



# Enterprise Transformation Research Summit

Massachusetts Institute of Technology  
January 21, 2009

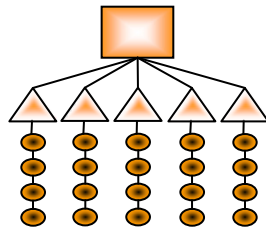
# Goals for the Summit

- Convene researchers, member representatives, and others interested in enterprise transformation
- Describe current projects, innovative ideas, and new approaches
- Illustrate the diversity of LAI research
- Convey how research creates knowledge that leads to deployment and transformation
- Show how engagement in research adds value to participants and LAI
- Gather feedback, suggestions, and ideas
- Stimulate support for and engagement in research

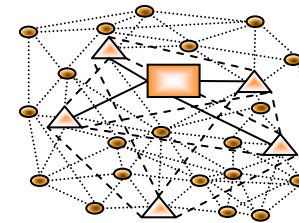
- 1. LAI's special enterprise focus**
- 2. Role of research at LAI**
- 3. LAI research agenda**
- 4. Research accomplishments and plans**
- 5. Modes of research – engaging with LAI**

# 1. The Challenges of Complex Enterprises Requires a Systems Approach

- New **strategic systems** perspective
- Enterprises as **holistic** and **highly networked** systems
- Integrating **leadership** processes, **lifecycle** processes and enabling **infrastructure** systems
- Beyond shopfloor and waste reduction to **value creation**
- Balancing needs of multiple **stakeholders** working across boundaries



**MOVING FROM THE PAST**  
(hierarchical) enterprise



**TOWARD THE FUTURE**  
(networked) enterprise

# LAI - Expanding Enterprise Focus

Increasing Total  
Enterprise  
Effectiveness

EVOLUTION OF LEAN ENTERPRISE THINKING

**Operations**  
Functional lean successes  
• Manufacturing  
• Supplier Networks  
“Islands” of Success

Successes through interaction between functions

Lean applied to enabling processes  
• HR  
• IT, etc.

Success through **enterprise integration** & application to **Product Dev**

Transition from waste minimization to value creation

Success through total enterprise integration of *all* stakeholders  
• Industry  
• Government  
• Suppliers  
• Employees

Success through **networked enterprises**

Expanding the lean boundaries  
• Suppliers  
• Customers  
• Partners

1993

NOW

# Creating a Holistic Approach to Enterprise Transformation

## Implementation Issue

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How do I motivate and sustain enterprise transformation?

How do I transform my enterprise to lean?

What analytical tools can I use to support my decision making?



## Enterprise Tools

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7 Principles of Lean Enterprise Thinking

Enterprise Transformation Roadmap

Enterprise Architecting Framework

Enterprise Strategic Analysis and Transformation (ESAT)

# 7 Principles of Lean Enterprise Thinking

**1.**

Adopt a  
**holistic approach**  
to enterprise  
transformation.

**2.**

Identify relevant  
**stakeholders**  
and determine their  
**value propositions.**

**3.**

Focus  
on enterprise  
**effectiveness before**  
**efficiency.**

**4.**

Address  
**internal and external**  
enterprise  
interdependencies.

**5.**

Ensure  
**stability and flow**  
within and across the  
enterprise.

**6.**

**Cultivate**  
**leadership**  
to support and drive  
enterprise behaviors.

**7.**

Emphasize  
**organizational**  
**learning.**

# LAI MIT Enterprise Transformation Roadmap

## STRATEGIC CYCLE

- Determine Strategic Imperative**
- Articulate Business Case for Transformation
  - Focus on Stakeholder Value
  - Leverage Transformation Gains

Pursue & Sustain Enterprise Transformation

## Engage Leadership in Transformation

- Convey Urgency
- Foster Enterprise Thinking
- Obtain Executive Buy-In
- Establish Executive Transformation Council

### Strategic Implications of Transformation...

### Nurture, Process & Imbed Enterprise Thinking

- Monitor & Measure the Outcomes
- Nurture Process, and Imbed Enterprise Culture
- Capture and Diffuse Lessons Learned
- Synchronize Strategic Planning and Execution Cycles

Long-Term Corrective Action

## PLANNING CYCLE

A Committed Leadership Team

### Understand Current Enterprise State

- Perform Stakeholder Analysis
- Define As-Is Enterprise State
- Perform Enterprise Assessment

Capabilities & Deficiencies Identified

### Envision & Design Future Enterprise

- Create Vision of Future Enterprise
- Define "To-Be" Enterprise State
- Perform Gap Analysis

Enterprise Vision

### Implement & Coordinate Transformation Plan

#### Implementation Results

- Develop Detailed Project Implementation Plans
- Synchronize Detailed Plans
- Implement Projects and Track Progress
- Commit Resources
- Provide Education & Training

Short-Term Corrective Action

## EXECUTION CYCLE

### Create Transformation Plan

- Identify Key Enterprise Improvement Focus Areas
- Determine Impact Upon Enterprise Performance
- Prioritize, Select, and Sequence Focus Areas
- Publish Communication Plan

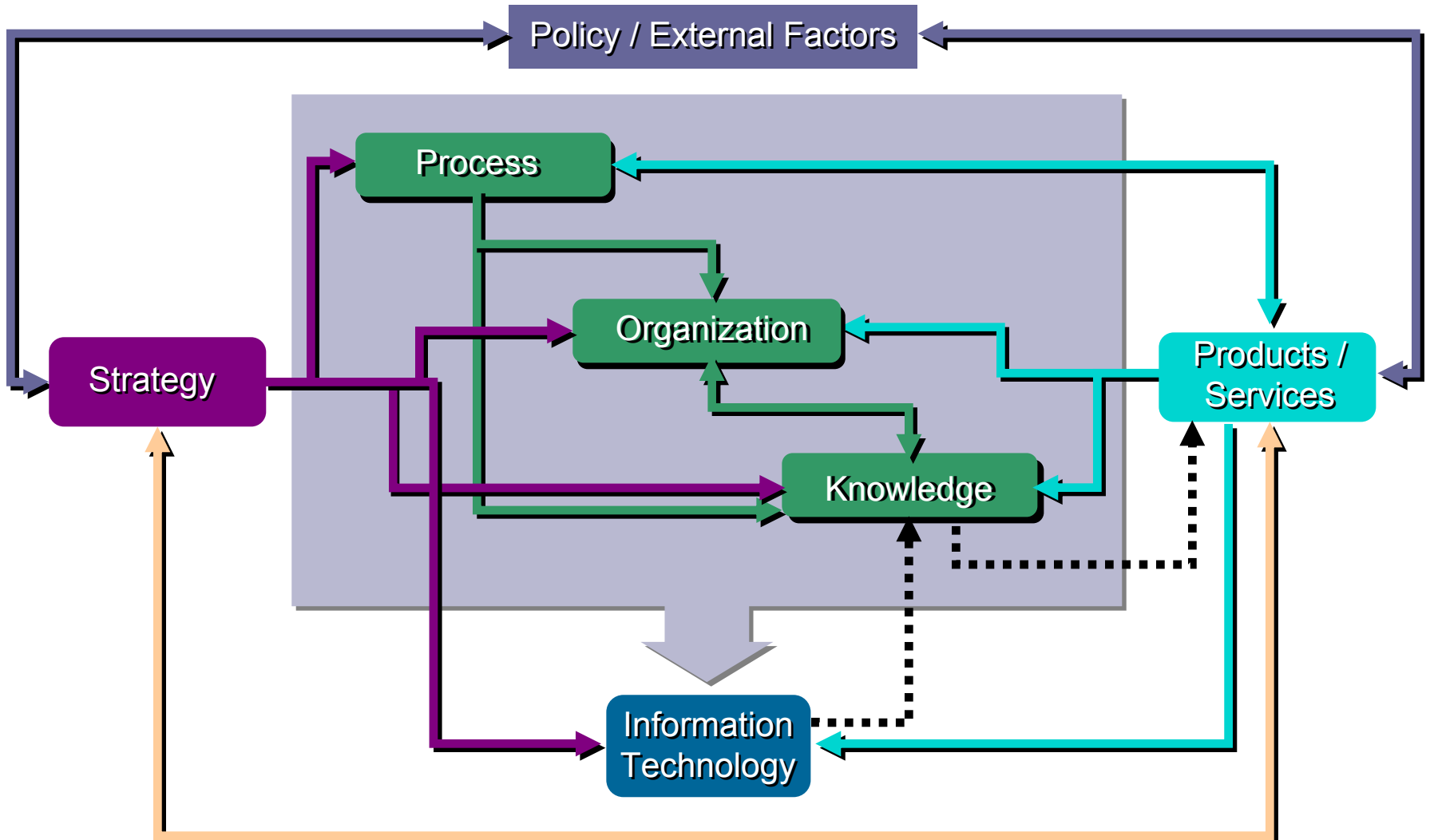
Alignment Requirements Identified...

### Align Enterprise Infrastructure

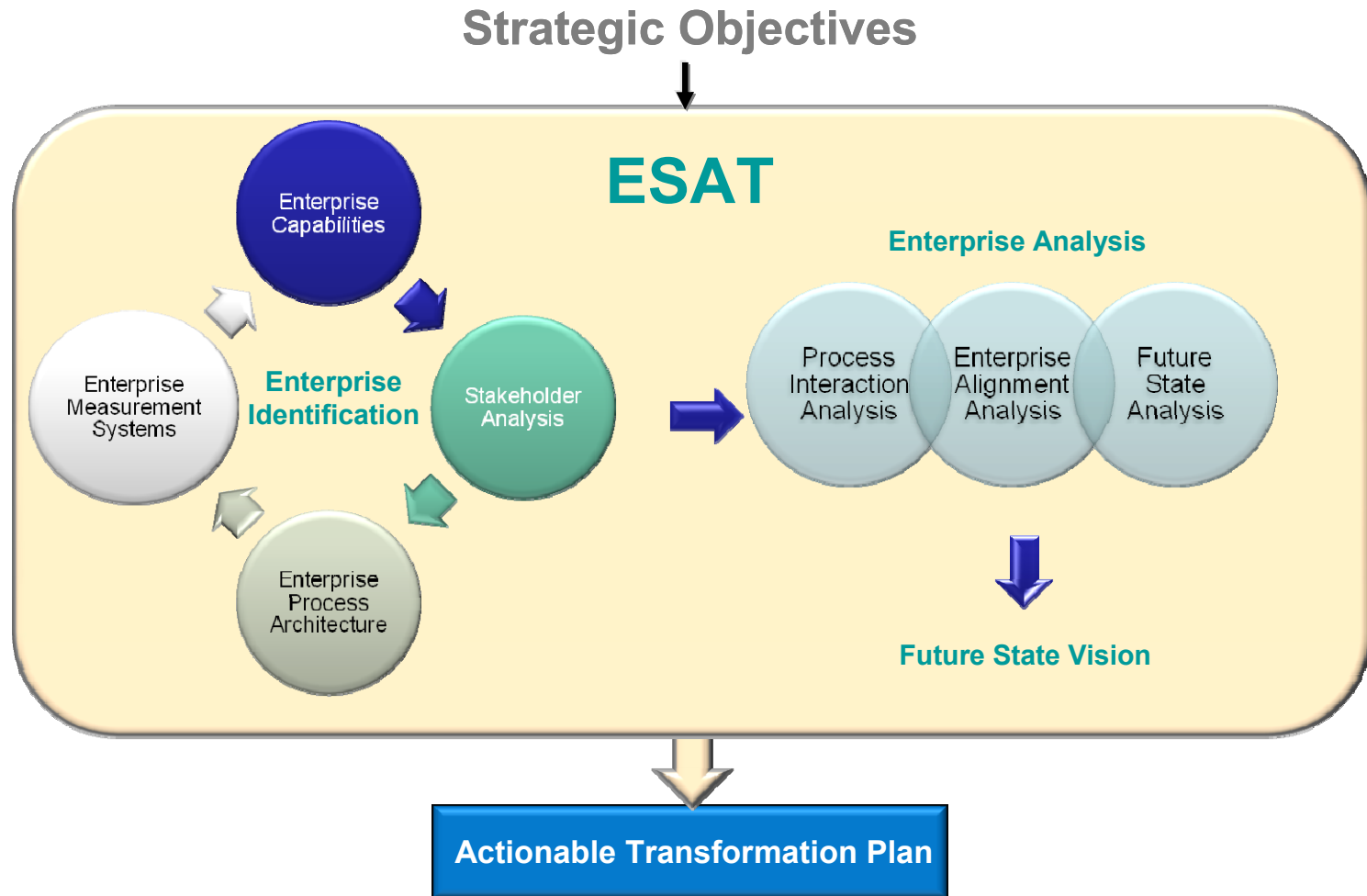
- Align Organization
- Align Incentives
- Empower Change Agents
- Rationalize Systems & Policies
- Align Metrics



# Enterprise Architecting Framework



# Enterprise Strategic Analysis for Transformation (ESAT)



# Our Place At The Leading Edge

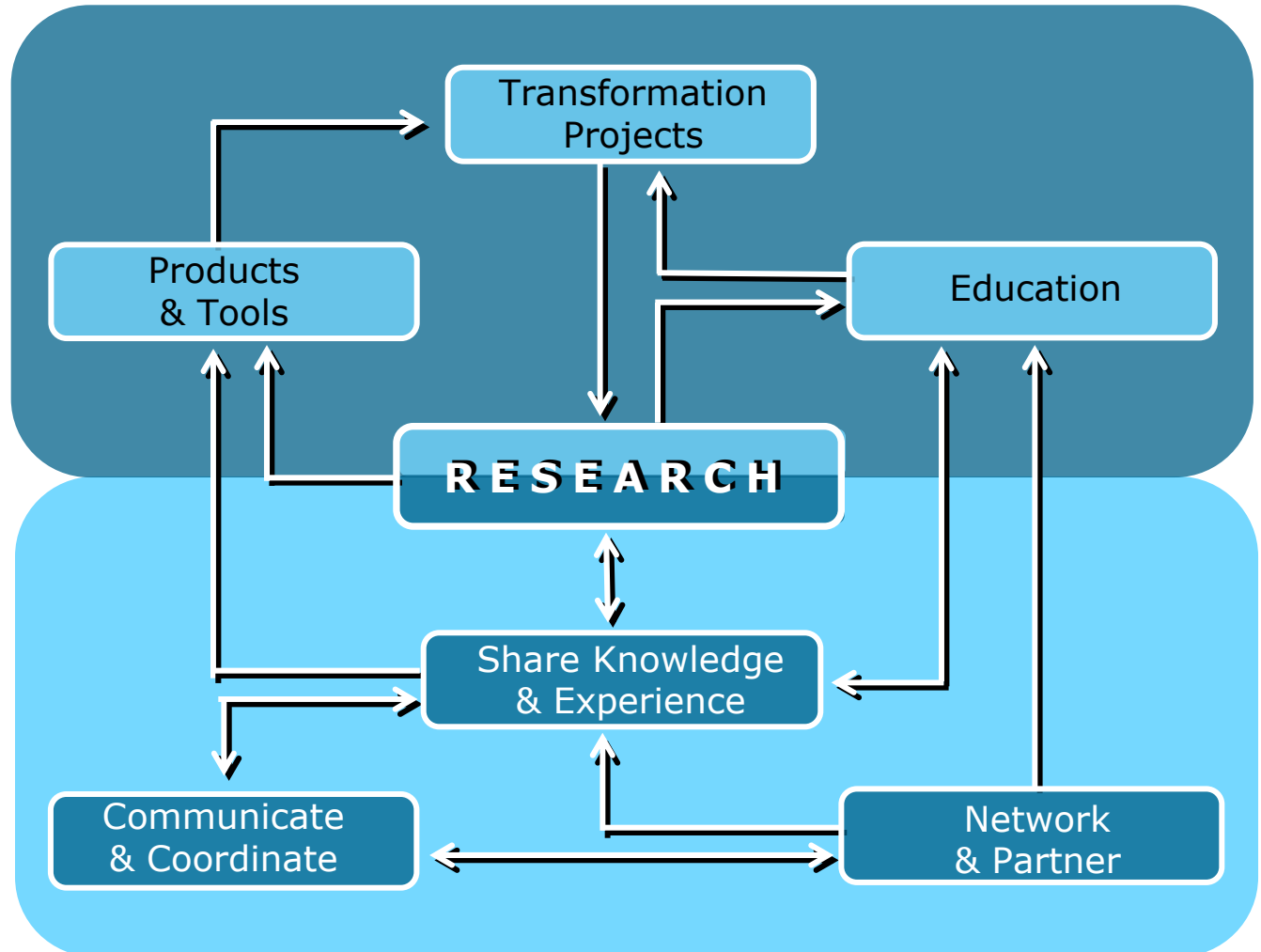
- **Involvement and influence in professional associations**
  - **NAE, INCOSE, Academy of Management, IIE, AIAA, ASME, IEEE**
  - **Lean SE working group created in INCOSE**
  - **International keynotes (Ireland, UK, Portugal, Mexico)**
  - **Award-winning papers**
  - **Conference program committees (e.g., Conference on Systems Engineering research, COCOMO forum on cost modeling)**
  - **Systems Engineering & Architecting doctoral student network**
- **Leverage other projects at MIT: MITRE, Portugal, IMVP, healthcare, etc.**
- **Interface with leaders in academia, including other parts of MIT and other universities**
- **Recognition and requests for help from industry, government, consulting, and educational institutions who recognize LAI as leaders in lean enterprise transformation and complex systems research**

## 2. Role of Research at LAI

Develop and  
 Deploy Products  
 & Tools to  
 Support  
 Transformation

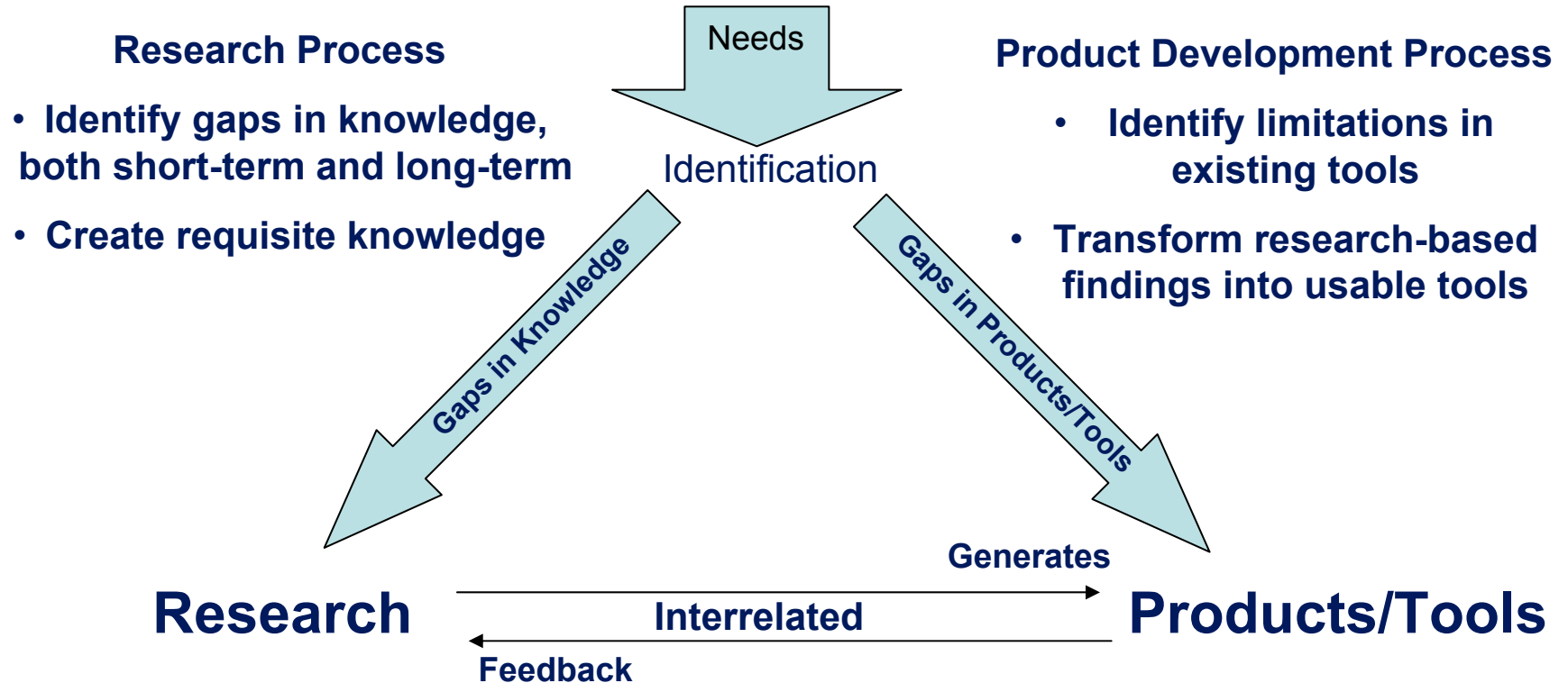
Inform Education  
 e.g., EdNet

Build and  
 Disseminate  
 Knowledge Base  
 e.g., KEEs

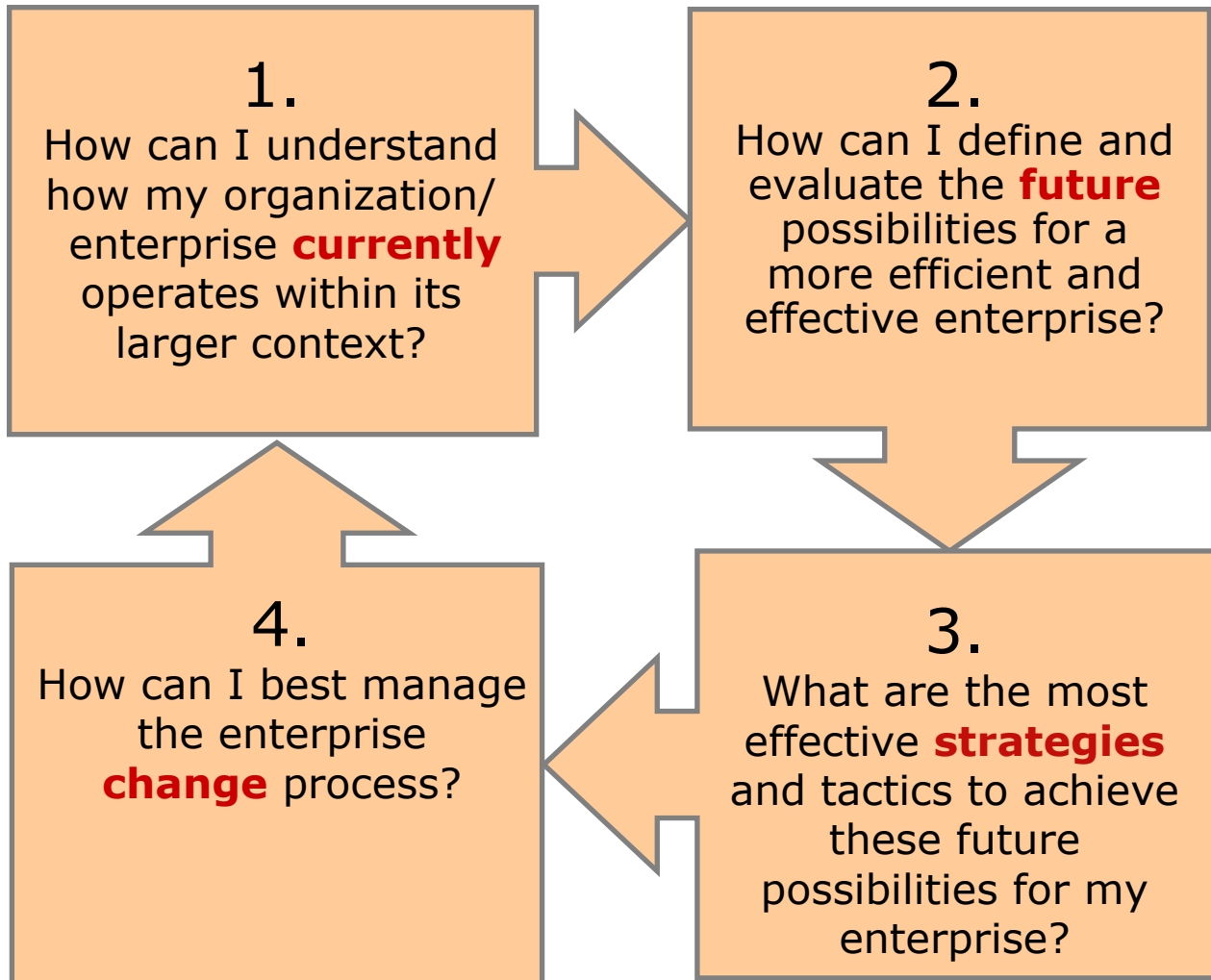


# Enable Transformation Through Research and Products/Tools

## Meeting Transformation Imperative



### 3. “Grand Questions” Derived From the Transformation Imperative



# Research Groups

	ECM Enterprise Change Management	ET/EA Enterprise Transformation/ Enterprise Architecting	ESE Enterprise Systems Engineering	LEPD Lean Enterprise Product Development
<b>Faculty Lead</b>	John Carroll	Debbie Nightingale & Joe Sussman	Warren Seering & Dan Hastings	Warren Seering
<b>Research Lead</b>	George Roth		Donna Rhodes	Eric Rebentisch
<b>Research Areas</b>	<ul style="list-style-type: none"> <li>• Change Management</li> <li>• Enterprise Change Philosophy</li> <li>• Studies of Successful Change</li> <li>• Distributed Leadership</li> </ul>	<ul style="list-style-type: none"> <li>• Enterprise Value Analysis</li> <li>• Enterprise Architecting</li> <li>• IT as Enterprise Enabler</li> <li>• Enterprise Metrics</li> <li>• Enterprise Transformation</li> <li>• Enterprise Modeling</li> </ul>	<ul style="list-style-type: none"> <li>• Enterprise SE Approaches</li> <li>• SE Effectiveness Indicators</li> <li>• Studies of ESE Practices (with MITRE)</li> </ul>	<ul style="list-style-type: none"> <li>• Lean Product Development</li> <li>• Lean Systems Engineering</li> <li>• Lean Software</li> </ul>
<b>Additional Team Members: Research</b>		Kirk Bozdogan JK Srinivasan Ricardo Valerdi	Ricardo Valerdi	JK Srinivasan Hugh McManus
<b>Products &amp; Tools</b>	Enterprise Change Fieldbook	Transformation Roadmap/ ESAT/LESAT/ 7 Principles	SE Leading Indicators Guide	PDVSM / LEPD/PDTTL

# LAI Research Agenda: Groups Address Grand Questions

1.

How can I understand the way my organization **currently operates** within its larger context?

2.

How can I define and evaluate the **future possibilities** for a more efficient and effective enterprise?

3.

What are the most **effective strategies** and tactics to achieve these future possibilities for my enterprise?

4.

How can I best manage the enterprise **change process**?

**EA-ET**  
 Enterprise Architecting - Enterprise Transformation

**FOCUS of RESEARCH**

- Enterprise Value Analysis
- Enterprise Architecting
- IT as Enterprise Enabler
- Enterprise Cost and Metrics
- Enterprise Modeling

**LEPD**  
 Lean Enterprise Product Development

**FOCUS of RESEARCH**

- Lean Product Development
- Lean Systems Engineering
- Lean Software

**ESE**  
 Enterprise Systems Engineering

**FOCUS of RESEARCH**

- ESE Approaches
- SE Effectiveness Indicators
- Studies of ESE Practices (with MITRE)

**ECM**  
 Enterprise Change Management

**FOCUS of RESEARCH**

- Change Management
- Enterprise Change Philosophy
- Studies of Successful Change
- Distributed Leadership



**Legend**



Assessment



Resource





Transformation





Training



  
 Production Operations  
 Transition to Lean  
 (POTTL)

  
 Lean Enterprise  
 Model (LEM)

  
 Transition to  
 Lean (TTL)

  
 Transition to  
 Lean Guides

  
 Lean Enterprise Self-  
 Assessment Tool  
 (LESAT)

  
 Lean Enterprise Self-  
 Assessment Tool  
 (LESAT) Facilitator  
 Guide

  
 Lean Now  
 Workshop

  
 Lean Product  
 Development

  
 Lean  
 Facilitator

  
 Supplier Networks  
 Roadmap


  
 Lean Academy

  
 Lean Enterprise  
 Value Short  
 Course

  
 Lean Enterprise  
 Value Book

  
 Supplier Mgmt.  
 Self-Assessment


  
 Government Lean  
 Enterprise Self-  
 Assessment Tool  
 (GLESAT)

  
 Supplier  
 Networks Desk  
 Reference

  
 Product Development Value  
 Stream Mapping (PDVSM)

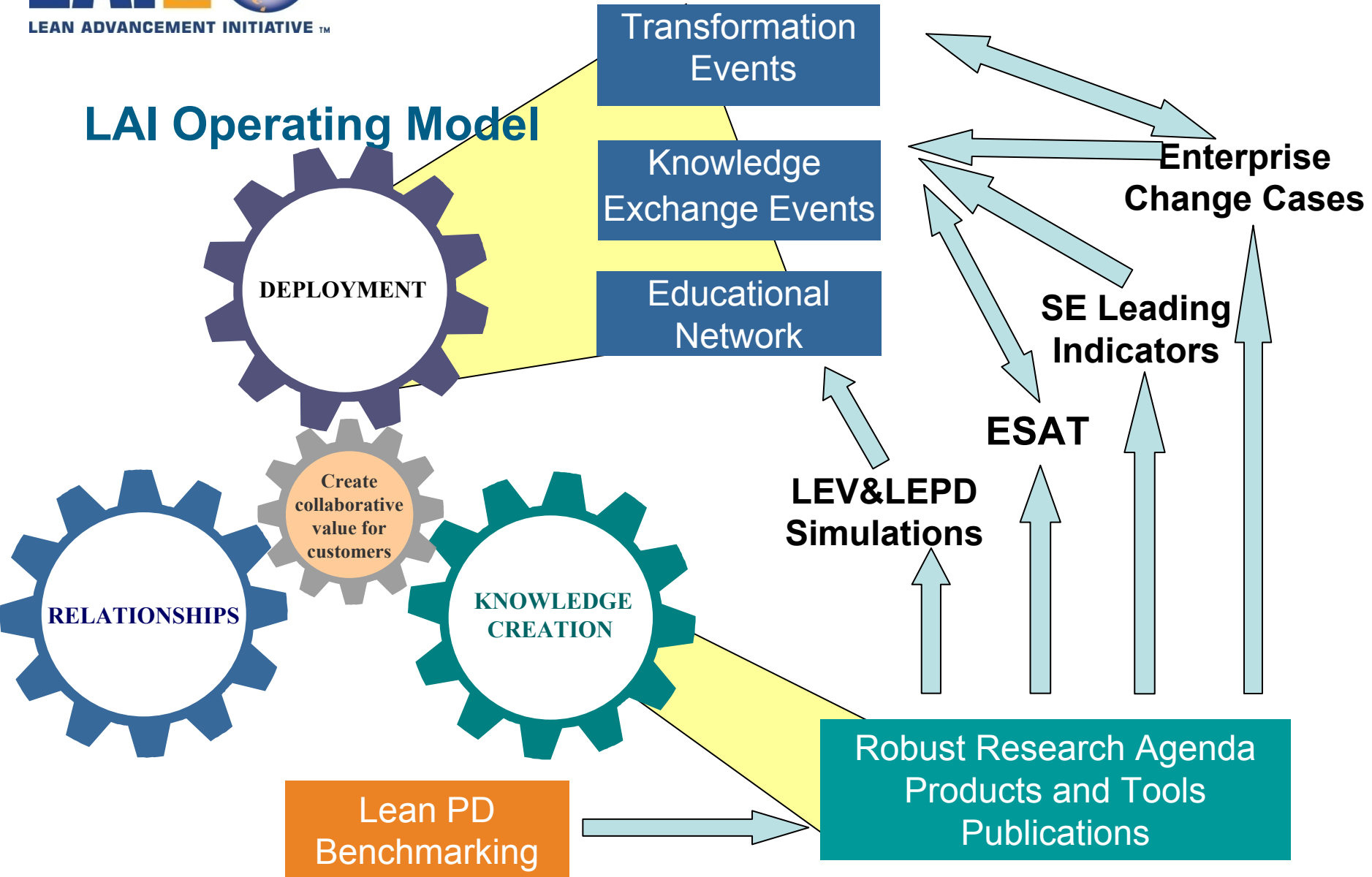
  
 Lean Enterprise  
 Value (LEV)  
 Simulation

  
 Lean Enterprise  
 Product  
 Development  
 Simulation

  
 Enterprise Strategic  
 Analysis and  
 Transformation (ESAT)



## LAI Operating Model



# Vigorous Research Agenda (with limited resources)

- **4.8 FTE Researchers (6 people)**
- **3.9 FTE Students paid by LAI**
  - 20 students part of LAI team
  - 12 affiliated students
  - 5 students funded (at some percentage)
- **In 2008**
  - 7 graduates with full or partial support
  - 13 new research studies added to LAI web site
  - 38 conference papers; 8 journal papers published
- **Adding to total LAI body of knowledge**
  - 25 case studies
  - 170 theses
  - 18 working papers/white papers
  - 42 reports
  - 122 conference papers

## 4. Research Accomplishments (2008)

- Case studies of enterprise transformation (UTC ACE, Rockwell Collins), collaborative systems thinking (12 cases), visual metrics (Raytheon), cost model development (BAE), lean software enterprises (3 cases)
- Leading Indicators Version 2.0 developed and several workshops to transfer knowledge
- Enhanced ESAT process to provide greater insights into enterprise transformation
- 5 Knowledge Exchange Events on various topics (held at Pratt & Whitney, Lockheed Martin, Raytheon, US Army, MIT)
- Lean PD benchmarking events at Boeing and Raytheon
- 2nd annual joint MIT-MITRE conference on enterprise modeling
- Presentations at conferences (Boeing/Rocketdyne, DoD CPI,...)
- Collaborations, e.g., INCOSE Lean Enablers for SE working group, MIT-MITRE Enterprise Dynamic Modeling

## Research Plans for 2009+

- **Case studies (UTC Internal Audit, Homogeneous Metals, ACE OS, TMC Engineering; Deficiency Reporting cross-organizational in USAF, DCMA, Pratt&Whitney; Rockwell Collins; system of systems PD management at US Army)**
- **Collect data on ESAT delivery and use at US Army and elsewhere**
- **Update LESAT to include new enterprise transformation concepts**
- **Leading Indicators 2.0 to be published**
- **Develop roadmap to enable rapid certification of aerospace software (with Boeing Phantom Works)**
- **Portfolio risk management (USAF)**

## Research Plans for 2009+, cont.

- **Joint Test & Evaluation project (White Sands)**
- **Enterprise Dashboard (Raytheon)**
- **Workshop on system level defects (with Raytheon and LM)**
- **Explore new research opportunities (US Army, LM21 culture change, Raytheon Common Lean Diagnostic)**
- **Journal of Enterprise Transformation begins with Debbie and Ricardo as Editors**
- **Papers, books, student theses in process**
- **Collaborations (e.g., McKinsey and high-performance PD practices)**

# LAI Books in Development

Incorporates lean enterprise principles, cases, and transformation methodologies (TTL, EVSMA, LESAT)

**Lean Enterprise Thinking: Driving Enterprise Transformation**

*D. Nightingale  
 J.K. Srinivasan  
 J. Mize*

Introduces holistic approach to enterprise design and evaluation of alternative architectures

**Architecting The Future Enterprise**

*D. Nightingale  
 D. Rhodes*

**Five Capabilities for Enterprise Change**

*G. Roth*

Through case studies of successful transformations, develops a change theory for sets of organizations (to be followed by a tools, methods, and examples field book for enterprise change)

**Systems Engineering Cost Estimation With COSYSMO**

*R. Valerdi  
 Publisher:  
 Wiley & Sons*

Models, methods and cases for performing program cost analyses

**Complex Enterprise Systems Engineering for Operational Excellence**

*Bozdogan,  
 Hoffman (MITRE)  
 Sussman,  
 Wojcik (MITRE)*

Provides concepts, models and applications for managing enterprise complexity and dynamics

## 2009 Knowledge Exchange Events

- **LAI Annual Meeting: Achieving Enterprise Excellence (3/31 - 4/2, Baltimore Hilton)**
- **Using LESAT for Transformation (5/14, MIT)**
- **Architecting the Future Enterprise (6/8-9, MIT)**
- **LAI Lean Academy® Course (7/13-15, MIT)**
- **LAI Lean Academy® Seminar: Engineering (7/16-17, MIT)**
- **Sharing Lean Change Stories Through the Lens of Enterprise Change Capabilities (10/28-30, tba)**
- **Metrics (11/4, tba)**
- **Visit <http://lean.mit.edu> for more information**



## 5. Modes of Research

The core Summit presentations are organized by “modes” of enterprise research:

- **Developing and Deploying Models into Practice**
- **Creating Powerful Partnerships**
  - Supporting enterprise architecting and transformation
- **Competency and Collaboration Models**
- **Learning from Case Studies**
  - Studying informative examples
- **Addressing Enterprise Processes**
- **Learning from Communities of Practice and Benchmarking**