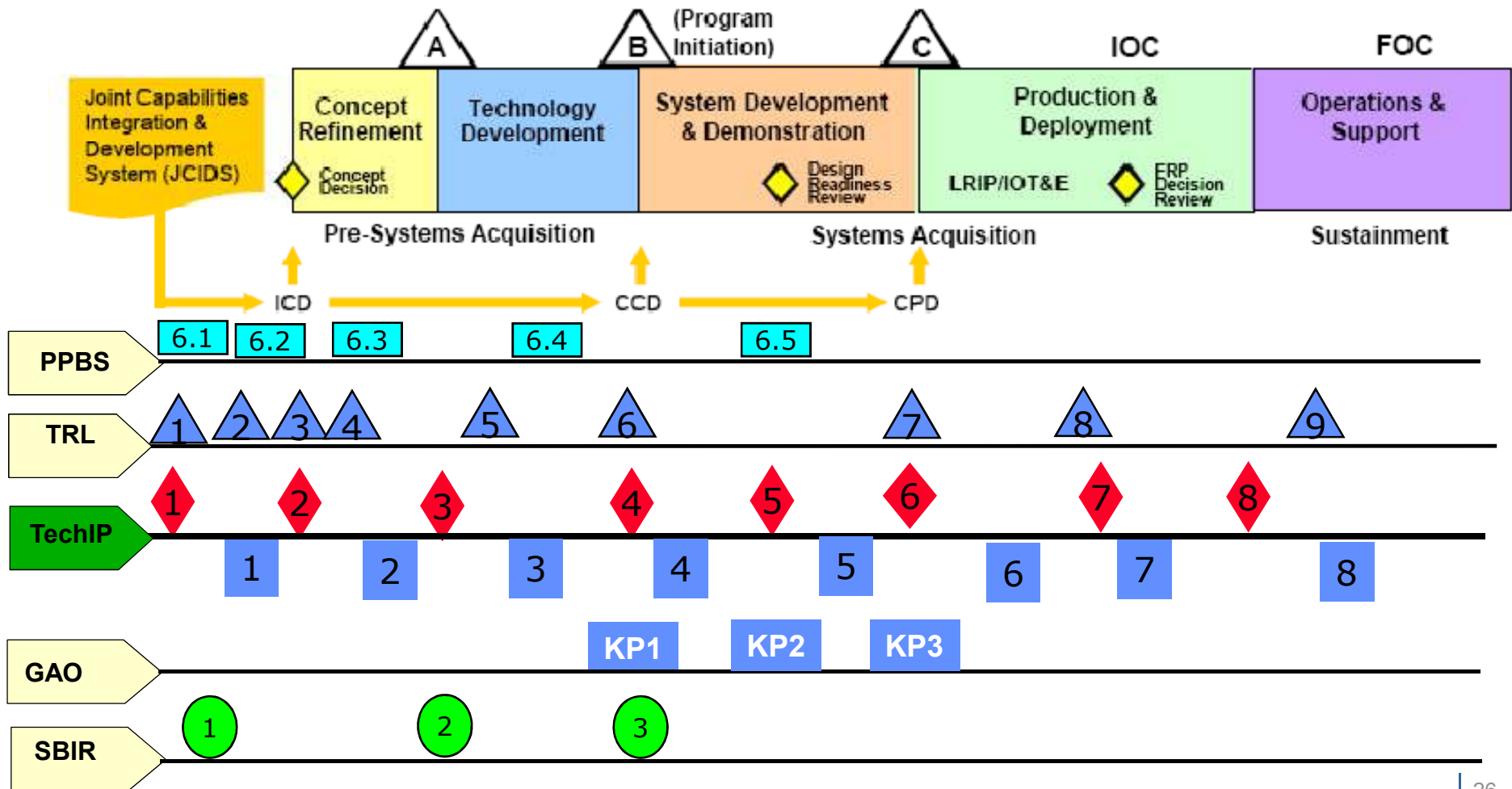
- Stages are where action occurs
- The team players undertake key tasks to gather information needed to advance the project to next point
- Stages are cross functional
- Each stage costs more than preceding stage - risk decreases and investments are allowed to mount

GATES:

- Quality control check point
- Go/Kill and Prioritization decision points
- Path forward for the next STAGE and resource commitments are decided
- Common Formats:
Deliverables, Criteria and Output

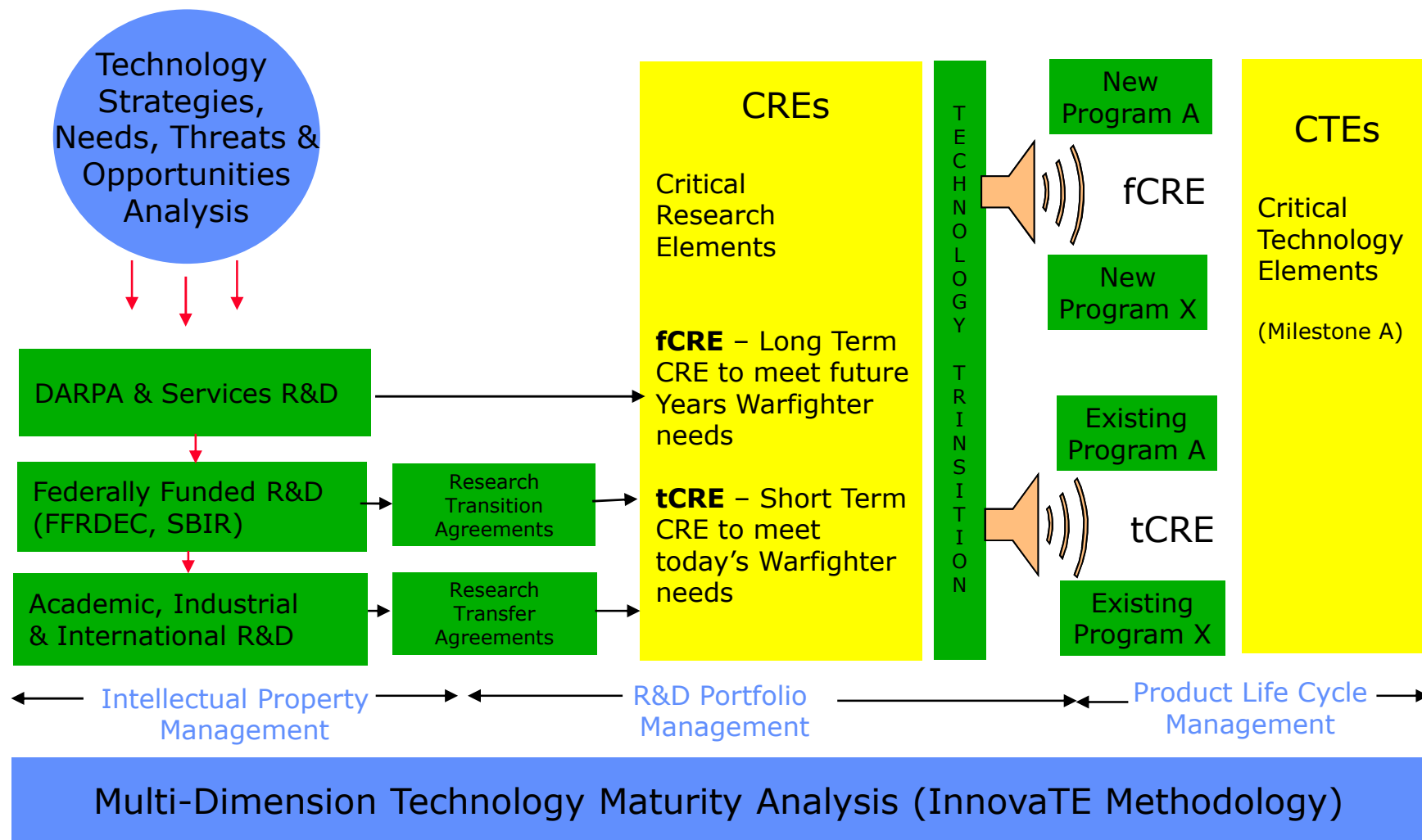
TechIP & DoD Acquisition Practices

DoD / FAR 5000.2 Framework & Matrices



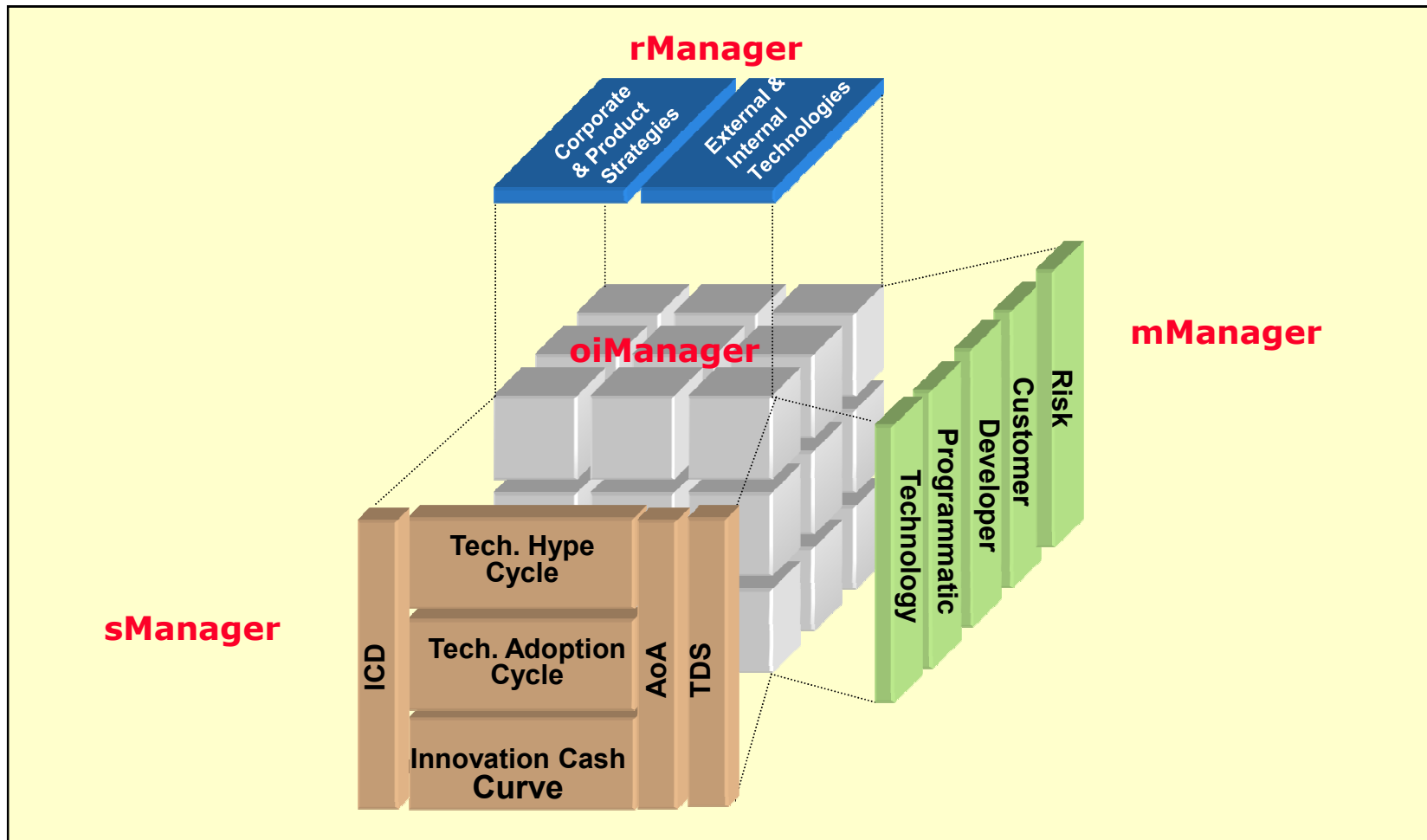
TechIP: Critical Research Elements

TechIP links IP, R&D Portfolio and Product Lifecycle Management



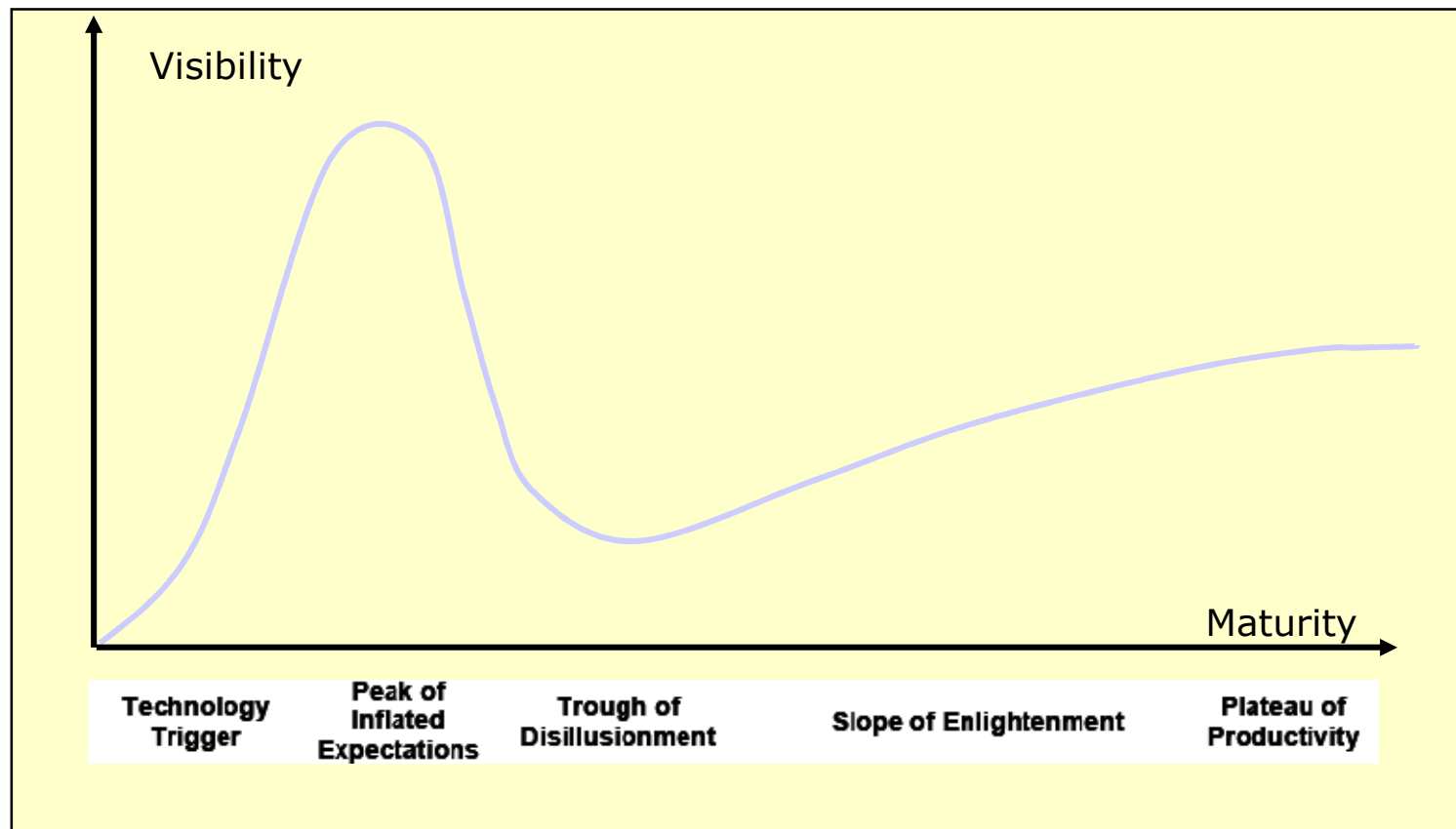
TechIP: Multi-Dimension Maturity Analysis - InnovaTE (Innovative Technology Environment)

The methodology comprises of reviewing user needs and technology opportunities (**rManager**), selecting Critical Technology Elements (**sManager**), conducting maturity analysis (**mManager**), and managing the Open Innovation process (**oiManager**)



Tech: Hype Cycle

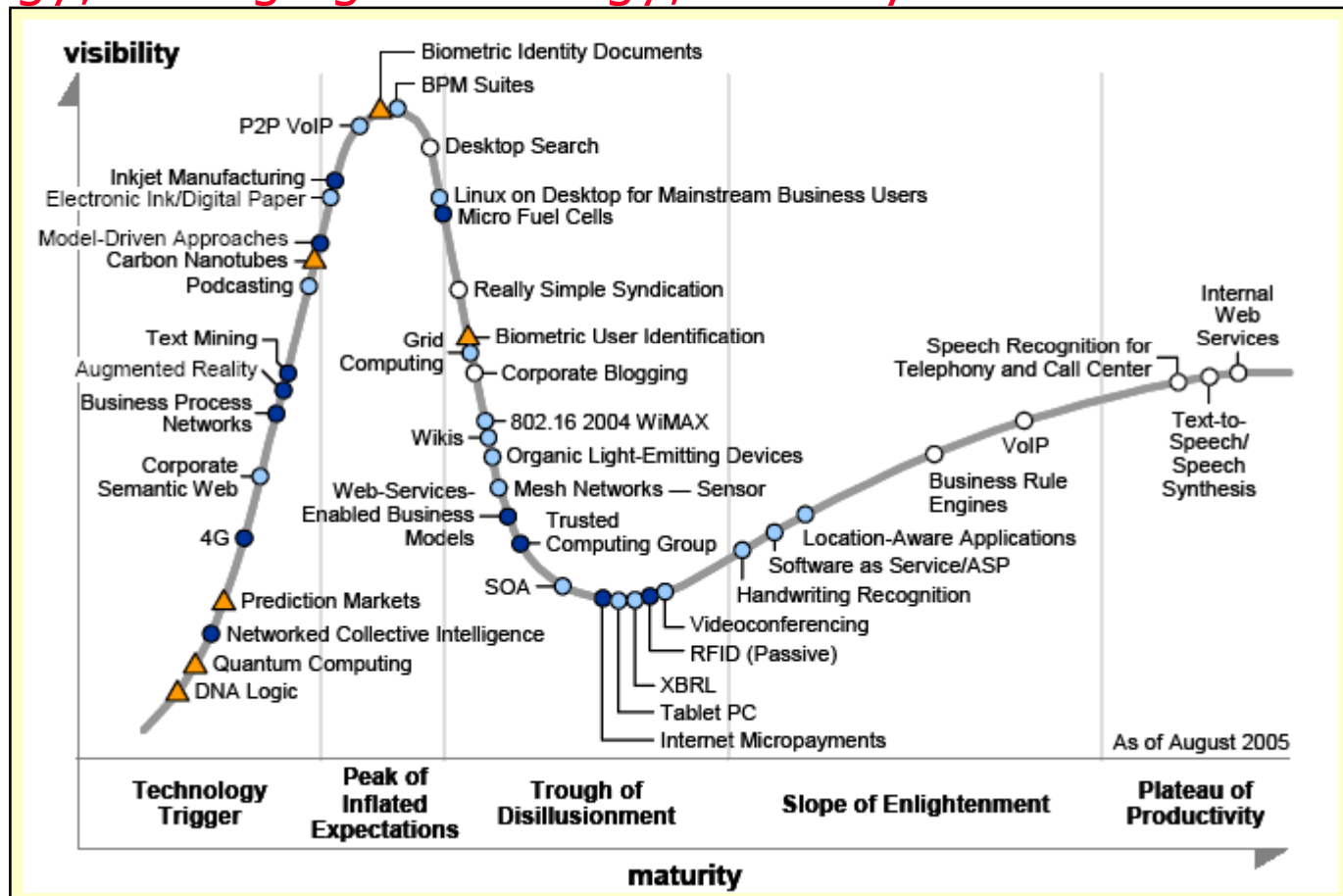
A Hype Cycle provides a snapshot of technologies, identifying which technologies are hyped, suffering disillusionment, and stable enough to study deployment



Source: Gartner, Hype Cycle for Emerging Technologies 2005

Hype Cycle: Gartner's Emerging Technology Elements

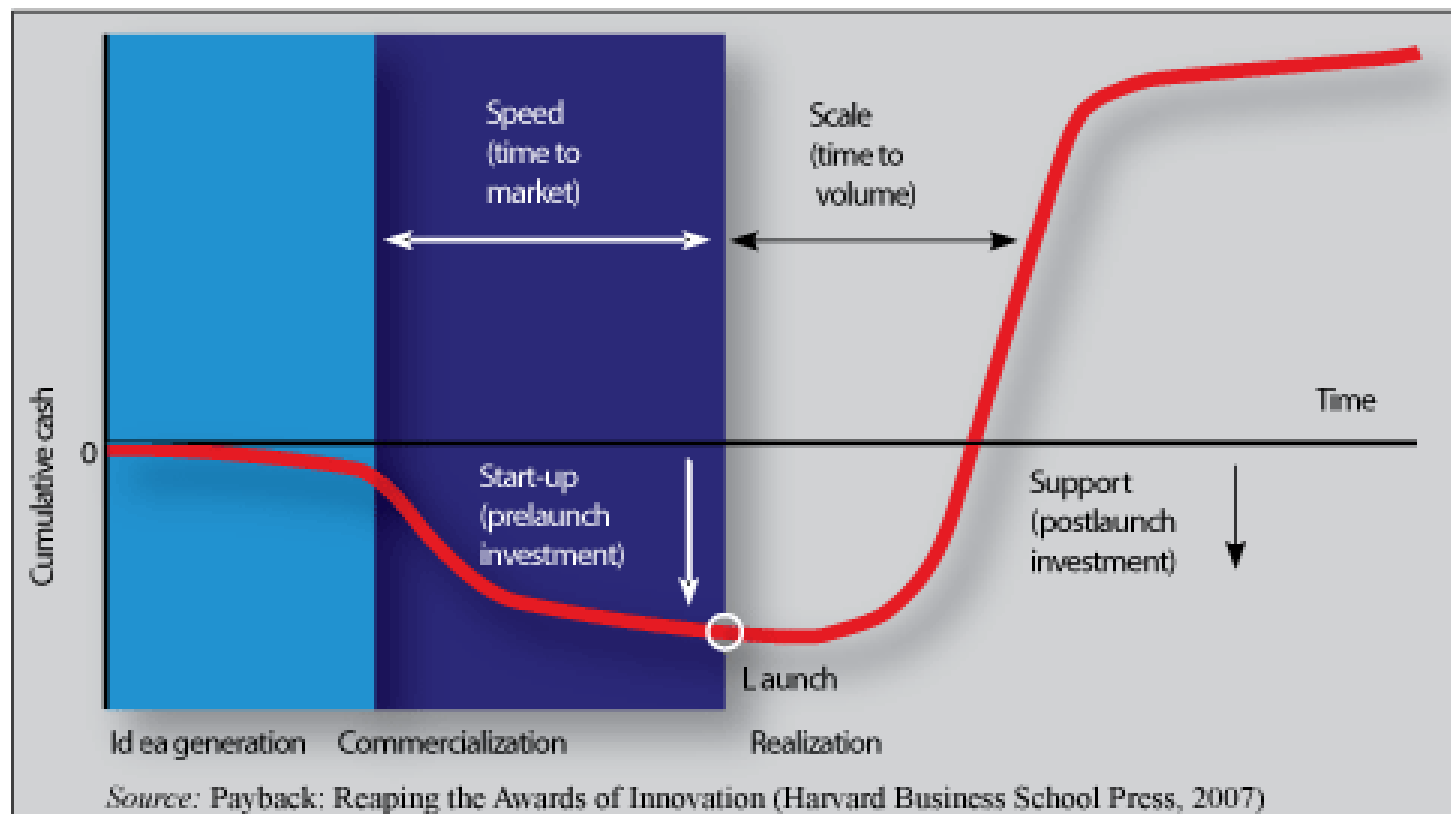
Hype Cycles are developed for different domains (e.g: government technology, emerging technology, security assurance technology)



Source: Gartner, Hype Cycle for Emerging Technologies 2005

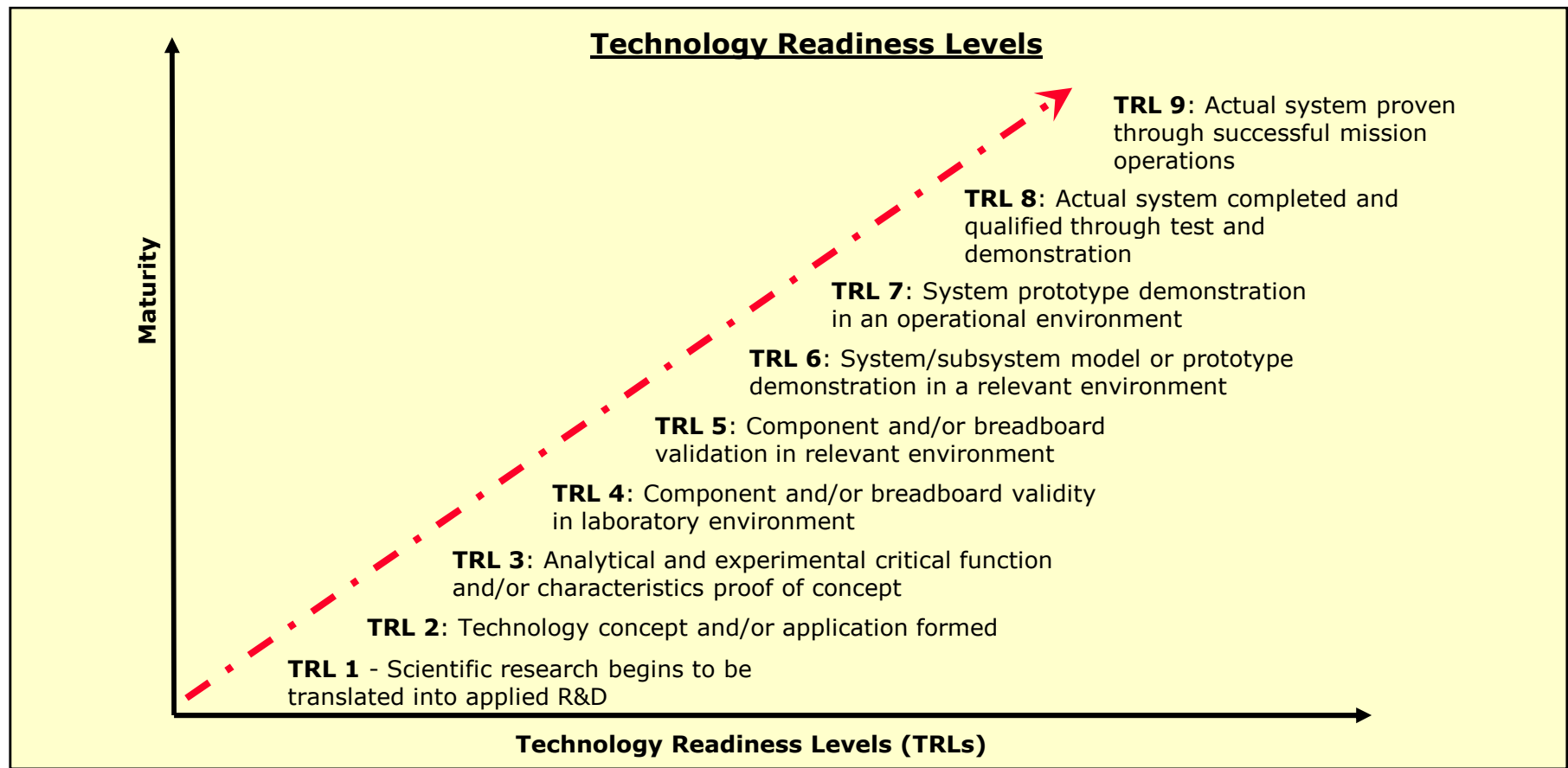
TechIP: Innovation Cash Curve

Consistent use of the Cash Curve can help organizations to effectively manage and track innovations



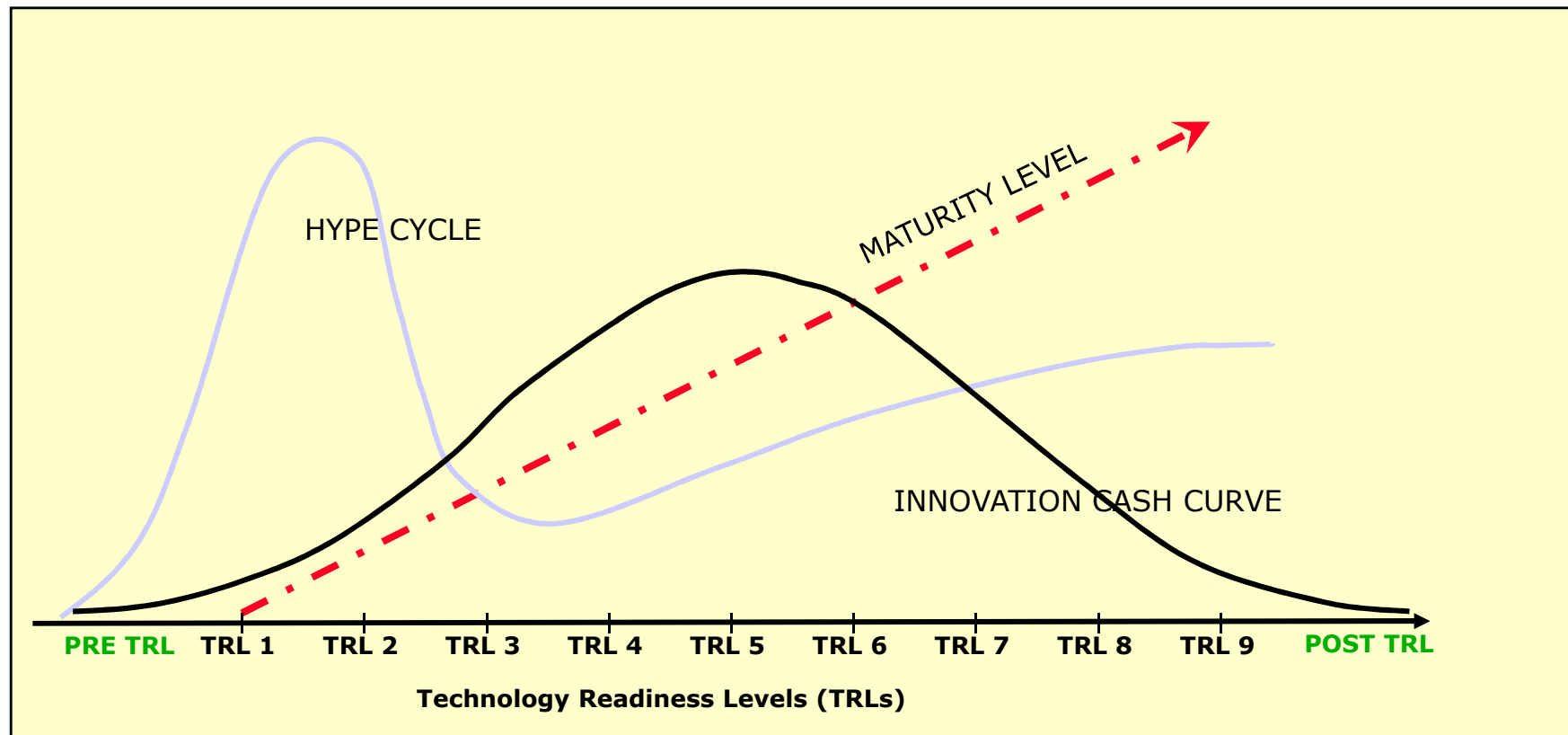
TechIP: Technology Readiness Levels (TRLs)

NASA developed matrix to classify technology maturity, which is widely accepted by the Department of Defense (DoD)



TechIP: Analysis of Alternatives

Maturity Levels should be linked to related technology evaluation cycles



Multi-Dimension Maturity Analysis

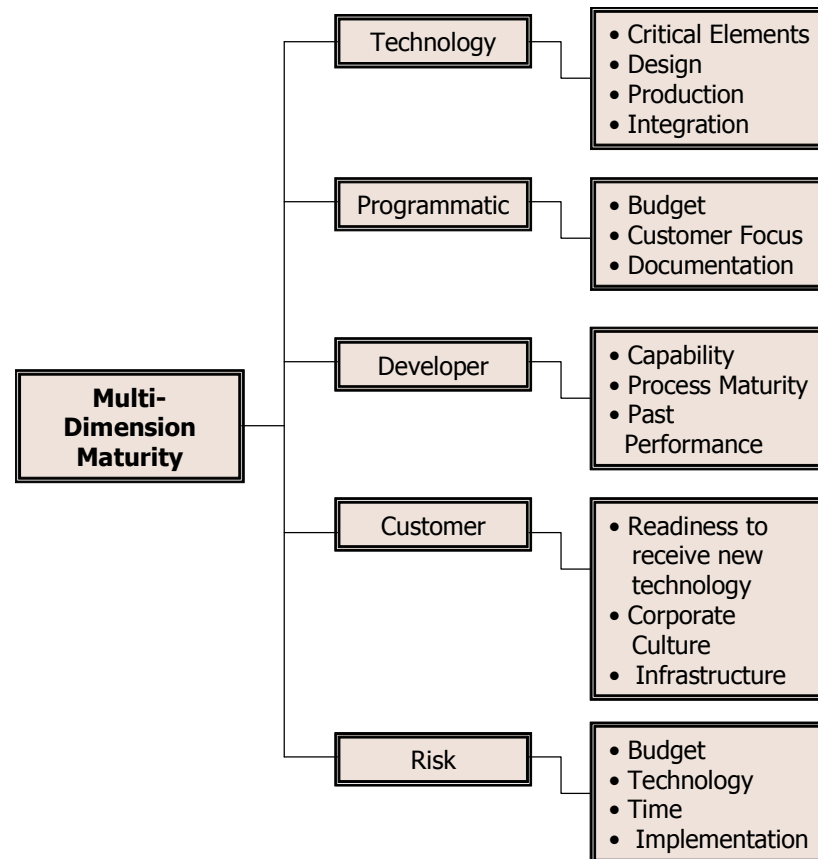
■ Original Concept

Presented and discussed during the inaugural DoD/NASA wide Technology Maturity Conference, 2006.

■ Functions

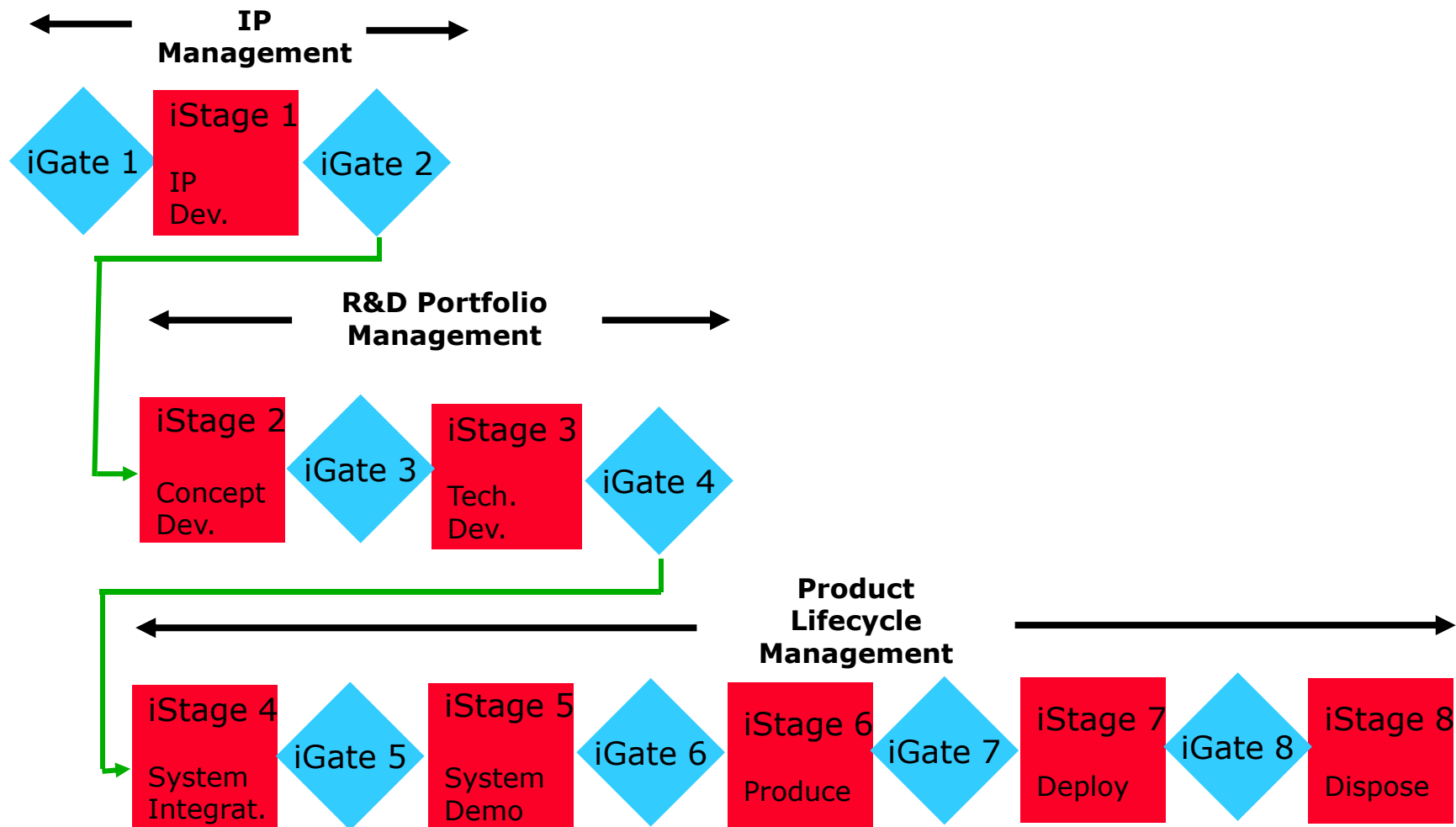
The purpose of mManager is to perform a systematic, matrix-based, multi-dimensional maturity analysis of the selected CTEs, called SRL (System Readiness Levels).

- Technology /System Maturity Matrices
- Interface Language
- A Matrices and Language to measure and communicate about Innovation but NOT to inhibit Innovation



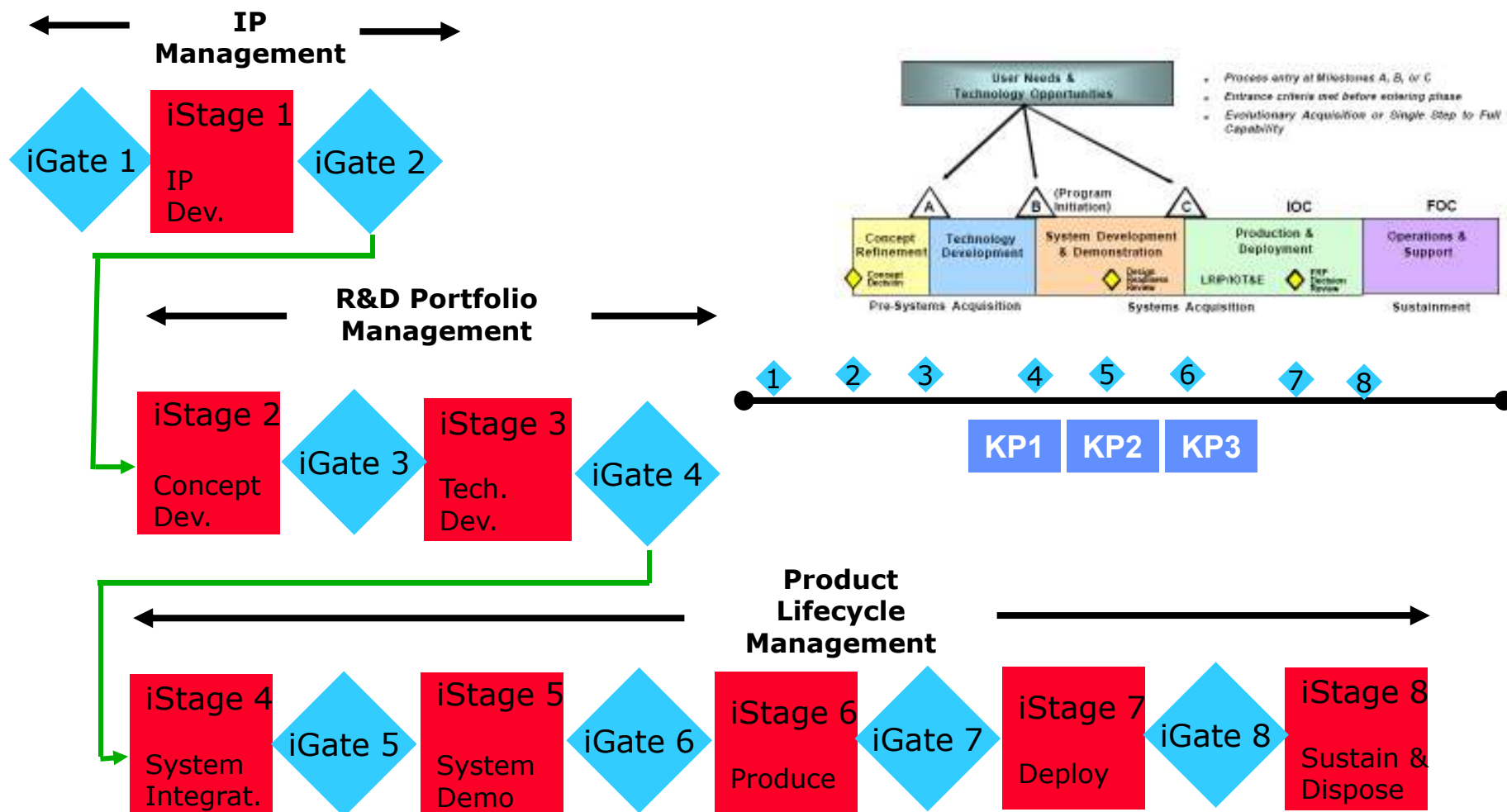
TechIP: iGate/iStage Framework

IP, R&D Portfolio & Product Lifecycle Management are linked



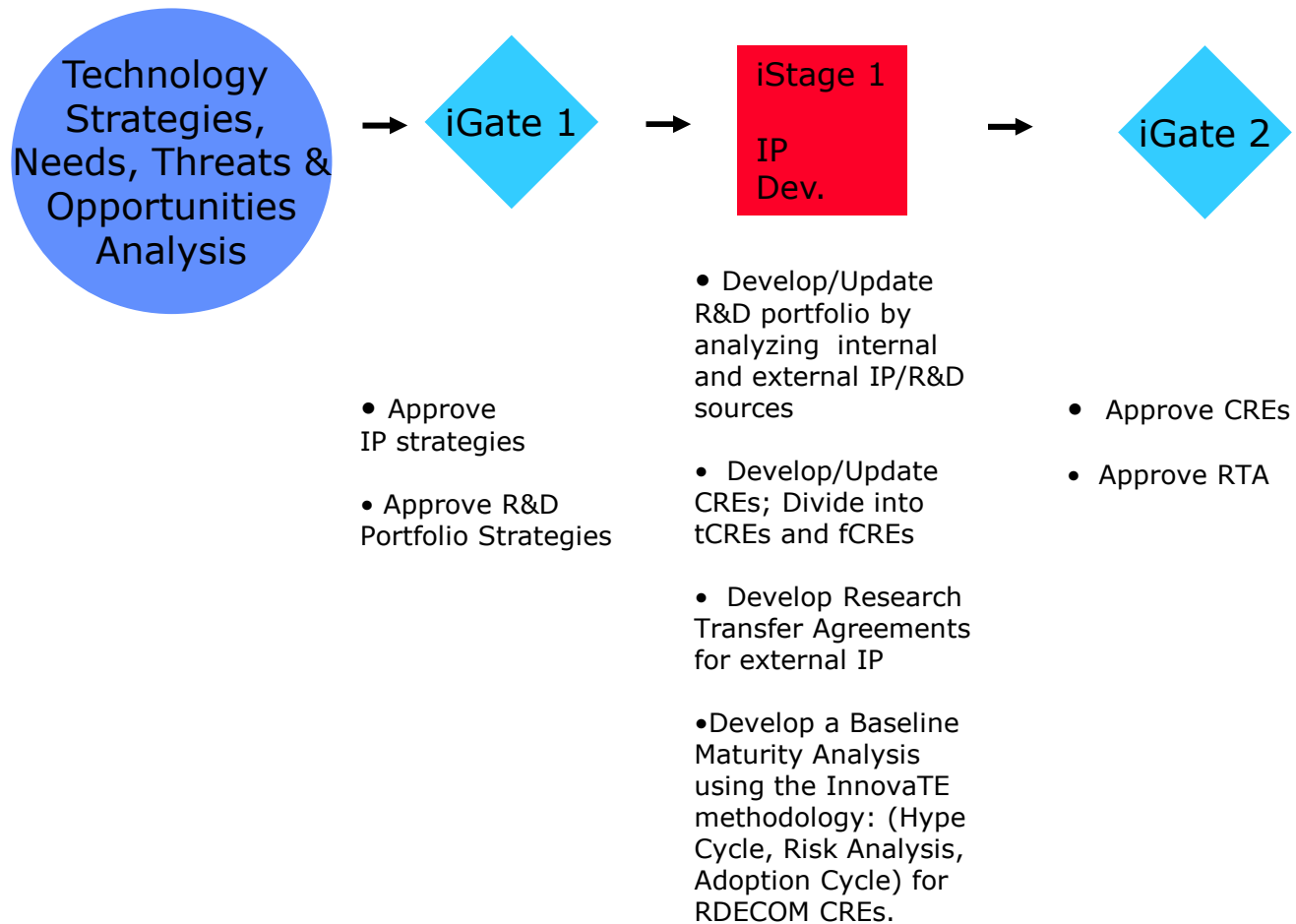
TechIP: iGate/iStage Framework

iGate/iStage & DoD Acquisition Management Framework



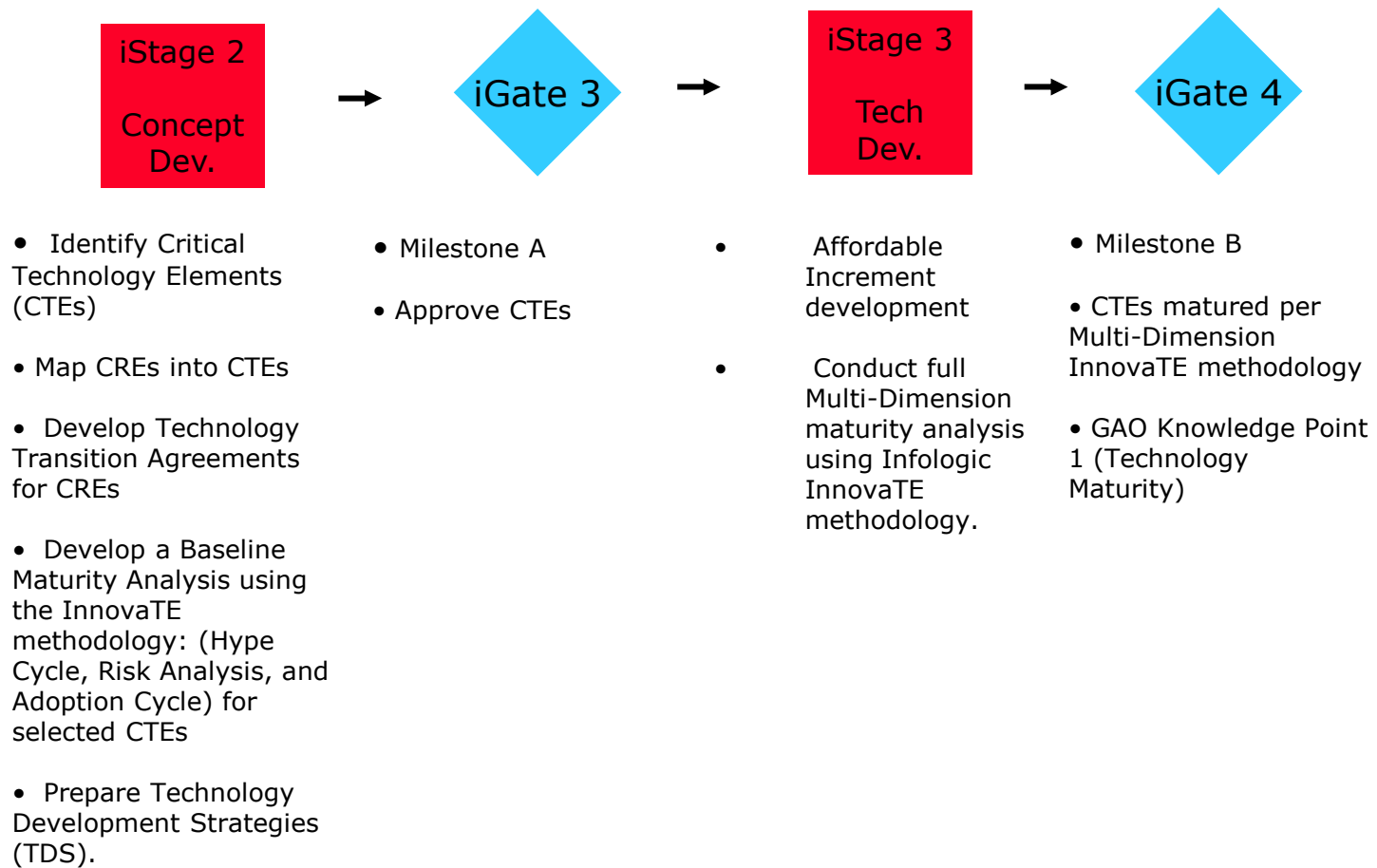
TechIP: IP Management

IP Management: iStage 1



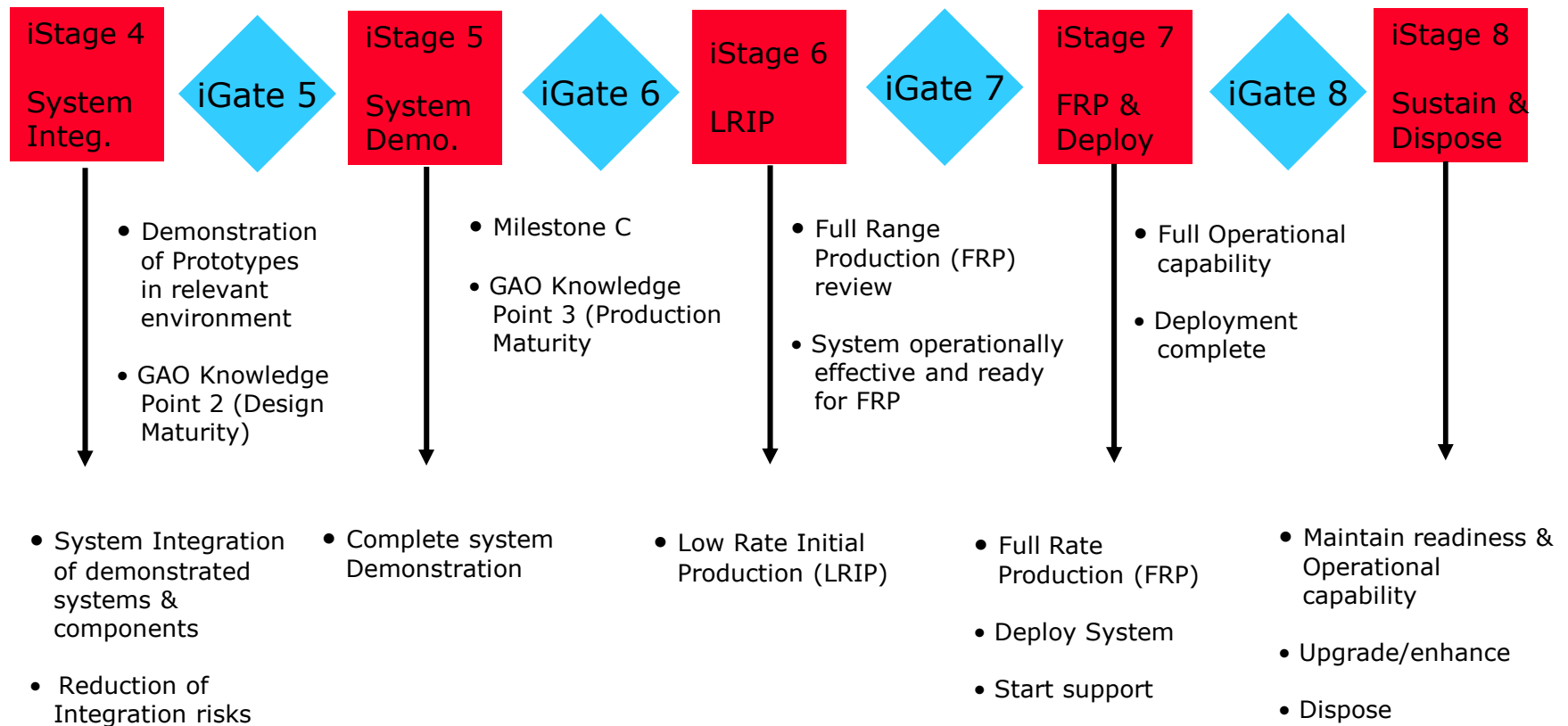
TechIP: R&D Management

R&D Portfolio Management: iStage 2 and iStage 3



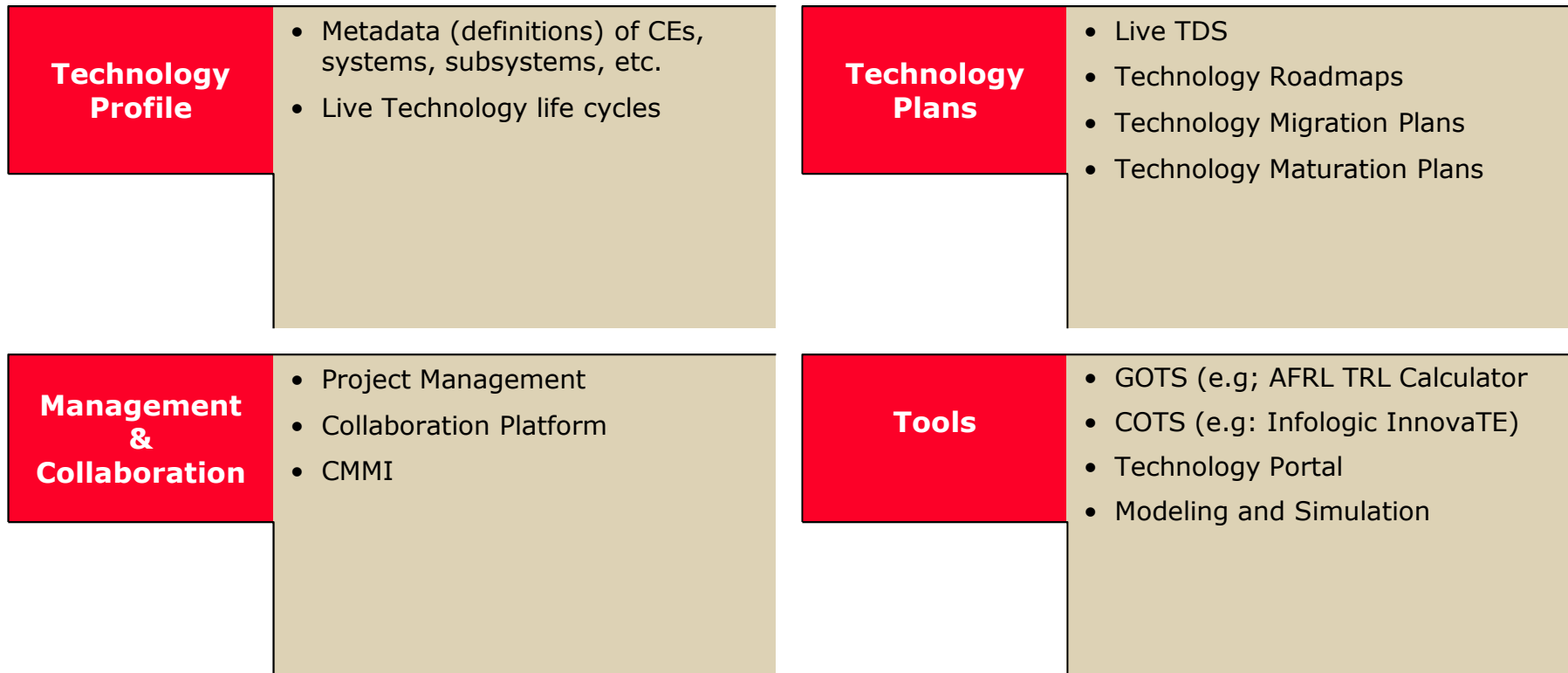
TechIP: Program Management

Product Lifecycle Management: iStage 4 thru iStage 8



pManager : Overview

The objective of pManager (which is a set of processes and software tools) is to manage the technologies identified by the tManager and iManager components of TechIP



Agenda: Execution

ART to SCIENCE ?

I. Innovation Management: Innovation Agenda for Public and Private Organizations: Concerns, Needs and Strategies, Why Innovation Management Art?, Need to convert to Science. Define an Innovation Management Model.

II. Innovation Management: DoD R&D and Technology Management Process

Develop a framework which incorporates DoD Acquisition Management framework (e.g: TRLs), Force Transformation strategies (e.g: Evolutionary Acquisition), GAO Recommendations (e.g: Knowledge-based Acquisition), DoD Community concerns & suggestions (e.g: Multi-Dimension Maturity Analysis), and Industry best practices (e.g: the Gate Process, CMMI, Technology Hype Cycle and Adoption Cycle).

III. Knowledge-Based Gate Process: An Art to Science process which may be employed by DoD R&D organizations and Program Managers to manage technologies through their life cycle. Introduce an Innovation Management methodology: TechIP (TechIP)

IV. Execution: Strategies to implement the Framework and Process.

Business Model Implementation Agenda

Convert the **ART** of Innovation Management into **SCIENCE**

■ Secure Sponsorship & Develop Plans

- Senior executive & line management, and R&D management commitments
- Develop a business model and associated implementation plans

■ Start with Existing Practices

- Align existing “best practices” (e.g.: TRLs, CMMI, Six Sigma) and software tools with the new business model, and put “teeth” and “rewards” into these practices

■ Migrate to a Business Model

- Develop or acquire necessary tools and processes to fully implement the model

■ Communicate & Coordinate

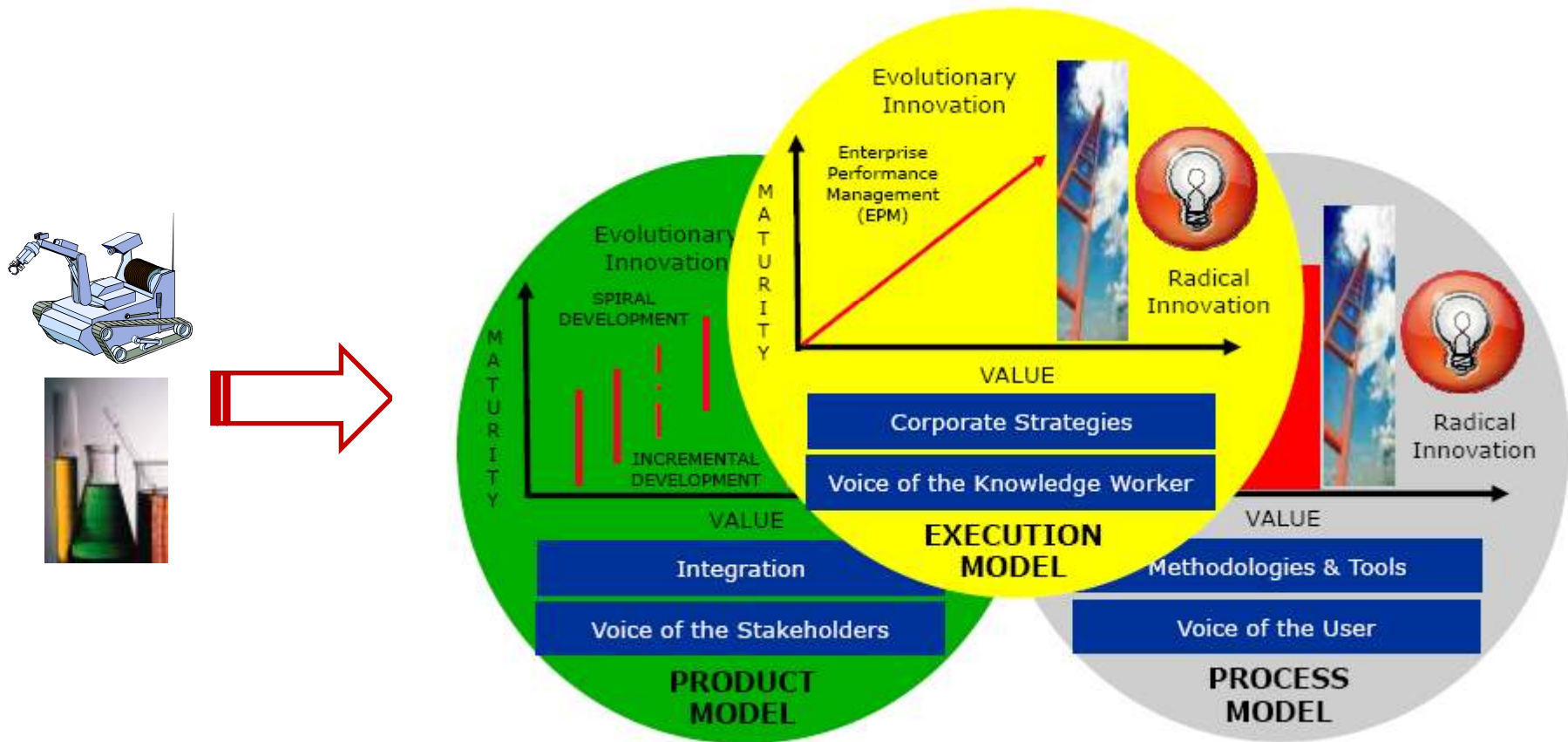
- Keep all stockholders in loop

■ Track Progress

- Continuously “perfect” the model by adding values to your “best practices” processes and eliminating “wasteful” processes.

A Call to Action : Evolve from R&D to Innovation Management Model

Innovation Maturity = f (Product, Process, Execution)

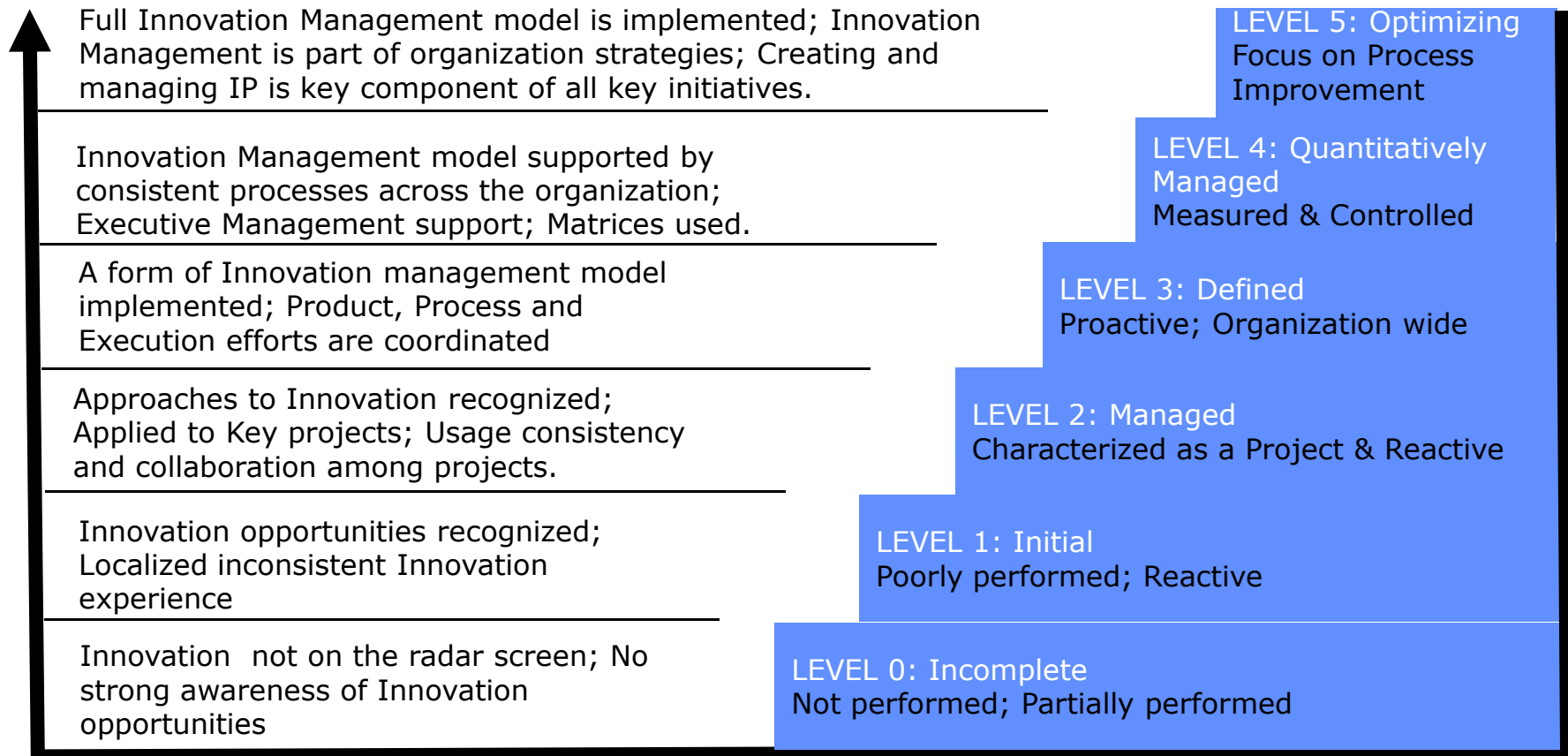


Traditional S&T Model

Art to Science-based Innovation Management Model

Execute: Innovation Management Model

Innovation Management is a Process and should be matured using the CMMI methodology



Agenda to Conclusions

ART to SCIENCE ?

I. Innovation Management: Innovation Agenda for Public and Private Organizations: Concerns, Needs and Strategies, Why Innovation Management Art?, Need to convert to Science. Define an Innovation Management Model.

II. Innovation Management: DoD R&D and Technology Management Process

Develop a framework which incorporates DoD Acquisition Management framework (e.g: TRLs), Force Transformation strategies (e.g: Evolutionary Acquisition), GAO Recommendations (e.g: Knowledge-based Acquisition), DoD Community concerns & suggestions (e.g: Multi-Dimension Maturity Analysis), and Industry best practices (e.g: the Gate Process, CMMI, Technology Hype Cycle and Adoption Cycle).

III. Knowledge-Based Gate Process: An Art to Science process which may be employed by DoD R&D organizations and Program Managers to manage technologies through their life cycle. Introduce an Innovation Management methodology: TechIP (Technology Insertion Plan)

IV. Execution: Strategies to implement the Framework and Process.

Successfully Transitioning Projects from S&T to Acquisition Programs

Infologic Webinar
May 25, 2011

**Any Questions?
Please contact:**

Has Patel
Infologic, Inc.
has.patel@infologic.com
(888) 325 0500 Ext. 100



INFOLOGIC
The logical approach to harness innovation

INFOLOGIC, INC.
1048 Irvine Avenue #624
Newport Beach, CA 92660
www.infologic.com