How to Measure, Monitor & Improve S&OP Performance

Alan L. Milliken  CFPIM CSCP CPF
Sr. SC Education Specialist
BASF SE

Agenda

• Establishing the Vision & Mission

• Developing the S&OP Scorecard

• Monitoring & Improving Performance

• Questions and Wrap-up
Alan L. Milliken  CFPIM CSCP CPF

• 22 Years at major plant sites in seven different functions (Production, Process Control, Quality Control, Operator Training, Scheduling, Industrial Engineering, Logistics)

• 14 Years as a Business Consultant specializing in SC Management. (7 Major re-engineering of SBU projects, integration of 3 major acquisitions, numerous improvement projects)

• 3 Years as Manager of Business Process Education for BASF Corporation in North America.

• Accepted global position in September, 2011 to implement CPIM throughout BASF.

• Education: BS Degree in Engineering – Auburn; MBA-Clemson; CFPIM, CSCP – APICS;CPF - IBF

BASF

• the world’s leading chemical company – “The Chemical Company”®

• founded in 1865 as Badische Anilin & Soda – Fabrik (BASF)

• Sales in 2011 of approximately $80B USD

• Over 100,000 employees, 100 large sites and a multitude of small sites across the globe

• Key business strategy is Value-Based Management

• Key execution strategy is Verbund – integrated production processes

• Combines economic success with social responsibility and environmental protection
Biggest Myth in Performance Management

“What gets measured, gets done!”

Measure – Monitor - Improve

S&OP is a “Directional” Focused Process

"Great leaders are almost always great simplifiers, who can cut through argument, debate and doubt, to offer a solution everybody can understand."

Effective leaders understand the KISS principle, Keep It Simple, Stupid. They articulate vivid, over-arching goals and values, which they use to drive daily behaviors and choices among competing alternatives. Their visions and priorities are lean and compelling, not cluttered and buzzword-laden. Their decisions are crisp and clear, not tentative and ambiguous. They convey an unwavering firmness and consistency in their actions, aligned with the picture of the future they paint. The result: clarity of purpose, credibility of leadership, and integrity in organization.

From: APICS International Conference
General Colin Powell
Chairman (Ret), Joint Chiefs of Staff
Former Secretary of State

5/17/2012
Value-Based Management

Shareholders provide Capital

Shareholders receive High ROI

1. Invest in Adding Value to Products & Services

2. Deliver Value to Your Customers

3. Create Value for Your Shareholders

And receive Value in Return

Value-Based Management Concept

Value can be created by:

- increasing Profit and/or

- reducing capital employed (e.g., inventories, receivables)

Source: BASF VBM Handbook
Who Can Create Value?

All employees can create value by optimizing the value drivers in their day-to-day business, e.g., by:

- increasing sales through higher prices and/or sales volumes
- reducing costs
- optimizing inventories and receivables
- using production plants optimally

Value Creation Driver Tree

Profit

EVA after costs of capital

Costs of capital

Sales revenue

Variable costs

Fixed costs

Working capital

Fixed assets

Value Drivers

- Pricing
- Product mix
- Delivery Performance
- Innovation (product and business models)
- Variable manufacturing costs
- Raw materials costs
- Shipping costs
- Packaging costs
- Transport costs
- Fixed manufacturing costs
- Process innovation
- Payment terms/dunning
- Inventories
- Receivables
- Forecast reliability
- New investments
- Investments in expansions
- De-bottlenecking

Note: S&OP is a “Business” Planning Process not a Supply Chain Planning Process!
What is the status of “Vision” at Your Firm?

1. The overall Vision of the business is well communicated and understood by all in the organization. Performance represented by the vision (e.g. EBIT, ROI, etc.) is linked directly to all employee’s personal compensation.

2. Understanding of the Vision is primarily limited to management as is the link between performance and compensation. Some managers communicate the Vision well while others do not.

3. Most people could not explain the firm’s Vision or how their personal responsibilities support overall success as represented by the Vision. No direct link between the performance represented by the Vision (e.g. EBIT, ROI, etc.) and personal compensation.
Developing the S&OP Scorecard

Linking the Vision to Operations

Market & External Environment Analyses

Corporate Strategy

Identification of Customers, Products, Competition, Socioeconomic Environment

Overall missions & goals of the Organization, Recognition of Distinctive Competencies.

Competitive Priorities (Cost, Quality, Time, Price, etc.)

Future Direction (Global Strategy, New Products & Services, etc.)

The strategy of the corporation and associated needs drive the Performance Management process.

Functional Area Strategies
- Finance
- Marketing
- Supply Chain
- Others

Key Performance Indicators
Aligning KPI’s with the Vision & Mission

- Earn a premium on our cost-of-capital
- Help our customers improve
- Ensure sustainability

Business Model
- Commodity Products
- Transparent Pricing
- Difficult to Differentiate

Competitive Priorities
- Low Price
- Reliable Delivery
- Consistent Quality

KPI’s
- SC Costs
- On-Time Delivery
- First-Pass Prime Yield

Performance Management is a “Top-Down” Process

The Balanced Scorecard

Performance Measurement must take into consideration multiple perspectives:

“How do we look to shareholders?”
- Contribution Margin
- Cash Flow
- Operating Roselt
- Return on Assets
- Days Sales Outstanding
- Value-Added Productivity

Customer Perspective
- Promise vs. Request Date
- Promise vs. Delivery Date
- Request vs. Order Date
- Order vs. Delivery Date
- Actual vs. Plan Ship Date
- Ship vs. Order Quantity

“Innovative Perspective”
- Trends in performance
- Rates of improvement
- Learn new processes
- Learn new technologies
- Share knowledge

“Can we continue to innovate and improve?”
- Forecast vs. Actual Sales
- Actual vs. Plan Production
- Inventory Velocity
- Non-Optimal Shipments
- Distribution Expenses
- Flexibility & response time

“At what must we excel?”

Source: “The Balanced Scorecard” by Norton & Kaplan
SCOR relates Metrics to Processes

Strategy: **Make-to-Stock**  Competitive Priority: **Delivery Reliability**

### SCOR Highlights

**SCOR applies to:**
- All customer interactions from order entry to paid invoicing
- All product transaction – physical materials and services
- All market interactions from aggregate demand through order fulfillment

**SCOR does not apply to:**
- Sales & Marketing Demand Generation processes
  - R&D
  - New Product Development
  - Post Delivery Support (except for returns)

**SCOR assumes:**
- Training
- Quality
- Information Technology

---

These are in scope for the Business Level S&OP Scorecard!
Align Metrics Across Planning Levels

![Diagram showing alignment of metrics across strategic, tactical, and operational levels.]

Key Performance Indicators

- EBIT after COC
- Strategic: Inventory (DIV), Forecast Accuracy, On-Time Delivery, SC Costs
- Tactical: Daily Yield Performance, Cycle Count Accuracy, Actual vs. Scheduled Production
- Operational: Source: APICS

Aligning Metrics with Strategy

Assign each to either Make-to-Stock or Std. Service or Make-to-Order or Custom Service:

**Competitive Priorities**

1. Delivery Speed
2. Customization
3. Low Cost
4. On-Time Delivery
5. Flexibility
6. Consistent Quality

**Profit Margins**

1. Higher
2. Lower

**SC Design**

1. Efficient
2. Responsive

**SC Design Features**

1. Flex or Intm Flows
2. Line Flows
3. High Capacity Cushion
4. Low Capacity Cushion
5. Lower Inventory
6. Higher Inventory
7. Minimize Lead Time
8. Minimize Cost

**Key SC Metrics**

1. Order Fill Rates
2. SCM Costs
3. Upside SC Flexibility
4. On-Time Delivery
5. New Product Intro LT
6. Inventory Investment

Source: APICS

APICS and IBF Present: 2012 Best of the Best S&OP Conference
Aligning Metrics with Strategy - Solution

Competitive Priorities

(1) Delivery Speed  MTO
(2) Customization  MTO
(3) Low Cost  MTS
(4) On-Time Delivery  MTS
(5) Flexibility  MTO
(6) Consistent Quality  MTS

Profit Margins

(1) Higher  MTO
(2) Lower  MTS

SC Design Features

(1) Flex or Inrm Flows  MTO
(2) Line Flows  MTS
(3) High Capacity Cushion  MTO
(4) Low Capacity Cushion  MTS
(5) Lower Inventory  MTO
(6) Higher Inventory  MTS
(7) Minimize Lead Time  MTO
(8) Minimize Cost  MTS

Key SC Metrics:

(1) Order Fill Rates  MTO
(2) SCM Costs  MTS
(3) Upside SC Flexibility  MTO
(4) On-Time Delivery  MTS
(5) New Product Intro LT  MTO
(6) Inventory Investment  MTS

Example of a SCOR-Balanced Approach

The business level scorecard should contain 10-15 metrics representing the various perspectives and supporting overall strategic objectives.

Include limits to define when action is required.

Use Red-Yellow-Green or Good-Fair-Poor to rate status.
Sample Global S&OP Scorecard

All KPI's include targets and tolerances. Status is used to key on problem areas.

What is the Status of Your Scorecard?

1. Scorecard well aligned with Vision, Strategy & Competitive Priorities. Scorecard includes multiple perspectives and highlights problem areas. Targets & tolerances are included. Status communicated with all employees in business or firm monthly via digital means.

2. Scorecard is somewhat aligned with overall Vision and Strategy. Focus is biased toward financial performance or innovative perspective is missing. Status is not communicated to entire organization. Tolerances not included with targets.

3. Scorecard does not exist or is not aligned with current business priorities. No attempt to communicate vision and performance status throughout organization. No formal system for identifying, monitoring and improving performance.
Key Performance Indicator (KPI)

Balanced Scorecard Perspective: Select the perspective - Financial, Customer, Internal or Learning & Growth

Business Process Category: What business process is being measured? - Customer service, Inventory Mgt, Forecasting, Prod’n Planning, Warehousing, Distribution, Freight, Training, Procurement, etc.

Owner: Who is accountable for the result of this KPI? Document Name & Function:

Data Coordinator: Who is responsible for gathering the data for the KPI? Document Name and Function.

Data Source: Where does the information come from? Financial Systems, EDW, DW, SAP, Controller’s Book, etc. Definition: What is measured? What are the primary components. Fit into one sentence.

Purpose: Why do we measure this KPI? What is the desired outcome?

Frequency: How often is this metric reviewed? Hourly, Daily, Monthly, Quarterly, Annually, etc.

Level of Detail: What level of information is available? By product, project group, business, business group, country, customer, customer segment, supplier, location, etc.

Calculation: Document the formula and any special components - average, count, mean absolute deviation, percentage, differences, summation, etc.

Baseline Data: What year, month, or other time period was used as the baseline?

Performance Targets: What performance do you require at the end of the calendar year? How is this value determined? - historical, business plan, estimates, benchmarks, capacities, etc.

Tolerance: What is the allowable error to the target?

Data Availability: When is the data available for updating?

Data Source Details: Describe in more detail where the data comes from - DW tables, queries, files, external sources, etc.

Comments: Include possibility of automating data collection, issues around gathering the data, potential resources for the information. Include any other information that tells the user more about the KPI.
Setting Targets - Benchmarking

**Definition:** Setting goals by comparison to another entity (inside or outside your organization) or authoritative definition of excellence.

**Competitive benchmarking**

Setting goals by reference to a competitor

For example, BASF has participated in supply chain benchmarking the chemical industry.

**Best-in-class benchmarking**

Setting goals by reference to the best performer

For example, Walmart in use of Point-of-Sale (POS) Data.

**Process benchmarking**

Setting process goals by reference to an authoritative process description (e.g., Oliver Wight checklist)

SCOR Model for SCM Processes for example.

“It isn’t what you know, it’s what you think you know that just isn’t so”

Satchel Paige

Sample Benchmark Report

Only complete for your company’s relevant manufacturing strategies. Enter “0” for steps that do not apply to your business model. Enter “NA” for strategies you do not employ

<table>
<thead>
<tr>
<th>Question</th>
<th>Engineer-to-Order</th>
<th>Make-to-Order</th>
<th>Configure/Package-to-Order</th>
<th>Make-to-Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Signature/Authorization to Order Receipt</td>
<td>NA Days</td>
<td>NA Days</td>
<td>1 Days</td>
<td>.5 Days</td>
</tr>
<tr>
<td>Order Receipt to Order Entry Complete</td>
<td>NA Days</td>
<td>NA Days</td>
<td>.5 Days</td>
<td>.5 Days</td>
</tr>
<tr>
<td>Order Entry Complete to Start Manufacture</td>
<td>NA Days</td>
<td>NA Days</td>
<td>.5 Days</td>
<td>0 Days</td>
</tr>
<tr>
<td>Start Manufacture to Order Complete Manufacture</td>
<td>NA Days</td>
<td>NA Days</td>
<td>4 Days</td>
<td>0 Days</td>
</tr>
<tr>
<td>Order Complete Manufacture to Customer Receipt of Order</td>
<td>NA Days</td>
<td>NA Days</td>
<td>2 Days</td>
<td>2 Days</td>
</tr>
<tr>
<td>Customer Receipt of Order to Installation Complete</td>
<td>NA Days</td>
<td>NA Days</td>
<td>0 Days</td>
<td>0 Days</td>
</tr>
<tr>
<td>Total Order Fulfillment Lead Time(s)</td>
<td>NA Days</td>
<td>NA Days</td>
<td>8 Days</td>
<td>3 Days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Performance Indicator</th>
<th>Best-in-Class</th>
<th>Your Avg. Firm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order Fulfillment Lead Time (Days) Make-to-Stock</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>
Targeting Continuous Improvement

1. **Performance Analysis**
   The first step is to document the “as-is” performance.

2. **Performance Assessment**
   Establish the baseline and decide how much to improve.

3. **Plan Improvement**
   Develop detailed plans including who, what and when. Track progress, manage resources and adjust goals as required.

4. **Implementation and Change Management**
   It takes strong leadership, committed participation and confident employees to ensure improvements occur.

---

Sample Measure-Monitor-Improve

1. Team agreed to create Inventory Analyst position in Supply Chain
2. KPI’s and diagnostic reports developed for overall aged inventory, New Product adds to aging, Off-Spec adds to aging, and % Reworked to First Grade.
3. Owner assigned to each category (e.g. Off-Spec – Production; New Product Adds – NPD, etc..)
4. S&OP Team reviews progress monthly – owner reports progress & plans.
Setting Improvement Targets

1. The firm has decided to formally measure on-time-delivery to request date. They have no baseline data but the Supply Chain Manager estimates their performance at 95% OTD to request date. He suggests a target of 98% OTD to request date. Do you agree?

   “Sometimes, you *don’t* know what you *don’t* know.”
   
   Donald Rumsfield – Former Secretary of Defense

2. A product group has averaged 60 days of inventory for the past 12 months with a range of 56-64. Based on industry benchmark data and the need to improve cash flow, the S&OP Team has set a target of 50 days supply to be achieved within 6 months. Most replenishment lead times are less than 30 days. Does this seem like a reasonable goal? What actions are required next?

Adjusting Performance Priorities

<table>
<thead>
<tr>
<th>KPI</th>
<th>Pre-Recession Goal</th>
<th>During Recession Goal</th>
<th>2009 Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity Utilization</td>
<td>&gt;90%</td>
<td>Match Demand</td>
<td>79%</td>
</tr>
<tr>
<td>Inventory</td>
<td>25-30 Days</td>
<td>25-30 Days</td>
<td>24 Days</td>
</tr>
<tr>
<td>OTD to Request</td>
<td>&gt;95%</td>
<td>&gt;88%</td>
<td>85%</td>
</tr>
</tbody>
</table>

• “PRICE” is differentiator in this environment and “Cash is King.”
• Customer accept that orders inside normal lead time may result in non-compliance to request date but the “price is right.”
What is the status of performance management at your firm?

1. Targets are reasonable based on current performance and benchmark information. Management has an effective process in place to prioritize improvement actions based on bottom-line impact. Diagnostics are in place for those areas needing the most improvement and progress is reviewed by S&OP Team.

2. Improvement activities are conducted but priorities are not necessarily aligned with bottom-line impact. Discussion in Executive S&OP Meeting may not include key diagnostics and recent results. Targets may not align well with recent performance and may be too subjective.

3. No formal process directed by S&OP Team. Functional managers determine priorities and manage process. Decisions are silo-based and not cross-functional oriented. Communications is fragmented.

Summary

– Communicate expectations (Vision-Mission-Goals)
  To ensure all members of the firm are working toward the same goals.

– Establish Key Performance Indicators
  Aligned with strategies, and competitive priorities.

– Measure and control key factors
  Compare actual-to-target and take actions as needed.

– Track changes in performance
  Detect trends and develop plans accordingly.

– Control operations
  To obtain desired behaviors and results.

The dictionary is the only place where success comes before work!