



SCOR and Benefits of Using Process Reference Models

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It is not the strongest of the species that survive nor the most intelligent - those that do, are the ones most adaptive to change."

Charles Darwin

Presentation Outline



- Importance of supply chain management
- Supply chain at HP
- Why HP uses reference models
- What a process reference model is
- Introduction to SCOR and history of the Supply Chain Council
- SCOR overview and benefits
- Case study using SCOR – HP/Compaq merger
- Evolution of SCOR and Supply Chain Council

Why Supply Chain Matters



To Customers...

Supply Chain performance directly impacts Customer Satisfaction

At HP...

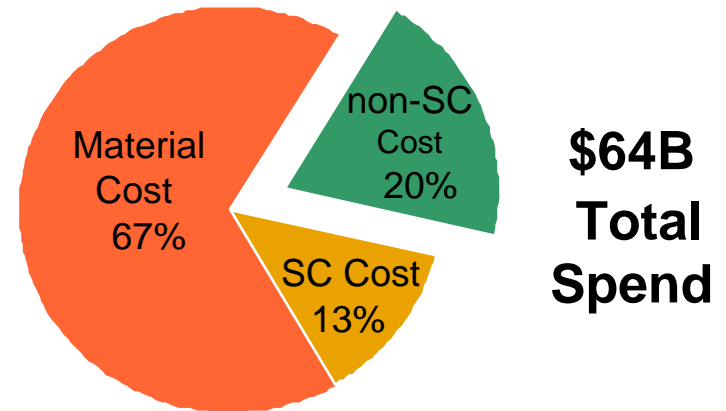
Supply Chain actively manages ~\$51B of Company Spend (80%)

To Shareholders...

Superior SC performance dramatically increases Market Capitalization

Customer Measures

Product Quality Order Cycle Time
Price Predictability
Transit Time Availability



Companies with best supply chain systems had stock market capitalization growth rates at 7 to 26% points above industry averages...

Accenture Ltd '95-'00 study of 600 world's largest companies

HP -- Industry's Largest Supply Chain



- #1 in material spend — \$40B+
 - Memory
 - Microprocessors
 - Windows software
 - Hard disk drives
 - Laser engines
 - Optical disk drives
 - Chipsets
 - LCD panels and many more
- #1 in contract manufacturing/ODM spend— \$5B+
- #1 in electronics industry logistics procurement — \$1.7B+
- 1M service support parts per month

Every day you spend at the conference, HP delivers:

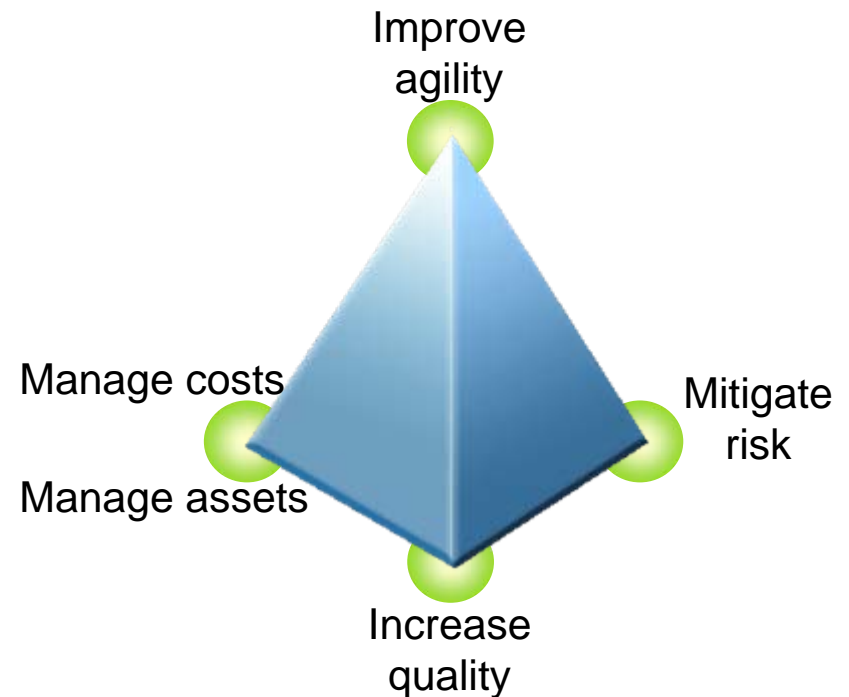
- Over a million Inkjet cartridges
- 110,000 printers
- 75,000 personal systems
- 3,500 servers



The Challenge

Customers demand more – and supply chains must be agile enough to adapt to constant changes in their markets

- Speed-up introduction of new products and services to market
- Design and provide anything anywhere
- Manage change and global operations more easily
- Enable profitable growth



Reference Models Meet the Challenge

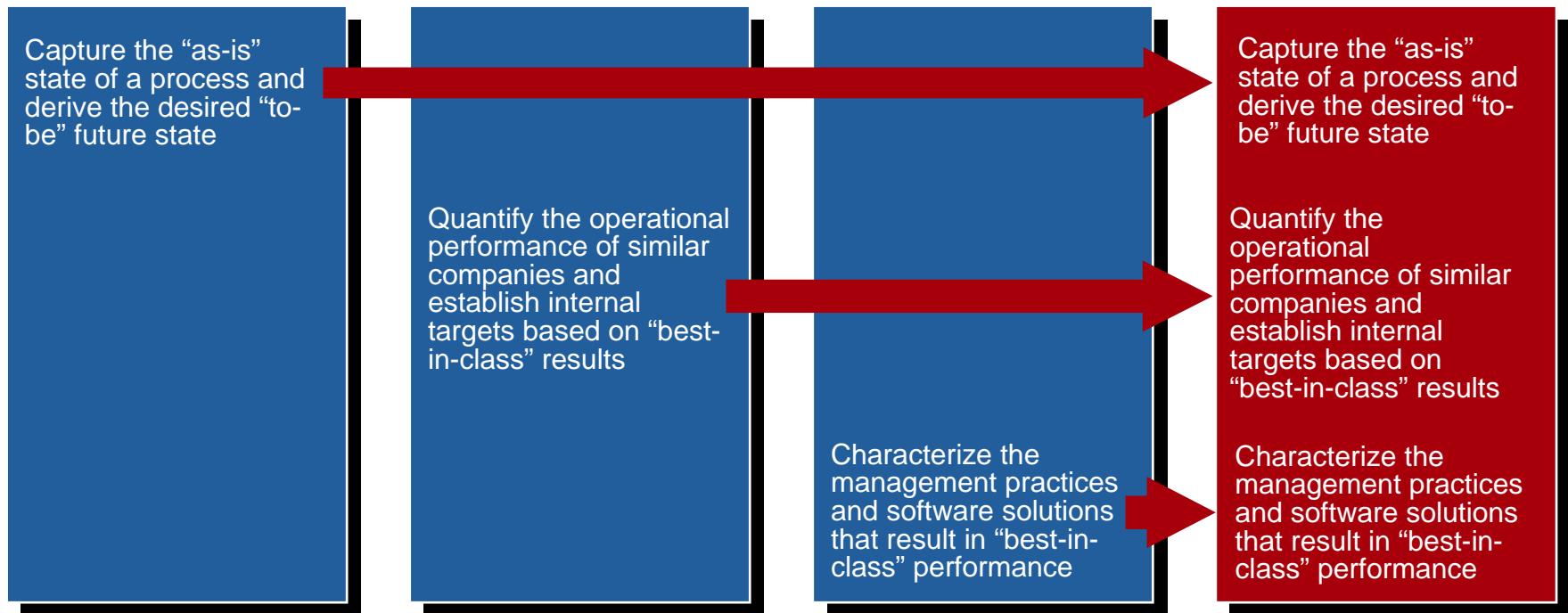


| metrics driven | process focus | speed of execution | cost saving |
|---|---|--|---|
| <p>Formulation of strategy in terms of measurable high-level business objectives.</p> <p>Metrics are tightly connected to performance attributes such as:</p> <ul style="list-style-type: none"> •Assets •Cost •Flexibility •Reliability •Responsiveness <p>Change projects are identified based on performance rather than point solutions.</p> | <p>Redirects focus from systems to processes. Focus on resolving problems rather than symptoms.</p> <p>No systems internal functionality knowledge required to understand a process description</p> <p>No need for translation for software and process experts.</p> <p>Easy lookup of predefined definitions.</p> <p>Reusability of project documentation.</p> | <p>Facilitates creation of strategies or solutions in weeks, not months, without re-work.</p> <p>Quick start up and less frustration due to organized framework and management.</p> <p>Effective communication (common language)</p> <p>Pre-defined process definitions, metrics and best practices</p> <p>Application independent</p> | <p>Competency which does not require involvement of external consultancy.</p> <p>Shorter project lifecycles (fast startup and execution) saves \$.</p> <p>Prevention of re-work and abandonment of non-value-add IT solutions</p> |

What is a Process Reference Model?



Process reference models integrate the well-known concepts of business process reengineering, benchmarking, and process measurement into a cross-functional framework



Process Reference Models Contain:



- Standard descriptions of management processes
- A framework of relationships among the standard processes
- Standard metrics to measure process performance
- Management practices that produce best-in-class performance
- Standard alignment to software features and functionality

Process Reference Model Examples



- ENUM Process Reference Model
 - Telecommunications industry
 - Mapping telephone numbers to Internet services
- POSC Business Process Reference Model
 - Petrochemical industry
 - Improving business performance by leveraging Internet technologies in the integration of oil and gas business processes
- BASEL II Operational Risk Management Process Reference Model
 - Banking industry
 - Aimed at producing uniformity in the way banks and banking regulators approach risk management
- Supply Chain Operations Reference Model (SCOR)
 - Industry neutral
 - Process reference model for supply chain
 - Managed and maintained by the Supply Chain Council

History of the Supply Chain Council



- In 1996 AMR Research and PRTM organized the Supply Chain Council as a not for profit trade association
 - Original membership consisted of 69 member companies
 - Ownership of SCOR Model intellectual property was transferred to SCC
- SCOR Model was originally created by collaboration between AMR Research and PRTM
- SCOR Model was created as a means to evaluate the then emerging ERP software market

The Supply Chain Council Today



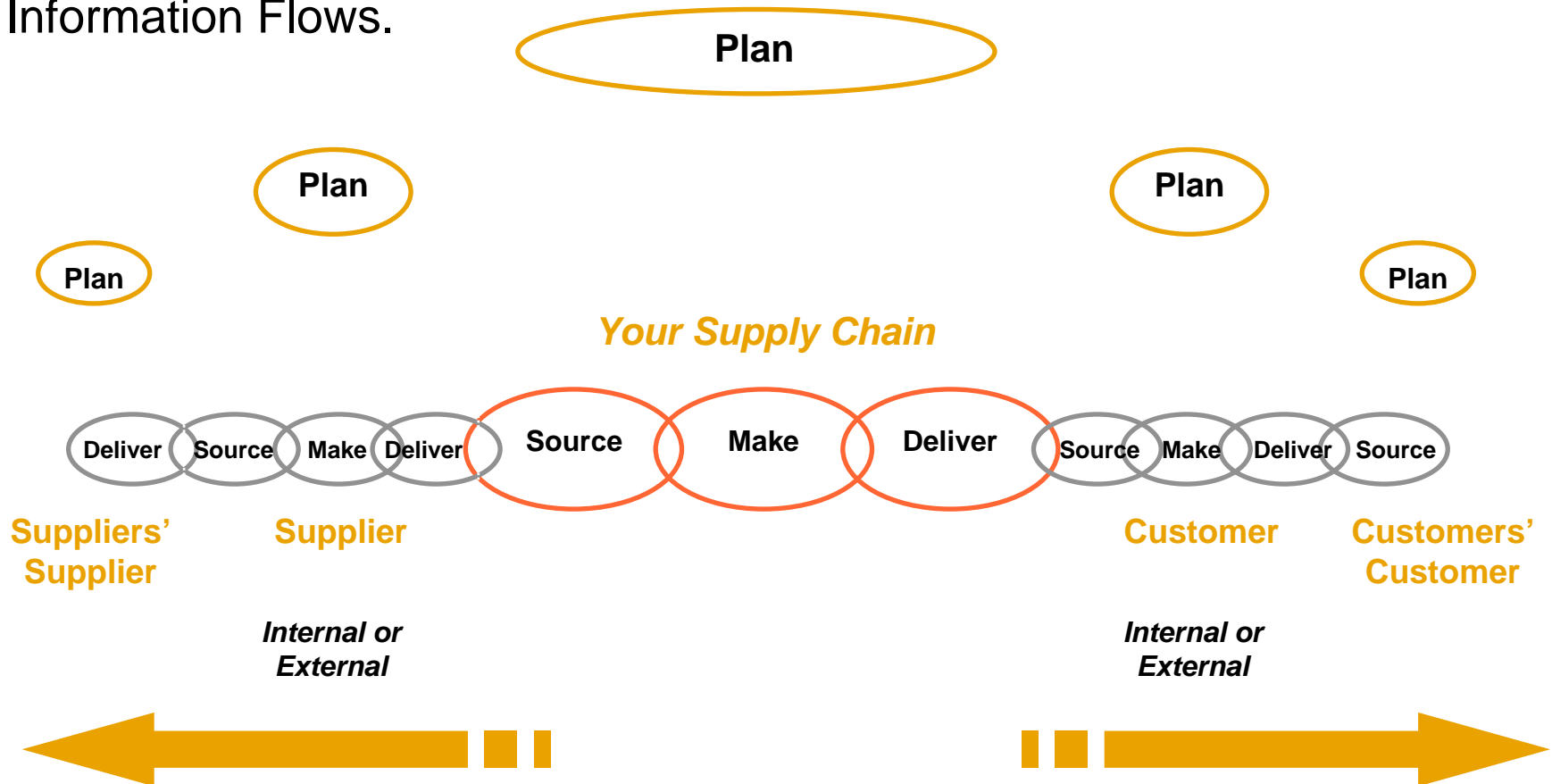
- Headquartered in Washington, DC USA
- Today the SCC has closer to 1000 member companies around the world and chapters in:
 - North America
 - Europe
 - Greater China
 - Japan
 - Australia/New Zealand
 - Southeast Asia
 - Brazil
 - Southern Africa
 - India (pending)
 - South America (pending)
- Manages and maintains the SCOR Model
- Is expanding into ‘value chain’ space with DCOR and CCOR assets

SCOR Model Overview

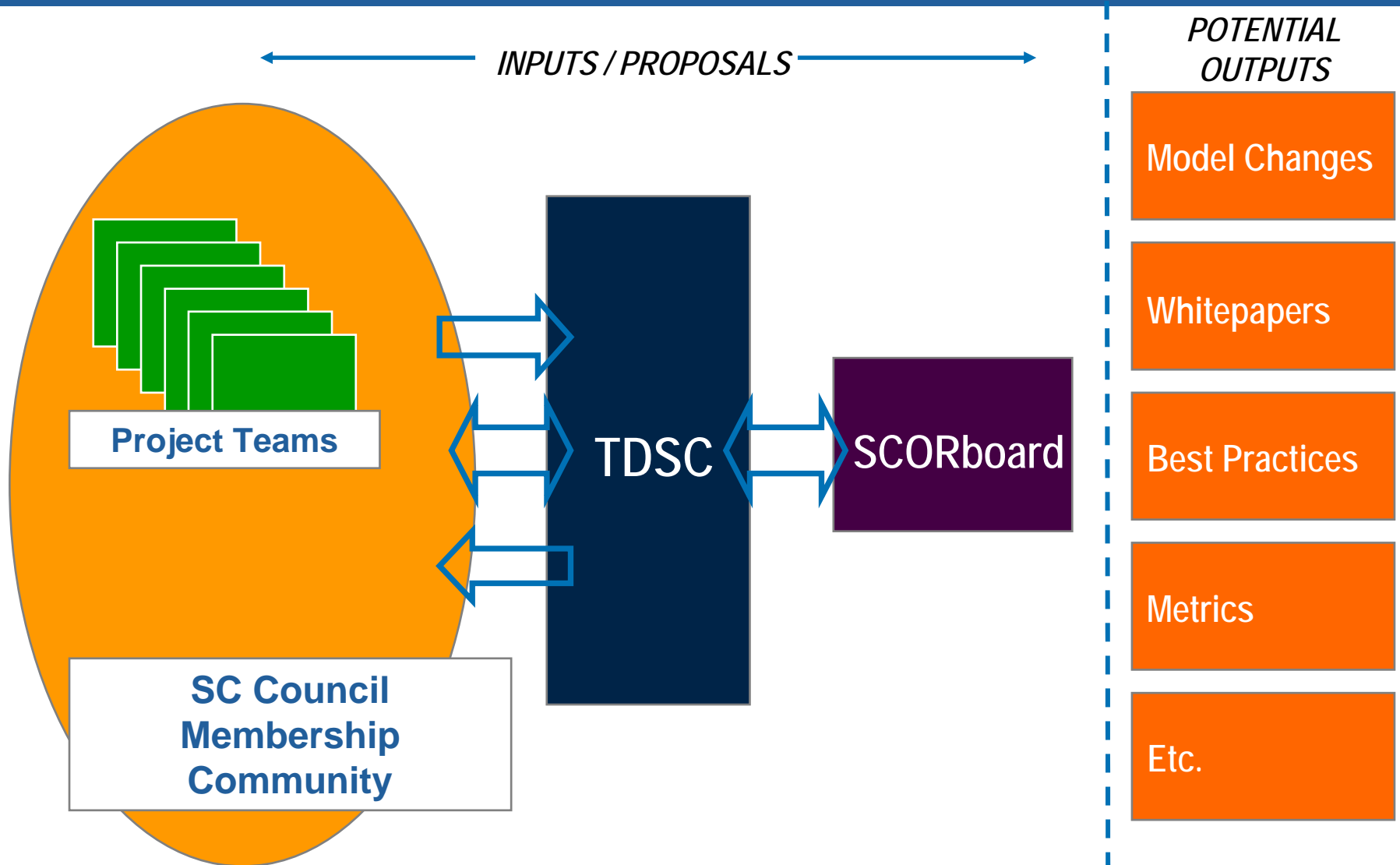
SCOR Snapshot



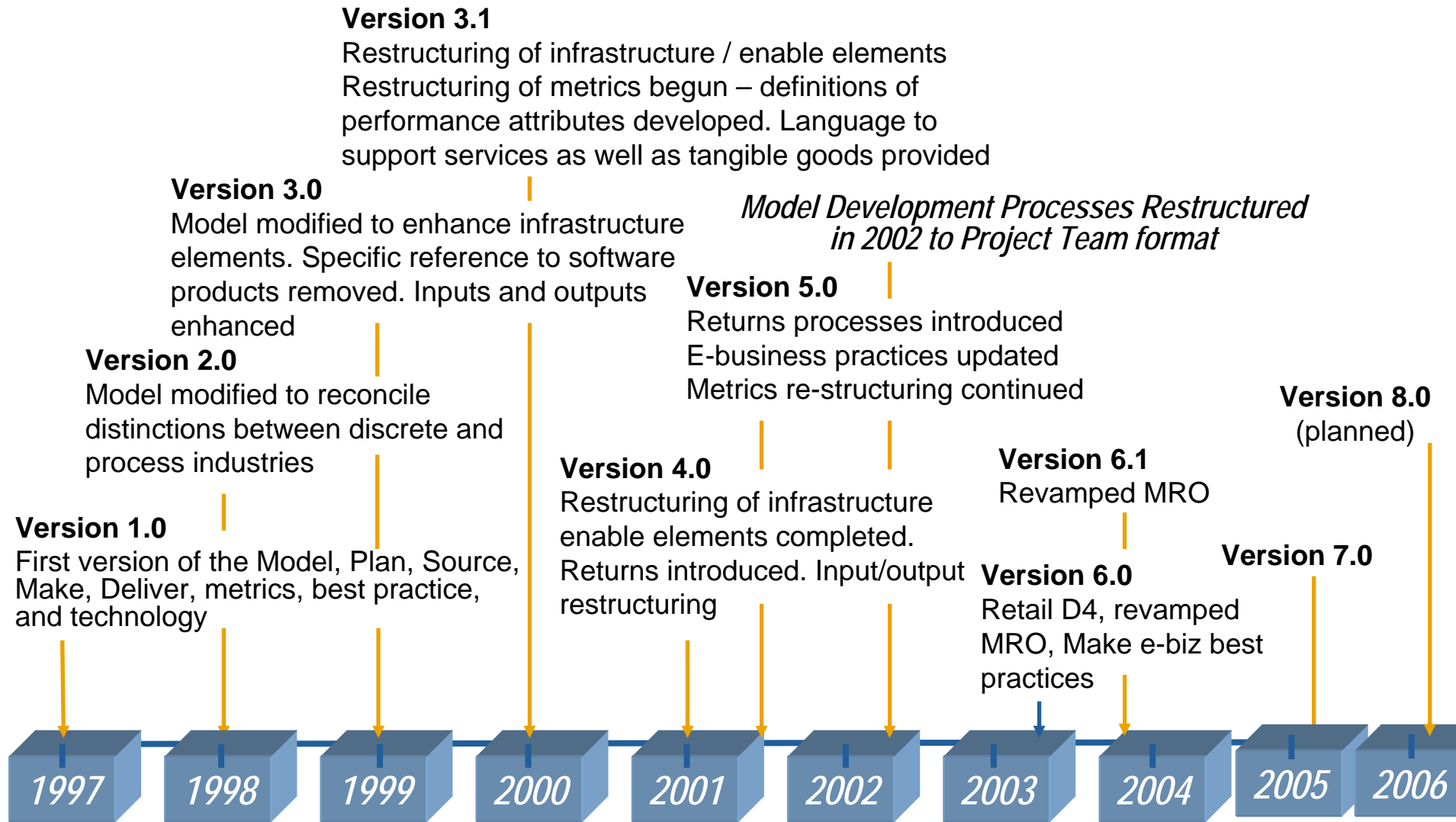
SCOR defines supply chain as the integrated processes of Plan, Source, Make, Deliver and Return, spanning your suppliers' supplier to your customers' customer, aligned with Operational Strategy, Material, Work & Information Flows.



SCOR Development Methodology



SCOR Release Timeline



SCOR Structure



Level 2

| PLAN | | | | | SOURCE | | | MAKE | | | DELIVER | | | |
|--|---|--|--|--|--|--|---|---|---|---|---|---|---|---|
| P1 | P2 | P3 | P4 | P5 | S1 | S2 | S3 | M1 | M2 | M3 | D1 | D2 | D3 | D4 |
| Plan Supply Chain | Plan Source | Plan Make | Plan Deliver | Plan Return | Source Stocked Product | Source Make-to-Order Product | Source Engineer-to-Order Product | Make-to-Stock | Make-to-Order | Engineer-to-Order | Deliver Stocked Product | Deliver Make-to-Order | Deliver Engineer-to-Order Product | Deliver Retail Product |
| P1.1: Identify, Prioritize, & Aggregate Supply-Chain Requirements | P2.1: Identify, Prioritize, & Aggregate Product Requirements | P3.1: Identify, Prioritize, & Aggregate Production Requirements | P4.1: Identify, Prioritize, & Aggregate Delivery Requirements | P5.1: Identify, Prioritize, & Aggregate Return Requirements | S1.1: Schedule Product Deliveries | S2.1: Schedule Product Deliveries | S3.1: Identify Sources of Supply | M1.1: Schedule Production Activities | M2.1: Schedule Production Activities | M3.1: Finalize Engineering | D1.1: Process Inquiry & Quote | D2.1: Process Inquiry & Quote | D3.1: Obtain & Respond to RFP/RFQ | D4.1: Generate Stocking Schedule |
| P1.2: Identify, Assess, & Aggregate Supply-Chain Resources | P2.2: Balance Product Resources with Product Requirements | P3.2: Balance Production Resources with Production Requirements | P4.2: Balance Delivery Resources with Delivery Requirements | P5.2: Identify, Assess, & Aggregate Return Resources | S1.2: Receive Product | S2.2: Receive Product | S3.2: Select Final Supplier(s) and Negotiate | M1.2: Issue Production Order | M2.2: Issue Production Order | M3.2: Schedule Production | D1.2: Receive, Enter, & Validate | D2.2: Receive, Confirm | D3.2: Manufacture & Package | D4.2: Receive Product |
| P1.3: Balance Supply-Chain Resources with Supply-Chain Requirements | P2.3: Balance Product Resources with Product Requirements | P3.3: Balance Production Resources with Production Requirements | P4.3: Balance Delivery Resources with Delivery Requirements | P5.3: Balance Return Resources with Return Requirements | S1.3: Verify | S2.3: Verify | S3.3: Verify Product | M1.3: Produce | M2.3: Produce | M3.3: Produce | D1.3: Reserve | D2.3: Reserve | D3.3: Manufacture & Package | D4.3: Receive Product |
| P1.4: Establish & Communicate Supply-Chain Plans | P2.4: Establish Sourcing Plans | P3.4: Establish Production Plans | P4.4: Establish Delivery Plans | P5.4: Establish & Communicate Return Plans | S1.4: Transfer | S2.4: Transfer | S3.4: Transfer Product | M1.4: Package | M2.4: Package | M3.4: Package | D1.4: Consolidate Orders | D2.4: Consolidate Orders | D3.4: Schedule Installation | D4.4: Stock Shelf |
| | | | | | S1.5: Authorize Supplier Payment | S2.5: Authorize Supplier Payment | S3.5: Verify Product | M1.5: Stage Product | M2.5: Stage Product | M3.5: Stage Product | D1.5: Build Loads | D2.5: Build Loads | D3.5: Build Loads | D4.5: Fill Shopping Cart |
| | | | | | | | S3.6: Transfer Product | M1.6: Release Product to Deliver | M2.6: Release Product to Deliver | M3.6: Release Product to Deliver | D1.6: Route Shipments | D2.6: Route Shipments | D3.6: Route Shipments | D4.6: Checkout |
| | | | | | | | S3.7: Authorize Supplier Payment | | | M3.7: Release Product to Deliver | D1.7: Select Carriers & Rate Shipments | D2.7: Select Carriers & Rate Shipments | D3.7: Select Carriers & Rate Shipments | D4.7: Deliver and/or install |
| | | | | | | | | | | | D1.8: Receive Product from Source or Make | D2.8: Receive Product from Source or Make | D3.8: Receive Product from Source or Make | |
| | | | | | | | | | | | D1.9: Pick Product | D2.9: Pick Product | D3.9: Pick Product | |
| | | | | | | | | | | | D1.10: Pack Product | D2.10: Pack Product | D3.10: Pack Product | |
| | | | | | | | | | | | D1.11: Load Product & Generate Shipping Docs | D2.11: Load Product & Generate Shipping Docs | D3.11: Load Product & Generate Shipping Docs | |
| | | | | | | | | | | | D1.12: Ship Product | D2.12: Ship Product | D3.12: Ship Product | |
| | | | | | | | | | | | D1.13: Receive & Verify Product by Customer | D2.13: Receive & Verify Product by Customer | D3.13: Receive & Verify Product by Customer | |
| | | | | | | | | | | | D1.14: Install Product | D2.14: Install Product | D3.14: Install Product | |
| | | | | | | | | | | | D1.15: Invoice | D2.15: Invoice | D3.15: Invoice | |






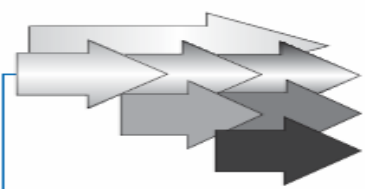
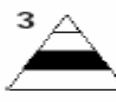
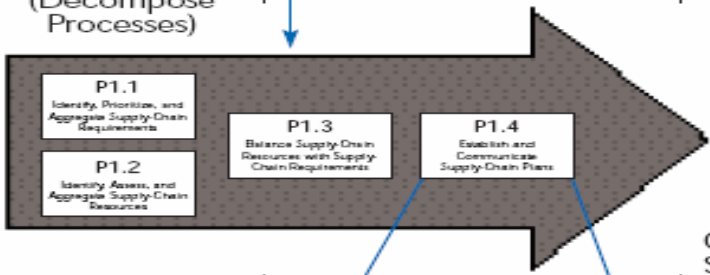

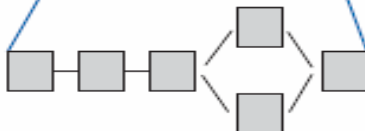
| SR1 | DR1 | SR2 | DR2 | SR3 | DR3 |
|--|--|--|--|---|--|
| Source Return Defective Product | Deliver Return Defective Product | Source Return MRO Product | Deliver Return MRO Product | Source Return Excess Product | Deliver Return Excess Product |
| SR1.1: Identify Defective Product Condition | DR1.1: Authorize Defective Product Return | SR2.1: Identify MRO Product Condition | DR2.1: Authorize MRO Product Return | SR3.1: Identify Excess Product Condition | DR3.1: Authorize Excess Product Return |
| SR1.2: Disposition Defective Product | DR1.2: Schedule Defective Product Return | SR2.2: Identify MRO Product Condition | DR2.2: Authorize MRO Product Return | SR3.2: Identify Excess Product Condition | DR3.2: Schedule Excess Return Receipt |
| SR1.3: Request Defective Product Return Authorization | DR1.3: Schedule Defective Product Return | SR2.3: Identify MRO Product Condition | DR2.3: Authorize MRO Product Return | SR3.3: Identify Excess Product Condition | DR3.3: Receive Excess Product (includes verify) |
| SR1.4: Schedule Defective Product Shipment | DR1.4: Transfer Defective Product | SR2.4: Schedule MRO Shipment | DR2.4: Transfer MRO Product | SR3.4: Schedule Excess Product Shipment | DR3.4: Transfer Excess Product |
| SR1.5: Return Defective Product | DR1.5: Return Defective Product | SR2.5: Return MRO Product | DR2.5: Return MRO Product | SR3.5: Return Excess Product | DR3.5: Return Excess Product |

SCOR Management Processes



| SCOR Process | Definitions |
|----------------|---|
| Plan | Processes that balance aggregate demand and supply to develop a course of action which best meets sourcing, production and delivery requirements |
| Source | Processes that procure goods and services to meet planned or actual demand |
| Make | Processes that transform product to a finished state to meet planned or actual demand |
| Deliver | Processes that provide finished goods and services to meet planned or actual demand, typically including order management, transportation management, and distribution management |
| Return | Processes associated with returning or receiving returned products for any reason. These processes extend into post-delivery customer support |

SCOR Model Hierarchy

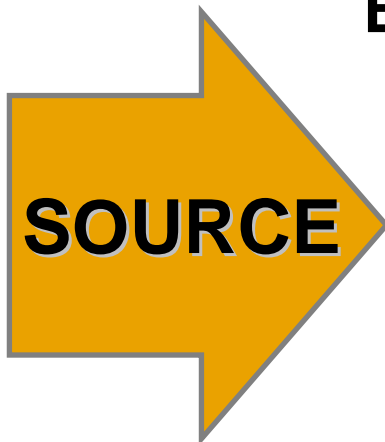
| | | Level | | | |
|--|---|---|--|--|----------|
| | | # | Description | Schematic | Comments |
| Supply-Chain Operations Reference-model  Not in Scope  | 1 |  Top Level (Process Types) |  | Level 1 defines the scope and content for the Supply Chain Operations Reference-model. Here basis of competition performance targets are set. | |
| | 2 |  Configuration Level (Process Categories) |  | A company's supply chain can be "configured-to-order" at Level 2 from 30 core "process categories." Companies implement their operations strategy through the configuration they choose for their supply chain. | |
| | 3 |  Process Element Level (Decompose Processes) |  | Level 3 defines a company's ability to compete successfully in its chosen markets, and consists of: <ul style="list-style-type: none"> • Process element definitions • Process element information inputs, and outputs • Process performance metrics • Best practices, where applicable • System capabilities required to support best practices • Systems/tools Companies "fine tune" their Operations Strategy at Level 3. | |
| | 4 |  Implementation Level (Decompose Process Elements) |  | Companies implement specific supply-chain management practices at this level. Level 4 defines practices to achieve competitive advantage and to adapt to changing business conditions. | |

Demand/Supply Planning and Management



- Balance resources and requirements and establish/communicate plans for whole supply chain, including Return, and the execution processes of Source, Make, and Deliver.
- Management of business rules, supply chain performance, data collection, inventory, capital assets, transportation, planning configuration, and regulatory requirements and compliance.
- Align the supply chain unit plan with the financial plan.

Source Stocked, Make-to-Order, and Engineer-to-Order Product



- Schedule deliveries, receive, verify, and transfer product; and authorize supplier payments.
- Identify and select supply sources when not predetermined, as for engineer to order product.
- Manage business rules, assess supplier performance, and maintain data.
- Manage inventory, capital assets, incoming product, supplier network, import/export requirements, and supplier agreements

Make-to-Stock, Make-to-Order, and Engineer-to-Order Production Execution



- Schedule production activities, issue product, produce and test, package, stage product, and release product to deliver.
- Finalize engineering for engineer-to-order product.
- Manage rules, performance, data, in-process products (WIP), equipment and facilities, transportation, production network, and regulatory compliance for production.

Order, Warehouse, Transportation and Installation Management for Stock, Make-to-Order, and Engineer-to-Order Product



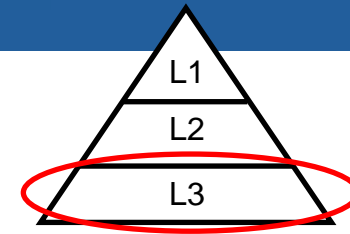
- All order mgmt steps from processing customer inquiries and quotes to routing shipments and selecting carriers.
- Warehouse mgmt from receiving and picking product to load and ship product.
- Receive and verify product at customer site and install, if necessary.
- Invoicing customer.
- Manage Deliver business rules, performance, information, finished product inventories, capital assets, transportation, product life cycle, and import/export compliance.

Return of Raw Materials and Receipt of Returns of Finished Goods

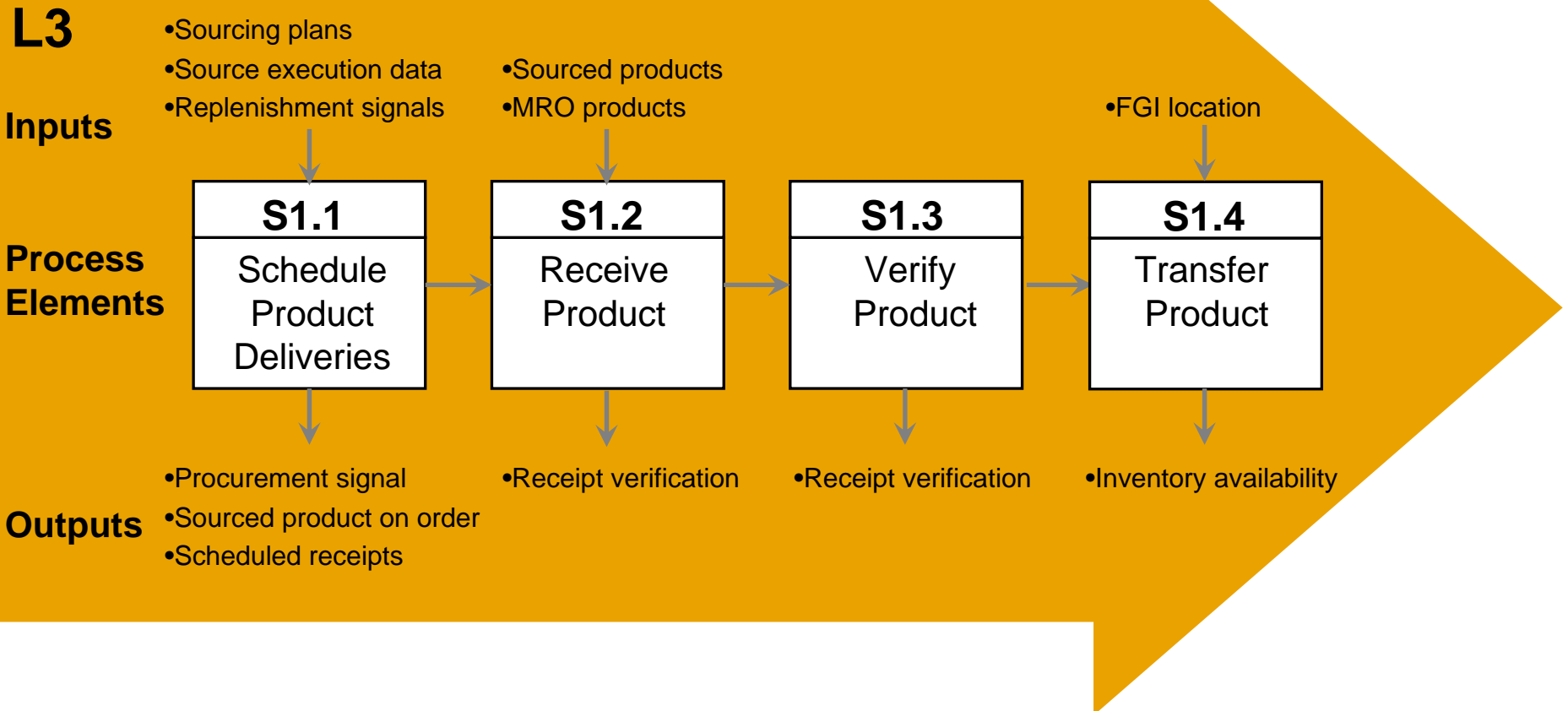


- All Return Defective Product steps from source
- All Return Maintenance, Repair, and Overhaul product steps from source
- All Return Excess Product steps from source
- Manage Return business rules, performance, data collection, returns inventory, capital assets, transportation, network configuration, and regulatory requirements and compliance.

SCOR Level 3 Example



S1 – Source Stocked Product



L3 Definition, Attributes, and Metrics



Process Element Definition

Scheduling and managing the execution of the individual deliveries of product against an existing contract or purchase order. The requirements for product releases are determined based on the detailed sourcing plan or other types of product pull signals.

Performance Attributes

Metric

Reliability

% Schedules Generated within Supplier's Lead Time
% Schedules Changed within Supplier's Lead Time

Responsiveness

Schedule Product Deliveries Cycle Time

Flexibility

None Identified

Cost

Schedule Deliveries Costs as a % of Product Acquisitions Costs

Assets

Return on Supply Chain Assets

Best Practices

Features

Utilize EDI transactions to reduce cycle time and costs

EDI interface for 830, 850, 856, and 862 transactions

Mechanical (Kanban) pull signals are used to notify suppliers of the need to deliver product

Electronic Kanban support

Consignment agreements are used to reduce assets and cycle time while increasing the availability of critical items

Consignment inventory management

Advanced ship notices allow for tight synchronization between SOURCE and MAKE processes

Blanket order support with scheduling interfaces to external supplier systems

Vendor Managed Inventory (VMI)

See Glossary

Supply Chain Performance Attributes



| Performance Attribute for Supply Chain | Definition |
|---|--|
| Reliability | The performance of the supply chain in delivering: the correct product, to the correct place, at the correct time, in the correct condition and packaging, in the correct quantity, with the correct documentation, to the correct customer. |
| Responsiveness | The speed at which a supply chain provides products to the customer. |
| Flexibility | The agility of a supply chain in responding to marketplace changes to gain or maintain competitive advantage. |
| Costs | The costs associated with operating the supply chain. |
| Asset Management | The effectiveness of an organization in managing assets to support demand satisfaction. This includes the management of assets: fixed and working capital. |

SCOR v7.0 Level 1 Metrics



| Domain | Performance Attribute | Metric | |
|--------------|------------------------|------------------|-------------------------------------|
| Supply Chain | <i>Customer Facing</i> | Reliability | Perfect Order Fulfillment |
| | | Responsiveness | Order Fulfillment Cycle Time |
| | | Flexibility | Upside Supply Chain Flexibility |
| | | | Upside Supply Chain Adaptability |
| | | | Downside Supply Chain Adaptability |
| | <i>Internal Facing</i> | Cost | Supply Chain Management Cost |
| | | | Cost of Goods Sold |
| | | Asset Management | Cash-to-Cash Cycle Time |
| | | | Return on Supply Chain Fixed Assets |

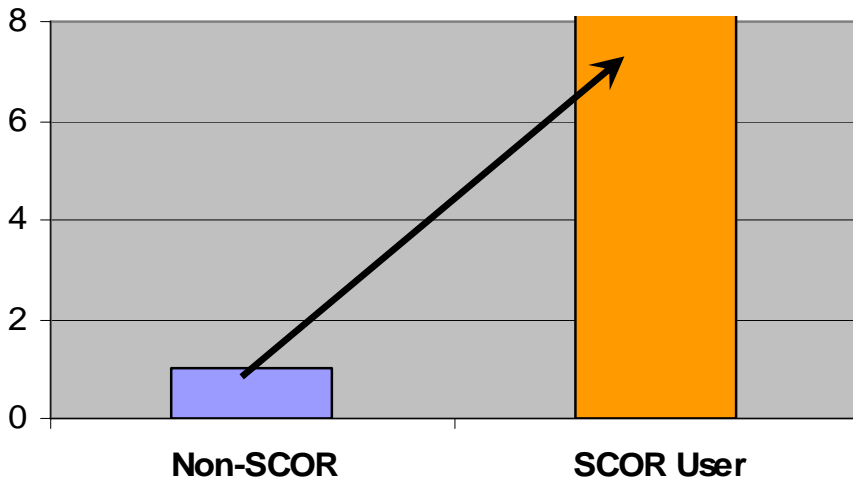
Benefits of Using SCOR

SCOR Delivers Real Business Value

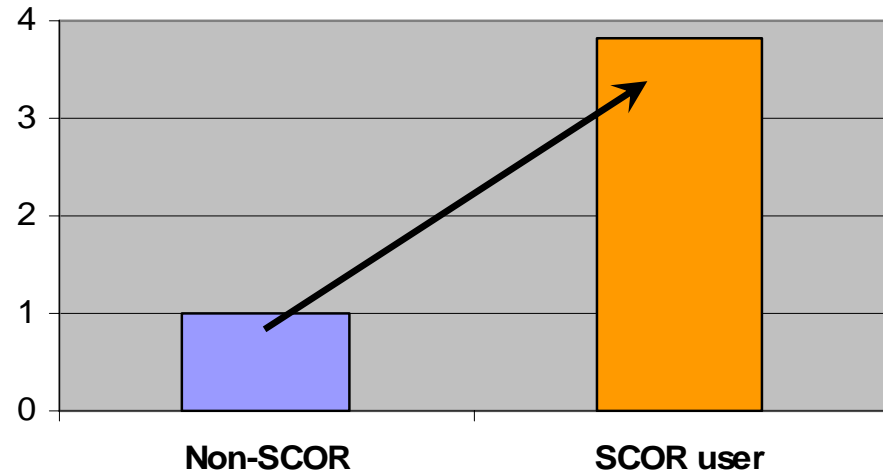


In a 2002 SCC Benchmark, Fortune-1000 (US) companies using SCOR enjoyed major advantages over their peers

Profit



Revenue



Benefits of Using a Reference Model



- Improved speed of deployments
- Faster and greater return on investments
- Common metrics across organization directly linked to processes
- ‘Benchmarkable’ metrics with other reference model users in industry
- Reference model serves as neutral ‘common language’
- Facilitates easier gap assessment
- Documented best practices derived from thousands of users

SCOR Case Study – HP/Compaq Merger

Case Study – HP/Compaq Merger



The challenge...

Largest tech merger in history

- 63 manufacturing plants
- 142 distribution hubs
- 1,200+ sites
- 1,500 major material suppliers
- 1,000s of supplier sourcing sites
- 385 logistics partners
- 600+ global customer service locations
- 119 call centers
- 7,000+ applications
- 30 million B2B messages monthly

The result...

Supply chain specifics

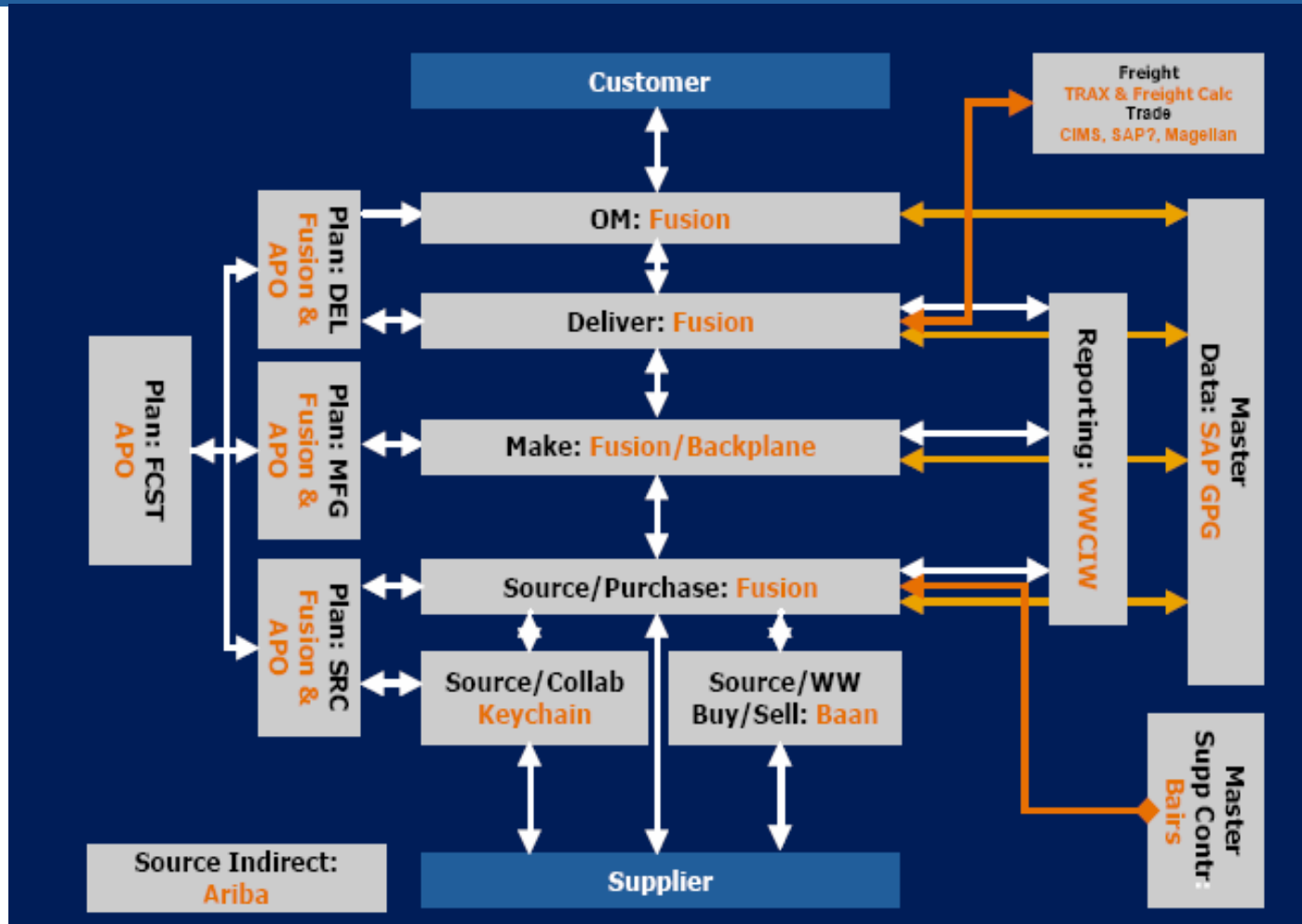
- \$2.7B in cost savings in 2 years:
 - Direct mat'l procurement: \$1.1B
 - Redesigning products and re-qualifying components: \$300M
 - Manufacturing overhead: \$295M
 - Logistics: \$235M+
 - Indirect procurement: \$525M
 - Systems and programs: \$265M

How SCOR was Used for Merger¹



- ‘Clean Room’ environment (went beyond supply chain)
 - 1000 pre-merger employees
 - In first half of fiscal year 2002, 1M hours collectively spent on integration planning
- Each company gave an unrestricted view to their operations
- SCOR was used as the reference model to document HP and Compaq supply chains
 - Supply chains were modeled down to Level 3 using a software package containing the SCOR framework
 - SCOR neutralized the ‘language’ differences between HP and Compaq
 - Served as a means to eliminate politics as processes were separated from organizations during modeling process
- Having supply chains in a common view facilitated ‘adopt-and-go’ methodology

Post Merger Target Architecture



DCOR, CCOR and Future of SCC

- DCOR – Design Chain Operations Reference Model
- CCOR – Customer Chain Operations Reference Model
- Both DCOR and CCOR built on SCOR ‘structure’
 - Hierarchical, classic process decomposition
 - Inputs, process elements, outputs, metrics, and best practices
- Originally developed by HP and licensed to the Supply Chain Council
- v 1.0 of DCOR and CCOR are available as downloads to Supply Chain Council members
- Technical Development Steering Committee is focused on future revisions and versions of both, with emphasis initially on DCOR
- SCOR combined with DCOR and CCOR provide a ‘suite’ of reference models covering the Value Chain space

Evolution of the Supply Chain Council



- With renewed emphasis on Design and Customer domains, in addition to Supply Chain domain, the SCC will evolve to more of a ‘value chain’ view
- DCOR, SCOR, and CCOR aligned under one overarching organization
 - Technical direction is three models with defined ‘touch-points’
 - Use them separately, or use them together
 - Not a ‘one size fits all’ solution, rather specialized models per domain
- Remain aligned with industry trends

Closing

- Process reference models integrate practices of process reengineering, benchmarking, and best practices into one tool
- Using a reference model like SCOR can help accelerate change in the supply chain
- The investment in the model itself and the time to become proficient in the use of the tool is small considering the potential return
- SCOR has been used successfully by many companies around the world
- Basic reference model principles found in SCOR are being leveraged into the Design and Customer domains



i n v e n t

谢谢你