

Enterprise Systems Principles

International Engineering Systems Symposium

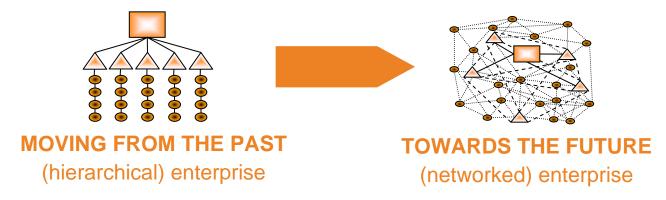
Prof. Debbie Nightingale MIT

June 17, 2009



The Challenges of Complex Enterprises Requires a Systems Approach

- New strategic systems perspective
- Viewing enterprises as <u>holistic</u> and <u>highly networked</u> systems
- Integrating leadership processes, lifecycle processes and enabling infrastructure systems
- Balancing needs of multiple stakeholders working across boundaries





Creating a Holistic Approach to **Enterprise Transformation**

Transformation Issue

How do I motivate and sustain enterprise transformation?

How do I transform my enterprise?

How do I assess my progress?

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

How do I design my future enterprise?













Enterprise Methodology

7 Principles of Lean Enterprise Thinking

Enterprise Transformation Roadmap

Lean Enterprise Self Assessment Tool (LESAT)

Enterprise Strategic Analysis and Transformation (ESAT)

Enterprise Architecting Framework



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.

LAIS Enterprise Transformation Roadmap

STRATEGIC CYCLE

Determine • Articulate Business Case for Lean

Strategic • Focus on Stakeholder Value Imperative • Leverage Lean Gains

Pursue & Sustain **Enterprise Transformation**

Long-Term

Corrective

Action

Engage

- Convey Urgency
- Foster Executive Lean Learning
- Leadership in Obtain Executive Buy-In
- Transformation Establish Executive Lean Transformation Council

Strategic Implications of Transformation

Nurture. **Process & Imbed**

Lean Enterprise Thinking

- Monitor & Measure the Outcomes
- Nurture, Process, & Imbed Lean Culture
- Capture & Diffuse Lessons Learned
- Synchronize Strategic Long-Term & Short-Term Cycles

Implementation Results

Implement & Coordinate

Transformation Plan

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

Short-Term Corrective Action

PLANNING CYCLE

A Committed Leadership Team

Understand

Current State

- Perform Stakeholders Analysis
- Define As-Is Value Stream
- Perform Enterprise Assessment

Capabilities & Deficiencies Identified

Envision & Design

Future Enterprise

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

EXECUTION CYCLE

Create Transformation Plan

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

Align **Enterprise Alignment** Infrastructure Requirements Identified

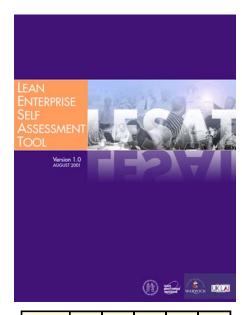
Lean Enterprise Vision

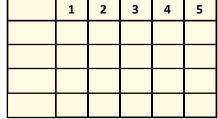
- Align Organization
- Align Incentives
- Empower Change Agents
- Rationalize Systems & Policies
- Align Metrics



Lean Enterprise Self Assessment Tool (LESAT)







Capability maturity model

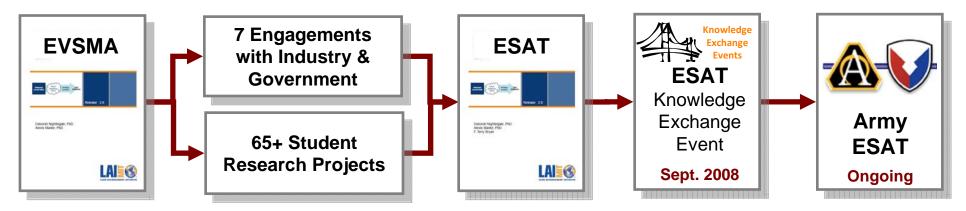
Tool for executive selfassessment of the present state of "leanness" of an enterprise and its readiness to change

Downloaded over 3400 times





Enterprise Strategic Analysis for Transformation (ESAT)



ESAT

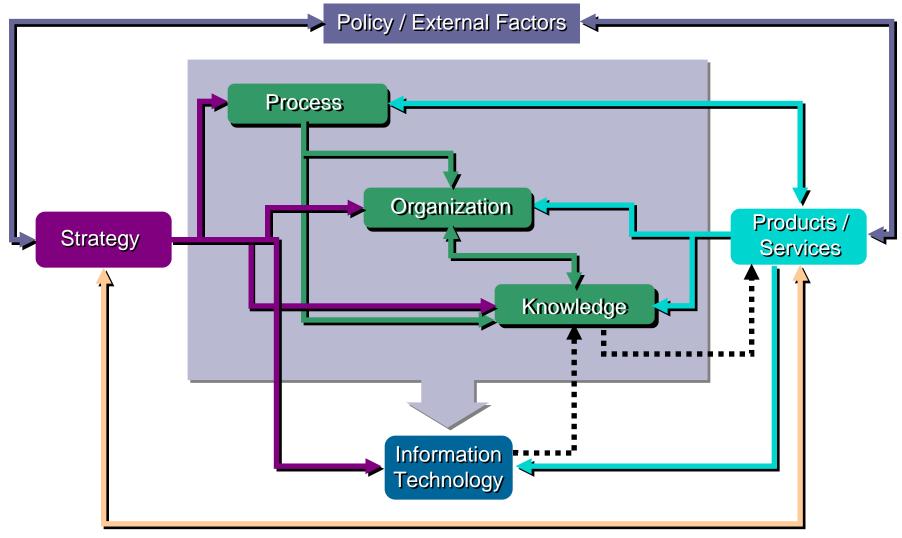
An integrated, analytical framework for diagnosing and improving overall Enterprise performance.

- Focuses on Enterprise-wide processes
- Provides a cohesive method for diagnosing an Enterprise to expose sources of waste and barriers to value delivery
- Considers the needs and values of all enterprise stakeholders

- Identifies process interfaces, disconnects, and delays
- Establishes an Enterprise vision for the future
- Identifies improvement opportunities that will lead the enterprise to its future state



Enterprise Architecture Framework



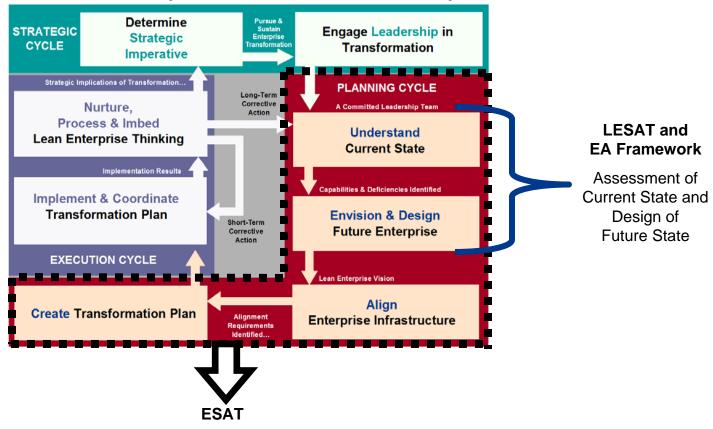
Source: D. Nightingale and D. Rhodes



Enterprise Transformation Framework

7 Enterprise Principles

LAIS Enterprise Transformation Roadmap



Methodology for Developing Transformation Plan



Enterprise Principles Deployed in Action Research and in Graduate Courses

- Graduate Courses (project based)
 - "Integrating the Lean Enterprise"
 - "Enterprise Architecting"
 - 65 cases
- Enterprise Transformation Cases with executive teams
 - Industry
 - Gov't
 - 9 cases
- Multiple Domains and Industries



Transformation Case Studies

Industry	Organization	Reason to Transform	Insights from Enterprise Analysis
Aerospace	Air Cargo Carrier Program	Reduce costs and cycle times	Multiple stakeholder (industry, government regulatory) essential for enterprise success
	Space Center	Long development /procurement times at high cost	Criticality of including extended enterprise, including key suppliers and requirements generators
Healthcare	Mental Health Hospital	Breaking cultural norms to drive needed change, improve service and reduce costs	While experts in patient care, enterprise analysis uncovered traditional behaviors were inadequate for enterprise optimization and operation across boundaries.
	Hospital	Emergency Dept. overcrowding	Traditional lean approaches prone to sub- optimization. Enterprise thinking unveiled strong interdependencies with other hospital units (inpatient, operating rooms, etc) and external entities (insurance companies, primary care, etc). Ensuing transformation efforts adopted holistic principles.
	Medical Device Manufacturer	High growth rate; improve quality and profitability	Requires governance structure to oversee enterprise transformation; critical to span cross-organizational boundaries



Transformation Case Studies

Industry	Organization	Reason to Transform	Insights from Enterprise Analysis
Services	Commodity Provider	Misalignment of customer service with development and delivery platform	Leveraged front end enterprise interface while supplying holistic stakeholder value propositions; adopted both effectiveness as well as efficiency measures
Automotive	Auto Manufacturer	Reduced time-to-market in global product development	Required more than just traditional R&D – streamlined cross functional information exchange across organizational boundaries key to transformation
Government	Air Logistics Center	Increase aircraft availability, Commercial competition for logistics support	Shared enterprise strategic vision provided focus for prioritizing projects to achieve increased mission effectiveness
	Acquisition, Technology and Materiel Support	Higher levels of support to the field at reduced costs and cycle time; organizational integration	Integrated enterprise model requires extensive involvement of leadership, inclusion of supply base and integration of processes with IT systems



Enabling Enterprise Excellence

Discovery - Deployment - Renewal

Research Shapes Deployment

Enterprise Research

We study Enterprises to identify best practices, transformation strategies and future Enterprise architectures



Transformation Knowledge Deployment

We transform research-based knowledge into education, products, knowledge exchange events, and transformation events

Deployment Shapes Research

Stakeholder-Centric Value Creation



BACKUP



LAI: A Consortium Dedicated To Enterprise Performance

- Enable Enterprises to effectively, efficiently and reliably create value in a complex and rapidly changing environment
- Enable focused and accelerated transformation of complex enterprises
- Collaborative engagement of all stakeholders in Industry, Government and Academia
- Understand, develop, and institutionalize principles, processes, behaviors and tools



LAI - Expanding Enterprise Focus

Increasing Total EVOLUTION OF LEAN ENTERPRISE THINKING **Effectiveness**

Operations Functional lean successes Manufacturing

Supplier Networks

'Islands" of Success

through interaction between functions

Lean applied to enabling processes

• HR

• IT. etc.

application to Product Dev

Transition from waste minimization to value creation

Success through total enterprise integration of stakeholders

- Industry
- Government
- Suppliers
- Employees

Success through networked enterprises

Expanding the lean boundaries

- Suppliers
- Customers
- Partners

1993 **NOW**



LAI Research Groups Address 4 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