Designing the Lean Enterprise Performance Measurement System

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Agenda

• Metrics Team Challenge from LAI Executive Board
• Metrics and Lean Transformation
• Research Objective
• Theory and current practices
• Gaps in current practices
• Conceptual Lean Enterprise Performance Measurement System
• Data Collection and Analysis
Challenge & Guidance from LAI Executive Board (Dec. 2003)

- **Challenge** – Research and Propose System of Metrics for Lean Enterprise Transformation

- **Guidance from Executive Board**
  - Investigate and develop high-level metrics to measure lean progress in government and industry
  - “Fewer metrics is better” approach and philosophy
  - Executive Committee tasked to “pilot” a set of measures and vet a final approach
System of Metrics for Lean Transformation

Knowledge and Behavior

New enterprise capability
Integration of processes/methods & tools supporting transformation across the value stream enabling new enterprise capabilities

New local behavior
Shift in thinking and behavior
New routines and ways of doing business
Organization and group culture change

New approaches (training and introduction of new methods)
Engagement in “LAI-venue” with like-minded people
Enterpise simulation, Lean Now and LAI knowledge area teams

Transformation over Time

Metrics and Assessments

Enterprise impact and results
Industry
ROIC
Government
ORPIC

Local results and visible indicators
Industry
Government
Cycle time, quality, WIP, on-time delivery, customer satisfaction, employee turnover and attitude, organizational climate and LESAT maturity

Local efforts and new capabilities
Industry
Government
Skills, training hours, certification, lean deployment, joint assessments and efforts

ROIC = Return on Invested Capital
ORPIC* = Operational Readiness per Invested Capital

Adapted from: Noel Nightingale, 2004
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Research Objective

- Identify and empirically test the relationship among business, financial, operational, organizational and leadership metrics that correlate with and predict lean improvement and change at an enterprise level.

- Validate the relationships among various metrics of business process and lean improvement to develop better performance measurement system for lean enterprises.
Role of Performance Measurement

- **Monitoring**
  - Measuring and recording actual performance

- **Control**
  - Identifying and attempt to close the gap between planned target and actual performance

- **Improvement**
  - Identify critical improvement opportunities

- **Coordination**
  - Information for decision making – Leading Indicators
  - Internal communication across processes
  - External communication with stakeholders

- **Motivation**
  - Align Behavior and encourage transformation
Performance Measurement Frameworks

- Balanced Score Card and Strategy Maps (*Kaplan and Norton*)
- EFQM - European Foundation for Quality Management
- SMART - Strategic Measurement Analysis and Reporting Technique system (*Wang Laboratories, Inc*)
- Feed Forward, Feedback control Model (*Fitzgerald et al.*)
- PMQ - Performance Measurement Questionnaire (*Dixon et al.*)
Basic Design of a Balanced Scorecard

- **Financial**
- **Customer**
- **Internal Business Process**
- **Learning & Growth**

Vision/Mission & Strategy

Generic Enterprise Management Process

- Strategy Formulation
  - Management Assessment
    - Competitive Intelligence
    - Internal Assessment
  - Strategic and Operational Planning
  - Resource Allocation Plan

- Strategy Execution
  - Cascaded Objectives
  - VSM and Project Prioritization
  - Performance Mgmt Process
  - Communication

- Value delivery
  - Shareholder Value
  - Customer Satisfaction
  - Employee Satisfaction
  - Other stakeholders

- Operations
  - Balanced Score Cards
  - Operations Management
  - Financial Management
  - Human Resource
  - Information Systems

External Environment
Strategic Metrics

- ROIC (Return on Invested Capital)
- Economic Value Add (EVA)
- Net Operating Profit
- Inventory Turnover
- Revenue
- Cash flow
- Market Position
- Wall Street Expectations

Efficiency metrics and Lagging indicators
Operational Metrics

- Financial Turnover
- Budget/Cost and Expenses
- Cost of quality
- Productivity
- Supply Chain Excellence
- Regulatory and social compliance
- Accuracy and timeliness of reporting and control
Tactical Metrics

- Safety
- Quality
- Environment
- Cost/Manufacturing Efficiency
- Delivery
- Time to market
- Education and development
- Time to Hire

- Operations
  - Balanced Score Cards
  - Operations Management
  - Financial Management
  - Human Resource
  - Information Systems
Value Delivery Metrics

- Stock Price
- Revenue
- On time delivery
- Customer satisfaction and loyalty
- Employee Satisfaction
- New product Introduction
Performance Management Process

External Environment

Strategy Formulation
- Management Assessment
  - Competitive Intelligence
  - Internal Assessment
- Strategic and Operational Planning
- Resource Allocation Plan

Value delivery
- Shareholder Value
- Customer Satisfaction
- Employee Satisfaction
- Other stakeholders

Strategy Execution
- Cascaded Objectives
- VSM and Project Prioritization
- Performance Mgmt Process
- Communication

Operations
- Balanced Score Cards
- Operations Management
- Financial Management
- Human Resource
- Information Systems

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Performance Management Process

- Strategy Formulation
- Strategy Execution
- Operations
- Reporting

Yearly → Quarter → Month → Day

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Balanced Scorecard/Strategy Map

Productivity Strategy
- Improve Cost Structure
- Increased Asset Utilization
- Expand Revenue Opportunities
- Enhance Shareholder value

Long-Term Shareholder Value

Growth Strategy

Financial
- Improve Cost Structure
- Increased Asset Utilization
- Expand Revenue Opportunities
- Enhance Shareholder value

Customer
- Price
- Quality
- Availability
- Selection
- Functionality
- Services
- Partnership

Internal Processes
- Operations
  - Supply
  - Production
  - Quality
  - Logistics
- Customer Relationship
  - Selection
  - Acquisition
  - Retention
  - Growth
- Innovation Process
  - Opportunity Ident.
  - R&D Portfolio
  - Design/Development
  - Time to market
- Regulatory and Social
  - Environment
  - Safety and Health
  - Employee development
  - Community

Learning & Growth
- Human capital
- Information capital
- Organization capital
- Leadership


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What are companies doing?

- Heavy reliance on management intuition
- Fixation on the “four buckets” of the balanced scorecard
- Consultant Driven quagmire of measurement frameworks, models, and laundry lists of measures
- Measurement overload to avoid missing anything important
- Disconnect between efficiency and effectiveness measures
Gaps Between Drivers and Measures


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Enterprise Transformation

Functional Enterprise

Lean Enterprise

Value Delivery

Stakeholder Objectives
- Shareholders
- Customer
- Community
- Suppliers
- Employees

Lifecycle Processes

Enabling Infrastructure Processes

Enterprise Leadership & Governance Processes
Gaps in Performance Measurement Systems

- Does not address value delivery for all the stakeholders.
- Causal relationship between the metrics and actions is not understood.
- Time lag between the actions and outcomes is not captured.
- Bottom-up reporting structure does not always translate to actionable feedback loop.
- Fosters local optimization instead of system level optimization.
- The systems are static and therefore cannot adapt to changing critical areas of success and do not incorporate measurements for continuous improvement.
Desired Characteristics of Performance Measurement Systems

• Performance Measures should support the strategic intentions of the organizations

• Managers at all levels should understand both drivers and results of their activities.

• Explicating Cause-Effect relationships between drivers and results
Understanding Performance Measurement Structures

Metric Cluster

Metric Set

Individual Metric

Overall Cost

Process Cost

Process Yield

Parts/min

Training hours

Change efforts
Performance Measurement System across the Enterprise Value Stream

Metric Sets

Overall Cost
- Availability
- Overall Capability
- Overall Utilization
- Growth
- Efficiency
- Internal Climate
- External Climate

Yield/Cost

Metric Clusters

Individual Metric

Training hours
Parts/min

Change efforts
Financial Benefits of Using Causal Models

Data Collection and Analysis

- **Quantitative data:**
  - Time series performance data across the functions and processes.
  - Definition of metrics and assumed relationships using metric record sheet.

- **Qualitative Data:**
  - Data on Change and improvement programs
  - Time series data on culture and leadership via a questionnaire

- **Analysis:**
  - Factor analysis to empirically develop metric clusters.
  - System dynamic modeling to understand the relationships.
  - Structural equation modeling to understand the impact of current performance measures on the enterprise level goals.
Expected Results

- Factors influencing rate of progress in lean transformation.
- Set of metrics that provide comparison across facilities and within companies against broader averages.
- Performance Measurement System that captures causal relationship.
Questions
Dimensions of Metric

- **Scope of Measurement**
  - Internal
  - External
- **Time horizon**
  - Leading
  - Lagging
- **Type**
  - Financial
  - Non-Financial