Five Capabilities for Enterprise Change

George Roth

SDM Webinar ~ July 25, 2011
What is my work?

Organizational leadership, culture, learning, and change theories applied in lean, learning, continuous improvement, and business enterprise contexts.
What is new about this presentation?

I am going to present in the way that I am writing the book:

• Background and what could and wasn’t learned
• Examples from cases for making improvements and changes that achieved and sustained excellent enterprise outcomes
• Going from illustrations to explanations of each of the five enterprise change capabilities
• Wrapping up by talking about the system of change that creates enterprises from organizations

Opportunities for SDM students and other audience members:

• Apply the Five Enterprise Change Capabilities in your MIT thesis and company change settings
• Contribute examples of changes using these types of methods and their outcome (developing a fieldbook of methods with vignettes on their use)
Origin of LAI

1990 MIT book on the automobile industry introduces Lean Production as a new industrial paradigm.

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

MIT wondered:

Does Lean apply to an industry with significantly different products and customers?

Will Lean principles and practices be extended beyond the TPS?
Lean Aerospace Initiative
formed in 1993

A National Consortium of

- **Industry**
  - Airframe, engine, avionics, missile and space companies

- **Government**
  - Air Force agencies and System Program Offices, AF HQ
  - NASA, Army, Navy
  - OSD

- **Labor**
  - International Association of Machinists and Aerospace Workers

- **Academia**
  - MIT
Evidence of Lean Impact on Aerospace Systems

- **Major cost savings**
  - C-17 unit priced decreased from $260M to $178 M for final 80 aircraft of 120 aircraft buy, saving $6.5 billion.
  - 63% reduction in unit cost of JDAM (Joint Attack Direct Munition), saving over $2.8 billion.

- **Major schedule savings**
  - Atlas launch vehicle program reduced lead time from 48.5 to 18 months*.
  - Northrop Grumman ISS lean enterprise implementation reduced throughput times for major systems by 21 to 42%.

- **Breaking old paradigms**
  - F-16 maintained sales price and decreased order-to-delivery time by up to 42% while production rate decreased 75%.
  - F/A18-E/F EMD completed on time, within budget while meeting or exceeding performance requirements.

---

LAI helped accelerate aerospace’s Lean transformation.


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

LAI: Expanding Enterprise Focus

Enterprise Architecting

Enabling Enterprise Excellence

Networked Enterprise
Extended Enterprise
Enterprise
Business Unit
Program
Shop Floor

Enterprise Transformation

ESAT
Healthcare
Enterprise Toolkit
Change Agent Network
System of Systems
Global Enterprises

Leading Indicators Guide
Supplier Network Toolset
LESAT V.2

Apply Lean Thinking

Transition to Lean Roadmap
Lean Enterprise Model

Phase 6
Phase 5
Phase 4

Lean Now

LESAT

PDVSM
EVSMA

http://lean.mit.edu
An ‘enterprise’ is a set of connected organizations

Source: Thomas W. Malone, 2001 “Inventing the Organizations of the New Economy”
Enterprise Change: The purpose

Enable and achieve high performance that is sustained over time and across stakeholder communities.

*How do you get there?*
*And, what keeps you there?*

Vertically Integrated Corporation  
Lean Enterprise
What data can we draw upon?

- **Documented studies**
  - Toyota and “lean” – i.e. *The Machine that Changed the World, Lean Thinking, The Toyota Way, Remade in America, Collaborative Advantage*
  - Management/leadership – i.e. *Built to Last, Good to Great, Execution, The Leadership Engine*
  - Corporate/leadership – i.e. *Jack, Who Says Elephants Can't Dance?, Swimming Across*
  - Strategy/Change – i.e. *The Innovating Organization, Leading Change, Breaking the Code of Change, The Dance of Change*

- **New cases & studies that develop and test lean enterprise change concepts**
  - Raytheon, Rockwell Collins, Ariens, UTC, & government

(understanding ↔ description) → theory → testing → prediction
Company - organizational level and change

Summary

Garden State Tanning
Plant case on leather automobile seats (Liker 1999)

Had fallen several months behind in production; first US supplier taught lean by Toyota engineers

4 years (1992-1995)

Delphi Saginaw
Plant level case on automobile steering columns (Liker 1999)

Because of quality and cost problems, GM was considering finding another supplier

7 years (1991-1997)

Donnelly (Grand Haven)
Plant level case on automobile mirrors (Liker 1999)

Plant was launched to serve Honda, but subsequent delivery, cost and quality issues threaten Honda's business

2 years (1996-1997)

Freundenberg NOK
Company (multi-plant) case on automotive rubber and plastic parts (Liker 1999, Womack and Jones 1996)

Business was barely profitable and lean was seen as the way to become more profitable

5 years (1992-1996)

Western Geophysical
One production line producing underwater cables (Liker 1999)

Cables produced by Western Geophysical (WG) then used by WG service crews; poor quality and lead times were hampering the success of service crews

5 years (1991-1995)

Cedar Works
Company (two plant) case on bird houses and animal feeders (Liker 1999)

Experiencing exponential growth, the small company could not keep up with demand

5 years (1993-1997)

Lantech
Plant level case on pallet wrapping machines (Womack and Jones 1996)

The key patent of this founder-led company had just expired and the company faced competition for the first time

4 years (1991-1994)

Wiremold
Main company plant producing wire management systems (Womack and Jones 1996)

Rising costs struck the once-profitable company; Art Byrne, who had previously learned lean from Japanese experts, took over

6 years (1991-1996)

Pratt & Whitney
Plant level case on aircraft engine production (Womack and Jones 1996)

Competition with General Electric and Rolls Royce was heightening; fell behind in engine market for single-aisle commercial jets

5 years (1991-1995)

United Electric Controls
Plant level case on control and sensor production (Ryckebusch 1996)

Long lead times and high costs led to a record loss in 1987; a new VP of manufacturing, Bruce Hamilton, was appointed

10 years (1987-1996)

Gelman Sciences
Plant level case on microfilter production (Liker 1999)

Did not want to fall behind the competition as US auto manufacturers had; adopted lean to become more generally competitive

5 years (1993-1997)

Porsche
Assembly plant case (Womack and Jones 1996)

The strengthened Deutschemark led to decreased sales to its largest market – North America; sales plummeted

6 years (1992-1997)

Cases posted at http://lean.mit.edu
Successful Lean Enterprise
Change

What does it take?
… capabilities in each of the following areas

1. Thinking Enterprise ← the “where”
   • Long-term system view of own organization and relationship with suppliers and customers as part of a common value stream

2. Installing Innovation Sets ← the “what”
   • Complementary approach – restructuring, process and boundary changes

3. Balancing Pull and Push ← the “how” & “when”
   • Based on deeper cultural assumptions that combine strategic change and enable virtuous learning processes within a “community of scientists”

4. Seeking Growth ← the “why”
   • The positive vision for continual renewal at individual and organizational levels

5. Distributing leadership ← the “who”
   • Interdependent roles in a system of leadership
Leadership Must Develop the Culture, the Process, the Speed

1. Create the Right Culture
   - Focus on Astounding Your Customer
   - Develop Long-Term Relationships

2. Value Stream Organization Flow
   - Start from the customer and define your value stream back to raw materials
   - Rapid New Product Development
   - Lean Design

3. Speed to Market
   - Operations improvements begin by year end

Putting it all together: Ariens Company

1. Conditions for Lean: Leaders told truth to create trusting conditions
2. Continual Improvement: Initial changes set off a virtuous learning cycle
3. Lean Change Methods: Leaders changed the culture
4. Ongoing Challenges: Getting started is not enough

Ariens Company Profile:
- Privately held (4th generation family owned)
- Brillion, Wisconsin
- Produces snow blowers & lawn mowers
- Competitors: Toro & John Deere
- Approx. 1,100 employees

© Massachusetts Institute of Technology
George Roth    July 25, 2011
SDM Webinar    Page: 15
Conditions for Lean

• Decoupling new from old leadership, re-establishing family culture, creating culture that values learning & problem solving, making invisible visible, & being led by true believers in lean created renewed...

• Trust in leadership
  When resistance, operations managers met with every employee to be sure treated fairly.
  Slowly, positive results evident & trust deepened.
Continual Improvement set off Virtuous Learning Cycle

• Small efforts…little changes…some benefit…instilled confidence…encouraged ongoing efforts…continuing changes accumulated into DRAMATIC improvements (over 5 years 600 employee driven improvement projects)

• Cycle initiated in all aspects of business & required broad restructuring into value streams
 Lean change: within & beyond Ariens’ boundaries

- “A loaded dealer is a loyal dealer” to a “turn & earn” philosophy
- Partner Plus Program
  - Organized production with a pull inventory system
  - Ariens helps dealers understand benefits by introducing them to lean concepts
- 2x/year Ariens’ field agents visit end-use customers & dealers & run kaizen events with them
- End-users are able to visit Ariens & participate in lean events
- Suppliers participate in Ariens’ Lean University
  - Suppliers can pay $3,000 to send up to 5 employees to a 7 week class on lean. 2003 first graduating class
- Lean Intern Program
  - 4 modules – basic concepts, supplier, dealer, and internal
Magnitude of changes from 1999 to 2005:

- Productivity & Sales increased over 200%
- Inventory turns improved over 300%
- Profits improved by factor of 10
- Safety incidents decreased by 50%
- Manufacturing floor space decreased by 40%
- Travel distances for products decreased 90%

Figure 12.1 Firms versus Value Streams (From Lean Thinking page 281)
Shift from managing organizations to cultivating enterprise value streams
Thinking enterprise: Capabilities for working across boundaries

What is outside my organizational (or functional) boundaries is not beyond my influence… or improvement ability!

… rethinking the boundaries of organizations
Methods that develop Thinking Enterprise Capabilities:

Representing an enterprise and its properties to increase its salience to its stakeholders:
Following one another:
Warner Robins Air Logistics Center

1999

Mantech lean depot repair prototype
-- F-15 Avionics
-- F-15 Wing Shop
-- F-15 PDM

2000

May 00
-- F-15 Avionics
-- F-15 Wing Shop
-- F-15 PDM

2001

Jan 01
Gen. Haines – Feb 2000
-- support for lean May 2001
-- off site training for senior staff
-- C-5 PDM
-- C-130 PDM
-- C-141 PDM (closing)
-- C-17 PDM

2002

Jun 02
C-5: 45 Events, 111 Projects, & 162 Doits
C-111: 26 Events, 74 Projects, & 41 Doits
C-17: 21 Events, 29 Projects, & 63 Doits

2003

Aug 02 – MA Directorate formed, 31 Doits*

Gen. Wetekam – Feb 2002
-- broad lean efforts – ROTA
-- PR
-- Lean Council
-- Lean CPI Plan

Gen. Haines → Gen Wetekam → Gen Collings
Lean ‘pilots’ contributed to Air Force’s Smart Operations for the 21st Century

http://lean.mit.edu

© Massachusetts Institute of Technology
George Roth    July 25, 2011

SDM Webinar    Page:   25
Organizational forms and multiple changes

- Changing structures
  - Decentralizing
  - Project forms of organizing
  - Delaying

- Changing processes
  - Horizontal & vertical communication
  - Investing in I.T.
  - Practicing new HR
  - Outsourcing
  - Downscoping
  - Developing strategic alliances

© Massachusetts Institute of Technology
George Roth    July 25, 2011
SDM Webinar    Page:   26
Systemic change: Europe, Japan and US, 1992-1997

<table>
<thead>
<tr>
<th>The 3 Dimensions</th>
<th>Europe</th>
<th>Japan</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure (S)</td>
<td>30.3%</td>
<td>6.2%</td>
<td>16.5%</td>
</tr>
<tr>
<td>Processes (P)</td>
<td>74.9%</td>
<td>53.7%</td>
<td>82.3%</td>
</tr>
<tr>
<td>Boundaries (B)</td>
<td>44.9%</td>
<td>30.7%</td>
<td>57.0%</td>
</tr>
</tbody>
</table>

Very few companies adopting whole system of change

* Based on work by Andrew Pettigrew, University of Bath
Systemic change and performance*: Summary of regression results

<table>
<thead>
<tr>
<th>The 4 Systems</th>
<th>Pooled Sample of Western Firms</th>
<th>UK</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>System 1 (S+P+B)</td>
<td>++</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>System 2 (S+P)</td>
<td>-</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>System 3 (P+B)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>System 4 (S+B)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

One symbol, + or -, indicates weak positive or negative significance; two symbols, ++ or --, indicate strong positive or negative significance.

- The adoption of a **full set** of changes (System 1) increases the probability of **improving** corporate performance
- The adoption of **partial** systems (System 2 and System 3) is likely to **reduce** performance

* ‘High’ performance companies are in upper quartile of sector adjusted Return on Capital Employed
Installing Innovation sets: Capabilities for multiple changes

“Doing more of one thing increases the returns of doing more of another”
Milgrom and Roberts, 1995

• Investing in one practice increased the returns from investing in another, setting off a potential virtual circle of high performance

The Positive Proposition:
• Changing only a few of the system elements at a time may not come close at all to achieving all the benefits that are available through a fully co-ordinated move

The Negative Proposition:
• Partial moves may drive down performance

Competitive Advantage Grows Out of a System of Activities as a Whole
Methods for installing Innovation Sets Capabilities:

Representing and facilitating change in sets:
Aligning an enterprise culture: Raytheon Lean Six Sigma
Limitations of Planned Organizational Change

Multi-organization enterprise form:

- New organizational forms correlate with high performance

Enterprises are:

- Polycentric
- Under organized
- Loosely coupled

http://lean.mit.edu
Challenges of Enterprise Change

- There are different assumptions about change and its context
- Do assume that we can bootstrap from past knowledge
- We need a change theory developed & tested in enterprises
Enterprise change conditions differ from the organizational change contexts that promote practices of setting top down goals, relaxing control, assigning teams, scripting initiatives, and focusing internally.
Changing

Learning leads to changing

Determine need for change
Set goals and plan change
Implement change plan
Manage transition & assess outcome

Teach and Implement tools & methods to influence behaviors
Observe people, processes, & results
Find, Design and develop tools & methods
Assess needs of customers, people and organization

Learning leads to changing

© Massachusetts Institute of Technology
George Roth  July 25, 2011
SDM Webinar  Page: 35
<table>
<thead>
<tr>
<th>Organizations</th>
<th>Enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>←Contextual Characteristics→</td>
<td>• Polycentric</td>
</tr>
<tr>
<td>Decision-making</td>
<td>• Under-organized</td>
</tr>
<tr>
<td>Structure</td>
<td>• Loosely-coupled</td>
</tr>
<tr>
<td>Operations</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change Approach Stages</th>
<th>Details ↓</th>
<th>Pushing Changes</th>
<th>Pulling Changes</th>
<th>Details ↓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hierarchical</td>
<td>Start by relaxing constraints and loosening structure to enable new options → determine need (unfreezing)</td>
<td>Loosening control</td>
<td>Identifying conditions</td>
<td>A focal organization determines who are the customers, what is the enterprise, who participates in it, what are stakeholders’ value propositions → observe</td>
</tr>
<tr>
<td>Highly-organized</td>
<td>Leaders create vision and set goals for what the organization needs to achieve → set goals</td>
<td>Setting goals</td>
<td>Directing attention</td>
<td>Need to provide direction for set of organizations you cannot “organize” a mess → assess</td>
</tr>
<tr>
<td>Tightly-coupled</td>
<td>Leaders assign teams and experts to develop plans that will goals → plan change</td>
<td>Making plans</td>
<td>Enabling Capabilities</td>
<td>Develop and apply methods and practices in your own setting to illustrate possible outcomes and desirable results → design &amp; implement</td>
</tr>
<tr>
<td>Program, new methods, training, and changes are rolled out across organization → implement plan (model new behaviors)</td>
<td>Implementing (rolling out) plans</td>
<td>Crossing boundaries</td>
<td>Involve and show customers and suppliers what you have achieved, ensure you are providing greater value, and offer to share methods → implement &amp; new observe</td>
<td></td>
</tr>
<tr>
<td>Ensure implementation, establish measures to report savings and gains → manage transition &amp; assess outcome (refreezing)</td>
<td>Consolidating gains</td>
<td>Developing performance</td>
<td>Diffusion of new methods enable common understanding and shared practices to make overall changes and improve performance → new assess, design &amp; implement</td>
<td></td>
</tr>
</tbody>
</table>

© Massachusetts Institute of Technology
George Roth    July 25, 2011
SDM Webinar    Page:   36
Methods for Balancing Pulling and Pushing Change Capabilities:

Representing a set of changes:

**Force Field Analysis**

**Forces Enabling Change**
- Habit
- Fear
- Lack of Time
- Lack of Resources
- Entitlements / Power
- Shared Assumptions

**Forces Inhibiting Change**
- Burning platform
- Role models
- Incentives
- Values / Identity
- Vision / Reframing
- External pressure

---

**Dimensions of Change**

<table>
<thead>
<tr>
<th>Goals</th>
<th>Theory E</th>
<th>Theory O</th>
<th>Theories E and O Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>maximize shareholder value</td>
<td>develop organizational capability</td>
<td>explicitly embrace the paradox between economic value and organizational capability</td>
</tr>
<tr>
<td>Leadership</td>
<td>manage change from the top down</td>
<td>encourage participation from the bottom up</td>
<td>set direction from the top and engage the people below</td>
</tr>
<tr>
<td>Focus</td>
<td>emphasis structure and systems</td>
<td>build up corporate culture, employees' behavior and attitudes</td>
<td>focus simultaneously on the hard structures and systems and the soft (corporate culture)</td>
</tr>
<tr>
<td>Process</td>
<td>plan and establish programs</td>
<td>experiment and evolve</td>
<td>plan for spontaneity</td>
</tr>
<tr>
<td>Reward System</td>
<td>motivate through financial incentives</td>
<td>motivate through compensation—use pay as fair exchange</td>
<td>use incentives to reinforce change but not to drive it</td>
</tr>
<tr>
<td>Use of Consultants</td>
<td>consultants analyze problems and shape solutions</td>
<td>consultants support management in shaping their own solutions</td>
<td>consultants are expert and manage how change is driven</td>
</tr>
</tbody>
</table>

---

**The Negotiator Magazine**

The one-test procedure is a systematic process for shifting negotiators away from thinking about concessions, by using a neutral, third party facilitator to elicit underlying interests and to simplify the process of jointly inventing many options and deciding on one. After eliciting the issues and interests of all the parties, the facilitator drafts a proposal and presents it to the parties as a draft for their criticism. The parties may not accept or reject any part of the draft at this stage of the process; they may only criticize.

The process is called the "one-test" procedure because quite literally there is only one test. All the parties get a copy of the facilitator's draft, but they are not allowed to keep it, revise it, or add to it. They must return the draft at the end of the session. The only people who can revise, delete, or add to the draft are the facilitators. This process helps prevent people from taking positions on getting a vested interest in particular language or proposed terms. It allows them to criticize freely without damaging their working relationships. It also allows them to learn that they often share the same interests and only disagree about the means used to achieve them. The facilitators continue to revise and resubmit drafts to the parties until the facilitators feel the draft they have reflects the best they can do to meet all parties' interests. Then and only then, they offer the parties an opportunity to say "yes" or "no." At that point, the parties have a clear choice, either I say yes to this or I say no. This procedure was used at Camp David in the negotiations between Israeli Prime Minister Begin and Egyptian President Sadat. President Carter and Secretary of State Vance created 25 drafts in 23 days before they had a proposal to which both sides could say yes.

---

© Massachusetts Institute of Technology  George Roth  July 25, 2011  SDM Webinar  Page:  37
**Leaders Immersed in and Aligned With Lean Transformation**

- Leaders Set Expectations and Teach Value Stream Mapping
- Set Priorities (Top 5-7)
- Remove Road Blocks
- Ensure Events Tie to VSM and Bottom Line
- Set Cadence
- Provide Positive Reinforcement
- Ensure Value Stream Alignment
- Set Breakthrough Goals
- Map Value Stream
- Determine Events Needed to Achieve Future State (Goals)
- Plan Events (RPIs, Bursts, etc.)
- Implement Improvements Quickly
- Review Monthly Versus Goals and for Sustainment
- Make Changes as Necessary (Mid-course)
- Evaluate Results Versus Goals
- Repeat Process

---

**Plan Targets**

- Annual sales growth of 10%
- Earnings per share at 13-15%
- Return on invested capital at 20-25%

**Growth Drivers**

- 1-2%
- 3-4%
- 5-6%

**Branding Change: Rockwell Collins Lean Electronics**

- Alliances & Acquisitions
- Expansion & New Growth
- Optimize Core Business
- Lean Electronics℠
Seeking Growth: Capabilities for sustaining positive renewal

Sustaining individual development, quality improvement, and productivity gains require business growth:

Finance case
1. Leadership developments at Letterkenny Army Depot ("LEAD"). Case builds off introduction of lean into Patriot missile recapitalization.
2. LEAD's context: its work and the Army's budget process.
3. LEAD's finance innovations.
4. Extended enterprise implications of LEAD's innovations.

Journal of Enterprise Transformation
1: 119-146, 2011.

Change valence
Achieving Competitive Excellence: UTC’s ACE Operating System

Over last decade, UTC has the highest shareholder return of any Fortune 50 company (155%)

UTC attributes its performance and improvement to the development and deployment of ACE
Distributing Leadership: Capabilities for aligning leaders

Engaging leaders at all levels in an operating system that achieves and sustains changes

Executive Leaders  Line/Local Leaders

The importance of shared culture
- Weak or disengaged culture
- Strong and directed culture

Network Leaders

Leadership for learning

Balanced teams
Deborah Ancona, faculty director of the MIT Leadership Center, and MIT Sloan Senior Lecturer William Isaac's key structural balance is vital to the success of teams. Their "Four-player model" answers that, applied appropriately and in the proper sequence, four core acts — Move, Follow, Oppose, and Bystand — are the building blocks of an effective team.

http://lean.mit.edu

George Roth July 25, 2011
Successful Lean Enterprise Change

What are the capabilities for Enterprise change?

1. Thinking Enterprise
   • Long-term system view of own organization and relationship with suppliers and customers as part of a common value stream

2. Installing Innovation Sets
   • Complementary approach – restructuring, process and boundary changes

3. Balancing Pull and Push
   • Based on deeper cultural assumptions that combine strategic change and enable virtuous learning processes within a “community of scientists”

4. Seeking Growth
   • The positive vision for continual renewal at individual and organizational levels

5. Distributing leadership
   • Interdependent roles in a system of leadership
These capabilities…

- are resources, talents, and abilities of an organization and its people
- that have the potential for development and use, and in their use,
- create expected outcomes while further developing themselves

The *system* of change

~ leads to a ~

lean enterprise *system*
Five Capabilities for Enterprise Change

1. A new view for changing
2. The essence of enterprise excellence (NUMMI illustration)
3. Putting it all together – Ariens Company
   - Thinking enterprise – capabilities for working across boundaries
4. Following one another – Warner Robins Air Logistics Center
   - Installing innovation sets – capabilities for enabling complementary changes
5. Aligning an enterprise culture – Raytheon Lean Six Sigma
   - Balancing pull and push changes – capabilities for integrating learning and execution
   - Returning the government’s money – Letterkenny Army Depot
   - Seeking growth – capabilities for sustaining positive renewal
7. Achieving Competitive Excellence – UTC’s ACE Operating System
   - Distributing leadership – capabilities for aligning leaders
8. Running on – the journey is the destination
Questions?

Discussion