Agenda

- Function Structure for SCM
- 3 Phases of SCM
- Design of a SC Network
- SC Drivers & SC Network
- SC Strategy
- HW #1 & Project
1. Function Structure for SCM

Deliver products to the customer

- Quality
- on-time
- Cost

PLAN → SOURCE → MAKE → DELIVER

- SC strategy
- suppliers?
- Cash?
- SC Network
- Manufacture the product
- Manage inventory
- product to customers (including transportation)
2. Phases in SCM

<table>
<thead>
<tr>
<th>Phase</th>
<th>Time-Scale (Time Horizon)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy</td>
<td>years</td>
<td>Facility location:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Suppliers?</td>
</tr>
<tr>
<td>Planning</td>
<td>several months to a year</td>
<td>- Inventory management (how much to stock)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- what modes of transportation to use?</td>
</tr>
<tr>
<td>Operations</td>
<td>days to weeks</td>
<td>- order fulfillment - scheduling deliveries.</td>
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<td>- ...</td>
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Reminder

- stages in a SC supply
- Processes in a SC chain
  - Cycle view
  - Push-pull view

Example PC or laptops

build-to-order \[\rightarrow\] build-to-stock

pull model \[\rightarrow\] push model

- Companies which excel in SCM
  - Apple, Walmart, Toyota, Dell
  - Amazon
Design of a SC Network

Design or create the competitive strategy for the firm
(TIM 105, 205, HW#1)

- customer needs
- product variety
- product platform/lines

Design the SC strategy to be aligned with the competitive strategy

- how responsive should the SC be?
- how efficient should the SC be?

Design the SC configuration (or structure or network) to meet desired performance objectives

- inventory management
- facilities
- transportation
- information
- sourcing
- pricing
DRIVERS for SCM

1. Inventory (△): raw materials, work-in-progress (manufacturing), finished goods

2. Facilities (□): places where inventory is stored, or manufactured, or assembled

3. Transportation (→): movement of inventory from one facility to another

4. Information (→): data and analysis regarding inventory, facilities, & transportation

Combine these 4 drivers to create the appropriate SC network for the product/service
SC Network for a product

Warehouse
(raw material 1)

Manufacturing plant
(components)

Assembly plant
(finished product)

DC: distribution center

Information System
(in the cloud)

DC

To retailer
**Exercise**

Create the SC chain network for your product (team project)
- Start with the stage representation

**SC strategy**

(a) Performance

There are 2 key performance attributes (or metrics)

(i) SC efficiency: cost of making, storing, and delivering the product to the customer

High efficiency $\iff$ Low cost

(ii) SC responsiveness: ability of the SC to respond rapidly to the following customer needs:

- large changes in quantity demanded;
- large range of products (product variety);
- highly innovative products;
- short lead-times;
- high service levels
### Efficiency

#### Responsiveness Spectrum:

<table>
<thead>
<tr>
<th>Highly responsive SC</th>
<th>Somewhat responsive SC</th>
<th>Somewhat efficient SC</th>
<th>Highly efficient SC</th>
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</table>
| DELL: customized PC in a few days | Automobile production; lead-times of several weeks to several months | Apparel manufacturer (HANES) production lead-times of several months | Integrated steel mills; extremely narrow, well-defined products, where 
the production can be scheduled several months in advance |

We capture the efficiency/responsiveness balance using a "Responsiveness Spectrum."
(b) Implied Demand Uncertainty (IDU)

(i) Demand uncertainty: uncertainty in the quantity of products demanded by the customers

Example:
Annual Demand = 100,000 units ± 20% (nominal uncertainty)

(ii) Implied Demand Uncertainty refers to the uncertainty in demand implied by the customer need for the product during its life-cycle.

Product Life-cycle in the market

Sales Volume

Time

High IDU would require a very responsive supply chain
IDU spectrum

- Low IDU
  - functional products
    - milk
    - gasoline
    - etc.
    - necessary for "us" to function

- somewhat certain IDU
  - established products
    - laundry detergent

- somewhat uncertain IDU
  - new models of existing products
    - new car models

- High IDU
  - entirely new products (disruptive technologies)
  - products developed last quarter in TIM 105/205
  - electric cars
(c) Achieving strategic fit in a SC

Process:

1. Understand customer needs, & the implied demand uncertainty (IDU) for the product.
   Map these needs onto an IDU spectrum (see above).

2. Derive the SC strategy (trade-off between responsiveness & efficiency) aligned with the firm's competitive strategy.
   Map the SC strategy onto a responsiveness/efficiency spectrum (see above).

3. Combine the IDU spectrum with the responsiveness spectrum & define the zone of strategic fit.
Comment: Companies like DELL & WALMART & APPLE are both responsive & efficient.

- Information Systems/Technology allow companies to be both very responsive & v. efficient.