Lean Enterprise Transformation

FCM - UNICAMP

Richard B. Lewis II
Executive Director, Lean Advancement Initiative, MIT

March 29, 2012
Lean Advancement Initiative (LAI)

• Founded in 1993, LAI has evolved from a focus on lean processes and tools to holistic enterprise transformation and architecting

• Enables enterprises to effectively, efficiently, and reliably create value in complex and rapidly changing environments

• Works with international enterprises in multiple domains, including: automotive, aerospace, manufacturing, health care, and financial services

• International Educational Network (EdNet) with more than 70 member educational institutions around the world
LAI Members Share a Common Goal: Enterprise Excellence
Lean Thinking

emerged from post-WWII Japanese automobile industry as a fundamentally more efficient system than mass production.

Lean Thinking is the dynamic, knowledge-driven, and customer-focused process through which all people in a defined enterprise continuously eliminate waste and create value.

### Comparison Table

<table>
<thead>
<tr>
<th></th>
<th>Craft</th>
<th>Mass Production</th>
<th>Lean Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus</strong></td>
<td>Task</td>
<td>Product</td>
<td>Customer</td>
</tr>
<tr>
<td><strong>Operation</strong></td>
<td>Single items</td>
<td>Batch and queue</td>
<td>Synchronized flow and pull</td>
</tr>
<tr>
<td><strong>Overall Aim</strong></td>
<td>Mastery of craft</td>
<td>Reduce cost and increase efficiency</td>
<td>Eliminate waste and add value</td>
</tr>
<tr>
<td><strong>Quality</strong></td>
<td>Integration (part of the craft)</td>
<td>Inspection (a second stage after production)</td>
<td>Inclusion (built in by design and methods)</td>
</tr>
<tr>
<td><strong>Business Strategy</strong></td>
<td>Customization</td>
<td>Economies of scale and automation</td>
<td>Flexibility and adaptability</td>
</tr>
<tr>
<td><strong>Improvement</strong></td>
<td>Master-driven continuous improvement</td>
<td>Expert-driven periodic improvement</td>
<td>Worker-driven continuous improvement</td>
</tr>
</tbody>
</table>

Sometimes “less” adds up to “more.”

- less waste
- less design time
- less costs
- fewer organizational layers
- fewer suppliers

- more employee empowerment
- more flexibility and capability
- more productivity
- more quality
- more customer satisfaction
- more long-term competitive success

The emphasis was on Lean Production.
The emphasis is on Value Added Activities.

Moving beyond lean “production” to an extended lean enterprise.

Add Design and Development, Supply Chain, Business Support Functions.

Add External Stakeholders, Environmental Factors, Global Context.
Lean and Six Sigma

• Most enterprises today base their transformation initiatives on elements of Lean and Six Sigma.
  • Lean optimizes flow and strives for perfect quality.
  • Six Sigma stresses quality through the elimination of variation in all enterprise processes.
• A unified framework called Lean Six Sigma is emerging.
• Enterprises usually adopt their own name.
Some examples:
  • Rockwell Collins - Lean Electronics
  • United Technology - ACE
  • Lockheed Martin - LM21
  • Textron - Textron Six Sigma
  • Raytheon - R6σ
  • NAVAIR - AIRSpeed
  • Boeing - Lean+
  • USAF - Smart Ops 21
Delivering Value – Five Lean Thinking Fundamentals

Specify Value

Value is defined by customer in terms of specific products and services

Identify the Value Stream

Map out all end-to-end linked actions, processes, and functions necessary for transforming inputs to outputs to identify and eliminate waste

Make Value Flow Continuously

Having eliminated waste, make remaining value-creating steps “flow”

Let Customers Pull Value

Customer’s “pull” cascades all the way back to the lowest level supplier, enabling just-in-time production

Pursue Perfection

Pursue continuous process of improvement striving for perfection

Value Creation Framework

Value Phases

**Value Identification**
- Identify the stakeholders and their value expectations

**Value Proposition**
- Develop a robust value proposition to meet the expectations

**Value Delivery**
- Deliver on the promise with good technical and program performance

Source: *Lean Enterprise Value: Insights from MIT’s Lean Aerospace Initiative*, Murman, et. al, 2002
An Enterprise is…

“…a complex, integrated, and interdependent system of people, processes, and technology that creates value as determined by its key stakeholders.

An enterprise typically consists of multiple organizations (e.g., suppliers, partners, regulators) rather than a single corporation, division, or government unit.”

Amacon Press, August 2011
Improvement That Flows to the Bottom Line Requires

• Vision

• Focus on Customers and Employees

• Active Leadership Involvement and Alignment with Workforce

• Willingness to Break Established Paradigms

• Hierarchy of Trained, Empowered, and Incentivized Employees

• Constancy of Improvement Activity

• Celebrate and Reward Success
Creating a Holistic Approach to Enterprise Transformation

Transformation Issue

How do I motivate and sustain enterprise transformation?
How do I transform my enterprise?
What analytical tools can I use to support my decision making?
How do I design my future enterprise?

Enterprise Methodology

7 Principles of enterprise thinking
Enterprise Transformation Roadmap
LAI Enterprise Self-Assessment Tool (LESAT)
Enterprise Architecting Framework
## 7 Principles of Lean 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.**
7. **Emphasize organizational learning.**

Source: D. Nightingale and J. Srinivasan, MIT 2010
Lean Transformation Issues

• Why do most lean transformation activities fail?

• What are the key success factors in implementing lean enterprise wide?

• How can we better assure that lean will impact bottom line results?

• Are there certain activities that are ideally performed before others?

• What is the role of senior leadership in assuring success?

Issues Motivated Development of Lean Enterprise Transformation Roadmap
Creating a Holistic Approach to Enterprise Transformation

Transformation Issue

How do I motivate and sustain enterprise transformation?

How do I transform my enterprise?

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

How do I design my future enterprise?

Enterprise Methodology

7 Principles of Enterprise Thinking

Enterprise Transformation Roadmap

LAI Enterprise Self-Assessment Tool (LESAT)

Enterprise Architecting Framework
Motivating an Enterprise Level Transformation Roadmap

• Improve the quality of thinking and awareness of leaders on the challenge of transforming their enterprises

• Framework for cultural, organizational, and change management considerations

• Provide enterprise leaders with a balanced decision aid to:
  • Identify barriers to the creation/delivery of value to each stakeholder
  • Specify a vision of their future lean enterprise
  • Determine significant gaps between current and future states
  • Prioritize opportunities for eliminating waste and increasing value deliver for the maximum benefit of the total enterprise

• Guidance in making the transition process itself a ‘lean’ process
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
- Lean Enterprise Vision

**EXECUTION CYCLE**
- Implement & Coordinate Transformation Plan
- Short-Term Corrective Action
- Long-Term Corrective Action
- A Committed Leadership Team

**Nurture, Process & Embed Lean Enterprise Thinking**

**Create Transformation Plan**
- Implementation Results

**Align Enterprise Infrastructure**

**Alignment Requirements Identified...**
Determine Strategic Imperative

- Articulate the Case for Transformation & Convey Urgency
- Focus on Stakeholder Value
- Leverage Transformation Gains
Breaking Down the Barriers

• Define the “burning platform”
• Work to obtain buy-in from key stakeholders
• Communicate, communicate, communicate
• Dispatch the resistance
• Reward results
Typical Imperatives for Change

- Customer dissatisfaction with development of critical new products
- Slow deliveries of products to support end-item deliveries
- In-service issues with perceived lack of reliability
- Unacceptable financial performance
Engage Leadership in Transformation

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

A Committed Leadership Team
Engaging Leadership

- Mobilize leadership team
- Agree on vision
- Set priorities
- Establish business metrics
- Flow down management policy throughout entire organization
- Where necessary reassign key leaders
Enterprise Transformation Roadmap

**Strategic Cycle**
- Determine Strategic Imperative
  - Pursue & Sustain Enterprise Transformation
- Engage Leadership in Transformation

**Planning Cycle**
- Understand Current State
  - Perform Stakeholder Analysis
  - Analyze Processes & Interactions
  - Perform Enterprise Maturity Assessment
  - Assess Current Performance Measurement System
  - Capabilities & Deficiencies Identified
“A **stakeholder** is any group or individual who can affect or is affected by the achievement of the organization's objectives”

Source: R. Edward Freeman


“**The enterprise is a network of stakeholders** configured by the flow of value, which moves between the enterprise and its stakeholders”

Source: D. Nightingale, and J. Srinivasan

“Beyond the Lean Revolution: Achieving Successful and Sustainable Enterprise Transformation”, AMACOM, 2011
Classic Stakeholder Map

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

The Enterprise

FCM - UNICAMP, Campinas, Brazil, March 29, 2012
http://lean.mit.edu
© 2012 Massachusetts Institute of Technology, Richard B. Lewis II - 27
Stakeholder Analysis

• Process for aligning the enterprise with its stakeholders

• Brings to the forefront the disconnects and misalignments in the enterprise value proposition

• Structured means of reflecting on the enterprise value proposition as a whole.
Business Metrics Based on Stakeholder Analysis

- On-time delivery
- Delivered product quality
- First-pass test yields
- Past-due receivables
- Return on Invested Capital
Creating a Holistic Approach to Enterprise Transformation

Transformation Issue

How do I motivate and sustain enterprise transformation?
How do I transform my enterprise?
What analytical tools can I use to support my decision making?
How do I design my future enterprise?

Enterprise Methodology

7 Principles of Enterprise Thinking
Enterprise Transformation Roadmap
LAI Enterprise Self-Assessment Tool (LESAT)
Enterprise Architecting Framework
LAI 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

Capability maturity model

Supporting materials
Lean Enterprise Practices

- There are **68 lean enterprise** practices in the assessment, divided amongst the three major sections
  - Section 1 **Leadership/Transformation** (30 practices)
  - Section 2 **Lifecycle Processes** (30 Practices)
  - Section 3 **Enabling Infrastructure** (8 Practices)

- Each practice is assessed on a capability maturity scale of 1 to 5

- There is a practice maturity definition for every maturity level in every practice, provided on a maturity matrix assessment sheet
Suggested Methodology for Employing LESAT 2.0

**Step 1:** Facilitated meeting to introduce tool
Enterprise leader champions

**Step 2:** Enterprise leaders and staff conduct LESAT 2.0 assessment

**Step 3:** Leadership reconvenes to jointly determine present maturity level

**Step 4:** Leadership determines desired level and measures gap

**Step 5:** Develop action plan and prioritize resources

--

FCM - UNICAMP, Campinas, Brazil, March 29, 2012  
http://lean.mit.edu  
© 2012 Massachusetts Institute of Technology, Richard B. Lewis II - 33
Understand the Current State

- Benchmark current performance against colleagues and competitors
- Focus on attributes data
- Analyze value streams
Envision & Design Future Enterprise

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

Enterprise Vision
LESAT 2.0 Desired Score Can be Tailored for Each Process Area

A Company’s Strategic Plan for a Tailored Capability Goal matched to the business objectives.

Gap

Current Capability

Capability Level

LESAT 2.0 Enterprise Process Areas
Align Enterprise Structure and Behaviors

- Reconcile Systems, Policies & Vision
- Align Performance Measurement System
- Align Incentives
- Empower Change Agents

Alignment Requirements Identified

Enterprise Transformation Roadmap

STRATEGIC CYCLE

Determine Strategic Imperative

Pursue & Sustain Enterprise Transformation

Engage Leadership in Transformation

PLANNING CYCLE

A Committed Leadership Team

Alignment Requirements Identified

EXECUTION CYCLE

Create Transformation Plan

Corrective Action

Future Enterprise

Enterprise Vision

Align Enterprise Infrastructure
Vision Clarified

• As determined by customer satisfaction

• And measured by a few understandable metrics

• Supported by a workforce trained and empowered to deliver improvement

• Across the entire business
Enterprise Transformation Roadmap

STRATEGIC CYCLE
- Determine Strategic Imperative
- Pursue & Sustain Enterprise Transformation
- Engage Leadership in Transformation

PLANNING CYCLE
- Strategic Implications
- Future Enterprise
- Align Enterprise Infrastructure

EXECUTION CYCLE
- Implement Transformation
- Corrective Action

Transformation Plan

Create Transformation Plan
- Identify Improvement Focus Areas
- Determine Impact on Enterprise Performance
- Prioritize, Select and Sequence Project Areas
- Communicate transformation plan
Transformation Plan

Initial Factory Kaizen Activities
  Team and Individual Training
  Supplier Quality Initiatives
  Process Improvement Initiatives
  Redesign Processes to Enable Flow
  Finance Management Initiatives
  Supply Chain Restructuring

Systematic incremental Activity
Implement & Coordinate Transformation Plan

Implementation Results:
- Develop Detailed Project Implementation Plans
- Synchronize Detailed Plans
- Commit Resources
- Provide Education & Training
- Implement Projects and Track Progress
A Hierarchy of Knowledge is Required

• Team and Leadership Skills

• Knowledge-based “Belts” - Yellow, Green, Black – in lean and six sigma

• Certified Mastery - ASQ

• Sensei - e.g. Mr. Ito at Pratt & Whitney
Strategic Implications of Transformation

Nurture Transformation & Embed Enterprise Thinking

- Monitor Transformation Progress
- Nurture Transformation
- Embed Enterprise Thinking
- Capture & Diffuse Lessons Learned
- Adjust and Align Planning & Execution Cycles
Understand Current State
• Perform Stakeholder Analysis
• Analyze Processes & Interactions
• Perform Enterprise Maturity Assessment
• Assess Current Performance Measurement System

Engage Leadership in Transformation
• Cultivate Enterprise Thinking
• Obtain Executive Buy-In
• Establish Executive Transformation Council

PLANNING CYCLE
A Committed Leadership Team

Prepare for Transformation
• Determine Strategic Imperative
  • Articulate the Case for Transformation & Convey Urgency
  • Focus on Stakeholder Value
  • Leverage Transformation Gains

Engage Stakeholders
• Perform Stakeholder Analysis
• Obtain Executive Buy-In

Alignment Requirements Identified

Pursue & Sustain Transformation

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

Enter the Lean Enterprise Transformation Roadmap

Execute Transformation
• Implement & Coordinate Transformation Plan
  • Develop Detailed Project Implementation Plans
  • Synchronize Detailed Plans
  • Commit Resources
  • Provide Education & Training
  • Implement Projects and Track Progress

Engage Leadership in Transformation
• Cultivate Enterprise Thinking
• Obtain Executive Buy-In
• Establish Executive Transformation Council

Support Transformation
• Reconcile Systems, Policies & Vision
• Align Performance Measurement System
• Align Incentives
• Empower Change Agents

Implement & Coordinate Transformation Plan
• Develop Detailed Project Implementation Plans
• Synchronize Detailed Plans
• Commit Resources
• Provide Education & Training
• Implement Projects and Track Progress

Create Transformation Plan
• Identify Improvement Focus Areas
• Determine Impact on Enterprise Performance
• Prioritize, Select and Sequence Project Areas
• Communicate transformation plan

Alignment Enterprise Structure and Behaviors

Determine Strategic Imperative
• Articulate the Case for Transformation & Convey Urgency
• Focus on Stakeholder Value
• Leverage Transformation Gains

Implement & Coordinate Transformation Plan
• Develop Detailed Project Implementation Plans
• Synchronize Detailed Plans
• Commit Resources
• Provide Education & Training
• Implement Projects and Track Progress

Support Transformation
• Reconcile Systems, Policies & Vision
• Align Performance Measurement System
• Align Incentives
• Empower Change Agents

Understanding Current State
• Perform Stakeholder Analysis
• Analyze Processes & Interactions
• Assess Current Performance Measurement System

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

Engage Leadership in Transformation
• Cultivate Enterprise Thinking
• Obtain Executive Buy-In
• Establish Executive Transformation Council

Enterprise Structure and Behaviors
• Align Systems, Policies & Vision
• Align Incentives
• Empower Change Agents

Pursue & Sustain Transformation

A Committed Leadership Team

Prepare for Transformation
• Determine Strategic Imperative
  • Articulate the Case for Transformation & Convey Urgency
  • Focus on Stakeholder Value
  • Leverage Transformation Gains

Engage Stakeholders
• Perform Stakeholder Analysis
• Obtain Executive Buy-In

Alignment Requirements Identified

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

Engage Leadership in Transformation
• Cultivate Enterprise Thinking
• Obtain Executive Buy-In
• Establish Executive Transformation Council

Support Transformation
• Reconcile Systems, Policies & Vision
• Align Performance Measurement System
• Align Incentives
• Empower Change Agents

Implement & Coordinate Transformation Plan
• Develop Detailed Project Implementation Plans
• Synchronize Detailed Plans
• Commit Resources
• Provide Education & Training
• Implement Projects and Track Progress

Prepare for Transformation
• Determine Strategic Imperative
  • Articulate the Case for Transformation & Convey Urgency
  • Focus on Stakeholder Value
  • Leverage Transformation Gains

Engage Stakeholders
• Perform Stakeholder Analysis
• Obtain Executive Buy-In

Alignment Requirements Identified

Pursue & Sustain Transformation

A Committed Leadership Team

Prepare for Transformation
• Determine Strategic Imperative
  • Articulate the Case for Transformation & Convey Urgency
  • Focus on Stakeholder Value
  • Leverage Transformation Gains

Engage Stakeholders
• Perform Stakeholder Analysis
• Obtain Executive Buy-In

Alignment Requirements Identified

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

Engage Leadership in Transformation
• Cultivate Enterprise Thinking
• Obtain Executive Buy-In
• Establish Executive Transformation Council

Support Transformation
• Reconcile Systems, Policies & Vision
• Align Performance Measurement System
• Align Incentives
• Empower Change Agents
Benefits of Lean Enterprise Transformation Roadmap

• Facilitates enterprise focus
• Provides “sequence” for enterprise transformation
• Increases understanding of “what went wrong” in previous transformation attempts
• Focuses on people/leadership issues
• Provides an organizing framework for enterprise-wide transformation
Robust Repeatable Processes Are Key to Sustained Excellence

These include:

- Standardized design tools
- Lean manufacturing techniques
- Supplier partnerships
- Kaizen throughout the company
- Respect for all employees
Creating a Holistic Approach to Enterprise Transformation

Transformation Issue

- How do I motivate and sustain enterprise transformation?
- How do I transform my enterprise?
- What analytical tools can I use to support my decision making?
- How do I design my future enterprise?

Enterprise Methodology

- 7 Principles of Enterprise Thinking
- Enterprise Transformation Roadmap
- LAI Enterprise Self-Assessment Tool (LESAT)
- Enterprise Architecting Framework
Motivation for Enterprise Architecting

- In order to transform an enterprise we need to know not only where we are, but more importantly where we want to be (future state)
- In enterprise value analysis how do we define the “future state” of the enterprise?
- Once we define the future “vision” how do we design the enterprise?
- How do we incorporate the multiple dimensions or “views” at the enterprise level?
Enterprise Architecting – Enables Greater Efficiency and Effectiveness

- Effective integration – managing complex interdependencies
- System optimization, not local optimization
- Knowledge-based enterprise capabilities
- Achieving desired future state characteristics
  - Agility
  - Flexibility
  - Reconfigurability
EA Example:
Reduce Time to Market Imperative

Streamlined Integrated Product/Process Development Process; Design standardization and reuse

Global product development and manufacturing; ITAR restrictions

Modular and platform product architectures to promote reuse, standardization, technology insertions, etc.

IPD teams with representatives from engineering design, manufacturing and suppliers; collaborative team members with holistic perspective

IPD members must understand critical dimensions of product life cycle

Responsive support structure, enabled by standardized components and reliable products

Reduce time to market for new product introduction

Engineering Data Management System to support new process

Strategy
Process
Organization
Knowledge
Information Technology
Products / Services

Policy / External Factors
□ Strategic Context (4 chapters)
□ Lenses of Current State Analysis (5 chapters)
□ Achieving Transformation (3 chapters)

Journal of Enterprise Transformation
Vol. 1, Issue 4:
“Enterprise Transformation in Action”

In collaboration with IIE and INCOSE

Hardcover and Kindle discounts at Amazon.com

Connect at:
www.tandfonline.com/loi/ujet20
Professional Education Courses

MIT Campus,
Cambridge, Massachusetts, USA

July 16-17, 2012
Principles of Enterprise Transformation

Prof. Debbie Nightingale
Jayakanth Srinivasan, Ph.D

This course highlights the importance of **going beyond classical lean thinking** to truly embracing the enterprise paradigm to achieve successful and sustainable transformation. Over two days, we provide a set of enterprise principles and a transformation roadmap that serve as the foundation for the holistic analysis framework that captures the current state, envisions the future state, and determines actions needed for transformation.

web.mit.edu/professional/index.html

10% Discount for LAI Members

July 30 to Aug. 1, 2012
Architecting the Future Enterprise

Prof. Debbie Nightingale
Donna Rhodes, Ph.D.

Enterprises often evolve in an ad-hoc, suboptimal manner, without viewing the enterprise as a whole system. This course looks at the enterprise as a holistic and highly networked structure wherein planning and decisions must be accomplished by applying a systems perspective and architecting principles, considering all facets of the enterprise.
• Please contact us at any time:

Dick Lewis 617.253.0477
rblewis@mit.edu

Nicolene Hengen 617.253.7633
nhengen@mit.edu