Enabling Enterprise Excellence

Lean Enterprise Thinking and Implementation

MICI China Lean Summit
Professor Earll Murman
November 4, 2010
Lean Advancement Initiative (LAI)

- An Academic – Industry – Government research consortium hosted by MIT
- Founded in 1993 as the Lean Aircraft Initiative
- Became the Lean Aerospace Initiative in 1998
- LAI Educational Network (EdNet) founded in 2002
- Became the Lean Advancement Initiative in 2007

LAI enables the focused and accelerated transformation of complex enterprises through collaborative stakeholder engagement in developing and institutionalizing principles, processes, behaviors, and tools for enterprise excellence.
LAI Members Share a Goal: Enterprise Excellence
LAI Educational Network

Research results and practitioner knowledge

EdNet

Curriculum Materials

Integrating lean into education

© 2010 Massachusetts Institute of Technology  MICI China Lean Summit – Murman  4
LAI Directors

Dr. Deborah Nightingale
Professor of the
Practice of
Aeronautics and
Astronautics and
Engineering Systems

Dr. John Carroll
Morris A. Adelman
Professor of
Management, Professor of
Behavioral and Policy
Sciences and
Engineering Systems

Co – Directors

Richard Lewis II
Research Affiliate,
COO Rolls Royce
Indianapolis, Retired

Dr. Earll Murman
Ford Professor of
Engineering Emeritus,
Aeronautic and
Astronautics and
Engineering Systems

Executive Director

EdNet Director

© 2010 Massachusetts Institute of Technology  MICI China Lean Summit – Murman  6
LAI Researchers

Dr. Kirkor Bozdogan
Dr. Wiljena J. Glover
Dr. C. Robert Kenley
Dr. Josef Oehman
Dr. Eric Rebentisch
Dr. Donna Rhodes

Dr. George Roth
Prof. Warren Seering
Dr. Jayakanth Srinivasan
Dr. Ricardo Valerdi
Prof. Joseph Sussman

Together with
10 US Air Force & Army Fellows
16 Research Assistants

© 2010 Massachusetts Institute of Technology  MICI China Lean Summit – Murman  7
LAI Staff

Juliet Perdichizzi
Operations and Events Mgr.

J. Thomas Shields
Program Mgr.

Nicolene Hengen
Membership and Communications Mgr.

Terry Bryan
Transformation Dir.

Dr. Hugh McManus
EdNet Associate Dir.

Dr. Jacqueline Candido
EdNet Associate Dir.
Lean Produces Results in Aerospace

In 1992 US Air Force asked: Can the concepts, principles, and practices of the Toyota Production System be applied to the military aircraft industry?

In 2002 LAI responded: YES

...if Lean is focused on enterprise value creation
Fundamental Principles applicable to many complex enterprises beyond aerospace; e.g. automotive, healthcare, government, services.
What Is an Enterprise?

An enterprise may be a firm, large division of a firm, government agency, a multi-firm program, etc.

One or more organizations having related activities, unified operation, and a common business purpose.

Source: Black’s Law Dictionary, 1999

What Are the Boundaries of an Enterprise?

- The enterprise boundaries need to be identified: Definition is contextual

- **Core enterprise:**
  Entities tightly integrated through direct or partnering agreements

- **Extended enterprise:**
  From customer’s customer to supplier’s supplier

Who are the Stakeholders?

- Customers - End Users
- Shareholders
- Employees
- Corporate Leadership
- Partners
- Society
- Suppliers
- Unions

Stakeholder: Any group or individual who can affect or is affected by the achievements of the organization’s objective*


Stakeholder Value

“Value - how various stakeholders find particular worth, utility, benefit, or reward in exchange for their respective contributions to the enterprise.”

What is A Lean Enterprise?

“A lean enterprise is an integrated entity that efficiently creates value for its multiple stakeholders by employing lean principles and practices.”


© 2010 Massachusetts Institute of Technology   MICI China Lean Summit – Murman   15
Value Creation Framework

Find stakeholder value
Agree to and develop the approach
Deliver on the promise

Value Identification
Value Proposition
Value Delivery

Dynamic and iterative

Do the Right Job & Do the Job Right

Lean Applies to All Enterprise Processes

Life Cycle Processes
- Business acquisition & program management
- Requirements definition
- Product/process development
- Supply chain management
- Production
- Distribution and support

Enabling Infrastructure Processes
- Finance
- Information technology
- Human resources
- Quality assurance
- Facilities and services
- Environment, health, and safety

Enterprise Leadership Processes

Lean also applies to enabling infrastructure and enterprise leadership processes required to deliver program/product value

Applying Lean Thinking to only some enterprise processes leads to Islands of Excellence – not Lean Enterprise Value

### Types of Enterprise Transformation Failure

<table>
<thead>
<tr>
<th>Failure Type</th>
<th>Results from ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only in my backyard</td>
<td>Undertaking only local projects, with no consideration for their impact across the enterprise</td>
</tr>
<tr>
<td>Activity</td>
<td>Feeling the need to “do something” and measuring/valuing activity rather than progress</td>
</tr>
<tr>
<td>Low-hanging fruit</td>
<td>Focusing efforts on whatever is the easiest problem to address</td>
</tr>
<tr>
<td>Pet project</td>
<td>Working on whatever a leader or leaders want, whether it is the right thing or addresses root issues</td>
</tr>
<tr>
<td>New leadership</td>
<td>Heading down the path set by a new leader with no regard for where the organization is/ has been going</td>
</tr>
<tr>
<td>Leaders who don’t lead</td>
<td>Delegating all transformation work to underlings, with leaders taking no part in the efforts</td>
</tr>
<tr>
<td>Hire the transformers</td>
<td>Bringing in outsiders to develop and implement transformation, who leave behind no plan</td>
</tr>
<tr>
<td>Flavor-of-the-month</td>
<td>Undertaking transformation efforts that shift from one methodology to another, again and again</td>
</tr>
</tbody>
</table>

---

**Transformation Principles and Tools are Needed!**

Source: D. Nightingale and J. Srinivasan, MIT 2010

© 2010 Massachusetts Institute of Technology   MICI China Lean Summit – Murman  18
Lean Enterprise Transformation
Processes and Tools

Transformation Issue

What are the key principles of lean enterprise thinking?

How do I transform to a lean enterprise?

How do I assess my progress?

Enterprise Tool

7 Principles of Enterprise Transformation

Enterprise Transformation Roadmap

Lean Enterprise Self Assessment Tool (LESAT)

Source: D. Nightingale and J. Srinivasan, MIT 2009
7 Principles of Enterprise Transformation

1. Adopt a holistic approach to enterprise transformation.
2. Secure leadership commitment to drive and institutionalize enterprise behaviors.
3. Identify relevant stakeholders and determine their value propositions.
4. Focus on enterprise effectiveness before efficiency.
5. Address internal and external enterprise interdependencies.
6. Ensure stability and flow within and across the enterprise.

Source: D. Nightingale and J. Srinivasan, MIT 2009
1 – Holistic Approach

1. Adopt a holistic approach to enterprise transformation.

4. Focus on enterprise effectiveness before efficiency.

Life Cycle Processes
- Business acquisition & program management
- Requirements definition
- Product/process development
- Supply chain management
- Production
- Distribution and support

Enabling Infrastructure Processes
- Finance
- Information technology
- Human resources
- Quality assurance
- Facilities and services
- Environment, health, and safety

Enterprise Leadership Processes

Source: D. Nightingale and J. Srinivasan, MIT 2009

© 2010 Massachusetts Institute of Technology  MICI China Lean Summit – Murman  21
2 – Leadership Commitment

1. Adopt a holistic approach to enterprise transformation.

2. Secure leadership commitment to drive and institutionalize enterprise behaviors.

3. Identify relevant stakeholders and determine their value propositions.

4. Focus on enterprise effectiveness before efficiency.

5. Address internal and external enterprise interdependencies.

Source: D. Nightingale and J. Srinivasan, MIT 2009
3 – Stakeholder Value Propositions

1. Adopt a holistic approach

2. Secure leadership commitment to drive transformation.

3. Identify relevant stakeholders and determine their value propositions.

Value Expected from the Enterprise

Value Contributed to the Enterprise

Source: D. Nightingale and J. Srinivasan, MIT 2009
4 – Effectiveness Before Efficiency

1. Adopt a holistic approach to enterprise transformation.
2. Secure leadership commitment to drive and institutionalize enterprise behaviors.
3. Identify relevant stakeholders and determine their value propositions.
4. Focus on enterprise effectiveness before efficiency.
5. Address internal and external enterprise interdependencies.
6. Ensure stability and flow within and across the enterprise.

Do the Right Job
THEN
Do the Job Right

Source: D. Nightingale and J. Srinivasan, MIT 2009
5 – Enterprise Dependencies

1. Adopt a holistic approach to enterprise transformation.

2. Secure leadership commitment to driving enterprise behavior.

3. Identify relevant stakeholders and institutionalize enterprise behaviors.

4. Focus on enterprise effectiveness before efficiency.

5. Address internal and external enterprise interdependencies.

Source: D. Nightingale and J. Srinivasan, MIT 2009
6 – Stability and Flow

1. Adopt a holistic approach.
2. Secure leadership commitment to drive transformation.
3. Identify relevant stakeholders and enterprise behaviors.
4. Focus on enterprise effectiveness before efficiency.
5. Address internal and external enterprise interdependencies.
6. Ensure stability and flow within and across the enterprise.

Source: D. Nightingale and J. Srinivasan, MIT 2009


- Industry Average
- Southwest

Source: Airline Monitor
7 Organizational Learning

Rockwell Collins Example

1. Adopt a holistic approach
2. Secure leadership commitment to drive
determination
3. Identify relevant stakeholders
to determine their value propositions.
4. Focusing on 21st-century-style
learning by tailoring education to
fit the individual
5. Apprentice like environment
through online mentoring
6. Knowledge management database, with expertise location

Each employee averages 40 hours of education per year

• Apprenticeship-like environment through online mentoring
• Knowledge management database, with expertise location
• Fluid communities of practice

Source: D. Nightingale and J. Srinivasan, MIT 2009
Rockwell Collins Overview

• Leading provider of commercial and military avionics systems and information technology
• Founded in 1933 as Collins Radio Company
• Acquired by Rockwell International in 1973
• Spun-off in 2001 as an independent, publicly traded company
• Today, more than 20,000 employees at over 60 locations in 27 countries
• 1998 - “Lean Electronics” launched by CEO Clay Jones as RC’s operating philosophy
Lean Electronics: Our Operating Philosophy

Results In the Office:
- Reduced Publishing Cycle Time 72%
- 70% Work In-Process Reduction
- 38% Productivity Improvement
- 77% Manuals Inventory Reduction

Results In the Factory:
- 25% Improvement in Productivity
- 46% Reduction in Inventory
- Cycle Time Reductions of up to 75%

Source: Rockwell Collins.
Rockwell Financial Performance

Notes

(1) Additional factors beyond Lean Electronics contribute to Rockwell Collins superior sector performance
(2) Financial performance for firms can include non-aerospace business units
Lean Enterprise Transformation Roadmap

**STRATEGIC CYCLE**

- Determine Strategic Imperative

**Pursue & Sustain Enterprise Transformation**

- Engage Leadership in Transformation

**PLANNING CYCLE**

- Understand Current State
- Capabilities & Deficiencies Identified
- Envision & Design Future Enterprise
- Enterprise Vision

**EXECUTION CYCLE**

- Implement & Coordinate Transformation Plan
- Implementation Results
- Long-Term Corrective Action
- Short-Term Corrective Action

- Align Enterprise Structure and Behaviors
- Alignment Requirements Identified

- A Committed Leadership Team
- Corrective Action

**Nurture Transformation & Embed Enterprise Thinking**

- Source: Nightingale, Srinivasan and Mize 2010
Pursue & Sustain Enterprise Transformation Roadmap

**Determine Strategic Imperative**

- Articulate the Business Case for Transformation and convey urgency
- Focus on Stakeholder Value
- Leverage Transformation Gains

**Engage Leadership in Transformation**

**Pursue & Sustain Enterprise Transformation**

**Source:** Nightingale, Srinivasan and Mize 2010
Lean Enterprise Transformation Roadmap

**STRATEGIC CYCLE**

- **Determine Strategic Imperative**
- **Engage Leadership in Transformation**

**EXECUTION CYCLE**

- **Create Transformation Plan**
- **Envision & Design Future Enterprise**

- **Implement & Coordinate Transformation Plan**
- **Align Enterprise Structure and Behaviors**

- **A Committed Leadership Team**

- **Cultivate Enterprise Thinking**
- **Obtain Management Buy-In**
- **Establish Executive Transformation Council**

Source: Nightingale, Srinivasan and Mize 2010
Lean Enterprise Transformation Roadmap

- Perform Stakeholder Analysis
- Analyze Processes & Interactions
- Perform Enterprise Maturity Assessment
- Assess Current Performance Measurement System

Engage Leadership in Transformation

PLANNING CYCLE
A Committed Leadership Team

Understand Current State

Capabilities & Deficiencies Identified

Envision & Design Future Enterprise

Enterprise Vision

Align Enterprise Structure and Behaviors

Source: Nightingale, Srinivasan and Mize 2010
Lean Enterprise Transformation Roadmap

- Create Vision of Future State
- Perform Gap Analysis Between Current and Future States
- Architect “To-Be” Enterprise Value Stream

Enterprise Vision

Transformation Plan
Lean Enterprise Transformation Roadmap

Pursue & Sustain

Sustain Enterprise Transformation

Engage Leadership in Transformation

STRATEGIC CYCLE

Determine Strategic Imperative

• Reconcile Systems, Policies, & Vision

• Align Performance Measurement System

• Align Incentives

• Empower Change Agents

Alignment Requirements Identified

PLANNING CYCLE

Understand Current State

A Committed Leadership Team

Capabilities & Deficiencies Identified

Envision & Design Future Enterprise

Enterprive Vision

Execution Cycle

Create Transformation Plan

Align Requirements Identified

Align Enterprise Structure and Behaviors

Source: Nightingale, Srinivasan and Mize 2010

© 2010 Massachusetts Institute of Technology, MICL China Lean Summit – Murman
**Lean Enterprise Transformation Roadmap**

**STRATEGIC CYCLE**
- Determine Strategic Imperatives
  - Identify Improvement for Focus Areas
  - Determine Impact on Enterprise Performance
  - Prioritize, Select and Sequence Project Areas
  - Develop and Synchronize Detailed Implementation Plans

**EXECUTION CYCLE**
- Create Transformation Plan
  - Implement & Coordinate Transformation Plan
  - Align Enterprise Structure and Behaviors
  - Strategic Implications of Transformation
    - Nurture Transformation & Embed Enterprise Thinking

Source: Nightingale, Srinivasan and Mize 2010
Lean Enterprise Transformation Roadmap

STRATEGIC CYCLE

Determine Strategic Imperative

- Communicate Transformation Plan
- Commit Resources
- Provide Education & Training
- Implement Projects and Track Progress

Nurture Transformation & Embed Enterprise Thinking

Implement & Coordinate Transformation Plan

Implementation Results

EXECUTION CYCLE

Create Transformation Plan

Structure and Behaviors

Source: Nightingale, Srinivasan and Mize 2010
Lean Enterprise Transformation Roadmap

- Monitor and Measure the Outcomes
- Nurture Transformation
- Embed Enterprise Thinking
- Capture and Diffuse Lessons Learned
- Synchronize Strategic, Planning & Execution Cycles

Short Term Corrective Actions
Long Term Corrective Actions

Source: Nightingale, Srinivasan and Mize 2010
Lean Enterprise Self Assessment Tool (LESAT)

Tool for executive self-assessment of the present state of “leanness” of an enterprise and its readiness to change

World Class

Assessment Matrix

Over 3400 downloads
LESAT Being updated

Capability maturity model

Supporting materials

Source: Nightingale, Srinivasan and Mize 2010

© 2010 Massachusetts Institute of Technology  MICI China Lean Summit – Murman  40
Mercy Hospital

Balanced Scorecard

Business Goals

Dept Goals

Strategic Goals

Opportunities

Business Plans

Opportunities

Daily metrics (Communication Board)

Opportunities

Process implemented

Organization takes ownership

GAP exists between goals and performance

Value Stream

Create the Future State

6S Events Projects Bursts Do-its

Implement Change

Action Items

StandardWork

Source: Mercy Hospital – Cedar Rapids, IA

© 2010 Massachusetts Institute of Technology MICI China Lean Summit – Murman 41
**Beyond the Lean Revolution: Achieving Successful and Sustainable Enterprise Transformation**

- Authors: Deborah J. Nightingale and Jayakanth Srinivasan
- Published by AMACOM Press, Out Spring 2011

### Book Structure: Emphasizes Understanding and Executing

<table>
<thead>
<tr>
<th>Strategic Context</th>
<th>Lenses of Current State Analysis</th>
<th>Achieving Transformation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Understanding Transformation</td>
<td>• Stakeholders</td>
<td>• Articulating the Vision</td>
</tr>
<tr>
<td>• Seven Principles</td>
<td>• Processes</td>
<td>• Planning Enterprise Transformation</td>
</tr>
<tr>
<td>• Transformation Roadmap</td>
<td>• Performance Measurement</td>
<td>• Managing Transformation</td>
</tr>
<tr>
<td>• Role of Leadership</td>
<td>• Resources</td>
<td>• Putting it all Together</td>
</tr>
<tr>
<td></td>
<td>• Maturity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Alignment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Wastes</td>
<td></td>
</tr>
</tbody>
</table>

Source: Nightingale, Srinivasan and Mize 2010
Products

• 242 Theses
• 766 Presentations
• 54 Reports, white papers, articles
• 91 Workshops
• 102 EdNet talks
• 104 Student research posters
• And more

Publications

9 Downloadable
Acknowledgements

• Nicolene Hengen
• Deborah Nightingale
• Juliet Perdichizzi
• Mark Prendergast
• Steven Shade
• Jayakanth Srinivasan