Supply Chain Performance Measurement

Presented by: David F. Ross, PhD, CFPIM
APICS Profession Development
Introduction

Meet Your Session Leader

- APICS member since 1986
- 13 Years Manufacturing and Distribution Industries
- 22 Years Enterprise Business Systems Education and Consulting
- Senior Manager, Professional Development – APICS
- Articles and 6 Books in SCM
Agenda

• Critical questions of SCM PM
• Goals and performance attributes of SCM PM
• Obstacles to effective SCM PM
• SCM PM models
• Balanced scorecard model
• SCOR model
• SCM PM technical architecture
• Steps to creating a successful SCM PM program
Critical Questions

• Why is SCM performance measurement important?
• What general approaches are available to measure supply chains?
• What methods are available for setting performance targets?
• How should a company get started?
Critical Questions

• Why is SCM performance measurement important?
Goals of SCM Performance Measurement

- Better alignment of channel capabilities and customer requirements and expectation
- Increased optimization of collective channel operations
- Increased visibility to demand and supply
- Increased opportunities for collaboration
- Increased opportunities for channel alignment
- Increased opportunities for information exchange
- Increased profitability
SCM Performance Attributes

- Velocity
- Visibility
- Collaboration
- Trust
- Customer focus
- Flexibility
- Security (risk management)
- Compliance and Environmental Excellence
Obstacles Hindering Performance Efforts

• **Technical barriers**, such as difficulty locating, cleansing, and integrating data from multiple sources

• **Design problems** that stem from not understanding how to use methodologies, strategy maps, and appropriate performance indicators and targets

• **Social constraints**, such as an organizational culture adverse to measurement and accountability, non-supportive executive team, unrealistic standards, and conflicting goals
Critical Questions

• Why is SCM performance measurement important?

• What general approaches are available to measure supply chains?
SCM Performance Measurement Models

- Cash Velocity
- Balanced Scorecard
- SCOR
- The Logistics Scoreboard
- Activity-Based Costing (ABC)
- Economic Value-Added (EVA)
Supply Chain PM Criteria

- Holistic approach
- Process-based
- Aligned with strategy
- A dynamic system
- Balanced approach
- A managerial tool
- Cover strategic, tactical and operations level

- Provide a forward looking (leading) perspective
- Tool for improvement
- Provide drill-down functionality
- Handling conflicting objectives
- Simple
- Comparability
- Relevant metrics
Critical Questions

• Why is SCM performance measurement important?
• What general approaches are available to measure supply chains?
• What methods are available for setting performance targets?
Balanced Scorecard SCM PM Strategy

• Communicate the strategic purpose of the balanced scorecard to supply chain partners

• Develop goals and measures consistent with the corporate and supply chain strategies

• Create schedules and assign responsibilities

• Drive managers to attain desired results
Linking SCM to the Balanced Scorecard

- **Financial Perspective**
  - Higher profit margins
  - Supply Chain Management Measurements
  - Improved product/service quality
  - Improved timeliness
  - Improved flexibility
  - Improved value

- **Customer Perspective**
  - Waste reduction
  - Time compression
  - Flexible response
  - Unit cost reduction

- **Business Process Perspective**
  - Product/process innovation
  - Partnership management
  - Information flows
  - Threats/substitutes

- **Innovation and Learning Perspective**

Customer Benefits
- Higher profit margins
- Improved product/service quality
- Improved timeliness
- Improved flexibility
- Improved value

SCM Goals
- Waste reduction
- Time compression
- Flexible response
- Unit cost reduction

SCM Improvement
- Product/process innovation
- Partnership management
- Information flows
- Threats/substitutes
## Balanced Scorecard Model

**Supply Chain Objective:** *Increased Channel Flexibility*

<table>
<thead>
<tr>
<th>Area</th>
<th>Strategic Theme</th>
<th>Strategic Objectives</th>
<th>Strategic Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial</strong></td>
<td>Increased supply chain flexibility</td>
<td>• Channel cost reduction&lt;br&gt;• Increase profit margins</td>
<td>• Increase cash flow&lt;br&gt;• Reduce channel inventory</td>
</tr>
<tr>
<td><strong>Customer</strong></td>
<td>Perception of flexible response to customers</td>
<td>• Customers drive product&lt;br&gt;• Service individualization&lt;br&gt;• Increase product variety</td>
<td>• Flexible supply channels&lt;br&gt;• Ability to deliver customized solutions</td>
</tr>
<tr>
<td><strong>Business Process</strong></td>
<td>Postponement and value-added strategies</td>
<td>• Increase synchronization&lt;br&gt;• Increase communication&lt;br&gt;• Fast flow inventories&lt;br&gt;• Multi-purpose facilities</td>
<td>• Increase inventory turns&lt;br&gt;• Increase efficiency/utilization&lt;br&gt;• Optimize transportation</td>
</tr>
<tr>
<td><strong>Innovation and Learning</strong></td>
<td>Increased material handling and process capabilities</td>
<td>• Increase core competencies&lt;br&gt;• Motivating/skilling workers</td>
<td>• Employee survey&lt;br&gt;• Personal scorecard&lt;br&gt;• Competency checks</td>
</tr>
</tbody>
</table>
SCOR Model

Plan
- Demand/Shipment Forecast
- Accuracy
- Adherence to Plans
- Inventory Turns
- Planning Cycle time

Source
- Procurement Costs
- Vendor Lead Times
- Materials Quality
- Materials Inventories

Make
- Production Costs
- Product Quality
- Changeover Times
- Capacity Utilization

Deliver
- On-Time Shipment
- On-Time Delivery
- Order Fulfillment
- Returns

Return
- Packaging Return
- Carbon Footprint
- Energy Reduction

Suppliers

Customers

Advancing Productivity, Innovation, and Competitive Success
<table>
<thead>
<tr>
<th>Performance Attribute</th>
<th>Attribute Definition</th>
<th>Level 1 Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply chain reliability</td>
<td>Delivery of right product, to right place, at right time</td>
<td>Perfect order fulfillment</td>
</tr>
<tr>
<td>Supply chain responsiveness</td>
<td>Supply chain speed providing product to the customer</td>
<td>Order fulfillment cycle</td>
</tr>
<tr>
<td>Supply chain flexibility</td>
<td>Agility of a supply chain to respond to marketplace change</td>
<td>Upside supply chain flexibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Upside supply chain adaptability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Downside supply chain adaptability</td>
</tr>
<tr>
<td>Supply chain costs</td>
<td>Costs associated with operating the supply chain</td>
<td>SCM cost</td>
</tr>
<tr>
<td>Supply chain asset management</td>
<td>Effectiveness in managing assets to support demand satisfaction</td>
<td>Cost of goods sold</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cash-to-cash cycle time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Return on supply chain fixed assets</td>
</tr>
</tbody>
</table>
## SCOR Metrics Detail

### Supply Chain Flexibility

<table>
<thead>
<tr>
<th>Level 1 Metric</th>
<th>Definition</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upside SC flexibility</strong></td>
<td>Number of days an organization requires to achieve an unplanned sustainable 20% increase in quantities delivered</td>
<td>Least amount of time required to achieve the increase considering source, make, and deliver components</td>
</tr>
<tr>
<td><strong>Upside SC adaptability</strong></td>
<td>Amount of increased production an organization can achieve and sustain in 30 days</td>
<td>Largest sustainable quantity increase considering source, make, and deliver components</td>
</tr>
<tr>
<td><strong>Downside SC adaptability</strong></td>
<td>Reduction in quantities ordered sustainable at 30 days prior to delivery with no inventory/penalties</td>
<td>Largest sustainable quantity decrease considering source, make, and deliver components</td>
</tr>
</tbody>
</table>
## SCOR Metrics Detail (cont.)

<table>
<thead>
<tr>
<th>Level 2 Metric</th>
<th>Level 3 Metric</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
<td>Labor</td>
<td>Number of tasks a worker can perform</td>
</tr>
<tr>
<td></td>
<td>Machine</td>
<td>Efficiency of using a flexible machine</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>Material Handling</td>
<td>Number of movements and movement paths without incurring more costs</td>
</tr>
<tr>
<td></td>
<td>Routing</td>
<td>Number of alternative routings without incurring more cost</td>
</tr>
<tr>
<td></td>
<td>Operation</td>
<td>Number of products with alternative sequencing paths without incurring more costs</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>Volume</td>
<td>Extent of change in process volume without incurring more costs</td>
</tr>
<tr>
<td></td>
<td>Mix</td>
<td>Number and variety of products produced without incurring more costs.</td>
</tr>
</tbody>
</table>
SCM PM Platform Architecture

- Customers
- Sales
- Transport
- Inventory
- Purchasing

ETL

Data Warehouse
- Sales
- Transport
- Inventory

BI

Operational Data Level
- ETL Level
- Data Warehouse Level
- Analytical Level
- User Level

Advancing Productivity, Innovation, and Competitive Success
### Excel Spreadsheet Example

<table>
<thead>
<tr>
<th>SCOR Supply Chain Process</th>
<th>Actual</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plan</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forecast Accuracy</td>
<td>85%</td>
<td>90%</td>
</tr>
<tr>
<td>Return on Assets</td>
<td>80%</td>
<td>99%</td>
</tr>
<tr>
<td>Delivery Performance to Customer Request Date</td>
<td>50%</td>
<td>75%</td>
</tr>
<tr>
<td>Capacity Utilization</td>
<td>88%</td>
<td>95%</td>
</tr>
<tr>
<td>Cumulative Source/Make Cycle Times</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Intra-mfg Replan Cycle Time</td>
<td>80%</td>
<td>75%</td>
</tr>
<tr>
<td><strong>Source</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source Flexibility</td>
<td>15%</td>
<td>25%</td>
</tr>
<tr>
<td>On Time Delivery Performance</td>
<td>85%</td>
<td>95%</td>
</tr>
<tr>
<td>Cumulative Source Cycle Times</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td><strong>Make</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative Make Cycle Time</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Production Plan Adherence</td>
<td>85%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Critical Questions

• Why is SCM performance measurement important?
• What general approaches are available to measure supply chains?
• What methods are available for setting performance targets?
• How should a company get started?
Developing SCM PM - Steps

**Step 1:** Formulate Strategy and Build Consensus

**Step 2:** Select Metrics in Alignment with the Supply Chain

**Step 3:** Integrate and Communicate Metrics

**Step 4:** Drive the Organization to Maintain and Optimize the Desired Results
Enabling the Supply Chain Universe

Thanks for Attending!