P04
SCOR (I)

E331 – Supply Chain Management

Diploma in Supply Chain Management

E331 Module Overview

- **E331 Supply Chain Management**
  - **Supply Chain Management Overview**
    - Bullwhip Effect and Control Tower (P1)
    - Supply Chain Design (P2)
    - Risk Pooling (P3)
  - **Supply Chain Performance Benchmarking**
    - SCOR Model -1 (P4)
    - SCOR Model -2 (P5)
  - **Supply Chain Design and Optimization**
    - Supply Chain Network Design (P6)
    - Types of Distribution Network (P7)
    - Humanitarian Logistic (P8)
    - Transportation Routing and Scheduling (P9)
    - Green supply chain (P10)
    - Impact on Financial Performance (P11)
  - **SAP Configuration and Analysis**
    - SAP SD Module (p12)
    - SAP MM Module (P13)

Scenario

League Logistics Pte. Ltd. is a well known global logistic service provider.

One of their key customers, Dota Corp. is a leading provider of flexible OLED display panels for corporate businesses.

Dota Corp. has assembly plants across Asia and a global distribution center (GDC), which is managed by League Logistics in Singapore. Dota Corp. sources components, accessories and packaging materials from their suppliers in several Asian countries.

The finished products are packed and shipped to corporate businesses worldwide from the Singapore's GDC which also handles defective panel returned.

Scenario

Source Suppliers (Asia)	→	Production & Assembly Plants (Asia)	→	Global Distribution Centre (Singapore)	→	Business Customers (Worldwide)

The diagram above illustrates the end to end flow of the supply chain of the OLED panel.

Isaac, the Operations Manager of League Logistics, was informed earlier by Dota Corp. of their intention to implement SCOR model with all their key suppliers and service providers. In preparation for Dota Corp's initiative, Isaac has been working on the operation service's processes, performance measurements and benchmarking tools as part of the continuous improvements for Dota Corp.

Isaac attended a supply chain conference & seminar recently and he was rather impressed by the presentation on SCOR model's process implementation in other companies from various industries.

Isaac wonders how SCOR model differs from what he has been doing so far. How would you get started if you were Isaac?

Activity 1: Think-Pair-Share

Based on the scenario, attempt the following questions first **on your own**, then **exchange your thoughts with your teammates** and finally **share with your class.**

What is Isaac's question?	What do I know? (Think)
• What's the difference between his current practices and SCOR model • How can he apply the SCOR model	
What my team mate knows but I don't? (Pair)	What do other teams in class know? (Share)

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APICS & Supply Chain Council

❑ APICS is a professional organization for supply chain operations management and provider of research, education, and certification programs.

❑ Supply Chain Council (SCC), a global, non-profit management organization focused on helping its membership make significant supply chain process improvements.

❑ APICS and SCC merged in 2014.

❑ The supply chain world's most widely accepted framework –the SCOR® process reference model – for **evaluating and comparing supply chain activities and their performance**

  • It can be used to describe supply chains that are very simple or very complex using a common set of definitions to enable a common understanding

  • It lets companies quickly determine and compare the performance of supply chain and related operations within their company or against other companies
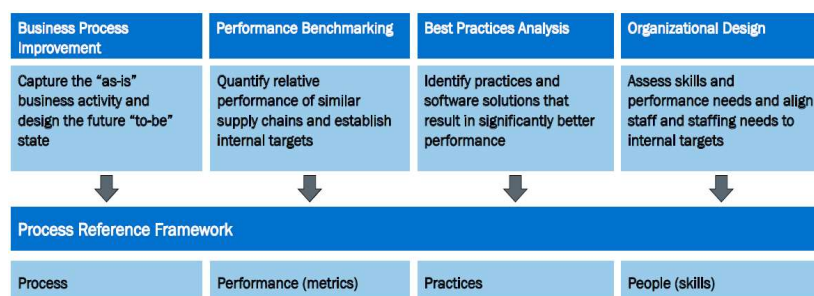
APICS SUPPLY CHAIN COUNCIL

Supply Chain Operations Reference (SCOR)

- ❑ A <u>process framework</u> that describes business activities associated with all phases of fulfilling customer's demand, using a <u>common set of definitions</u> across industries.
- ❑ It is organized around six primary management <u>processes</u>:
  - Plan, Source, Make, Deliver, Return, Enable
- ❑ It provides standard <u>metrics</u> to measure process performance:
  - Perfect Order Fulfillment, Cash-to-Cash Cycle Time, Order Fulfillment Cycle Time, etc.
- ❑ It promotes best <u>practices</u> for best-in-class performance:
  - CPFR, ERP, Cross-Training, Sales & Operations Planning, etc.
- ❑ It describes pre-defined relationships between processes, metrics and practices

SCOR Framework

Combination of 4 techniques into 1 integrated approach

Business Process Improvement	Performance Benchmarking	Best Practices Analysis	Organizational Design
Capture the "as-is" business activity and design the future "to-be" state	Quantify relative performance of similar supply chains and establish internal targets	Identify practices and software solutions that result in significantly better performance	Assess skills and performance needs and align staff and staffing needs to internal targets

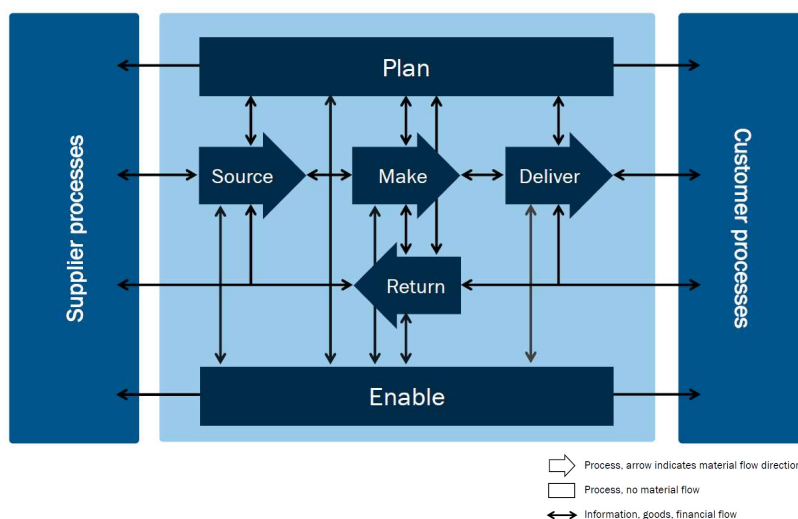| Process Reference Framework			
Process	Performance (metrics)	Practices	People (skills)

Advantages of Using the SCOR Framework

- Scope of the SCOR framework applies to the entire supply chain
- Orients supply chain improvements around <u>standardized</u> set of performance, process, practice, and skills metrics
- Enables supply chain performance and practice <u>benchmarking</u>
- Centers supply chain improvement efforts on <u>creating value</u> for customers
- Applies detailed supply chain metrics to <u>measure</u> supply chain performance
- Provides metric and activity <u>alignment</u> across organizational boundaries
- Establishes a <u>common repository</u> of supply chain performance terms and toolsets

SCOR Model

In SCOR model, a supply chain is organized around **SIX (6)** management processes: **Plan, Source, Make, Deliver, Return, Enable**

Process, arrow indicates material flow direction
Process, no material flow
Information, goods, financial flow

Activity 2: Team Discussion

- If you are running a fashion business, can you model your supply chain after companies from other industries, such as Boeing, Microsoft or Wal-Mart? Explain your answer.
- What is the supply chain model you can use?

Activity 2: Suggested Answers

- These companies are doing well in their own industries but it's hard for other companies to follow exactly their models with the same desired outcomes because of different supply chain processes and practices.
- A standard model such as SCOR was introduced to serve as a common reference for all parties and organizations involved in a supply chain so everyone from different industries can communicate with each other using a common definitions.
- SCOR Model was created by SCC (Supply Chain Council) by incorporating the best practices and expertise from different companies in different industries all over the world.

Activity 3: Team Discussion

- A supply chain commonly involves many different companies from raw materials suppliers to finished goods retailers.
- What are the main challenges for these different companies to work together?
- What are the potential problems that SCOR model may help resolve?

Activity 3: Suggested Answers

- Two main challenges are process integration and information visibility which are critical for supply chain management.
- SCOR model includes suppliers, manufacturers, distributors, retailers and customers, not just the brand's company.
- SCOR model does not represent organizations, but rather activities and processes, and it has no boundary.
- Common definitions and understanding across parties along supply chain
- *SCOR does not describe every business process or activity. It does not address sales and marketing, research and technology development, or product development. There are other models developed for those processes.*

Activity 4: Della Apple Puree

Watch the following video **from 1:31 to 2:11 min**
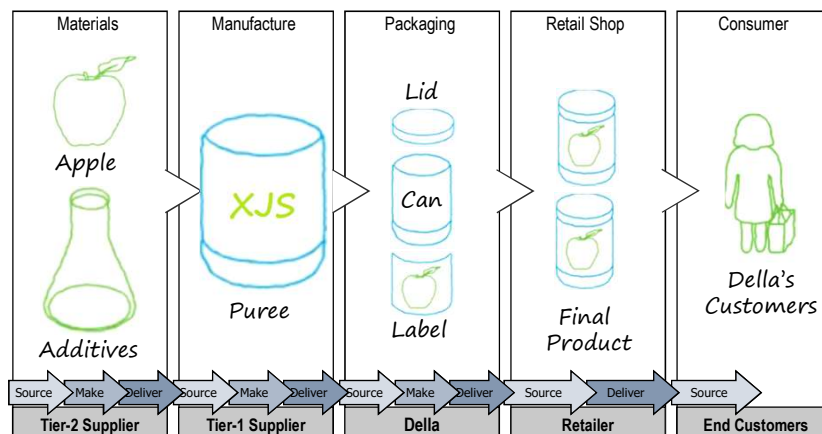https://youtu.be/qhn9gpOf8uQ?t=91
In the following diagram, fill in the column with the correct words from the
following list: **Apple, Additives, Puree, Can, Lid, Label, Final Product**.
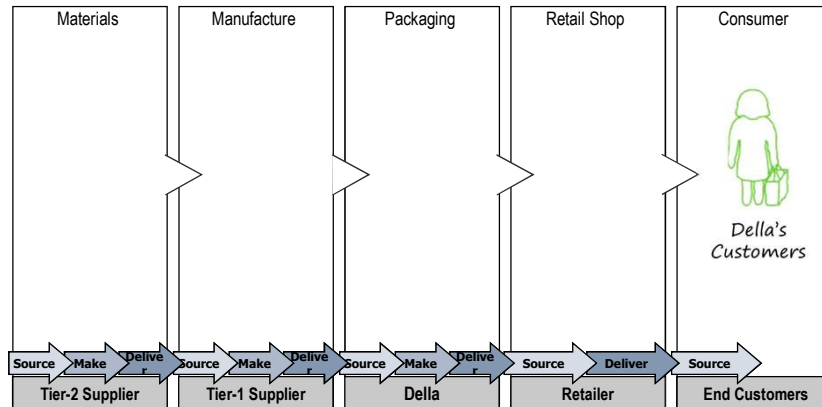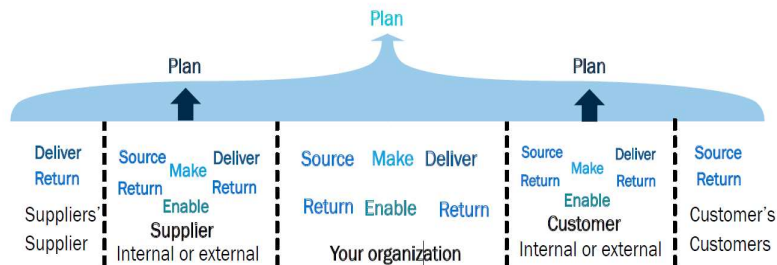

Activity 4: Suggested Answers

In the following diagram, fill up the column with the following correct words from the
following list: Apple, Additives, Puree, Can, Lid, Label, Final Product.

How do you apply SCOR model for Della's supply chain?

SCOR Integrated Processes

The integrated process of *plan*, *source*, *make*, *deliver*, *return*, and enable spanning from the suppliers' supplier to the customers' customer

SCOR is not limited by organizational boundaries

SCOR Process Levels

Level 1	Level 2	Level 3	Level 4	Level 5
Scope	**Configuration**	**Activity**	Workflow	Transactions
sS Source	sS1 Source Stocked Product	sS1.1 Schedule Product Delivery		EDI XML
Differentiates Business	Differentiates Complexity	Names Tasks	Sequences Steps	Links Transactions
Defines Scope	Differentiates Capabilities	Links, Metrics, Tasks and Practices	Job Details	Details of Automation
Framework Language	Framework Language	Framework Language	Industry or Company Language	Technology Specific Language

SCOR standards   Company/Industry definitions

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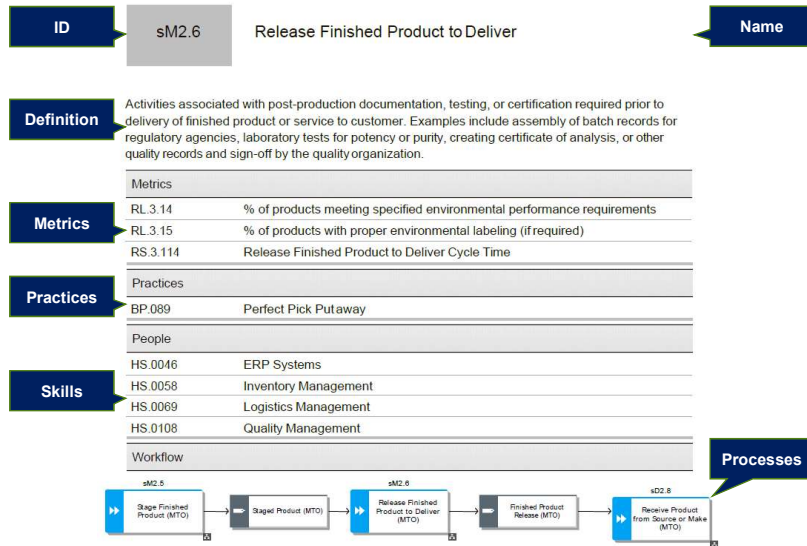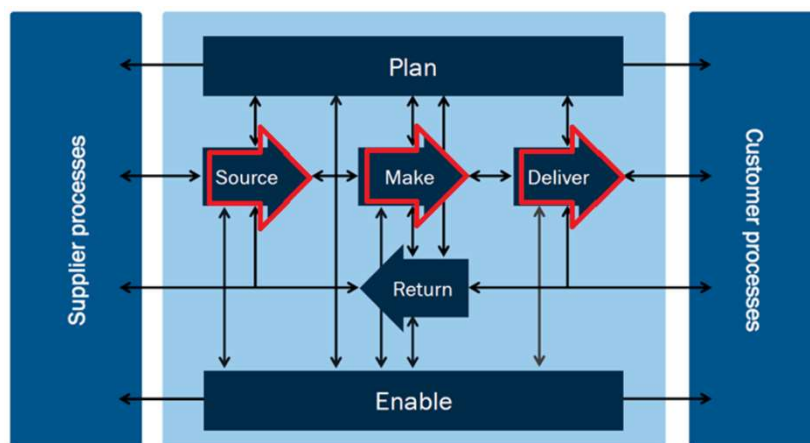## SCOR Model Structure
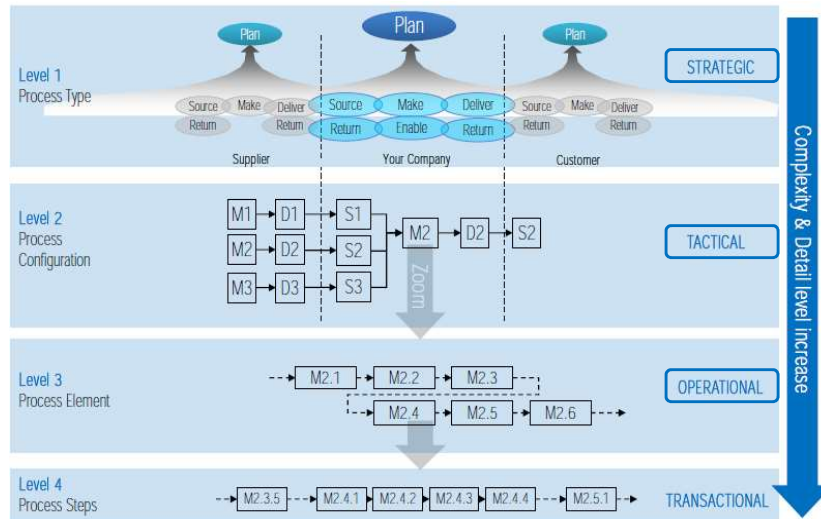
SCOR Codification

❑ SCOR level processes are represented by unique identifiers.
- Two letters coded is a Level-1 process:
  sP, sS, sM, sD, sR, sE
- Two letters plus a number is a Level-2 process:
  sP1 - 5, sS1 - 3, sM1 - 3, sD1 - 4, sSR1 - 3, sDR1 – 3, sE1 - 11
- Two letters plus a number, a period and another number is a Level-3 process: **sP5.4, sS3.7, sM3.8, sD4.7, sSR3.5, sDR3.4, sE11.7**

Level 1	sP	sS	sM	sD	sR		sE
Level 2	sP1 - 5	sS1 - 3	sM1 - 3	sD1 - 4	sSR1 - 3	sDR1 - 3	sE1 - 11
Level 3	sP1.1 - 1.4	sS1.1 - 1.5	sM1.1 - 1.7	sD1.1 - 1.15	sSR1.1 - 1.5	sDR1.1 - 1.4	sE1.1 - 1.6
	sP2.1 - 2.4	sS2.1 - 2.5	sM2.1 - 2.7	sD2.1 - 2.15	sSR2.1 - 2.5	sDR2.1 - 2.4	sE2.1 - 2.6
	sP3.1 - 3.4	sS3.1 - 3.7	sM3.1 - 3.8	sD3.1 - 3.15	sSR3.1 - 3.5	sDR3.1 - 3.4	sE3.1 - 3.6
	sP4.1 - 4.4			sD4.1 - 4.7			sE4.1 - 4.6
	sP5.1 - 5.4						sE5.1 - 5.8
							sE6.1 - 6.7
							sE7.1 - 7.8
							sE8.1 - 8.6
							sE9.1 - 9.5
							sE10.1 - 10.7
							sE11.1 - 11.7

SCOR Manual

| ID | sM2.6 | Release Finished Product to Deliver | | Name |

Definition — Activities associated with post-production documentation, testing, or certification required prior to delivery of finished product or service to customer. Examples include assembly of batch records for regulatory agencies, laboratory tests for potency or purity, creating certificate of analysis, or other quality records and sign-off by the quality organization.

Metrics

Metrics	
RL.3.14	% of products meeting specified environmental performance requirements
RL.3.15	% of products with proper environmental labeling (if required)
RS.3.114	Release Finished Product to Deliver Cycle Time

Practices

Practices	
BP.089	Perfect Pick Putaway

People	
HS.0046	ERP Systems
HS.0058	Inventory Management
HS.0069	Logistics Management
HS.0108	Quality Management

Skills

| Workflow |

Processes

sM2.5 Stage Finished Product (MTO) → Staged Product (MTO) → sM2.6 Release Finished Product to Deliver (MTO) → Finished Product Release (MTO) → sD2.6 Receive Product from Source or Make (MTO)

Execution Processes

☐ Processes: **Source**, **Make** and **Deliver**

☐ Objective: receive raw materials, perform transformation or value-add activities and deliver finished product to customers

Execution Strategies

Level: Different strategies	Production Strategy

Stocked Product (sS1, sM1, sD1) **BTS**
- Usually Inventory Driven (Plan)
- Standard Material Orders
- High Fill-rate, short turnaround

Make-to-Order (sS2, sM2, sD2) **CTO & BTO**
- Customer Order Driven
- Configurable Materials
- Longer turn-around times

Engineer-to-Order (sS3, sM3, sD3)
- Customer Requirements Driven
- Sourcing New Materials
- Longest long lead-times, low fill rates

Source (Process Category: sS)

❑ Objectives of this process:
- The ordering, delivery, receipt and transfer of raw material items, subassemblies, product and/or services

❑ Key processes comprehended:
- Schedule product deliveries
- Receive, inspect, and hold materials
- Issue material to Make or Deliver processes
- Supplier/Vendor Agreements
- Vendor certification and feedback, sourcing quality
- Manage raw materials inventories
- Freight, import/export documentation

Source Configurations

❑Source Stocked Product (Process ID: sS1)
  • The ordering and receiving of existing products, components and services from existing contracts, based on requirement plans.

❑Source Make-to-Order (Process ID: sS2)
  • The ordering and receiving of existing products, components and services for a unique and identified customer order.
  • Materials are received against the unique customer order reference.

❑Source Engineer-to-Order (Process ID: sS3)
  • The selection, ordering and receiving of specialized products or services that are designed and/or built based on the requirements or specifications of a particular customer order or contract.

Activity 5: Team Discussion

• A supply chain manager found out that a high percentage of finished goods need to be reworked as one of the standard components installed in the product is showing high failure rates. Which level 3 process helps to screen out faulty materials before they are used in production?

• Answer: sS1.3 Verify Product

Make (Process Category: sM)

❑ Objectives of this process:
- The process of adding value to products through mixing, separating, forming, machining, and chemical processes

❑ Key Processes Comprehended:
- Schedule production, request and receive material from Source and/or Make processes
- Manufacture, assemble/disassemble and test product, package, hold/release product
- Managing product quality and engineering changes
- Managing facilities and equipment, production status workflow and capacity management
- Manage Work-In-Process (WIP) inventories

Make Configurations

❑Make-to-Stock (Process ID: sM1)
- The making of standard products and services. Planning (Plan) processes determine what, how much and when to make.

❑Make-to-Order (Process ID: sM2)
- The making of standard or configurable products and services for unique customer orders.
- Customer orders determine what, how much and when to make.

❑Engineer-to-Order (Process ID: sM3)
- The making of specialized products or services that are fully or partially designed and made based on the unique requirements and specifications of a particular customer order or contract.

Activity 6: Team Discussion

- A production manager found out that an engineer-to-order product is unable to meet the daily schedule. The down-time, change-over-time and misalignment between sequence and materials were suspected to be the problems. Which level 3 process should she investigate?
- Answer: sM3.2 Schedule Production Activities

Deliver (Process Category: sD)

❑ Objectives of this process:
   - Perform customer-facing order management and order fulfillment activities including outbound logistics

❑ Key processes comprehended:
   - Product, service and price quotations
   - Order entry and maintenance
   - Order consolidation, picking, packing, labeling and shipping
   - Import/export documentation
   - Customer delivery and installation
   - Logistics and Freight Management
   - Manage Finished Goods inventories

Deliver Configurations

❑Deliver Stocked Product (Process ID: sD1)
- The delivery of standard products (and services) that are maintained in a finished goods state prior to the receipt of a customer order.

❑Deliver Make-to-Order Product (Process ID: sD2)
- The delivery of standard or configurable products and services that are obtained (Source or Make) for a customer order.

❑Deliver Engineer-to-Order Product (Process ID: sD3)
- The delivery of specialized products and services that have been fully or partially designed in negotiation and based on requirements from a customer order and customer provided specifications

❑Deliver Retail Product (Process ID: sD4)
- D4 processes are used to acquire, merchandise and sell finished goods at a retail store.

Activity 7: Team Discussion

- A warehouse manager observes a large increase of returns of finished products from his customers. A quick study of the return reasons shows the increase is primarily in the category of 'Wrong Product'.
  He wonders whether the "order it today, we ship it today" approach is impacting the quality of his operation.

- Which level 3 processes should he investigate?

  Answer: sD1.2 Receive, Enter and Validate Order

  sD1.9 Pick Product

- Which of above process would he look at first if 'wrong product ordered' contributes to 90% of the increase?

  Answer: sD1.2

Reverse Processes: Return
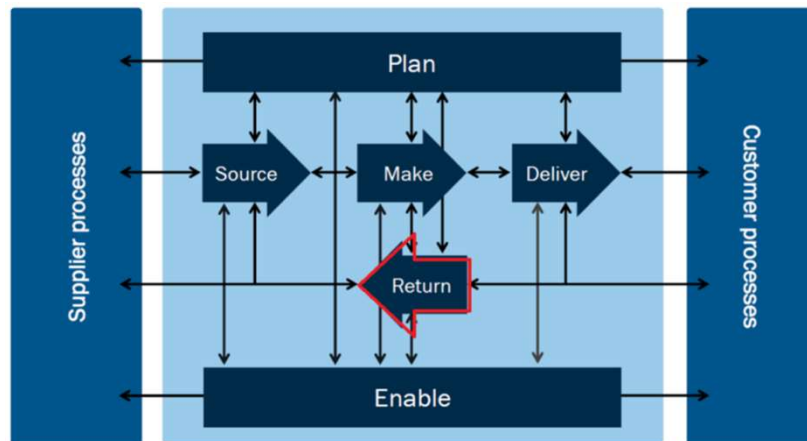
❑ Processes: **Return (Source Return, Deliver Return)**
❑ Objective: Reverse material flows

Return (Process Category: sR)

❑ Objective of this process:
  • Moving material from customer back through supply chain to address defects in product, ordering, or manufacturing, or to perform upkeep activities
❑ Key Processes Comprehended
  • Identification of the need to return a product or asset
  • Requesting and issuing return authorization
  • Inspection and disposition decision-making
  • Transfer/Disposition of product or asset
  • Managing return transportation capacity
  • Managing returned material inventories

Return Configurations

❑Return Defective Products (sSR1 and sDR1)
- Manufacturing defects
- Ordering defects
- Delivery issues

❑Return Maintenance, Repair & Overhaul (sSR2 and sDR2)
- Preventative maintenance
- End-of-life overhaul
- Repairs due to breakage/aging with use

❑Return Excess Products (sSR3 and sDR3)
- Product retirement (end-of-life excess).
- The product is new and in original packaging.

❑sSR = Source Return (returning material to a supplier including communication with the trading partner, the generation of documentation, and the physical return/shipment of product)

❑sDR = Deliver Return (receiving and disposing of returned material from a customer including the communication with the trading partner, the generation of documentation, and the physical return/receipt and disposal of product)

Activity 8: Team Discussion

- In the League Logistic scenario, there is an agreement with Dota Corp. that excessive inventory at the DC can be returned, besides defective OLED panels received from their customers. Which SCOR Return Level 2 processes are relevant here?
- Answers:

  Return Excess Products (sDR3)

  Return Defective Products (sDR1)

Control Processes: Plan, Enable

❑ Plan (sP) and Enable (sE) processes prepare the supply chain to ensure smooth execution

❑ Plan (sP) processes balance the need for resources, materials, capacity, etc. with the availability of these resources.

❑ Enable (sE) processes address 11 control aspects for the supply chain. They monitor compliance, manage information from other process areas and highlight dependencies on these other process areas. They also support maintenance of relationships with suppliers.

Planning Processes
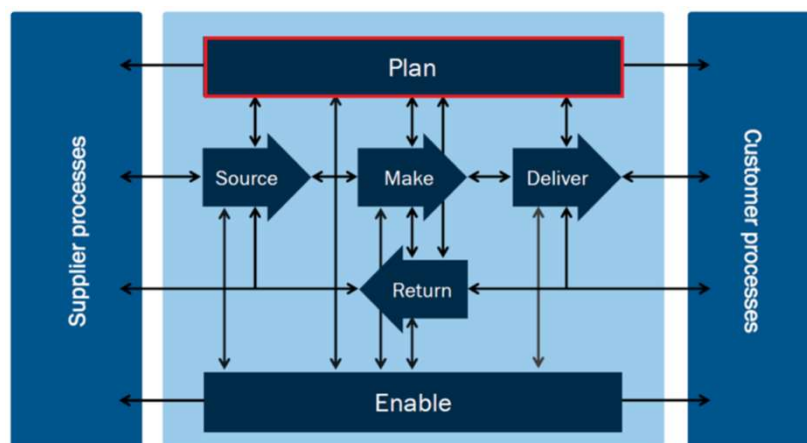
❑ Processes: **Plan**

❑ Objective: Drive / Coordinate execution processes

Plan (Process Category: sP)

❑ Objectives of this process:
- The process of determining requirements and agree corrective actions to achieve supply chain objectives

❑ Key Processes Comprehended:
- Supply chain revenue planning/forecasting
- Materials requirement planning
- Factory, repair, maintenance facilities capacity planning
- Distribution requirements planning
- Manage planning parameters

Plan Configurations (1/2)

❑Plan Supply Chain (Process ID: sP1)
- The coordination of all supply chain activities.
- sP1 collects all Source, Make, Deliver and Return requirements by period and develop a plan to support these needs with existing resources.

❑Plan Source (Process ID: sP2)
- sP2 drives the sourcing activities for stocked products via plan driven acquisition.
- Sourcing activities for make-to-order and engineer-to-order are driven by customer orders and specifications
- sP2 ensures the resources are in place as needed

❑Plan Make (Process ID: sP3)
- Plan Make drives the activities for making stocked products with the make plan driving the make activities
- Make activities for make-to-order and engineer-to-order are driven by customer orders and specifications
- sP3 ensures the resources are in place as needed

Plan Configurations (2/2)

❑Plan Deliver (Process ID: sP4)
- Plan Deliver drives the activities for make-to-stock processes, the plan is the trigger for inventory updates.
- Deliver activities for make-to-order and engineer-to-order are driven by customer orders and specifications
- P4 ensures the resources are in place as needed

❑Plan Return (Process ID: sP5)
- A strategic or tactical process to establish and adjust tasks over specified time periods that represent a projected appropriation of return resources and assets to meet anticipated as well as unanticipated return requirements.
- The scope includes unplanned returns of sold merchandise as well as planned returns of products that are refurbished for reissue to customers

Activity 9: Team Discussion

- A supply chain manager found out that different organizations (the factory, the distribution center and procurement) were not following the supply chain plan. Procurement ordered more materials than needed, the factory was producing at capacity but capacity is too low. Which level 3 process would you investigate?
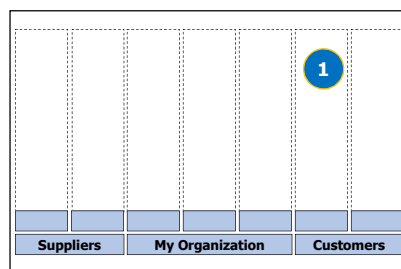
  Answer:
 sP1.4 Establish and Communicate Supply Chain Plans

Enabling Processes
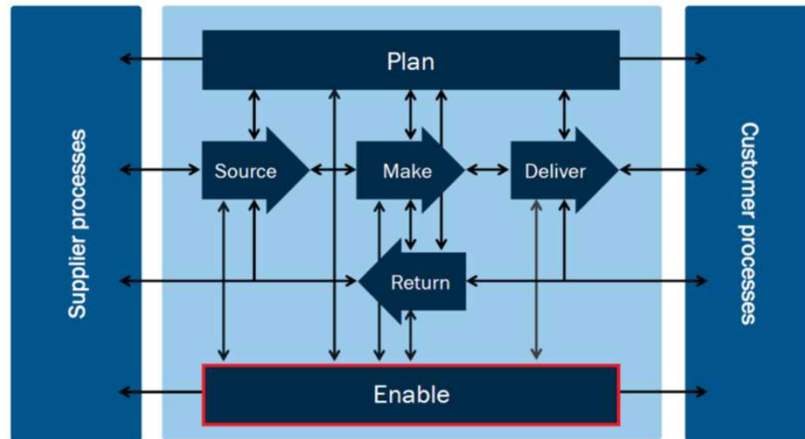
- Processes: **Enable**
- Objective: Manage business rules, performance, data, HR, assets, contract, network, compliance, risk, procurement & technology

Modeling with SCOR (Thread Diagram)

1. Plot your facilities on a map
   - Plot customer and supplier facilities
   - Define the SCOR scope for each facility (source, make, deliver, source return, deliver return)
2. Identify and connect level 2 processes. Example: sS1.
3. Identify and connect the planning activities (sP1, sP2, etc.)
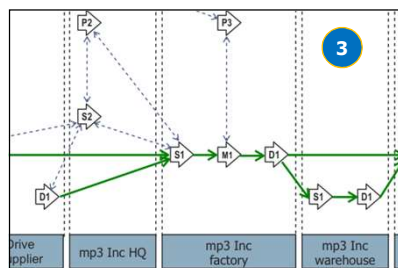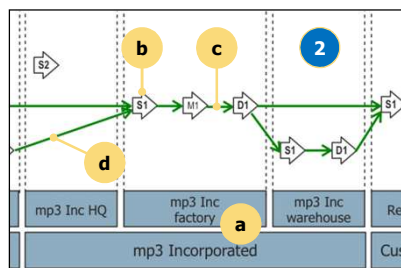
Activity 10: BBQ Party Supply Chain

- You decided to host a party this weekend with 25 friends
- Among other food, you will make and serve burgers from your barbecue grill
- You are responsible for organizing the event, ingredients, tools and utensils and general well-being of your guests
- Ingredients of a burger: minced beef patty, sesame seed buns, shredded lettuce leaves, sliced tomatoes, sliced cheese, pickles, tomato ketchup and mayonnaise.
    - Who do you think may be involved in the burger's supply chain?
    - Identify the relevant SCOR management processes in the burger's supply chain.
    - Identify the SCOR level 2 processes involved in the burger's supply chain.
    - Draw the Thread Diagram for the burger's supply chain
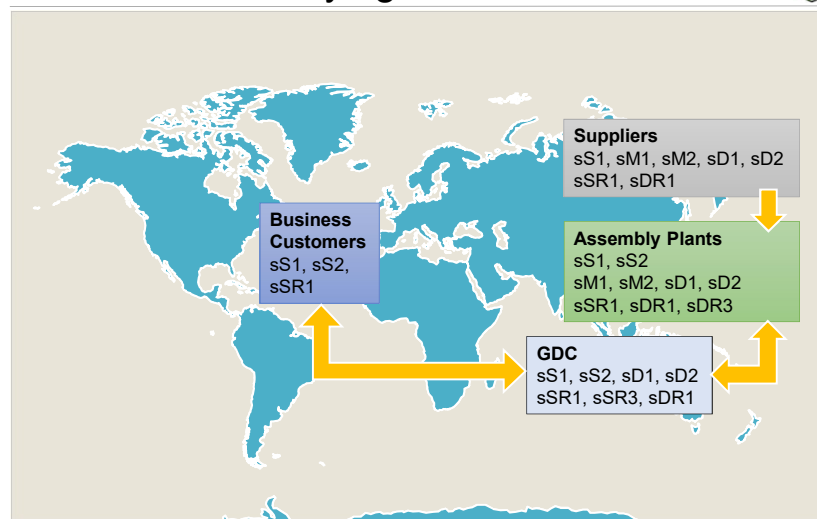
Suggested Thread Diagram
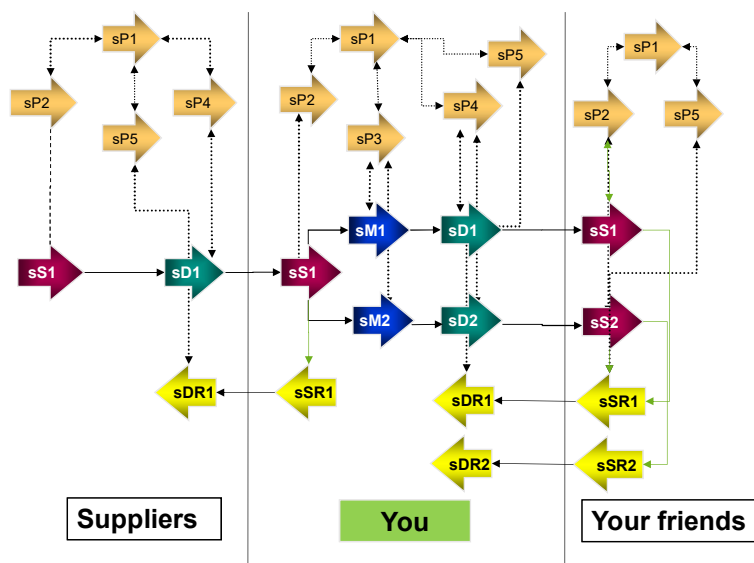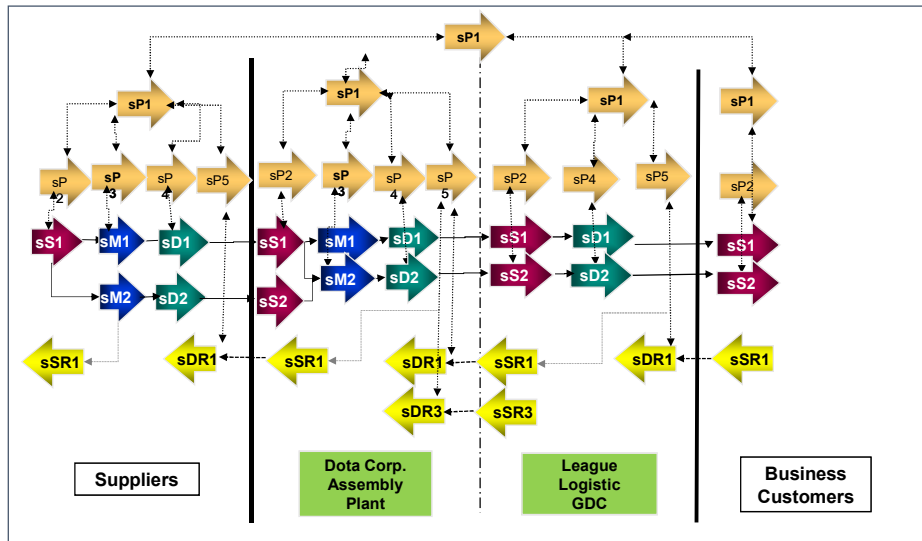
Activity 11: Team Assignment

Draw the Thread Diagram for Level 1 and Level 2 processes for the scenario of League Logistic & Dota Corp. The following is the additional information for the scenario.

- League Logistics' manages both Make-to-Stock and Make-to-Order OLED panels in their DC for Dota Corp.
- Both standard and customized components are used to assemble the OLED panels at the assembly plant before shipping to the DC
- For Make-to-Order panel, suppliers need to discuss and confirm the requirements with Dota Corp. before they can quote their prices.
- Agreement is in place between Dota Corp. and their suppliers for return of defective panels.
- Dota Corp. also has an agreement with League Logistics to return excessive inventory at the DC

Scenario – Identifying Level 2 Processes

Suppliers
sS1, sM1, sM2, sD1, sD2
sSR1, sDR1

Business Customers
sS1, sS2,
sSR1

Assembly Plants
sS1, sS2
sM1, sM2, sD1, sD2
sSR1, sDR1, sDR3

GDC
sS1, sS2, sD1, sD2
sSR1, sSR3, sDR1

Scenario – Suggested Thread Diagram

Learning Objectives

- Explain the SCOR Model and its applications
- Describe the 6 management processes of SCOR Model (Plan, Source, Make, Deliver, Return and Enable)
- Describe and relate the 5 levels of SCOR Model
- Explain the SCOR process mapping steps (Thread Diagram)
- Construct a SCOR Model (up to level 2) for a given business scenario
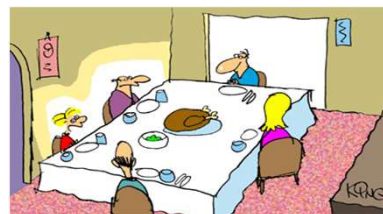
"I'm thankful for my family, our house, and the highly optimized Plan, Source, Make and Deliver processes that brought this feast to our table."