On Developing Business Architectures:
A Multi-Framework Evaluation of an Early-Stage Enterprise

Mario Montoya, Jr.
Dec. 20, 2010
This presentation examines the efficiency and effectiveness of using multiple frameworks to analyze an early-stage enterprise within the medical technology industry, Lentesco Luminarium. The company faces a critical choice between two growth strategies: vertical penetration within existing modalities or horizontal growth into new modalities, so Montoya will explore what tools might inform and guide the executive team to make the right decision for Lentesco’s particular industry, maturity, and size. In addition to the standard Lean Advancement Initiative suite of tools, he uses Nightingale and Rhodes’ eight Enterprise Architecture views, Kaplan’s Balanced Scorecard, Piepenbrock’s Evolution of Business Ecosystems, McKinsey’s 7S framework, and Grave’s Spiral Dynamics. He concludes that Lentesco needs to improve transparency and communication, and he suggests the use of the McKinsey 7S framework to put concepts into perspective as simply as possible. For a multiple perspective evaluation, he suggests the EA 8 Views framework.

Visit sdm.mit.edu for further details and to register.
Acknowledgements

• Thesis Advisors:
  + Professor Deborah J. Nightingale
  + Dr. Theodore F. Piepenbrock

• Contributors:
  + Commander Douglas M. Schofield, USCG
  + Anando A. Chowdhury
  + RJ Lehman III
  + Taroon Aggarwal
  + Bayan T. Takizawa, M.D.
About the Thesis

- Much of the available literature characterizes and categorizes companies and industries in a descriptive context. My research examines a real-time “case study” in the making.
- By applying various frameworks, I hope to provide actionable recommendations to the case organization based on a holistic examination.
- This thesis culminates in the creation of the Strategic Enterprise Architecting Process (SEAP).
Lentesco Luminarium

- Industry: Medical Devices
- Years in Industry: 5
- # of Employees: ~140
- # of Unique Business Units: 4
Background: The Sucker’s Choice

- Vertical Growth through greater market capture
  or
- Horizontal Growth through greater market creation
  or
- Architect an enterprise to do both well
# The Frameworks

<table>
<thead>
<tr>
<th>Framework</th>
<th>Originator</th>
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<tbody>
<tr>
<td>Balanced Scorecard (BSC)</td>
<td>Kaplan and Norton</td>
</tr>
<tr>
<td>X-Matrix and LESAT</td>
<td>Lean Advancement Initiative</td>
</tr>
<tr>
<td>EA 8 Views</td>
<td>Nightingale and Rhodes</td>
</tr>
<tr>
<td>Evolution of Business Ecosystems (EBE)</td>
<td>Piepenbrock, et al</td>
</tr>
<tr>
<td>McKinsey’s 7S</td>
<td>Peters and Waterman</td>
</tr>
<tr>
<td>Spiral Dynamics</td>
<td>Clare Graves</td>
</tr>
</tbody>
</table>
# Balanced Scorecard

## Strategy Map

<table>
<thead>
<tr>
<th>Process:</th>
<th>Customer Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme:</td>
<td>Customer Satisfaction</td>
</tr>
</tbody>
</table>

### Financial
- Revenue Growth
  - Grow Revenue
  - Increased Revenue, 2010
  - Increased Revenue, 2013
  - Gross Margin

### Customer
- Customer Satisfaction
  - Availability
  - Ease of Use

### Internal
- Clinical Value
  - Clinical Value
  - # of Publications
  - # of Conf. Sessions
  - # of Regional Demos
  - Data Refresh Rate (%/week)
  - Data Access Rate (hits/employees/week)

### Learning
- Knowledge Tools
  - Develop Purposeful Database
  - % Training Tools Complete
  - % Employees Trained
  - Convert Focus Accounts
  - Alignment to Corporate Strategy
- Training Tools
  - Develop Product Line
  - Training Tools

## Balanced Scorecard

### Objectives

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Measurement</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$X Million</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$3.3X Million</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintain Current Level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>95%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Significantly Better</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 / Modality / year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 / Modality / year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 / Modality / year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20% / week</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 / employee / week (all employees)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50%</td>
</tr>
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</table>

## Action Plan

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Budget</th>
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<tbody>
<tr>
<td>Product Quality</td>
<td>$XXX</td>
</tr>
<tr>
<td>Training Certification</td>
<td>$XXX</td>
</tr>
<tr>
<td>Product Innovation</td>
<td>$XXX</td>
</tr>
<tr>
<td>SR Presence</td>
<td>$XXX</td>
</tr>
<tr>
<td>Surgeon Partnerships</td>
<td>$XXX</td>
</tr>
<tr>
<td>Filter/Implementation</td>
<td>$XXX</td>
</tr>
<tr>
<td>Update Mechanism</td>
<td>$XXX</td>
</tr>
<tr>
<td>Standard Toolkit</td>
<td>$XXX</td>
</tr>
<tr>
<td>Training Program</td>
<td>$XXX</td>
</tr>
<tr>
<td>Focus Account Strategy</td>
<td>$XXX</td>
</tr>
</tbody>
</table>
Balanced Scorecard

Pro’s

- The Process:
  + Well-defined
  + Customizable
  + Collaborative

- May Result in:
  + Alignment
  + Empowerment
  + Common Language

Con’s

- The Process:
  - Ignores “Culture”
  - Team-Dependent
  - Requires “Buy in”

- May Result in:
  - Analysis Paralysis
  - Prolonged Discussions
  - High Maintenance Costs

“Tell me what you want me to achieve, not how to achieve it”
X-Matrix and LESAT

The diagram illustrates the current state maturity and gap in 54 LESAT practices. It categorizes practices into Strategic Objectives, Metrics, Stakeholder Values, and Key Processes, highlighting the differences between expected maturity levels and current state conditions.
X-Matrix and LESAT

**Pro’s**
- The Process:
  + Holistic
  + Selective

**Con’s**
- The Process:
  - Subjective
  - Non-prescriptive

**May Result in:**
- Big Picture View
- Intentional Focus

- Biased Perspectives
- Specific Lobbying
EA 8 Views
EA 8 Views

Pro’s

- The Process:
  + Holistic
  + Customizable
  + Incorporates “Culture”

- May Result in:
  + Big Picture View
  + Greater “Buy in”

Con’s

- The Process:
  - Lacks Performance Metrics
  - Non-prescriptive
  - Lacks Temporal Aspect

- May Result in:
  - Relational Representations
  - Static Perspectives
Evolution of Business Ecosystems
Evolution of Business Ecosystems

Pro’s

• The Process:
  + Objective
  + Well-defined Criteria
  + Actionable

• May Result in:
  + Understanding the Market
  + Identifying Preferred Enterprise Architecture

Con’s

• The Process:
  - Requires Extensive Work
  - *What & Why* not *How*
  - Generalizations

• May Result in:
  - Multiple Strategies
  - Orthogonal Focii
McKinsey 7-S
McKinsey 7-S

Pro’s

• The Process:
  + Simple
  + Holistic
  + Addresses “Style”

• May Result in:
  + Easy to Communicate
  + Easy to Understand
  + Relative Fit of “Levers”

Con’s

• The Process:
  - Limited Objectivity
  - No Measure of Correctness
  - Team-Dependent

• May Result in:
  - Biased Perspective
  - Inappropriate Recommendations
Spiral Dynamics

**Pro’s**

- **The Process:**
  - Addresses “Culture”
  - Improves Communication
  - Builds Community

- **May Result in:**
  - *Greater Understanding*
  - *Tailored Communication*

**Con’s**

- **The Process:**
  - Behavior-based
  - Identifies Central Memes
  - Generalized

- **May Result in:**
  - *Gross Simplifications*
  - *Tendency To “Label”*
Strategic Enterprise Architecting Process

- Implementation Context (Red v Blue)
- Define Behavior & Performance (EA 8 Views / LESAT) - Concept Selection (EA 8 Views)
- Define Artifacts (Spiral Dynamics)
- Define Solution & Rollout (Balanced Scorecard)

Entity Vee

- Verification & Test (X-Matrix)
- Validation in Context (Red v Blue)

Definition Sequence and Elaboration of Detail

Solution Realization

Verification Planning

Customer Confirmation

Validation Preparation (7S Model)

Anomaly Investigation

PDR

CDR

Opportunity and Risk Investigation

Assembly and Performance Assurance Sequence
# Strategic Enterprise Architecting Process

<table>
<thead>
<tr>
<th>Step</th>
<th>Framework</th>
<th>Intent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Evolution of Business Ecosystems</td>
<td>Implementation Context</td>
</tr>
<tr>
<td>2</td>
<td>EA 8 Views + LESAT</td>
<td>Define Behavior &amp; Performance</td>
</tr>
<tr>
<td>3</td>
<td>EA 8 Views</td>
<td>Concept Selection</td>
</tr>
<tr>
<td>4</td>
<td>Spiral Dynamics</td>
<td>Define Artifacts</td>
</tr>
<tr>
<td>5</td>
<td>Balanced Scorecard</td>
<td>Define Solution &amp; Rollout</td>
</tr>
<tr>
<td>6</td>
<td>X-Matrix</td>
<td>Verification &amp; Test (Internal)</td>
</tr>
<tr>
<td>7</td>
<td>X-Matrix</td>
<td>Verification &amp; Test (External)</td>
</tr>
<tr>
<td>8</td>
<td>7-S Model</td>
<td>Validation Preparation</td>
</tr>
<tr>
<td>9</td>
<td>Evolution of Business Ecosystems</td>
<td>Validation in Context</td>
</tr>
</tbody>
</table>
Revisiting: The Sucker’s Choice

- Vertical Growth through greater market capture
- or
- Horizontal Growth through greater market creation
- or
- Architect an enterprise to do both well
Enterprise Architecture: *Integral Tending Toward Modular*
Future State: Organization Chart
Strategic Objectives Focus

- Revenue X in 2010
- Revenue 3.33X in 2013
- Sustain Current Gross Margin

Central Themes:
- Patient-Focused
- Shareholder-Focused

Fiber Production
Revenue Growth
Fiber Sales ($)
Laser Sales ($)
Focus Account Strategy Compliance

Cost Effective Solutions That Bring Clinical Value Value to Shareholders
Future State Architecture

- **Policy / External Factors**
  - One Company Mentality
  - Collaborative
  - Balanced Scorecards
  - # of FDA Approved Modalities
  - Internal Customer Mentality

- **Process**
  - Standard Operating Procedures
  - Teamwork Metrics
  - One Company Mentality
  - Collaborative
  - Balanced Scorecards

- **Organization**
  - Strategy
    - Expanding "Customer" Focus
    - Corporate Alignment
  - Products / Services
    - Increased Responsiveness
    - Improved Customer-centric Solutions
    - Tiered Service Levels
  - Information Technology
    - Common Database
    - Shift towards ‘Cloud Services’

- **Knowledge**
  - Standard Operating Procedures
  - Workshops

- **Information Technology**
  - Common Database
  - Shift towards ‘Cloud Services’
## Spiral Dynamics: Adapted to an Enterprise

<table>
<thead>
<tr>
<th>Level</th>
<th>Learning System</th>
<th>Thinking</th>
<th>Motivational System</th>
<th>Specific Motivation</th>
<th>Means Values</th>
<th>End Values</th>
<th>Nature of Existence</th>
<th>Problems of Existence</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-N</td>
<td>Habitation</td>
<td>Automatic</td>
<td>Opportunistic</td>
<td>Periodic financial needs</td>
<td>Founder-defined</td>
<td>Investor-defined</td>
<td>Entrepreneurial</td>
<td>Maintaining financial stability</td>
</tr>
<tr>
<td>B-O</td>
<td>Classical Conditioning</td>
<td>Autistic</td>
<td>Assurance</td>
<td>Aperiodic financial needs</td>
<td>Traditionalism</td>
<td>Viability</td>
<td>Tribalistic</td>
<td>Achievement of relative viability</td>
</tr>
<tr>
<td>C-P</td>
<td>Operant conditioning</td>
<td>Egocentric</td>
<td>Survival</td>
<td>Market Dominance</td>
<td>Exploitation</td>
<td>Power</td>
<td>Egocentric</td>
<td>Living with Self-Awareness</td>
</tr>
<tr>
<td>D-Q</td>
<td>Avoidant learning</td>
<td>Absolutistic</td>
<td>Security</td>
<td>Order, meaning</td>
<td>Core Competencies</td>
<td>Salvation</td>
<td>Brand / Image</td>
<td>Achieving financial sustainability</td>
</tr>
<tr>
<td>E-R</td>
<td>Expectancy</td>
<td>Multiplistic</td>
<td>Independence</td>
<td>Adequacy, competency</td>
<td>Innovation</td>
<td>Materialism</td>
<td>Materialistic</td>
<td>Sustained Dominance</td>
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<tr>
<td>F-S</td>
<td>Observational</td>
<td>Relativistic</td>
<td>Affiliation</td>
<td>End-customer value delivery</td>
<td>Integration</td>
<td>Community</td>
<td>Personalistic</td>
<td>Living with the human element</td>
</tr>
<tr>
<td>G-T</td>
<td>All learning systems open</td>
<td>Systemic</td>
<td>Existential</td>
<td>Enterprise-worth</td>
<td>Accepting</td>
<td>Existence</td>
<td>Value-sharing</td>
<td>Coopetition</td>
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<tr>
<td>H-U</td>
<td>All learning systems open</td>
<td>Differential</td>
<td>Experience</td>
<td>?????????</td>
<td>Experiencing</td>
<td>Communion</td>
<td>Experientialistic</td>
<td>Accepting existential dichotomies</td>
</tr>
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Q&A

Enterprise

Methodology