Integrating the Lean Enterprise:

Incorporating LAI Research, Products, and Practice into MIT Curriculum

LAI Plenary Conference

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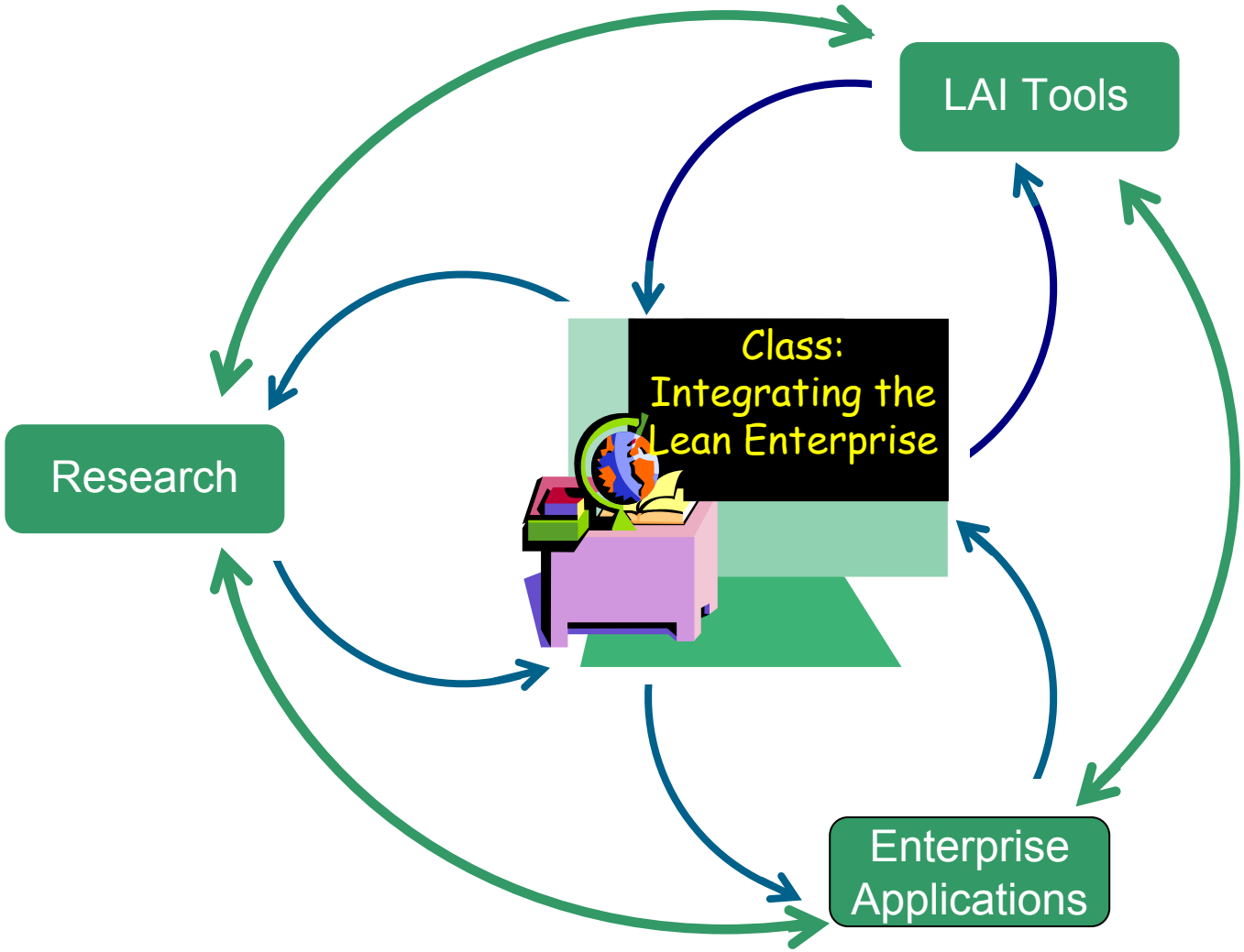
April 20, 2006

Class: Integrating the Lean Enterprise



Course Overview

- Examines key issues involved with the planning, development and implementation of Lean Enterprises
- People, technology, process and information dimensions addressed in unified framework
- Emphasis placed on the *integration* of these dimensions across the enterprise (product development, production, supply chain, etc.)
- Information requirements and technology and process enablers for achieving enterprise integration addressed
- Analysis and transformation tools employed
- Lean enterprise transformation applications presented by industry executives

Learning Objectives of 16.852J/ESD.61J Integrating The Lean Enterprise

- "Lean" principles and practices
  - Implications of lean vs mass
  - Lean Enterprise Model (LEM)
- Holistic view of the enterprise
- "Lean" in an enterprise context
- Value stream mapping and analysis
- Stakeholder Value

Learning Objectives of 16.852J/ESD.61J Integrating The Lean Enterprise

- Understand elements of the enterprise in context of the whole
  - Elements: customer, product development, manufacturing, supply chain, support, Finance, HR, society, etc.
- "People" and organization issues
  - Training, leadership, motivation, teaming…
- IT Issues
  - Seamless information flow, "loose/tight", ERP, enablers and challenges

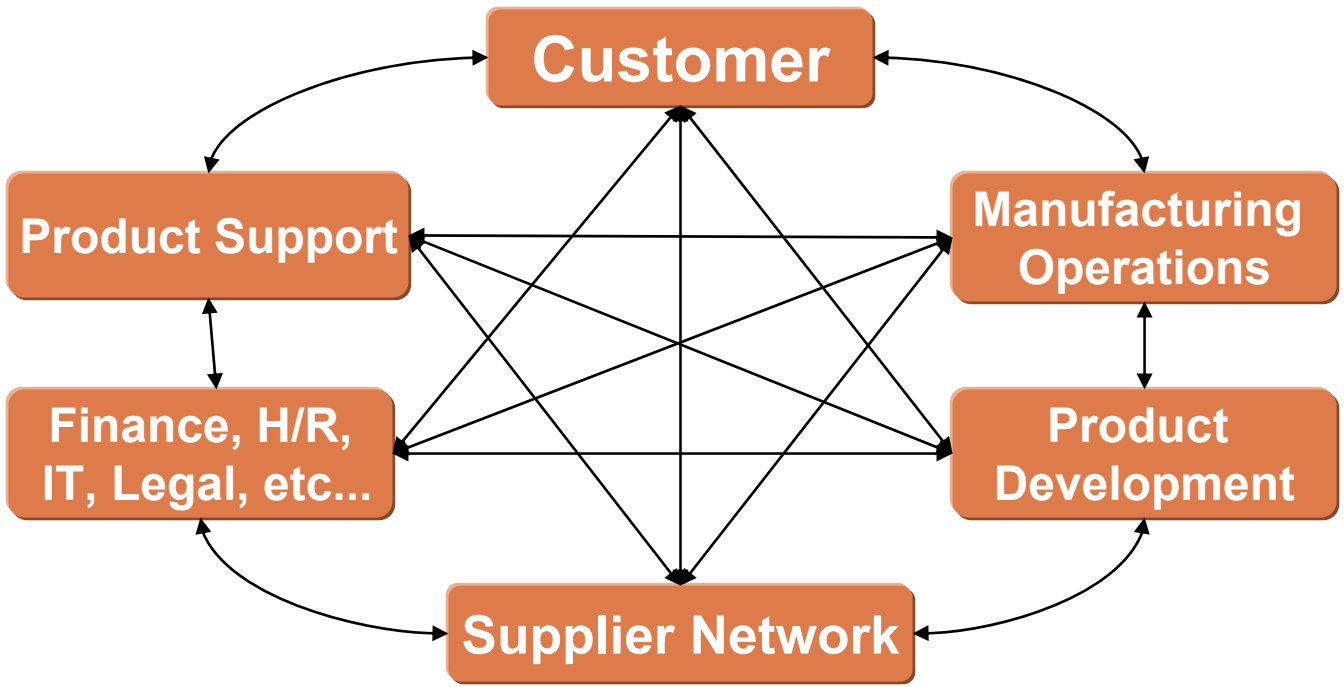
Learning Objectives of 16.852J/ESD.61J Integrating The Lean Enterprise

- Integration / Interfacing of Enterprise Elements
  - Understand integration vs interfacing
  - Components critical for each element pairing
    - Information
    - Processes
    - Technology Enablers
    - People
- Implementation Strategies
  - Vision / Management Buy-in/Leadership
  - Change Management Principles
  - Metrics
  - Transformation Planning
  - Case Studies
  - Assessment

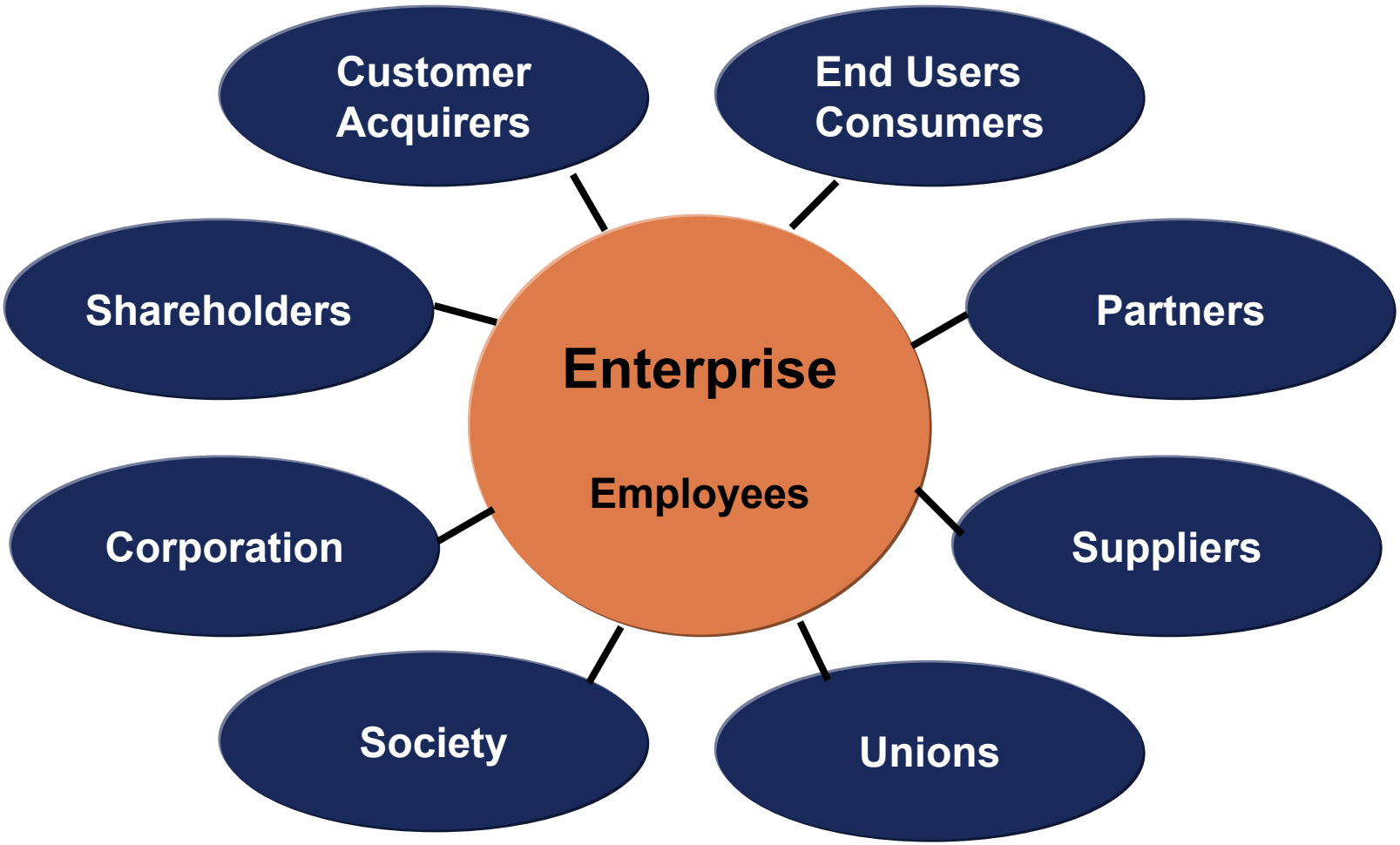
Learning Objectives of 16.852J/ESD.61J Integrating The Lean Enterprise

- Future Trends
  - IT
  - e-Business
  - Knowledge Management
  - Globalization
  - Enterprise Architecting

Integrated Enterprise

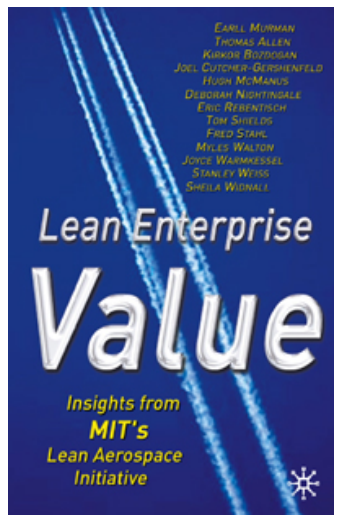


Enterprise Stakeholders



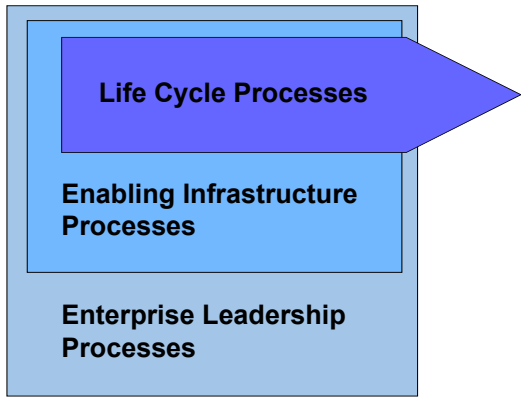
Reference Materials

- Lean Enterprise Value – Murman et al
- Machine That Changed the World - Womack, Jones and Roos
- Lean Thinking - Womack and Jones
- Course Pack of Articles
  - Journals
  - Conference articles
  - Book excerpts
  - Trade magazines
  - White papers



Lectures

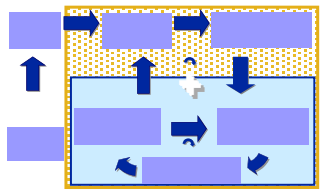
- Lean Enterprise Fundamentals
  - Lean Enterprise Overview
  - Lean Enterprise Model (LEM)
  - Value Stream Mapping
  - Enterprise Integration



- Lean Applied to Life Cycle Processes
  - Production Systems Design & Measurement
  - Framework for Lean Engineering
  - Engineering Tools for Integrated Product-Process Development (Industry Case)
  - Engineering Design to Support Lean Manufacturing
  - Early Supplier Integration into Design and Development
  - Industry Case: Lean Supply Chain & Manufacturing

Lectures

- People, Organizations and Leadership in the Lean Enterprise
  - People/Organizational Issues
  - Transformational Leadership
  - Strategic Measurement in the Lean Enterprise
  - Enterprise Transition-to-Lean Roadmap
  - Change Management



- Information/Knowledge Management
  - Enterprise Resource Planning Systems (ERP)
  - Knowledge Management

- "Future Enterprises"
  - Next Generation Manufacturing Enterprises
  - e-Lean

Lectures

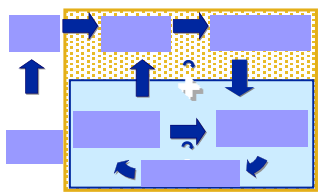
- Enterprise Implementation Case Studies
  - Industry Executives present “real” experiences in enterprise transformation
  - Draw from LAI Exec Board members
  - Opportunity to bring theory, research, and tools into practices

- Putting it all Together
  - Lean Enterprise Framework - a la students
  - Enterprise Team Project Presentation

Enterprise Team Project

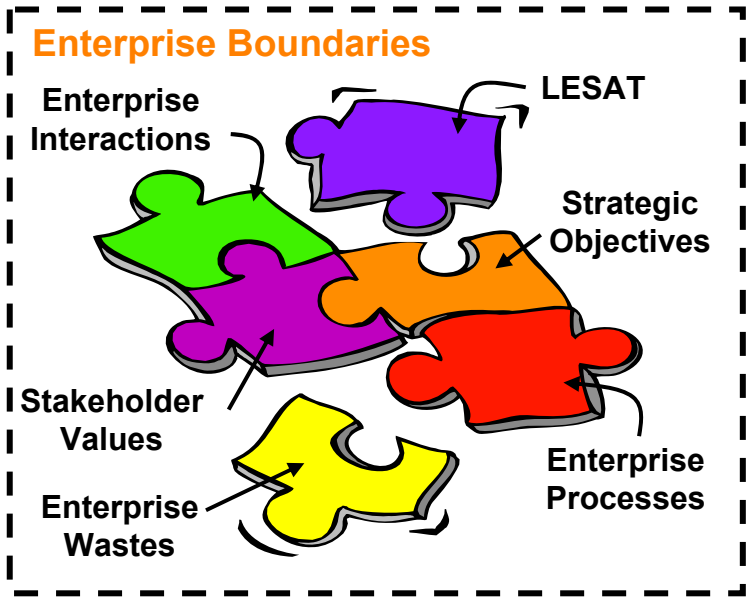
- Enterprise Value Stream analysis of actual firms and organizations
- Spans entire business enterprise: product concept generation and development through production, delivery and support
- Consideration of extended enterprise stakeholders: suppliers, customers, partners
- Includes support processes such as, Finance, Human Resources, Marketing, Information Technology, etc.
- Entails “As-Is” assessment creating “Future-State” vision & developing transformation strategy and plan

- **Utilizes LAI products**:
  - **TTL**
  - **EVSMA**
  - **LESAT**



EVSMA Approach

Define and Characterize the Current State



Close the Gap

Prioritized Improvement Plan

Create the Future State

Lean Enterprise Vision
5-10 years in the future
- Enterprise goals
- Vivid description
- Focus areas
- Revised system of metrics

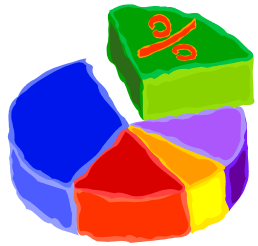
- Enterprise Commitment
- EVSMA Team
- Facilitators
- Enterprise Lean Training
- Current Enterprise Goals

1

Define the Enterprise

- Team Charter
- Enterprise Description: Boundaries, Stakeholders, Processes

2



Collect Data

- Prioritized Stakeholder Values
- LESAT Scores
- Enterprise Resource Allocation Based on Processes
- Current Metric Values

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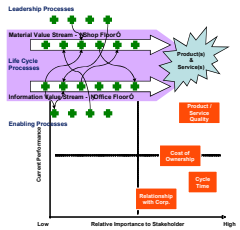


Construct Current State Perspectives

- Stakeholder Values Analysis
- Current State Process Map
- Process Interactions

4

Identify Enterprise Opportunities

- Alignment of Goals, Values, Processes, Metrics
- List of Wastes
- List of Opportunities

5

Describe Future State Vision

- 5 - 10-yr Goal
- Focus Areas
- Mid-point Goals

6

Create Transformation Plans

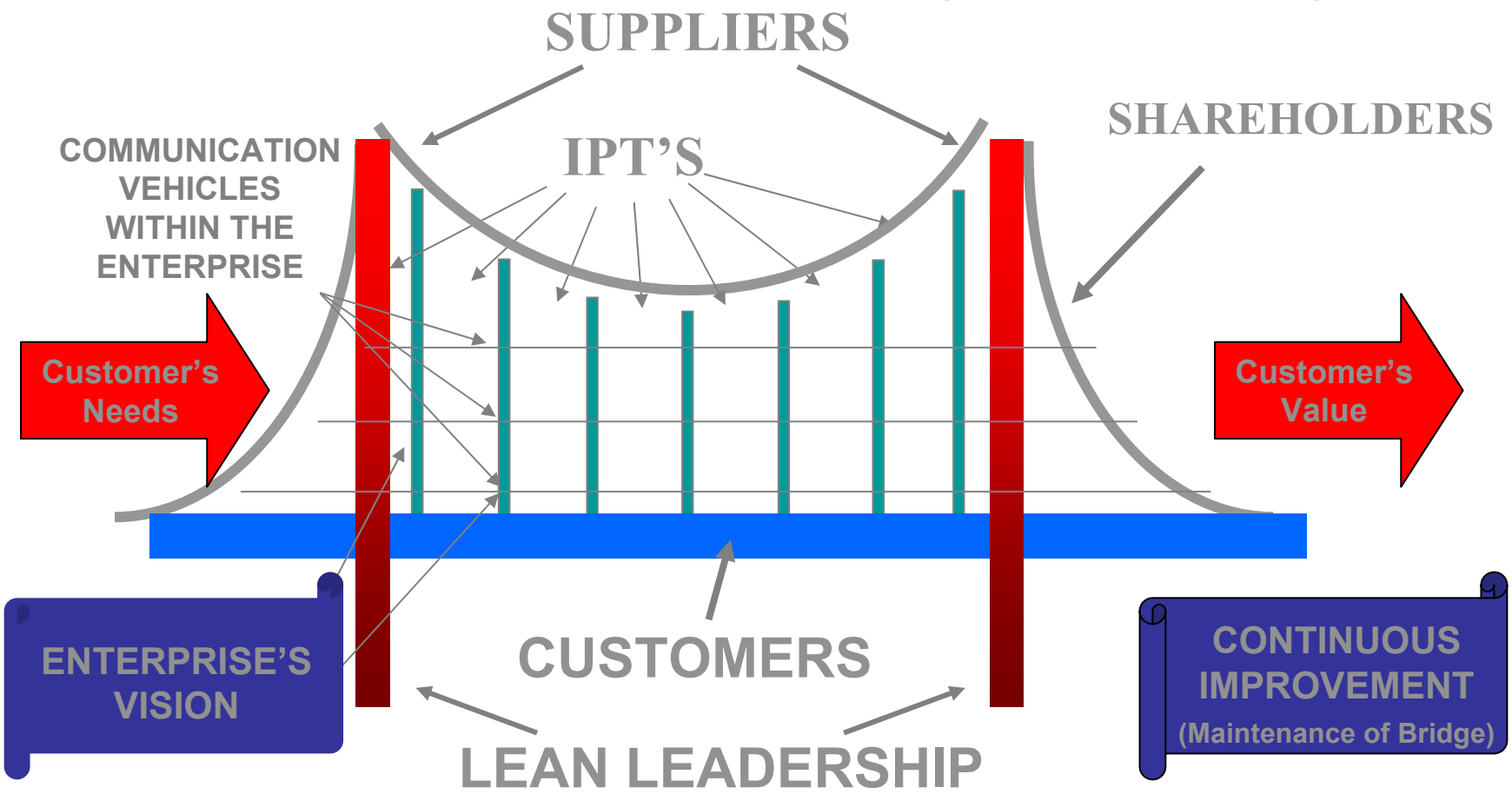
- Strategic Transformation Plan
- Governance Model
- Revised System of Metrics
- Communication Plan

Sample Team Projects

- Pratt & Whitney engines: large military engine enterprise; GE development partnership
- Xerox: network laser printer enterprise
- Sikorsky: S92 helicopter enterprise
- Boeing: 777 enterprise
- Ford: entire chain for one vehicle program (from customer input to product development, to production, to sales through dealerships and support)
- Navy: NAVSEA submarine enterprise
- Philippine construction company
- Hamilton Sundstrand: APU engine enterprise

New Integrated Global Lean Enterprise

Every Integrated Product Team (IPT) will have its own team composed of: Product Development, Human Resources, Finance, Marketing, Sales, Manufacturing, etc.



Observations/Issues

- Distant students play key role
- Incorporates emerging theory, research, application
  - LAI
  - MIT research
  - Industry cases/speakers
  - Real life projects/issues
- Explores technical, management information and process issues in integrated fashion
- Opportunity to gain further insight into MIT and LAI partner companies

Research Issues for Enterprise Integration

- Enterprise Value Stream Mapping Methodology
- Enterprise "Value" Optimization Across Multiple Stakeholders
- Interaction Analysis Methodology
- Visioning Tools
- Enterprise Modeling Tools
- Enterprise Architecting Framework
  - Information view
  - Process view
  - Product view
- Many graduate students pursue thesis work in Lean EI

Research needs are identified via class project and consortium member implementations

Class: Integrating the Lean Enterprise