

Quick Reference Guide

SCOR® Model

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David and Roderick are passionate about helping organizations understand and document their own business processes, using frameworks such as APQC's Process Classification Framework and standards such as BPMN as well as applying simple approaches to improve and simplify these business processes.

In our recently published White Paper, Quick Reference Guide: Business Process Frameworks, we outlined the main Business Process Frameworks commonly in use. In this Quick Reference Guide, we are covering the SCOR® (Supply Chain Operations Reference) Model.

Similarly to the APQC's Process Classification Framework, SCOR has been around for almost 20 years, with the first version created in late 1996. SCOR is a reference model developed and managed by the Supply-Chain Council (SCC) as the cross-industry de facto standard diagnostic tool for supply chain management.

SCOR enables users to define, analyze, improve, and communicate supply chain management practices within and between all interested parties across their extended enterprise. The scope of the extended enterprise covers the scope of the supplier's supplier of the core enterprise to their customer's customer.

SCOR enables an organization to:

- Develop a detailed plan for launching new businesses and products;
- Allow rapid assessment of the performance of the organization's supply chain;
- Identify gaps in supply chain performance;
- Improved and enhanced operational control from standard core processes; and
- Alignment of supply chain team skills with strategic objectives.

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Introducing the SCOR Model

Who are the Supply Chain Council?

The Supply Chain Council (SCC) were formed in 1996 by PRTM (a consultancy now part of PWC) and AMR Research (an independent research and industry analysis firm, now part of Gartner), initially with 69 member organizations. The SCC now has close to 1,000 corporate members worldwide, as well as having international chapters in Australia / New Zealand, Europe, China, Japan, Latin America and North America.

SCC's membership consists primarily of practitioners representing a broad cross section of industries, including manufacturers, services, distributors, and retailers.

The SCC defines their mission as:

...a global non-profit organization whose methodology, diagnostic, and benchmarking tools help nearly a thousand organizations make dramatic and rapid improvements in supply chain processes. SCC has established the world's most widely accepted supply chain framework for evaluating and comparing supply chain activities and their performance. The framework—the Supply Chain Operations Reference (SCOR®) model—lets organizations quickly determine and compare the performance of supply chain and related operations within their company or against other organizations. SCC continually advances its tools and educates members about how organizations are capitalizing on those tools. By using its tools, SCC members are able to rapidly overcome the first difficult steps in supply chain improvement: determining what processes to improve first and how much to improve them.

In addition to the SCOR® model, the SCC provides members access to the Customer Chain Operations (CCORSM) model and the Design Chain Operations Reference (DCORSM) model.

What is SCOR?

The SCC defines the Supply Chain Operations Reference (SCOR) model as a framework:

...that links performance metrics, processes, best practices, and people into a unified structure. The framework supports communication between supply chain partners and enhances the effectiveness of supply chain management, technology, and related supply chain improvement activities.

The SCOR model has developed and evolved over the last 16 plus years by seeking input from the industry leaders and also members of the SCC, who manage global supply chains and use it daily to analyze and improve the performance of their organizations.

The resulting outcome of this work, i.e. the SCOR model, is kept on an intentionally broad scope and definitions that can be adapted to the specific supply chain requirements of any industry or application. It represents a cross industry consensus view of supply chain management.

The current version of SCOR is V11.0, which was released in December 2012. However, due to the timing and availability of information relating to the changes made in SCOR V11.0, this Quick Reference Guide is based on SCOR V10.0, with changes SCOR V11.0 highlighted where known.

How is SCOR structured?

The SCOR model comprises of:

- **Processes**

Standard descriptions of management processes and a framework of process relationships

- **Performance Metrics**

Standard metrics to measure process performance

- **Practices**

Management practices that produce best-in-class performance

- **People**

Training and skills requirements aligned with processes, best practices, and metrics.

SCOR Model Overview

The scope of a process framework or process model is an important aspect of any process framework or model and SCOR is no different.

SCOR processes extend from an organization’s supplier’s supplier to their customer’s customer.

Consequently, the SCOR model includes all customer interactions from order entry through paid invoice; all product (physical material and service) transactions, including equipment, supplies, spare parts, software, etc.; and all market interactions, from understanding aggregate demand to the fulfillment of each order.

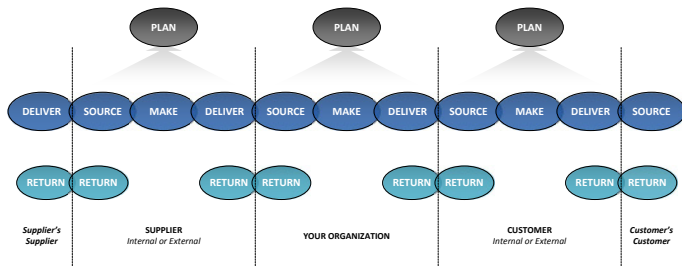


Figure 1: SCOR Model Process Framework Structure

SCOR does not describe every business process or activity. For example, it does not address sales and marketing, research and technology development, or product development. SCOR assumes but does not specifically address:

- Quality;
- Information Technology; or
- Administration.

SCOR Model in Detail

SCOR Processes

Overview

SCOR identifies the unique processes a supply chain requires to support the objective of fulfilling customer orders.

By definition, a process is a unique activity performed to meet predefined outcomes.

SCOR processes are organized by aggregation and decomposition relationships. From level 3 to 2 to 1 is aggregation; from 1 to 2 to 3 is decomposition.

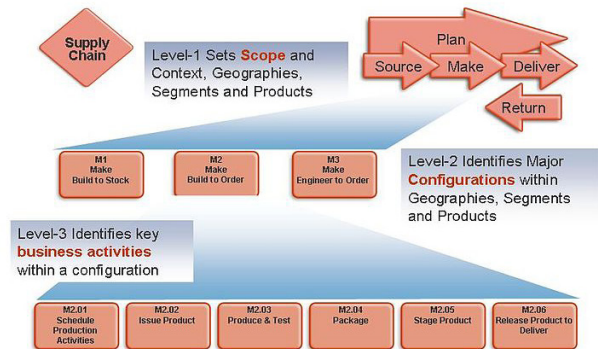


Figure 2: SCOR Process Framework Levels

SCOR processes help standardize the description of the supply chain architecture (level 1 and level 2 processes) and the implementation of the architecture (level 3 processes).

SCOR provides standards down to the level where process descriptions are applicable across a range of industries.

The SCOR process reference model stops at level 3, as level 4 and below provide the specific contexts of industry and organization specific processes.

SCOR is based on 5 Level 1 Management Processes:

- Plan (P)
- Source (S)
- Make (M)
- Deliver (D)
- Return (R)

SCOR 11 promotes a Level 2 Process, Enable (E), to the Level 1 Management Processes.

In SCOR 10, there are three Level 2 Processes:

- Planning
- Execution
- Enable

Each Level 2 Process Can Be Further Described by Type

Planning	<p>A process that aligns expected resources to meet expected demand requirements.</p> <p>Planning processes:</p> <ul style="list-style-type: none"> Balance aggregated demand and supply Generally occur at regular, periodic intervals Consider consistent planning horizon Can contribute to supply chain response time
Execution	<p>A process triggered by planned or actual demand that changes the state of material goods.</p> <p>Execution processes:</p> <ul style="list-style-type: none"> Generally involve: <ol style="list-style-type: none"> Scheduling/sequencing, Transforming product, and/or Moving product to the next process. Can contribute to the order fulfillment cycle time
Enable	<p>A process that prepares, maintains, or manages information or relationships on which planning and execution processes rely.</p>

Figure 3: Level 2 Processes

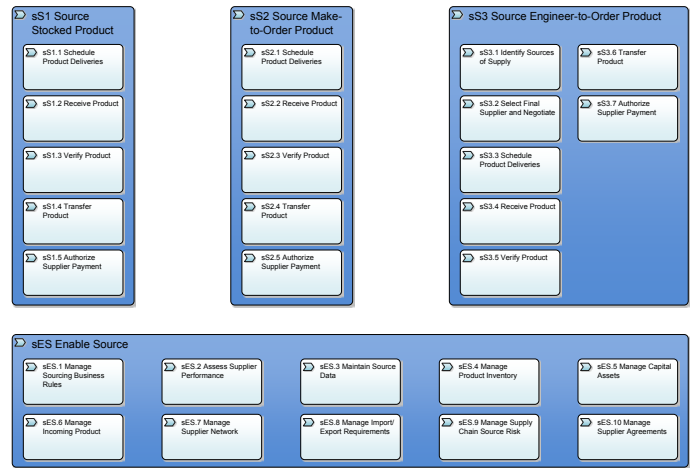


Figure 5: Source (S) Processes

Plan (P)

The Plan processes describe the planning activities associated with operating a supply chain. This includes:

- Gathering customer requirements;
- Collecting information on available resources; and
- Balancing requirements and resources to determine planned capabilities and resource gaps.

This is followed by identifying the actions required to correct any gaps.

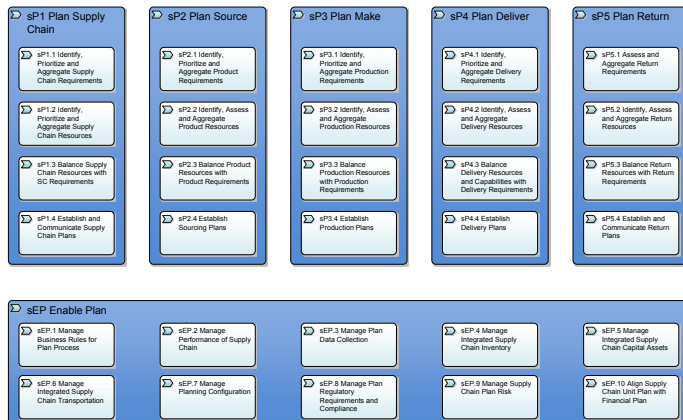


Figure 4: Plan (P) Processes

Source (S)

The Source processes describe the ordering (or scheduling) and receipt of goods and services. The Source process includes:

- Issuing purchase orders;
- Scheduling deliveries;
- Receiving;
- Shipment validation and storage; and
- Accepting supplier invoices.

Make (M)

The Make processes describe the activities associated with the conversion of materials or creation of the content for services.

It focuses on conversion of materials rather than production or manufacturing because Make represents all types of material conversions:

- Assembly;
- Chemical processing;
- Maintenance;
- Repair;
- Overhaul;
- Recycling;
- Refurbishment;
- Remanufacturing; and
- Other material conversion processes.

As a general guideline: these processes are recognized by the fact that one or more part item numbers go in, and one or more different part item numbers come out of this process.

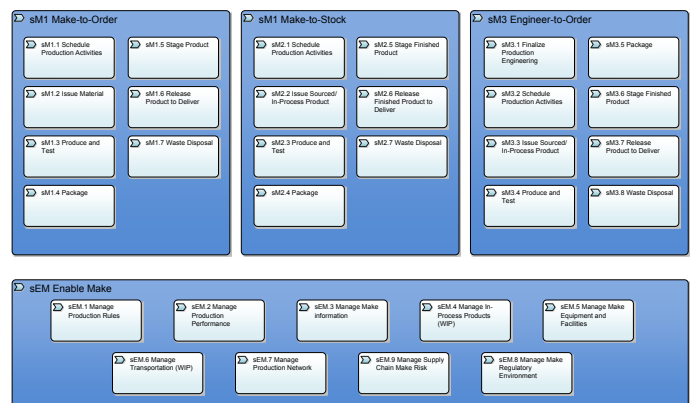


Figure 6: Make (M) Processes

Deliver (D)

The Deliver processes describe the activities associated with the creation, maintenance, and fulfillment of customer orders.

It includes:

- The receipt, validation, and creation of customer orders;
- Scheduling order delivery;
- Pick, pack, and shipment; and
- Invoicing the customer.

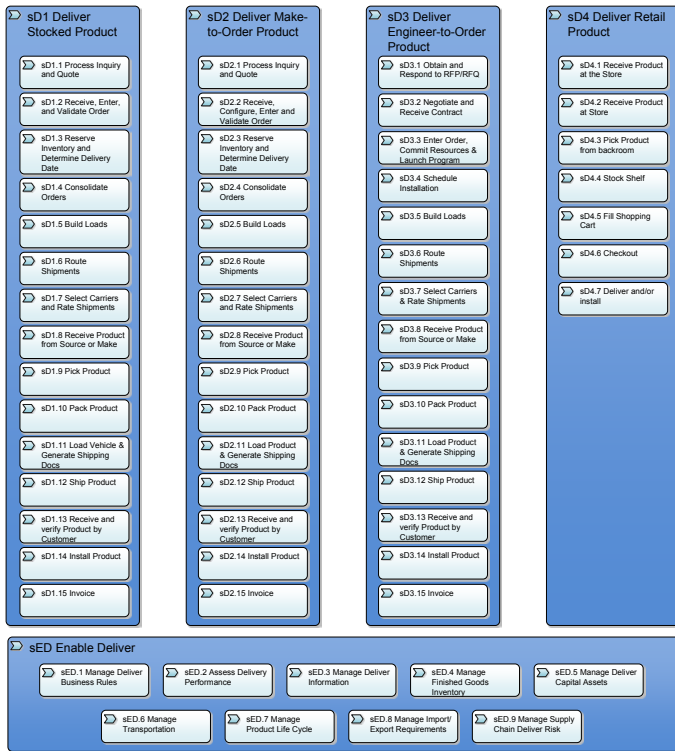


Figure 7: Deliver (D) Processes

Return (R)

The Return processes describe the activities associated with the reverse flow of goods back from the customer.

The Return process includes:

- The identification of the need for a return;
- The disposition decision making, the scheduling of the return; and
- The shipment and receipt of the returned goods.

(Repair, recycling, refurbishment, and remanufacturing processes are not described using Return process elements. See Make.)

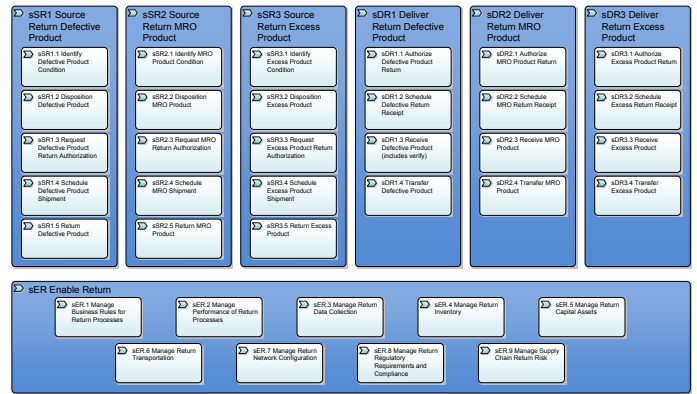


Figure 8: Return (R) Processes

SCOR Performance

Background

SCOR Performance, the performance related section of the SCOR model, comprises of two different elements:

- **Performance Attributes**

These are a group of metrics used to express a strategy, however these cannot be measured in themselves as they are used to set strategic direction.

- **Metrics**

A metric is a standard for measurement of the performance of a process. SCOR metrics are diagnostic metrics.

Performance Attributes

As outlined above, a performance attribute is a group of metrics used to express a strategy.

An attribute cannot be measured itself, rather it is used to set strategic direction.

For example:

- “The LX product needs to be best-in-class for reliability”; and
- “The XY market requires us to be among the top five most agile manufacturers”.

Metrics are then used to measure the ability of a supply chain to achieve these strategic attributes.

SCOR identifies five core supply chain performance attributes:

- Reliability
- Responsiveness
- Agility
- Costs
- Asset Management

Metrics

SCOR recognizes three levels of predefined metrics:

- Level 1 metrics are diagnostics for the overall health of the supply chain.

These metrics are also known as strategic metrics and key performance indicators (KPIs).

Benchmarking level 1 metrics helps establish realistic targets that support strategic objectives.

- Level 2 metrics serve as diagnostics for the level 1 metrics.

The diagnostic relationship helps to identify the root cause or causes of a performance gap for a level 1 metric.

- Level 3 metrics serve as diagnostics for level 2 metrics.

The analysis of performance of metrics from level 1 through 3 is referred to as decomposition. Decomposition helps identify the processes that need to be studied further. (Processes are linked to level 1 and level 2 metrics.)

Many metrics in the SCOR model are hierarchical, just as the process elements are hierarchical.

Level 1 metrics are created from lower level calculations. Level 2 metrics are generally associated with a narrower subset of processes.

For example, Delivery Performance is calculated as the total number of products delivered on time and in full based on a commit date.

Additionally, metrics (diagnostics) are used to diagnose variations in performance against plan. For example, an organization may wish to examine the

correlation between the request date and commit date.

Consideration of these attributes makes it possible to compare different organization strategies, such as choosing to be a low-cost provider against choosing to compete on reliability and performance.

Reliability Metrics

The Reliability attribute addresses the ability to perform tasks as expected. Reliability focuses on the predictability of the outcome of a process. Typical metrics for the reliability attribute include: on-time, the right quantity, the right quality.

The SCOR KPI (level 1 metric) is Perfect Order Fulfillment. Reliability is a customer-focused attribute.

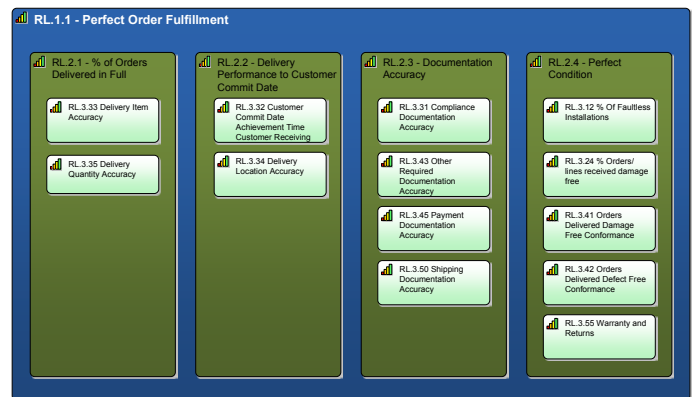


Figure 9: Reliability Metrics



Figure 10: Responsiveness Metrics



Figure 11: Agility Metrics

Costs Metrics

The Cost attribute describes the cost of operating the process. It includes labor costs, material costs, and transportation costs.

The SCOR KPIs include Cost of Goods Sold and Supply Chain Management Cost. These two indicators cover all supply chain spend. Cost is an internally focused attribute.

Responsiveness Metrics

The Responsiveness attribute describes the speed at which tasks are performed. Examples include cycle-time metrics.

The SCOR KPI is Order Fulfillment Cycle Time. Responsiveness is a customer-focused attribute.

Agility Metrics

The Agility attribute describes the ability to respond to external influences and the ability to change.

External influences include:

- Non-forecasted increases or decreases in demand;
- Suppliers or partners going out of business;
- Natural disasters;
- Acts of (cyber) terrorism;
- Availability of financial tools (the economy); or
- Labor issues.

The SCOR KPIs include Flexibility and Adaptability. Agility is a customer-focused attribute.



Figure 12: Cost Metrics

Asset Management Metrics

The Asset Management Efficiency (“Assets”) attribute describes the ability to efficiently utilize assets. Asset management strategies in a supply chain include inventory reduction and in-sourcing vs. outsourcing. Metrics include: inventory days of supply and capacity utilization.

The SCOR KPIs include: Cash-to-Cash Cycle Time and Return on Fixed Assets. Asset Management Efficiency is an internally-focused attribute.

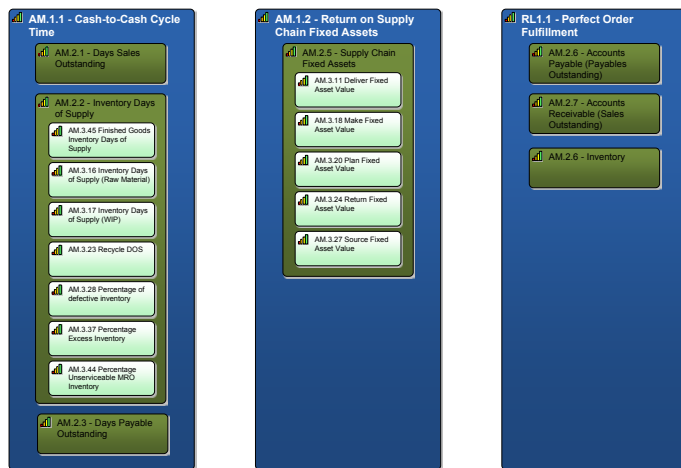


Figure 13: Asset Management Metrics

SCOR Best Practices

Overview

The SCC in SCOR describe best practice as a unique way to configure a process or a set of processes.

The uniqueness can be related to:

- The automation of the process;
- A technology applied in the process;
- Special skills applied to the process;
- A unique sequence for performing the process; or
- A unique method for distributing and connecting processes between organizations.

Further, SCOR recognizes that several different types of practices exist within any organization:

- Leading or Emerging practices
- Best practices
- Common practices
- Poor practices

These practice categories can also go by other names as well.

What’s important to understand is that different practices have different performance expectations. The classification of a practice are also likely to vary by industry.

For some industries a practice may be common, whereas the same practice may be considered a leading or best practice in another industry.

The section of SCOR that defines Best Practices contains management practices, software solutions, and definitions associated with each process.

These practices can contribute to best-in-class performance in supply chain optimization (SCOR), supply chain risk management, and environmentally responsible supply chain management (GreenSCOR).

SCOR practitioners from a diverse range of industries have selected the set of SCOR best practices.

However, it needs to be kept in mind that not all best practices will yield the same results for all industries or supply chains.

SCOR People

Overview

Talented people are at the heart of supply chains that effectively respond to and capitalize on growth opportunities. The SCOR skills framework provides a global view of the needs and issues surrounding skills management for supply chain professionals, including the technical skills, aptitude, and experience required to manage an effective supply chain. This allows supply chain leaders to align the skills of their people and organizational structure with strategic objectives.

The skills management framework within SCOR complements process reference, metrics reference, and practice reference components with an integrated view of supply chain skills in four areas:.

1. Baseline skills necessary for the overall process area (e.g., Sourcing or Planning) and for the individual process.

Supply Chain Practice Categories

	Best Practices	Leading Practices
MODERATE / HIGH RETURNS	<p>Best practices are current, structured, and repeatable practices that have had a proven and positive impact on supply chain performance.</p> <ul style="list-style-type: none"> Current: Not emerging, not outmoded. Structured: Feature a clearly stated goal, scope, process, and procedure. Proven: Demonstrated in a working environment, and linked to key metrics. Repeatable: Proven in multiple organizations and industries. 	<p>Leading practices introduce new technology, knowledge, or radically different ways of organizing processes. Leading practices may yield a steep change in performance by redefining the playing field within an industry. Leading practices may not be easy to adopt because of proprietary technology, or special knowledge may prevent wider adoption. Leading practices generally have not been proven in a wide variety of environments and industries.</p>
NEGATIVE / LOW RETURNS	<p>Common practices are how a wide range of organizations have historically done business by default or happenstance. These well established practices do the job, but don't provide a significant cost or competitive advantage over other practices (except over bad practices).</p>	<p>Poor practices represent ways of doing business, which can be widespread, that have proven to result in poor supply chain performance as indicated by key metrics.</p>
	LOW / MODERATE RISK	HIGH RISK

Figure 14: SCOR Best Practices Categories

- Critical skills that differentiate leaders in a particular process area from those who only perform at a baseline level.
- Performance measures through SCOR metrics that relate to continuous assessment of job performance in each process area.
- Credentialing of supply chain skills, including training or certification programs, related to the specific process areas.

Key Elements of SCOR People

• Skill

A Skill is the capacity to deliver predetermined results with minimal input of time and energy. Skills are further defined by Experience, Aptitude, Training, and Competency levels. Examples of supply chain skills include: master scheduling, import / export regulations, production planning, and risk mitigation.

• Experience

Experience is the knowledge or ability acquired by observation or active participation. Experience is obtained by doing the work in a real-life environment and responding to a variety of challenges that require different responses and actions. Example experiences include: cycle counting, cross docking, and hazardous materials handling.

• Aptitude

An Aptitude is a natural, acquired, learned, or developed ability to perform a certain kind of

work at a certain level. Example aptitudes include: accuracy, analytical, and leadership.

• Training

Training develops a skill or type of behavior through instruction. Examples of training are SCOR-P certification and APICS CPIM certification. This element also includes on-the-job training.

• Competency

Competency levels describe the level or state of qualification to perform a certain role or tasks. SCOR recognizes five commonly accepted competency levels:

- 1. Novice** – Untrained beginner, no experience, requires and follows detailed documentation to be able to perform the work.
- 2. Experienced beginner** – Performs the work; limited situational perception.
- 3. Competent** – Understands the work and can determine priorities to reach organizational goals.
- 4. Proficient** – Oversees all aspects of the work and can prioritize based on situational aspects.
- 5. Expert** – Intuitive understanding. Experts can apply experience patterns to new situations.

SCOR links each skill to Experiences, Aptitudes, and Trainings. Competency level is to Skill as the equivalent of what Maturity level is to Process.

Note: SCOR does not suggest or list competency levels.

Match Supply Chain Skills to Strategy

The SCOR people elements help supply chain and HR managers to find and develop people with the necessary technical expertise and experience. It improves the ability to match responsibilities with skills of candidates to avoid costly hiring mistakes.

Benchmarking with SCOR

Like the APQC, the SCC also has its own benchmarking initiative, SCORmarkSM. In fact in a previous incarnation, SCORmark was implemented using the APQC's benchmarking tool, approaches

and portal. However, SCC now have their own approaches, tools and portal developed in conjunction with PWC's Performance Measurement Group.

Conclusion

The SCOR Model is probably the most comprehensive model currently available relating to supply chain. The combination of Processes, Performance Metrics, Best Practices and People provide the key views of how to manage your supply chain.

Organizations have used SCOR, have found it to be an effect enabler in helping them aligning their portfolio of improvement projects with strategic goals, helping with:

- Solving supply chain problems;
- Improving and redesigning processes; and
- Undertaking process reengineering.

The SCC lists the benefits of adopting the SCOR model to include:

- Rapid assessment of supply chain performance
- Clear identification of performance gaps
- Efficient supply chain network redesign and optimization
- Enhanced operational control from standard core processes
- Streamlined management reporting and organizational structure

- Alignment of supply chain team skills with strategic objectives
- A detailed game plan for launching new businesses and products
- Systematic supply chain mergers that capture projected savings.

The challenge of capturing all this important and useful intellectual property can be both tiresome and time consuming, this is why Orbus Software's iServer Accelerator for SCOR is a useful starting point for any initiative you may be considering using SCOR. One of the benefits of using the iServer SCOR Accelerator is that it great for navigating through the large number of diagrams and category diagrams to locate the specific diagram you are wanting to find. This can be done through either the iSever client or the Portal.

The SCOR Accelerator currently supports SCOR 10, but the version of the Accelerator to support SCOR 11 is scheduled to be released in the near future.

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