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View Point

# Building and leveraging Metrics Framework to drive Supply Chain Performance

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## Abstract

A well designed and integrated metrics framework increases the capability of business intelligence systems to provide accurate insights for effective supply chain decision making. This paper outlines how a metrics framework-based approach, to supply chain performance management (SCPM), is fundamental to leverage investments in business intelligence and analytics.

Mar 2006

# A business case for Supply Chain Performance Management

Supply Chain Performance Management (SCPM) has been a critical area for consumer packaged goods (CPG) companies in their efforts to develop an agile, lean and efficient customer-oriented supply chain. A robust SCPM infrastructure is crucial to realize the benefits of various collaborative initiatives. However, CPG companies need to resolve crucial questions before making significant investments in SCPM initiatives. These include:

- Is there an enterprise-wide awareness and understanding of strategic and financial objectives?
- Is there an understanding of the financial impact of supply chain performance on overall corporate performance?
- Are all processes and roles in the supply chain mapped to key metrics to determine performance?
- Is there a mechanism to periodically review actual supply chain performance and redefine performance measures in the changing business context?
- Is there an integrated single view of supply chain performance across functions and hierarchies?
- Is senior management able to quickly determine the causes for supply chain failures?

This paper focuses on defining and building a "metrics framework" to effectively leverage and drive supply chain performance management.

## *A. Developing the supply chain metrics framework*

A balanced set of metrics, aligned to various supply chain functional areas - demand planning, customer management, warehouse management, need to be identified to address decision-making requirements. These metrics should be mapped to the processes of each supply chain function, the overall business strategy and the roles responsible for executing these processes.

### 1. Establish the right metrics

The key characteristics of metrics include:

- Reliability – This refers to the consistency of the metric used to measure a given process. As long as the circumstances governing the process do not change, the metric should return a fairly consistent value.

> A large diversified manufacturer uses Cost of Goods Sold (COGS) as the basis for calculating inventory turns. Since the manufacturer had a substantial import content of raw materials, exchange rate fluctuations led to sharp variations in COGS, even when overall sales were constant. Such variations in COGS led to similar variations in inventory turns though sales and inventory value, the two key determinants of inventory turns, were constant. Under these circumstances, COGS is an unrealiable metrics for computing inventory turns.

- Validity – A valid metric is one that measures the concept in a specific business context.

> Many CPG manufacturers today focus on making their demand planning and fulfillment processes agile and responsive, through greater collaboration with sales, supply chain and manufacturing. One metric for measuring the effectiveness of this collaboration process could be the number of "expedited work orders". While this metric may suggest inefficient planning in the first place, from a collaboration point of view it can be indicative of a more healthy process of revising supply plans to reflect actual demand changes in the markets.

- Accessibility – Good metrics must be easily accessible, i.e. retrieved with reasonable effort and cost.
- Relevant – Metrics need to be meaningful so that concerned functions/ people can relate to the information and take intelligent and proactive decisions.

Additional considerations about metrics include:

- Metrics are most useful when embedded in a metrics model that represents a business process
- The criticality of a metric is determined by the process performance insight that it provides
- Metrics need to be assigned to roles that have process execution, monitoring and tracking responsibilities

## 2. Link metrics to overall strategic objectives

This involves multiple steps:

- Determine the strategic objectives to evaluate your supply chain (e.g. customer satisfaction, enterprise profitability, etc.)
- Under each of these strategic objectives, build related supply chain metrics hierarchy starting with high-level metrics – suggestive of the overall health of the supply chain, to mid-level and lower-level metrics – more tactical or operational in nature.

See Table 1 for illustrative metrics belonging to different classes

## 3. Create the detailed metrics bank

This is a multi-step process to create an exhaustive set of related metrics that involves:

- Associating metrics with each supply chain process
- Mapping the metric to the role that is directly accountable and responsible for its measurement and performance
- Identifying the class of the metric based on the information and process health insight it conveys
- Building high-level interdependencies of metrics based on common knowledge and understanding of basic processes
- Identifying the various dimensions to enable a comprehensive view of the metric
- Determining how metrics will need to be computed
- Determining the frequency at which the metrics will be measured – this will also be governed by the granularity of available data and the cost-benefits associated with a certain measurement frequency

An illustrative metrics bank for inventory management process is described in Table 2.

| Strategic Objective | Typical Metric | Class | What it signifies |
|---|---|---|---|
| Customer Satisfaction | Perfect Order | Strategic | Reliability of the supply chain to meet customer orders in quantity, in-time, quality and with complete accuracy on documentation |
| Customer Satisfaction | Manufacturing Schedule Adherence | Tactical | Ability of manufacturing to supply as per planned manufacturing schedule and meet desired inventory levels for a make-to-stock item or meet desired customer delivery schedules for make to order items |
| Customer Satisfaction | Machine Downtime | Operational | Loss of manufacturing capacity due to various reasons like machine breakdown, planned preventive maintenance, stock-out of input materials, etc. |
| Customer Satisfaction | Supplier delivery schedule adherence | Operational | Ability of vendor to supply as per planned supply schedule |
| Operational Excellence | cash - to - cash cycle time | Strategic | Time taken between cash spent to purchase raw material to the time taken to realize cash-on-sales to customers, e.g. days of inventory, accounts receivable in days, accounts payable in days |
| Operational Excellence | Total Supply Chain Cost | Strategic | Total costs incurred in the supply chain including warehousing, logistics, purchasing, planning, manpower costs, etc. |

*Table 1: Metrics Classification*

| Metrics | Performance Attribute | Class | Measurement Hierarchy | Formula | Unit of Measure | Freq. | Role | Metrics influenced | Metrics influenced by |
|---|---|---|---|---|---|---|---|---|---|
| Inventory Turnover Ratio | Asset Utilization | Strategic | Product | (Monthly COGS/Average Total inventory value)*12 | No | Monthly | Supply Planner, Supply Chain Head | Cash-to-Cash cycle time | Forecast Accuracy, Manufacturing Schedule Adherence, Sales Returns |
| Inventory Carrying Cost | Cost | Tactical | Product | Inventory value* cost of capital | Value | Monthly | Financial Analyst, Supply Chain Head | Total Supply Chain Costs | Inventory Value, Cost of Capital |
| Finished Goods Inventory | Asset Utilization | Operational | Product, Geography | FG inventory value and % of total inventory value | Value% | Daily | Supply Planner, Sales Manager | Days of Inventory | Forecast Accuracy, Manufacturing Schedule Adherence |

*Table 2: Metrics bank for Inventory Management Process*

## *B. Leveraging the supply chain metrics framework*

This section demonstrates how metrics framework can be leveraged to enhance supply chain performance.

### 1. Generate insights using cause-and-effect guided analysis

A metrics framework is a collection of relevant metrics. These metrics are inter-related to establish a cause-and-effect relationship that helps to determine the root causes of failure of various business processes.

To illustrate this, let's focus on 'product availability at shelf' as an effect and start building a metrics framework (See figure 1) The end objective is to ensure product availability at the shelf.

The framework (Figure1) clearly highlights the need to collect important metrics like forecast accuracy, order fulfillment times, manufacturing schedule adherence, etc. In the absence of a good framework, having data regarding 'product availability at shelf' and not of the related metrics, would severely limit constructive use of the end-result data.

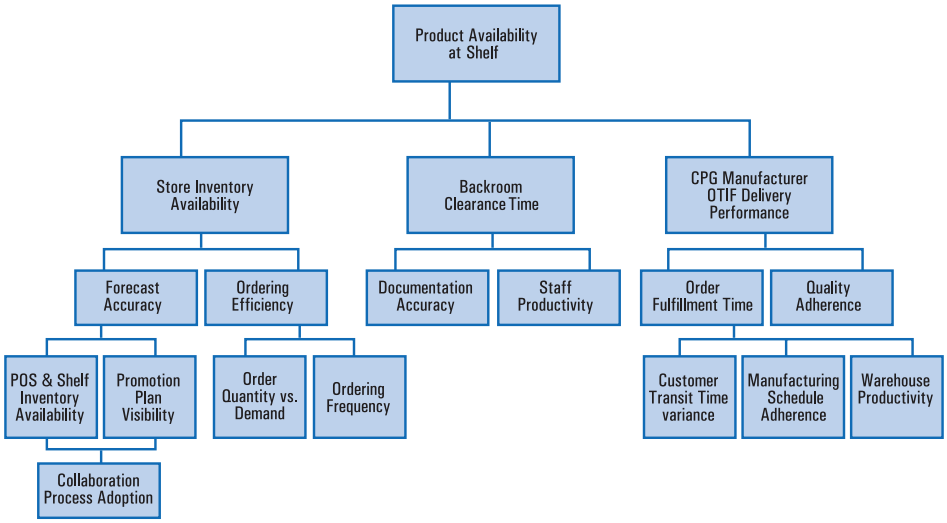


*Figure 1 – A guided analysis path for 'Product Availability at Shelf'*

### *A word of caution – 'Every metrics framework is unique'*

Each enterprise is expected to have a metrics framework that is unique in terms of number and the types of causes as well as the hierarchy and criticality of causes to the end-effect. Key points to be considered while defining the metrics framework include:

- No metrics framework is likely to identify all relevant variables. However, enterprises must make a conscious effort to build a metrics model that is comprehensive enough for their business context. This can be best achieved by deploying a cross-functional team with a strong understanding of underlying processes and responsibility for process execution.
- Top management sponsorship is also critical to ensure that the metrics framework identified by the cross-functional team is aligned with the overall enterprise objectives.
- Some element of judgment and approximation in developing the metrics framework is unavoidable. Given this, there should be a focused effort to identify the most relevant and high impact causes.
- Like metrics, metric frameworks tend to be highly contextual in nature. They are dependent on the team developing them – knowledge, goals for measurement, and vision on how the SCPM system should integrate with the overall enterprise performance management objectives. Besides people, data availability, accuracy, etc. are other factors that must be considered. These also act as constraints in designing the metrics framework.
- Metric framework cannot be static and has to be continuously refined to align with enterprise objectives. As the enterprise IT landscape changes, metrics ignored earlier for lack of data availability may need to be accommodated to make the framework more robust and relevant.

## 2. Quantify financial impact of supply chain metrics

This process is used to link supply chain metrics to financial Key Performance Indicators (KPIs). Example, cash-to-cash cycle

| Typical Metric | Performance Attribute | Strategic Objective | Benchmark | | Target | Actual | Benefits from Improvement |
|---|---|---|---|---|---|---|---|
| | | | Baseline | Entitlement | | | |
| Perfect Order | Reliability | Customer Satisfaction | 75% | 90% | 80% | 60% | $50M savings in lost sales |
| Order Fulfillment Time | Responsiveness | Customer Satisfaction | 3 days | 2 days | 2 days | 3 days | $10M additional revenue from surge orders |
| Forecast Accuracy | Process Improvement | Operational Excellence | 85% | 95% | 90% | 75% | Key enabler to customer satisfaction and operational excellence |
| Cash-to-cash cycle time | Asset Utilization | Operational Excellence | 90 days | 75 days | 85 days | 105 days | $70M reduction in working capital; $10M savings in interest cost |
| Total Supply Chain Cost as a % of COGS | Cost | Operational Excellence | 15% | 10% | 10% | 18% | $45M reduction in direct cost; $20M reduction in indirect cost |

*Table 3 : Supplychain Scorecard*

time metrics framework linked to return on assets, total supply chain cost metrics framework linked to net margin through COGS, etc. We need to establish the link with financial measures as it helps quantify the performance of supply chain metrics and better understand its full impact on the enterprise's top line and bottom-line. This "linking" is done through scorecards. A sample supply chain scorecard is highlighted in Table 3.

Enterprises use these scorecards to determine priorities for investments for improving processes and related technology. Such scorecards help establish a standardized "single version of truth" on supply chain performance, which is quantifiable and understood by all entities in the organization.

### 3. Review the supply chain scorecard in the Sales & Operations Planning (S&OP) process

While metrics reflect the overall health of the supply chain and various functions, they need to be supported with process mechanisms. These mechanisms enable a joint review and formalization of corrective plans from a cross-functional perspective. Some best practices for implementing effective sales and operations planning (S&OP) processes include:

- Establishing pre-scheduled meeting, with well-defined agenda, with critical players in the supply chain, along with their cross-functional teams
- Articulating and quantifying the performance of the supply chain. This in turn leads to performance measures for individual players of the network
- Adequate review of metrics and root causes at functional levels to make cross-functional S&OP meetings effective
- Benchmarking supply chain performance with the best in and across industries

Another key requirement to enable an effective S&OP is to have the IT capability to aggregate and structure enormous supply chain information and data originating from disparate IT systems. This facilitates overall view of the supply chain.

## Conclusion

Supply Chain Performance Management is a process-centered approach towards business decision-making. It helps manage supply chain performance, using a metrics framework for stakeholders, managers and employees, within an integrated management environment. SCPM should be a business-critical process; driven by metrics and supported by business intelligence. With increasing competition and changing market forces, tapping into this critical asset is essential in sustaining competitive advantage in the CPG space.

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