Demand Management

Creating Value along the Supply Chain
Learning Objectives

- Understand the critical importance of outbound-to-customer logistics systems.
- Appreciate the growing need for effective demand management.
- Know the types of forecasts that may be needed, and understand how collaboration among trading partners will help the overall forecasting and demand management process.
Learning Objectives

- Identify the key steps in the order fulfillment process, and understand how effective order management can create value for a firm and its customers.

- Realize the meaning of customer service, and understand its importance to logistics and supply chain management.
Learning Objectives

- Understand the difference between logistics and marketing channels, and understand that goods may reach their intended customer via a number of alternative channels of distribution.
Logistics Profile: **Dreyer’s**

- Instituted scan-based trading.
- Manufacturer (Dreyer’s) is paid based on what is actually scanned at the checkout counter.
- Customer takeaway drives manufacturing and delivery.
- Freed resources for use elsewhere.
- Win-win partnership arrangement.
Outbound-to-Customer Logistics Systems

- To increase levels of customer service, significant emphasis is placed on outbound-to-customer logistics systems.
- These systems refer to the set of processes, systems, and capabilities that enhance the firm’s ability to serve its customers.
- This topic also is of historical interest in the study of physical distribution, logistics, and supply chain management.
Inbound-to-Operations Logistics Systems

- These systems refer to the set of processes that precede and facilitate value-adding activities such as manufacturing, assembly, and so on.

- This topic also is of historical interest in the study of the supply chain and includes materials management and physical supply.

- The study of inbound-to-operations logistics systems will be presented in the next chapter.
Demand Management

- Defined as “focused efforts to estimate and manage customers’ demand, with the intention of using this information to shape operating decisions.”

- Recent practice has been just the opposite, with the manufacturer determining the what, where, when, and how many of the sale.
Demand Management

- It is this disconnect between manufacturing and the demand at the point of consumption that attracts attention to demand management.
- Any attention paid to demand management will likely result in benefits flowing through the supply chain.
On the Line: *Ingram Micro*

- Took leadership in creating a demand chain among its supply chain partners.
- $22 billion sales of 200,000 products from 1,500 manufacturers to 140,000 resellers in 130 countries.
- Ingram Micro is using a demand chain, rather than a supply chain, to focus on meeting consumer demand.
On the Line: *Ingram Micro*

![Diagram](image-url)
Demand Management Objectives

- Gathering and analyzing knowledge about consumers, their problems, and their unmet needs.
- Identifying partners to perform the functions needed in the demand chain.
- Moving the functions that need to be done to the channel member that can perform them most effectively and efficiently.
Demand Management Objectives

- Sharing with other supply chain members knowledge about consumers and customers, available technology, and logistics challenges and opportunities.

- Developing products and services that solve customers’ problems.

- Developing and executing the best logistics, transportation, and distribution methods to deliver products and services to consumers in the desired format.
Demand Management: Related Issues

- Lack of communication between departments results in little or no coordinated response to demand information.

- Too much emphasis is often placed on forecasts of demand with little attention paid to collaborative efforts and strategic and operational plans that need to be developed from the forecasts.
Demand Management: Related Issues

- Demand information is often used more for tactical and operations purposes than for strategic purposes.
- Primary emphasis should be on using demand information to create likely scenarios of the future as they relate to product supply alternatives.
- Resulting business successes will be a outcome of the better match of demand to product availability.
Traditional Forecasting: Demand Forecasting

- A major component of demand management is *forecasting* the amount of product that will be purchased by consumers or end users.
- In the integrated supply chain all other demand will be derived from the primary demand.
- A key objective is to anticipate and respond to primary demand as it occurs in the marketplace.
Figure 3-1

Supply-Demand Misalignment

1. True end-customer demand.
2. Production cannot meet initial projected demand, resulting in real shortages.
3. Channel partners over-order in an attempt to meet demand and stock their shelves.
4. As supply catches up with demand, orders are canceled or returned.
5. Financial and production planning are not aligned with real demand; therefore, production continues.
6. As demand declines, all parties attempt to drain inventory to prevent write-down.
### Table 3-1 How Demand Management Supports Business Strategy

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Examples of How to Use Demand Management</th>
</tr>
</thead>
</table>
| Growth strategy | • Perform “what if” analyses on total industry volume to gauge how specific mergers and acquisitions might leverage market share.  
• Analyze industry supply/demand to predict changes in product pricing structure and market economics based on mergers and acquisitions.  
• Build staffing models for merged company using demand data. |
| Portfolio strategy | • Manage maturity of products in current portfolio to optimally time overlapping life cycles.  
• Create new-product development/introduction plans based on life cycle.  
• Balance combination of demand and risk for consistent “cash cows” with demand for new products. |
| Positioning strategy | • Ensure diversification of product portfolio through demand forecasts.  
• Manage product sales through each channel based on demand and product economics.  
• Manage positioning of finished goods at appropriate distribution centers, to reduce working capital, based on demand.  
• Define capability to supply for each channel. |
| Investment strategy | • Manage capital investments, marketing expenditures, and research and development budgets based on demand forecasts of potential products and maturity of current products.  
• Determine whether to add manufacturing capacity. |

Traditional Forecasting

- An example of integrating forecasting with production is illustrated by Figure 3-2.
- Long-term (more than three years), midrange (one to three years), and short-term forecasting are each important contributors to the forecasting process.
Figure 3-2  Integration of Sales Forecasting and Production

- History file (3 years—demand, price, seasonality, deals, promotions, etc.)
- Forecasting model (moving average, Box-Jenkins, regression analysis, etc.)
- 12-month forecast (by month)
- Brand and product managers review and recommend changes
- Revised forecast
- Gross market requirements (1- to 3-year periods)
- Aggregate production schedules (12 months)
- Allocation of aggregate requirements to plants
- Short-term production scheduling
Collaborative Planning, Forecasting, and Replenishment

- CDFR is recognized as a breakthrough business model for planning, forecasting, and replenishment.
- Uses available Internet-based technologies to collaborate from operational planning through execution.
Collaborative Planning, Forecasting, and Replenishment

- The CDFR model is illustrated in Figure 3-3.
- Emphasizes a sharing of consumer purchasing data among and between supply chain partners.
- Creates a direct link between the consumer and the supply chain.
CPFR Business Model

1. Develop Front-End Agreement
2. Create Joint Business Plan
3. Create Sales Forecast
4. Identify Exceptions for Sales Forecast
5. Resolve/Collaborate On Exception Items
6. Create Order Forecast
7. Identify Exceptions for Order Forecast
8. Resolve/Collaborate On Exception Items
9. Order Generation

Key:
- Distributor Activities
- Either/Joint Activities
- Manufacturer Activities
Collaborative Planning, Forecasting and Replenishment

Source: Voluntary Interindustry Company Standards, May 2004. Reprinted with permission. CPFR® is a registered trademark of VICS.
Collaborative Planning, Forecasting, and Replenishment

- The plan and the forecast are entered by suppliers and buyers into an Internet accessible system.
- Within established parameters, any of the participating partners is empowered to change the forecast.
- Only a few CPFR initiatives have been made public, but results are impressive.
Collaborative Planning, Forecasting and Replenishment

- Example: Wal-Mart
- Sales and operations planning process (S&OP)
- Challenges to adopting CPFR
Supply Chain Technology: *Midwest Pharmaceuticals*

- Using a statistically advanced demand-management system the company discovered that in one of its five 3,000 product families, 72% of the products were in the mature phase and 14% were in decline.
- Management modified and improved its product investment strategy.
- In essence, demand management helped make the company more profitable and effective.
Order Fulfillment and Order Management

- Collaborative planning improves the quality of the demand signal for the entire supply chain through a constant exchange of information from one end to the other.
- Goes beyond the traditional practice.
- Examine the three critical elements of collaborative planning in Figure 3-4.
Figure 3-4
Collaborative Planning

- Collaborative demand planning
- Joint capacity planning
- Collaborative planning and execution
- Synchronized order fulfillment
Order Fulfillment and Order Management

- Order fulfillment activities differ as a supply chain matures through transactional to interactive to interdependent levels.

- Examine the four key stages of order fulfillment in Figure 3-5.
**Figure 3-5**

**Stages of Order Fulfillment**

<table>
<thead>
<tr>
<th></th>
<th>Transactional</th>
<th>Interactive</th>
<th>Interdependent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information sharing</strong></td>
<td>Limited to basic order information</td>
<td>Some sharing of inventory availability and shipment information</td>
<td>Extensive sharing of inventory, shipment, and sell-through information</td>
</tr>
<tr>
<td><strong>Decision making</strong></td>
<td>Independent order decisions—“phantom demand”</td>
<td>Some negotiation of order decisions among partners</td>
<td>Synchronized ordering decisions driven by shared replenishment policies, channel inventory data, and POS information (VMI)</td>
</tr>
<tr>
<td><strong>Performance measures</strong></td>
<td>Limited performance measures</td>
<td>Some shared performance measures like lead times, on-time delivery, and inventory availability</td>
<td>Extensive use of performance measures tied to shared risks and rewards</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>Limited use of technology</td>
<td>Some use of technology to track orders and material flow</td>
<td>Extensive use of technology to allow real-time tracking of orders and material and an automatic replenishment</td>
</tr>
</tbody>
</table>

*Source: Accenture, Stanford University, and Northwestern University, Customer-Driven Demand Networks: Unlocking Hidden Value in the Personal Computer Supply Chain (Accenture, 1997), 32.*
Order Fulfillment and Order Management

- Order-management systems represent the principal means by which buyers and sellers communicate information relating to individual product orders and is key to operational efficiency and customer satisfaction.

- Examine the characteristics of order-management functions in Figure 3-6.
Figure 3-6
Order-Management Functions

<table>
<thead>
<tr>
<th>Receive order</th>
<th>Identify shipping point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter order - manual/electronic</td>
<td>Generate picking documents</td>
</tr>
<tr>
<td>Verify and check order for accuracy</td>
<td>Originate shipment</td>
</tr>
<tr>
<td>Check credit</td>
<td>Inquire order status</td>
</tr>
<tr>
<td>Check inventory availability</td>
<td>Deliver order</td>
</tr>
<tr>
<td>Process back order</td>
<td>Measure service level</td>
</tr>
<tr>
<td>Acknowledge order</td>
<td>Measure quality of service</td>
</tr>
<tr>
<td>Modify order</td>
<td>Assure continuous improvement</td>
</tr>
<tr>
<td>Suspend order</td>
<td>Handle product returns</td>
</tr>
<tr>
<td>Check pricing and promotion</td>
<td></td>
</tr>
</tbody>
</table>
Order Fulfillment and Order Management

- The order cycle traditionally includes only those activities that occur from the time an order is placed to the time it is received by the customer.

- Examine the four principal activities of the order cycle in Figure 3-7.
Figure 3-7

Major Components of the Order Cycle

- Order placement
- Order processing
- Order preparation
- Order shipment

→ = Principal product flows
-----→ = Principal information flows
Order Fulfillment and Order Management

- Order placement methods seem to be changing to accommodate new technologies.
- Examine order placement trends in Figure 3-8.
Figure 3-8
Order-Placement Trends

Based on fifty companies responding (multiple responses accepted)
Order Fulfillment and Order Management: *Other Issues*

- Order processing
- Order preparation
- Order shipment
- **Length and variability of the order cycle**
  - Examine the order cycle time analysis in Figure 3-9 and order cycle length and variability in Figure 3-10.
Figure 3-9
Example of Order Cycle Time Analysis

<table>
<thead>
<tr>
<th>Step</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order transmission</td>
<td>0</td>
</tr>
<tr>
<td>Order edit/entry</td>
<td>2</td>
</tr>
<tr>
<td>Pick-ticket generation</td>
<td>4</td>
</tr>
<tr>
<td>Order picking</td>
<td>6</td>
</tr>
<tr>
<td>Transit to customer</td>
<td>8</td>
</tr>
<tr>
<td>Complete cycle</td>
<td>10</td>
</tr>
</tbody>
</table>

- Average: 2.0, 1.5, 2.5, 1.1, 5.0, 12.1, 12.0
- 95th percentile: 10.0, 4.0, 6.0, 5.0, 32.0

Generation of order by customer
Receipt of order
Receipt of material (average)
Receipt of material (95th percentile)
Figure 3-10
Order Cycle Length and Variability

ORDER CYCLE COMPONENTS

- Order placement
  - Before system change: Average: 3 days
  - After system change: Average: 2 days

- Order processing
  - Before system change: Average: 4 days
  - After system change: Average: 3 days

- Order preparation
  - Before system change: Average: 2 days
  - After system change: Average: 2 days

- Order shipment
  - Before system change: Average: 4 days
  - After system change: Average: 3 days

Total order cycle
- Before system change: Average: 13 days
  Range: 4 to 22 days
- After system change: Average: 11 days
  Range: 6 to 16 days
Order Fulfillment and Order Management: *E-Commerce*

- Success is just as much about designing and implementing the basic principles of logistics and supply chain management as it is about marketing the latest technologies.

- According to Richer and Kalatora\(^\text{10}\), some of the critical decisions are related to the evaluation of multiple fulfillment planning strategies.

- What are the reasonable alternative fulfillment strategies?
Five Alternative Fulfillment Strategies for E-Commerce

1. Distributed delivery centers
2. Partner fulfillment operations
3. Dedicated Fulfillment centers
4. Third-party fulfillment centers
5. Build to order
Stockouts

Four possible outcomes from a stockout

- Customers wait
- Back orders
- Lost sales
- Lost customers
## Expected Costs of Stockouts

<table>
<thead>
<tr>
<th>Event</th>
<th>Probability</th>
<th>Costs</th>
<th>Expected Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back Order</td>
<td>70%</td>
<td>$6.00</td>
<td>$4.20</td>
</tr>
<tr>
<td>Lost Sale</td>
<td>20%</td>
<td>$20.00</td>
<td>$4.00</td>
</tr>
<tr>
<td>Lost Customer</td>
<td>10%</td>
<td>$200.00</td>
<td>$20.00</td>
</tr>
<tr>
<td>Estimated cost per stockout</td>
<td>100%</td>
<td>---</td>
<td>$28.20</td>
</tr>
</tbody>
</table>
Channels of Distribution

- One or more companies or individuals who participate in the flow of goods and services from the producer to the final user or consumer.
- Wide variety of firms comprise these channels.
- Examine Figures 3-14 & 3-15.
Figure 3-14

Distribution Channel Separation

Logistical channel:
- Transportation
- Manufacturer
- Distribution center
- Retail store
- Consumer

Marketing channel:
- E-Procurement
- National account sales
- Wholesaler/Distributor
- Retail customer
- Consumer
Figure 3-15
Examples of Channels of Distribution for the Food Products Manufacturing Industry

Food manufacturing firms

- Food service distributors
  - Restaurants
  - Specialty (airlines, etc.)

- Grocery wholesalers

- Food brokers

- Internet (direct)
  - Internet retailer

Retail chains (local and regional)

Retail grocers (independent)

Institutional buyers

Retail chains (national)

Consumers of manufactured food products
Growth and Importance of Channels of Distribution

- Retail channels showing dramatic growth.
- Mass merchandisers such as Wal-Mart, Kmart, Sears, and Target squeezing smaller retailers.
- Nature of logistics changing to accommodate customized systems.
- Successful retailers base efficiency on logistics systems.